

PROCEEDINGS

OF THE

Bristol Naturalists' Society

VOLUME XXVII, 1944-1948

EDITED BY H. W. TURNER

ASSISTED BY A COMMITTEE



"Rerum cognocere causas."—Virgil.

Authors alone are responsible for the accuracy of their articles

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CORRIGENDA

Page 39, line 5: *for ' hight ' read ' high '.*

.. 135, last para. but one: *for ' actiivty ' read ' activity '.*

.. 192, last line: *for ' 94 ' read ' 91 '.*

.. 258, Wood-Sandpiper: *for ' Trin gaglareola ' read ' Tringa glareola '.*

.. 361, top: *for ' 1945 ' read ' 1948 '.*

.. 361, Contents—item 13: *for ' Lepidotera ' read ' Lepidoptera '.*



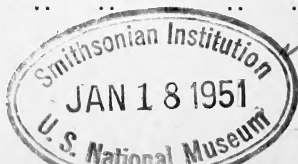
INDEX

TO

VOLUME XXVII

	PAGE
Abbots Leigh, Circular Structures in Vein-Calcite at	104
Account of General Meetings	11, 68, 147, 201, 380
Accounts, Hon. Treasurer's Statement of	5, 61, 137, 193, 374
Additions to Bristol Insect Fauna (Diptera) since 1942	46
— — — — — 1944	107
— — — — — 1945	269
Address, Presidential	380
— congratulatory, to the Cotteswold Naturalists' Field Club	136
— — — — — Royal Asiatic Society of Bengal	60
Addresses of Members	363
Age of the Clifton Gorge, The	283
Annual Dinner	147, 201, 381
Audcent, H. L. F.	46, 107, 269, 409
Bassindale, R.	109, 223
Bat, Leisler's, occurrence at Bristol	486
Bath, Some exposures in the Jurassic rocks at	329
Biology of the Bristol Channel, Studies on the	109, 285
Blathwayt, C. S. H.	405
Borehole, Eastwater	481
— Erlong	482
— Priddy.. .. .	479
Boreholes, on Mendip	479
— for Severn and Wye Bridges	311
— for tunnel under Bristol—Gloucester Road	471
Botany, Bristol,	14, 70, 149, 203, 383
— — Leopold Hartley Grindon's contributions to	27
Botanical Section, Report of	see Report
— Papers	14, 27, 41, 70, 149, 177, 203, 383
Boyd, Hugh	483
Bristol Botany	see Botany
— Channel, studies on the Biology of	see Biology
— — <i>Elminius modestus</i> in	223
— — Littoral and Sub-Littoral Fauna of Northern Shores, near Cardiff	285
— District, white-flowered <i>Viola odorata</i> in	41
— — Lepidoptera Notes	221, 405
— — Ornithological Notes	19, 79, 161, 209, 393
— — a Revised List of the Birds of	225
— Insect Fauna (Diptera)	see Audcent
— The Occurrence of Leisler's Bat at	486
— — — the Pine Marten near	121
— The Plesiosaurs in the City Museum	343
British Fungi, Notes on Bucknall's drawings of	177
Bucknall's Drawings of British Fungi, Notes on	177

	PAGE
Calcite, Circular Structures in.. .. .	104
Cardiff, Fauna of Northern Shores of Bristol Channel near	285
Circular Structures in Vein-Calcite	see Abbots Leigh
Clifton Gorge, Bristol, Age of.. .. .	283
Congratulatory Address to Cotteswold Naturalists' Field Club	136
— — — — — Royal Asiatic Society of Bengal	60
Contents, Table of	1, 49, 123, 187, 361
Cotteswold Naturalists' Field Club, Address to	136
Council	2, 50, 124, 188, 362
— Reports of	4, 59, 134, 192, 373
Davis, H. H.	19, 79, 161, 209, 225, 393
Dinner, Annual	see Annual Dinner
Diptera	see Audcent
Donovan, Desmond T.	181, 329
Drawings of British Fungi, Notes on Bucknall's	177
Eastwater Borehole	481
Editorial	4
Entomological Papers	46, 107, 221, 269, 405, 409
— Section, Report of	see Report
Erlong Borehole	482
Exchange and Gift List	139
Exhibition Meeting of Society	11, 68, 148, 201, 381
Exposures and Borehole Records in the Bristol Area, Temporary	311, 329, 471, 479
Fauna (Diptera), Bristol Insect	see Audcent
— of Skomer Island, The	109
— The Littoral and Sub-Littoral near Cardiff	285
Fermor, Sir Lewis L.	201, 380
Field Meeting Report	202, 381
— Section Report	9, 65, 143
Fungi, Notes on Bucknall's Drawings of British	177
Gait, R. P.	37
General Meetings	11, 68, 147, 201, 380
Geological Papers	93, 104, 181, 283, 311, 329, 343, 471, 479
— Section, Report of	9, 66, 144, 198, 377
Gift List, Exchange and	139
Gorge, The Age of the Clifton	283
Great Spotted Woodpecker	37
Greenly, E.	283
Grignon, Miss A. E.—Obituary	192
Grindon, Leopold Hartley	27
Hawkesbury, Rhætic and Lower Lias near.. .. .	181
Inglestone Common, near Hawkesbury, Rhætic and L. Lias of	181
Insect Fauna—Diptera (Orthorrhapha), Bristol	409
— — — — — Additions to the Bristol	46, 107, 269
Isopoda of Steep Holm, The Terrestrial	483
Jurassic Rocks at Bath, Some Exposures in the	329
Leisler's Bat at Bristol, The Occurrence of	486
Lepidoptera Notes, Bristol District, 1948	405
— 1947, Some Records and Observations of	221
Librarian, Report of Hon.	see Report
Littoral and Sub-Littoral Fauna near Cardiff, The	285
Loupequine, I. S.	104
Lyell Medal	194



INDEX

iii

	PAGE
Matthews, L. Harrison	122, 486
Mayes, W. E.	122, 486
Meetings, Reports of	see Report
Members, Lists of	51, 125, 363
Mendip, Boreholes on	479
Nightingale and Great Spotted Woodpecker, Notes on the	37
Notes, Lepidoptera, Bristol District, 1948	405
— Ornithological, Bristol District	see Ornithological
— on white-flowered <i>Viola odorata</i> L.	41
— Zoological, 1947	223
<i>Nyctalus leisleri</i> (Kuhl.) at Bristol, Occurrences of	486
Obituary	12, 69, 192
Observations of Lepidoptera, 1947; Some Records and	221
Occurrence of Leisler's Bat at Bristol, The	486
— the Pine Marten near Bristol	121
Officers of Society, and of Sections	see Council
Ornithological Notes, Bristol District	19, 79, 161, 209, 393
— Section, Report of	see Report
Orthorrhapha	409
Owen's "Observations"	93
Part I	1
— II	49
— III	123
— IV	187
— V	361
Peach, A. H.	221
Pearson, A. A.	177
Pine Marten near Bristol, Occurrence of the	121
Plesiosaurs in the City Museum, Bristol, The	343
Priddy Borehole	479
Purchon, R. D.	285
Record of Circular Structures in Vein-Calcite at Abbots Leigh, near Bristol	104
Records and Observations of Lepidoptera, 1947; Some	221
— in the Bristol Area, Borehole	311, 471
— of Boreholes sunk for the Tunnel under the Bristol-Gloucester Road	471
Report of Council	4, 59, 134, 192, 373
— Hon. Librarian	6, 62, 138, 195, 373
— Botanical Section	7, 63, 141, 196, 375
— Entomological Section	8, 64, 142, 197, 376
— Field Section	9, 65, 143
— Geological Section	9, 66, 144, 198, 377
— Ornithological Section	10, 67, 146, 200, 379
Revised List of the Birds of the Bristol District, A	225
Rhætic and L. Lias Rocks of Inglestone Common, The	181
Royal Asiatic Society of Bengal, Congratulatory Address to the	60
Sandwith, C. I. and N. Y.	14, 70, 149, 203, 383
Sections, Officers of	see Council
— Reports of	see Report
Selley, A. J. W.—Obituary	69
Severn Bridge, Records of Boreholes sunk for the new	311
Skomer Island, The Fauna of	109
Smith, Stanley	93
Some Records and Observations of Lepidoptera, 1947	221
Statement of Accounts, Hon. Treasurer's	5, 61, 137, 193, 374
Steep Holm, The Terrestrial Isopoda of	483

	PAGE
Studies on the Biology of the Bristol Channel	190, 285
Swinton, W. E.	343
Table of Contents	see Contents
Tetley, H.—Obituary	12
Treasurer's Statement of Accounts, Hon	see Accounts
Vein-Calcite at Abbots Leigh, Circular Structures in	104
<i>Viola odorata</i> L. in the Bristol District, Note on the white-flowered ..	41
Walters, S. M.	41
Warne, L. G. G.	27
Whittard, W. F.	311, 471, 479
Woodpecker, Great Spotted	37
Wye Bridge, Records of Boreholes sunk for the new	311
Zoological Notes, 1947	223

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1944

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OF THE

Bristol Naturalists' Society

EDITED BY H. W. TURNER, ASSISTED BY A COMMITTEE

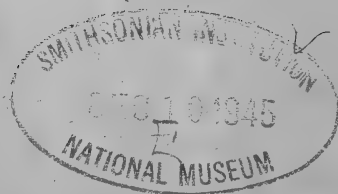


"Rerum cognoscere causas."—Virgil.

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THE ACCURACY OF THEIR ARTICLES.



CONTENTS

	PAGE
Council 1944	2
New Members	3
Editorial	4
Report of Council	4
Hon. Treasurer's Statement of Accounts	5
Hon. Librarian's Report	6
Report of Botanical Section	7
Report of Entomological Section	8
Report of Field Section	9
Report of Geological Section	9
Report of Ornithological Section	10
Account of Annual and General Meetings	11
Obituary: H. Tetley	12
Bristol Botany in 1944, by Cecil I. Sandwith	14
Ornithological Notes, Bristol District, 1944, by H. H. Davis, M.B.O.U. ..	19
Leopold Hartley Grindon: his life and contributions to Bristol Botany, by L. G. G. Warne, M.Sc., Ph.D.	27
Notes on the Nightingale and Great Spotted Woodpecker, by R. P. Gait	37
Notes on white-flowered <i>Viola odorata</i> L. in the Bristol district, by S. M. Walters, B.A.	41
Additions to Bristol Insect Fauna (Diptera) since 1942, by H. L. F. Audcent, M.Sc.	46

All Books, Pamphlets, Reports of Proceedings sent by way of exchange, gift or otherwise, and all correspondence relating thereto and to purchases of the Society's publications should be addressed to:—

HON. LIBRARIAN, BRISTOL NAT. SOC.,
THE CITY MUSEUM,
BRISTOL, S.

All matter for inclusion in the next issue of the *Proceedings* should reach the Hon. Editor:—

H. W. TURNER, Esq., M.A., F.G.S.,
THE UNIVERSITY,
BRISTOL, S.

NOT LATER THAN JAN. 31.

The SOCIETY'S LIBRARY in the City Museum is open to members as under at present:—

Weekdays - - - - - 10.0 a.m. to 6.0 p.m.

Sundays - - - - - 2.30 p.m. to 5.0 p.m.

N.B.—Much of the Library is still removed from Bristol; members will be notified of arrangements on its return.

Applications for membership of the Society should be addressed to the present Hon. Secretary:—

R. BASSINDALE, Esq., M.Sc.,
THE UNIVERSITY,
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	Westcott, Miss M. V.	20 Linden Road, Redland, Bristol, 6	
J.	Williams, Miss M. St. C.	38 Ravenswood Road, Redland, Bristol, 6	O.

EDITORIAL

COUNCIL has agreed to a re-numbering of the volumes of the *Proceedings* commencing with the present volume. This will secure a simplification of the title for purposes of reference.

Up to the present, the 'Proceedings' appear to fall into four groups as follow:—

1. 1862—1865 .. unpublished except in newspaper reports (see Presidential Address, 1932, by J. W. Tutcher, *Proc. B.N.S.*, 4th Series, Vol. VII, p. 335),
2. 1866—1872 .. Vols. I—VII of a 'New Series,'
3. 1873—1903 .. Vols. I—X of the New Series proper,
4. 1904—1943 .. Vols. I—IX of the Fourth Series.

It will thus be seen that 26 volumes of the *Proceedings* have been published, and it has now been decided, therefore, to issue the present volume as Vol. XXVII of the whole series, though the term 'Whole Series' will not be used in the title, and references to this and to future volumes will be by means of the volume number without qualification.

Council also wishes to make it known that it does not generally accept for publication in the *Proceedings*, papers, lectures or addresses which do not, to some extent at least, specially bear upon local Natural History and include matter hitherto unpublished.

REPORT OF COUNCIL

1944

AT the Annual General Meeting, held on 27 January, Mr. H. Tetley was elected President for a third year, Mr. H. O. Edmonds and Professor W. F. Whittard were elected Vice-Presidents, and Miss D. A. Pratt and Professor C. M. Yonge to serve on Council.

The annual Field Meeting was held on 24 June at Radstock, Clandown and Camerton, and was led by Mr. G. E. J. McMurtrie.

Your Society has suffered a great loss in the death of its President, Mr. Humphrey Tetley, B.Sc. Never of robust health, he was keenly interested in the activities of the Society when the end came quite suddenly. He passed away on 21 September, and his death leaves a great gap amongst those who had been associated with him for so many years. We also report with regret the death of Miss A. Dunscombe and Mr. T. Hosegood Davies, both of whom had been Ordinary Members of the Society for many years, and also that of Captain Maxwell Brown, killed in action.

Our grateful thanks are due to Mr. H. O. Edmonds, Vice-President, who has kindly acted as President from September to December.

Council would congratulate Professor C. M. Yonge, a past Vice-President, on his appointment to the Chair of Zoology at the University of Glasgow, and wish him all success in his new sphere of work.

In this sixth year of war it is exceedingly satisfactory to be able to report the considerable influx of 39 new members during the year. The total membership now stands at 229, which includes 17 on Active Service.

It would appear that the policy of the Society, determined at the outbreak of war, by which officers and members resolved to make every endeavour to continue work and activities, has been abundantly justified. The pre-war organization of this Society remains intact for post-war development.

M. DORIS HILEY, *Hon Secretary.*

HON. LIBRARIAN'S REPORT

1944

IT is still possible to report that the library has suffered no damage at the hands of the enemy, but it was the fate of one batch of books to be evacuated from Bristol to avoid risk of fire only to suffer ordeal by water. This mishap occurred during the early part of the year, and was due to an undetected safety valve which came into operation for the first time during its long existence, and blew a jet of steam and hot water from the heating system all over the stack of books. Fortunately, although between thirty and forty volumes will need rebinding, only half a dozen were damaged beyond repair.

There is one addition to the Exchange List to report, the Leicester Literary and Philosophical Society, whose Ornithological Section publishes an excellent *Bird Report*. Another addition to the Library is Butcher and Strudwick's *Further Illustrations of British Plants* which has been purchased by the Society. Miss Strudwick was for some time Hon. Librarian of this Society, and her illustrations are not merely scientifically accurate but most attractive artistically.

The American Museum of Natural History has resumed shipment of current exchange material, and has also sent a number of publications held up because of abnormal shipping conditions. Altogether, in spite of war difficulties, copies of nearly seventy journals were received in exchange for our *Proceedings* during the year, as well as eight others which were purchased as usual by the Society or by individual Sections, and the library continues to expand at a fairly rapid rate. It is hoped that before long the books and journals at present distributed over various parts of the neighbouring countryside may be brought back to Bristol. When this is done it will be difficult to prevent the library from overflowing from the rather dreary room where it is now housed into the still more depressing cellar behind, and if this is to be avoided it will soon be necessary to give serious consideration to the possibility of finding more adequate accommodation.

H. GORVETT, *Hon. Librarian.*

REPORT OF BOTANICAL SECTION

1944

DURING the year indoor meetings have been held every month in the Wiglesworth Library. In the unavoidable absence of Prof. Skene, Mr. F. W. Evens has kindly taken the chair.

On January 22, Miss Pratt gave a talk on "Medicinal Plants," specifying their influence in a few well known drugs as differing from that of minerals, and stressing that allopaths treat specific diseases and herbalists specific conditions.

On February 19, Mrs. Bell's talk was on "Some of our Local Economic Plants," and, with herbarium specimens, described their uses as food, fodder, medicines, oils and dyes.

On March 18, Mr. Stuart M. Walters gave a paper on "Varieties and hybrids of *Viola odorata* and *Viola hirta*" (see p. 00).

Throughout the summer, material was plentiful, being specially rich in hybrids—*Viola odorata* × *hirta*, *Viola lactea* × *Riviniana*, *Primula acaulis* × *veris* = *variabilis*, *Primula elatior* × *veris*, *Geum urbanum* × *rivale* = *intermedium*, *Potentilla procumbens* × *repans*, *Senecio squalidus* × *vulgaris*, *Luzula Forsteri* × *pilosa* = *Borreri* and *Glyceria fluitans* × *plicata* = *pedicillata*.

At the General Exhibition on November 4, members made a good display:—Plants from Portway, by Mr. H. O. Edmonds, from Cleeve Combe, by Mr. R. Sleight, and from a pond, by Mr. H. Williams and Mr. M. Wright. *Datura Stramonium* with well-developed thorn apples was brought by Miss Pratt. Of the genus *Euphorbia*, both native plants and succulents were shown by Mrs. Bell.

Field Walks. Mr. Ivor Evans led a variety of walks round Bristol, and Mr. T. H. Payne in the neighbourhood of Chew Stoke. When the 'bus service can be improved, members will be able to take full advantage of these; knowledge of systematic and field work, and notes on the characteristics of the various plant communities in their different habitats would help the indoor meetings.

Spartina has now reached the Suspension Bridge.

We regret to report the death of Miss Florence Strudwick, a former member of the Section. Her clever drawings in *Further Illustrations of British Plants* are a great help in determining critical species.

We welcome eight new members, bringing our membership to forty-two.

ETHEL M. F. BELL, *Hon. Secretary.*

REPORT OF ENTOMOLOGICAL SECTION

1944

THE 80th Annual Meeting was held on 5 February, 1944, when Mr. J. W. Norgrove was re-elected President and Mr. A. H. Peach again elected as Hon. Secretary and Treasurer. We were fortunate in being able to secure Dr. F. S. Wallis to give a lecture on "Fossil Insects"; at the outset he explained, with the aid of specimens kindly lent by the British Museum (N.H.), the various ways in which insects' remains are preserved. The attendance numbered 23, including 7 visitors.

On 1 April Mr. H. Tetley exhibited the extensive collection of the late Mr. Chas. Bartlett (a former President of the Section) which was given to the Bristol Museum by his widow.

In June a Field Excursion was held. Meeting at Abbots Leigh, the party proceeded to the Manor House Farm for tea. The attendance numbered 16, and, the day being sunny and warm, an enjoyable afternoon was spent.

On 7 October Mr. R. Bassindale gave a most interesting lecture on "Social Insects." This was confined to an account of the life history and nest building of the solitary leaf-cutter bee, the humble bee and the common wasp. Many exhibits of the nests and sections were shown.

On 4 November, after the reading of the minutes, the Section joined the Annual Exhibition of the Parent Society, many members contributing various subjects.

On 3 December an Open Meeting was held when Mr. J. S. Knight, Hon. Sec. of the Bee Keepers' Association, kindly visited us and gave an extremely interesting account of the life and habits of the Honey Bee.

The attendances were very satisfactory and in breaking new ground the membership of the Section has increased. As new members we welcome Mrs. H. H. Davis, Miss Frost, Rev. F. L. Blathwayt, Dr. E. E. Lowe, Messrs. R. Bassindale, J. F. and H. W. Bird, J. Bowden, A. Fitzroy Jones, R. J. Sleigh and B. H. Williams.

We have experienced a great loss by the death of Mr. H. Tetley, the President of the Society, so long a valued member of the Section.

The membership is 29, having doubled since 1939.

Members of the Society, not belonging to the Section, wishing to attend any of our meetings will be welcomed.

A. H. PEACH, *Hon. Secretary.*

REPORT OF FIELD SECTION

1944

IN 1944 the activities of the Section were still restricted by transport arrangements and consequently the number of places available for study was limited.

We record with deep regret the loss to the Society of its President, Mr. H. Tetley, who frequently attended Field Meetings.

On 22 April Mr. H. O. Edmonds led a party to Dundry and Bishopsworth and on Saturday, 22 May, Mr. H. W. Bird conducted members over Kenn Moor.

On 24 June the Annual Field Meeting was held at Radstock, Clandown and Camerton, led by Mr. G. E. J. McMurtrie. He fully described the Fosseyway and gave members an opportunity of inspecting same. A visit was also made to the Saxon cemetery at the Clandown and Camerton cross roads and members had an opportunity of collecting from the Radstock Series of Coal Measures at the Camerton Colliery.

On 22 July Mr. F. W. Evens led a party in the Yatton and Wrington district. Cadbury Camp at Yatton was first visited, the walk then continuing across the main road at the top of Rhodyate Hill, eventually passing over the top of Goblin Combe and reaching Wrington.

Mr. Ivor Evans conducted a party to Whitchurch and Brislington on 9 September.

The Field Section co-operated with the Botanical, Entomological, Geological and Ornithological Sections in giving publicity to their monthly programmes.

The average attendance at the general meetings was 27.

The membership now stands at 54.

M. DORIS HILEY, *Hon. Secretary.*

REPORT OF GEOLOGICAL SECTION

1944

AT the Annual General Meeting held on 15 January, Dr. Wallis was elected President and Professor Whittard re-elected Vice-President; Mr. Loupekine was elected Hon. Secretary; and Mrs. Marsden and Mr. McMurtrie were re-elected Hon. Treasurer and Hon. Auditor respectively. Sir Lewis Fermor, Professor Reynolds, Dr. Stanley Smith, Mr. Blackburn, Mr. Marsden and Mr. Maunder were appointed Committee Members. The formal business was followed by a demonstration-lecture given by Mr. Loupekine on "Minerals and Rocks under the Microscope."

On 26 February a large audience welcomed Mr. H. E. Balch, Curator of the Wells Museum, who delivered a stimulating and challenging lecture entitled "Notes and Queries in Mendip Geology."

The Open Meeting was held on 11 March when Mr. Anderson, of the Precious Stone Laboratory, London Chamber of Commerce, spoke on "Modern Methods in Gem Testing," and exhibited a fine collection of cut and uncut gem-stones and various modern apparatus used by the gemmologist for their identification.

Four excursions were held during the summer. The Portishead, Bathampton Down, and Barrow Court areas, and the Chew and Cheddar reservoir sites, were visited under the leadership respectively of Dr. Stanley Smith, Mr. Fry, Dr. Wallis, and Mr. Paterson of the Bristol Water Works Co.

On 19 October Mr. Pugh presented the chemist's view-point when he took as his subject "Minerals and their effect on Water Supply." Experiments on water hardness were carried out at this lecture, and numerous specimens of the substances under discussion were exhibited.

The last lecture of the session was provided by Professor Whittard on 16 November, under the title of "Applied Geophysics."

As new members the section welcomes the Misses E. Frost, A. K. Swaine, and E. Monro; and Messrs. H. W. Bird, J. Bullard, K. S. Hawkins, P. D. Lace, J. Parfitt, E. L. Smith, and M. A. Wright. The membership now stands at 72.

I. S. LOUPEKINE, *Hon. Secretary.*

REPORT OF ORNITHOLOGICAL SECTION

1944



WITH the election of 21 new members—a greater number than in any previous year, and resignations totalling only 6, the Section's roll, including 11 members on service with the Forces, now stands at 89. Such an increase, together with the prospect of an early return to more normal times, must be regarded with some satisfaction.

Six meetings have been held, and the attendance has been well up to the average of war-time sessions. In *January* Mr. R. P. Gait, in an illustrated lecture on "Field Photography," gave many useful hints on how to photograph wild-life, and later dealt with the exciting pursuit of obtaining flashlight pictures of mammals by night. On Open Meeting in *March* was the occasion for a most entertaining lantern talk by Dr. Ludwig Koch on "The Songs of Wild Birds and how I Record them." A brief summary of past and present methods of reproducing bird calls was followed by gramophone recordings illustrating variations in the song of the Chaffinch, mimicry by the Starling, Marsh-Warbler and Bluethroat, and, among others, the songs of such interesting species as the Golden Oriole, Willow-Tit, Barred and Great Reed-Warblers. In *April* Mr. B. W. Tucker gave a lantern lecture entitled "An Ornithologist in Ireland." In this the speaker referred especially to Choughs, to large colonies of Sandwich and Roseate Terns, and to the breeding of the Black-necked Grebe, Red-necked Phalarope and Common Scoter.

A meeting in *September* was devoted to Exhibits and Communications by members. Various interesting exhibits were shown, and remarks by Mr. R. P. Gait and the Secretary on local bird-life were followed by a résumé on Bird-Ringing and the Ringing Scheme by Mr. A. E. Billett. In *October* Mr. W. B. Alexander, in a lantern talk on "Bird-life in Queensland," dealt first with birds of the coastal areas, and afterwards with those of the bush country and of the tropical scrub. In describing the habits of the Satin and Spotted Bower-Birds, the lecturer showed decorative objects collected from bowers of both species. The final meeting was held in *November* when Mr. J. H. Savory lectured, and adapted for his talk the title of E. V. Lucas's book *A Wanderer in Holland*. Among many pictures shown on the screen were views of Arnhem and Walcheren Island—scenes of the recent gallant fighting by British and Canadian Forces. Slides of bird-life were chiefly from photographs taken on the Island of Texel.

Much useful work has been accomplished by Mr. A. E. Billett and Mr. R. H. Poulding in support of the Rook Investigation of the British Trust for Ornithology, while Dr. N. F. W. Brueton and Mr. H. W. Neal undertook the usual census of Herons at Brockley Combe. There was, unfortunately, no opportunity for nest counting at the Banwell Heronry.

As a result of contributions by individual members, and a donation of one guinea from the Section, the sum of £2 3s. 3d. was subscribed to the Kite Preservation Fund.

It is with the deepest regret that we have to record the loss of Mr. H. Tetley, whose death, following a severe illness, took place in September. The Section, in common with the Parent Society, was thus deprived of both its President and one of its most ardent supporters. The continual progress achieved during Mr. Tetley's long association with the Section was to a great extent due to his influence and sound advice, and to his wide ornithological knowledge.

The finances show a balance in hand of £7 6s. 2d.

H. H. DAVIS, *Hon. Secretary.*

Account of the Annual and General Meetings

1944

THE 81st Annual Meeting of the Society was held in the Wiglesworth Library of the University on Thursday, 27 January, with the President, Mr. H. Tetley, in the Chair. The reports of the Hon. Treasurer, Hon. Librarian and Hon. Secretary were read and adopted. Mr. H. Tetley and Mr. H. O. Edmonds were re-elected President and Vice-President respectively. Professor W. F. Whittard was elected Vice-President, and the remaining officers were re-elected.

Mr. H. Tetley, in his Presidential Address, "Biology and Nature Reserves" (see *Proc.* for 1943, p. 466), dealt with examples of inter-relationships of wild animals with one another and with man, and explained the present investigation on Nature Reserves.

At a General Meeting on 2 March, in the Wiglesworth Library, the President was in the Chair and Professor W. F. Whittard gave a lecture on "Evolutionary Changes in the Mammal-like Reptiles." The lecture was illustrated by lantern slides.

The General Field Meeting was held on 23 June at Radstock, Clandown and Camerton and was led by Mr. G. E. J. McMurtrie.

At a General Meeting held in the Wiglesworth Library on 5 October, Mr. H. O. Edmonds, Vice-President, was in the Chair. He referred to the sad loss which the Society had sustained in the death of its President, Mr. H. Tetley, B.Sc. Mr. H. H. Davis spoke of the valuable work which Mr. Tetley had done both for the Society and the Museum.

Mr. B. W. Tucker, M.A., M.B.O.U., of Oxford, gave a lecture on "Bird-Watching on the Continent," which was illustrated by lantern slides of birds, of their nests and of their habitat and surroundings.

On Saturday, 4 November, a General Meeting was held in the Senior Botanical Laboratory of the University, and took the form of an Exhibition Meeting. The Vice-President, Mr. H. O. Edmonds, was in the Chair. Exhibits were shown by the Botanical, Entomological, Geological and Ornithological Sections, and detailed explanations were given.

M. DORIS HILEY, *Hon. Secretary.*

Obituary

H. TETLEY (1890-1944)

THE Society sustained a great loss by the death of its President on September 26, 1944. As Curator in Zoology at the Museum and Art Gallery for nearly eighteen years, Humphrey Tetley was a constant supporter of the B.N.S. and was at all times an extremely helpful member. It may, indeed, be said that seldom has anyone played a wider rôle in furthering the interests of Natural Science in the Bristol area.

Tetley was born at Leeds on September 17, 1890. He went to Malvern College, and in 1909 entered the University of Leeds with the intention of qualifying for the medical profession. Owing, however, to a prolonged and severe illness—the effects of which undoubtedly undermined his health for life—he was obliged to abandon the idea of so active a career. On his convalescence, he rejoined the University and, in 1916, graduated B.Sc. in Zoology and Geology, later carrying out research in the Department of Agricultural Entomology in the University of Manchester. In 1917 he volunteered for war service with the R.N.V.R. and, following a course of instruction at the Royal Naval Barracks at Chatham, was appointed for duties on the Staff of the Principal Naval Transport Officer at Marseilles. He attained the rank of Paymaster-Lieutenant in 1919 and earned the reputation of being a hard-working and very capable officer. On demobilisation he became Assistant Demonstrator in Zoology and Curator of the Zoological Museum in the University of Sheffield.

He took up his appointment at the Bristol Museum in January 1927, and at once began a thorough overhaul of the Zoological exhibits. The success he achieved was perhaps reflected most in his arrangement of the British section, particularly that of the mammals and, among the bird exhibits, the geese, ducks and waders. Often hampered by ill-health, his work was marked throughout by a high sense of duty, while his chief aim was always the general improvement of the collections. The extensive damage done to these, together with the destruction of almost all his records, by enemy action in 1940 was a severe blow which he bore with the utmost fortitude.

By careful and diligent methods of recording he soon became an



H. TETLEY

Photo: J. Bacon, Leeds

[To face p. 12



authority on the local distribution of birds and mammals, and as such was of immense help to a wide circle of naturalists. His ardent support of the B.N.S. found full expression in all he did for the Ornithological Section, of which he was Secretary from 1928 to 1936 and President from 1939 onwards. He was a Vice-President of the Parent Society in 1933 and 1934 and in 1938 and 1939, and was elected to the Presidential Chair in 1942. Of the various excellent papers which he contributed to the annual *Proceedings*, the most important were his "Bird-Life on Barrow Gurney Reservoirs" (1937) and his "Land Mammals of the Bristol District" (1940). He also made occasional contributions on mammals to *Nature* and to the *Proceedings of the Zoological Society*, while from 1933 to 1942 he was frequently responsible for valuable notes in *British Birds Magazine*. For several years he was Special Lecturer in Systematic Zoology at the University, and had recently accomplished much useful spade-work on behalf of the University sub-Committee of the Nature Reserves Investigation Committee. He devoted considerable time to collecting details for Volume III of the *International Wildfowl Inquiry*, and was lately engaged in writing a compilation on some characters and the distribution of the family *Alcidae*. Among other activities, he was on the Editorial Committee of the annual *Reports on Somerset Birds*, and during the past three years had acted in an advisory capacity at the University on the acquisition of books for the Wiglesworth Library. He was a Fellow of the Zoological Society of London, and in 1943 was elected a member of the British Ornithologists' Union.

Despite his quiet and somewhat retiring disposition, Tetley was always ready, whether in the museum or in the field, to draw on his store of zoological knowledge for the benefit of others. Although not sufficiently robust to undertake field-work of a rigorous nature, he was nevertheless a frequent visitor to the North Somerset reservoirs and other parts of the district in search of birds. Those, and not least among them the writer, who were privileged to accompany him on such excursions were quick to recognise his ability as a painstaking and most accurate observer. Both as zoologist and field-naturalist he will be sadly missed.

He married, in 1927, Miss Evelyn Stidston, who, with a daughter and a son, survives him.

H. H. D.

Bristol Botany in 1944

BY CECIL I. SANDWITH

(Received, Feb. 4, 1945. Read in title, March 15, 1945)

THE year 1944 proved capricious as regards weather conditions, two months being outstanding. In May there were many hot, sunny days and sharp, night frosts, there was a hailstorm on the 5th, and serious drought throughout the month, which ended in a heat-wave and oppressive temperature during the last week and in heavy storms with thunder and lightning on the 30th. There was no fine warm autumn. The Saints did not smile on us with those late summer days so frequently connected with their Festivals. St. Luke brought the floods, and St. Martin must have wept for the sorrows of the world. November will be remembered as a month of ceaseless rain. The Swiss radio proclaimed it the wettest November since 1864, and where the river Yeo runs through the valley between Nailsea and Tickenham, the ground being intersected with 'rhines' and springs, acres of meadowland were flooded.

It is encouraging to see increasing activity in contributions to these notes, as is shown by the numerous interesting records and observations which follow:—

Ranunculus parviflorus L. Dry bank on slope between Twerton and Englishcombe, S., D. Coombe.

Sisymbrium officinale (L) Scop. var. *leiocarpum* DC. Numerous fine plants of this variety, unaccompanied by normal plants, by the roadside at Croscombe, S., Dr. J. N. Mills and J. P. M. Brenan. They attracted attention even while bicycling past them by their bright green colour, lacking the "dusty" appearance so characteristic of typical *S. officinale*.

Viola lactea Sm. Mr. S. M. Walters writes: "I revisited the [Yate Lower Common, G.] locality of *Viola lactea* (see 1943 notes) with Mrs. Bell on May 11th, 1944. We hoped to see the plants in full flower—in 1943 most of the flowers had withered by May 28th—and in this we were not disappointed. A rather careful survey on the railway bank revealed that pure *lactea* plants were very much rarer than the hybrid, and markedly less vigorous in vegetative growth. In fact, a group of about a dozen plants in one small

area must compose the main *lactea* population here. The hold of the species is clearly most precarious.

"We were also fortunate in finding a small area, near the top border of the field, in which undoubted *Viola canina* L. var. *ericetorum* Reichb. was growing. In spite of a careful search, however, no *canina* hybrids were found, although the hybrid with *Riviniiana* is almost certain to occur in such a locality, where a small 'pocket' of *canina* is surrounded by *Riviniiana*.

"The sterile plant (? *lactea* \times *canina*, see 1943 Notes) found and cultivated in the previous year is almost certainly *lactea* \times *Riviniiana*. These hybrids naturally vary in character, as the *Riviniiana* parent varies."

Polygala calcarea F. Schultz. Mr. D. Coombe writes that this species is more frequent to the south of Bath, S., than was formerly imagined. It occurs not merely on the Oolitic slope at Fortnight, where it was first discovered in 1909, but also on slopes south-east of Combe Hay, and as near the city as a tumpy field on Odd Down, by Bloomfield Crescent.

Impatiens capensis Thunb. (*I. biflora* Walt.). Bank of the Avon at Newton St. Loe, S., with *I. glandulifera* Royle, Dr. C. L. Walton. A first record for the district.

Rhamnus Frangula L. Stoke Lane Valley, S.: three much branched bushes about 4-7 ft. high, on a steep north-facing slope at about 500-550 ft. alt., in woodland with scattered, standard oak trees and fairly recently cut hazel coppice, associated with *Fraxinus* (local), *Ilex* (rare), *Lonicera Periclymenum* (rare), *Sorbus Aucuparia* and a very dense, dominant undergrowth of blackberry and raspberry; *Digitalis* (frequent), *Dryopteris Filix-mas* (local) and *Pteridium* (local) were also observed. The woodland is called locally Leigh Wood, but is unnamed on the one-inch Ordnance Survey map; it is situated above Whitehole Farm, between Coleford and Stoke Lane, J. P. M. Brenan. Mr. Brenan writes: "It is possible that there may be more bushes in this wood, as lack of time and the density of the undergrowth prevented a thorough search. This find is of interest since it is the first time (with the possible exception of Duck's doubtful Portishead record) that the species has been found on the Somerset side of the area away from fen-like habitats in the lowland levels. In Devon, Cornwall and South Wales it is not infrequent in habitats similar to that in the Stoke Lane Valley."

- Vicia sylvatica* L. Dyrham Wood, G., *Rev. F. L. Blathwayt*.
- Cratægus Oxyacantha* L. emend. Jacq. (*C. oxyacanthoides* Thuill.).
One bush among many of *C. monogyna* in a copse in an old quarry on Odd Down, Bath, S., 1935 and subsequently, *D. Coombe*.
The second record from the Somerset side of our area.
- Epilobium hirsutum* L. With white flowers in a ditch by the Weston road beyond Congresbury, S., *H. Williams*.
- Lonicera Caprifolium* L. Still in Brass Knocker Wood, Bath, S., 1942, *D. Coombe*.
- Scabiosa arvensis* L. A single plant of a very remarkable "sport" in a hedgebank above Easton, near Wells, S., *Dr. J. N. Mills* and *J. P. M. Brenan*, who write: "In this plant the normal capitula are replaced by lax dichasia of single flowers (the main stem ends, however, in a cluster of about 2-4 flowers), subtended by reduced, bract-like leaves. Its appearance was most extraordinary, at first sight not in the least recalling the familiar scabious. We have written a fuller account of this plant which we hope will appear in the next *B.E.C.* Report."
- Erigeron canadense* L. and *Senecio squalidus* L. On the increase at Bath, S., and the latter also on a wall at Saltford, S., *D. Coombe*.
- Senecio squalidus* L. × *vulgaris* L. Bombed site at Bristol Bridge, G., one plant in May, 1944, *C.* and *N. Sandwith*. Rays spreading when fresh, 3.5-4.0 mm. long. Achenes pubescent, apparently sterile.
- Crepis capillaris* Wallr. A remarkable form with creamy-white flowers, the outer tipped with pink, was found in All Saints' Lane, E. Clevedon, S., by *Miss Todd*.
- Lactuca Serriola* L. Bombed site at the west end of St. Peter's, Bristol, G., with *Erysimum cheiranthoides* L., *Mrs. Bell*. This species has also appeared in recent years on waste ground at Bath, S., and is likely to increase, as it has done on the outskirts of London.
- Campanula rapunculoides* L. On both sides of the railway between Ashcott and Shapwick Stations, S. First noticed in Sept., 1942, by *C. I.* and *N. Y. Sandwith*, and confirmed when flowering in July, 1944, by *C. I. S.* in company with *J. P. M. Brenan*.
- Ligustrum vulgare* L. var. *chlorocarpum* Loud. Several bushes of privet with greenish-yellow fruit have been noted on Cleeve Toot, S., by *D. Coombe*, who adds, "I should not connect them with the obviously planted Box and Ilex there."
- Gentiana anglica* Pugsl. (*G. lingulata* C.A. Ag. var. *præcox* (Townsend) Murb.). Below Brown's Folly, Bathford, S., *Mr. Lubbock*. The

first record for our district of the early-flowering Gentian of down-land in South England. Identification reported to me by Mr. D. Coombe.

Pulmonaria officinalis L. Wood opposite the Manor, Combe Hay, S., D. Coombe.

Calystegia sepium Br. var. *colorata* (Lge.) Druce. Along a hedge in meadow-land between Tickenham and Nailsea, S., C. I. Sandwith. Corolla deep pink. Perhaps = *Convolvulus sepium* var. *americanus* Sims, *Bot. Mag.* t. 732, a figure cited by de Candolle under his *Calystegia sepium* var. *rosea*. Both these names are earlier than Lange's.

Cuscuta Trifolii Bab. Slope above Tickenham, S., towards Naish House, on *Trifolium pratense* on ground recently put into cultivation, C. I. and N. Y. Sandwith. In two spots near Combe Hay, S., growing on a number of species in different families, D. Coombe and C. L. Walton.

Antirrhinum Orontium L. Many plants appeared in the summer in the garden of an empty cottage at Stone-edge Batch, Tickenham, S. First noticed by D. Coombe. This species is very rarely recorded from our area: all the specimens hitherto collected on Bristol tips are referable to the Mediterranean var. *calycinum*.

Mentha alopecuroides Hull. A large patch on a rough bank below the road between Bowlish and Shepton Mallet, S., Mrs. J. F. Brenan, det. J. P. M. Brenan.

Prunella vulgaris L. Plants with pink corollas were seen scattered over a considerable area of open grassland on the slopes of the Mendips above Easton, S.; the same colour-form occurred much more sparingly on slopes by the track leading from the top of Cheddar Gorge to Velvet Bottom, S., and with it was a second striking form with pale bluish-mauve corollas and green calyces, Dr. J. N. Mills and J. P. M. Brenan.

Chenopodium ficifolium Sm. Behind Brislington House, S., D. Coombe.

Rumex crispus L. × *obtusifolius* L. subsp. *agrestis* (Fries) Danser. With the parent species on the edge of a hay meadow at Field Farm, Shepton Mallet, S., J. P. M. Brenan. Confirmed by Mr. J. E. Lousley.

R. *obtusifolius* L. subsp. *agrestis* (Fries) Danser × *sanguineus* L. var. *viridis* Sibth. Growing with the parent species in a field on Hembury Hill above Worth (near Wookey), S., J. P. M. Brenan. Confirmed by Mr. J. E. Lousley.

- Allium oleraceum* L. Lane between Burnt House and Priston, S.,
D. Coombe.
- Bromus commutatus* Schrad. Railway bank about $\frac{1}{4}$ mile N.W. of
Ashcott railway station, S., *C. I. Sandwith* and *J. P. M. Brenan.*
Confirmed by Mr. C. E. Hubbard.
- B. racemosus* L. Rather sparsely in a damp, grassy enclosure S.W.
of Shapwick railway station, S., *J. P. M. Brenan.* Confirmed
by Mr. C. E. Hubbard.
- B. lepidus* Holmb. Border of fodder-field, Twinhoe, near Combe
Hay, S., *D. Coombe.* Det. Kew.
- ALIENS. *Galinsoga quadriradiata* R. et P. var. *hispida* (DC.)
Thell. A troublesome weed at Inglescombe Nursery, Bath, S.,
Mr. Lubbock, vide specimen in Mr. D. Coombe's collection.
- Madia sativa* Molina subsp. *capitata* (Nutt.) Piper. Welshback,
Bristol, G., *Mrs. Bell* and *Mrs. Gibson.* A new alien for the
Bristol list. This plant has recently appeared in several counties,
see *B.E.C.* 1941-2 Rep. 470-1 and 491 (1944). It has perhaps
been introduced with flax seed imported from California during
the war. The species is native in Chile, and is widely introduced
in western North America.
- Salvia verticillata* L. One apparently well established plant on
top of a stone wall at Bowlish, near Shepton Mallet, S., *J.P.M.*
Brenan. Earth Works, Odd Down, Bath, S., *D. Coombe.*
- Setaria glauca* Beauv. Inside a barbed-wire fence on Durdham
Down, G., *Miss F. M. Barton* and *Dr. Hughes.*

My thanks are due to Mr. N. Y. Sandwith for help with the selection
and arrangement of the list.

Ornithological Notes, Bristol District, 1944

By H. H. DAVIS, M.B.O.U.

(Received, Feb. 1, 1945. Read in title, March 15, 1945)

IN spite of war-time difficulties, interest in local bird-life has been well maintained during 1944, and observers, although few in number, have taken every opportunity of visiting the North Somerset reservoirs, the Severn Estuary and other good bird haunts.

Of the reservoirs, Blagdon received most attention, being visited fairly regularly throughout the year. Here the usual small parties of Goldeneye and Smew were noted both early and late in the year, while of commoner ducks, Mallard, Teal, Wigeon, Pochard and Tufted Duck were reported as being present in very large numbers in October. Black Terns were seen at the end of July and again in September, and, as in the previous year, Little Grebes were unusually plentiful in the autumn. Records from Barrow Gurney and Cheddar include those of a Red-throated Diver at the former in March, and about fifty Shoveler and a Great Northern Diver at the latter in November.

Waders on autumn passage found ideal conditions at Blagdon where, until the continuous rainfall of November, the water-level remained extremely low. A Black-tailed Godwit was seen late in July, and on one occasion in September as many as eight species, comprising a Grey Phalarope, several Dunlin, a Ruff, a few Common and Green Sandpipers, a Greenshank, several Ringed Plover and numerous Lapwing were found feeding in close company at the Ubley end. Finally, two Spotted Redshank were identified early in October.

Among reports from the Severn, attention may be drawn to those of three Bar-tailed Godwits with a party of Whimbrel at Littleton in April, a Black-tailed Godwit with a large flock of Lapwing near the same place in August and the probable breeding of Common Redshank at Oldbury. At Severn Beach the familiar Turnstone was particularly abundant in the late summer but, as in 1943, winter observations failed to disclose any sign of the usual Purple Sandpipers.

Noteworthy records from other localities include the nesting of Carrion-Crows and Rooks on electric pylons at Weston-super-Mare,

an exceptionally early Pied Flycatcher at Little Stoke, and Black Redstarts near Clevedon in October.

The most important event of the year has been the apparently widespread occurrence of Quail. Calling was frequently reported from late May to July from several places in the Cotswold area, while, immediately north of the City, a pair with young was found at Stoke Gifford in August. Calling was also noted at Hutton, near Weston-super-Mare, on various dates in July. Although breeding was confirmed only at Stoke Gifford, it seems likely that birds were nesting in each of these areas. This increase of a species, hitherto regarded as being no more than a very scarce visitor to the district, appears to coincide with a similar increase reported from other parts of the British Isles.

The more important records for the year are given below and, except where otherwise stated, are the result of observations by the following members of the B.N.S. Ornithological Section—R. E. Alley, A. E. Billett, Rev. F. L. Blathwayt, N. F. W. Brueton, H. H. Davis, H. Dunicliff, R. P. Gait, B. King, A. C. Leach, G. Mogg, H. W. Neal, R. H. Poulding and H. Tetley.

RAVEN (*Corvus c. corax*). A freshly built nest, without lining, was seen at Sand Point on March 12. No later observation was carried out. Successful breeding at this site was last reported in 1930. Two were watched in the Avon Gorge and over Leigh Woods on March 21, but were not seen afterwards.

CARRION-CROW (*Corvus c. corone*) and ROOK (*Corvus f. frugilegus*). Although the nesting of either Carrion-Crows or Rooks on electric pylons has occasionally been recorded, it may be considered a matter of some interest that in May both species were ascertained to be breeding thus between Bleadon and Weston-super-Mare. Single nests were located in mid-April on nine of a total of fifteen pylons over a distance of $1\frac{3}{4}$ miles and, though the actual identity of the birds was not then determined, it was clearly evident that all the nests were in use. Closer investigation on May 4 showed that four of the nests had been deserted. Of the remainder, four were occupied by Rooks and the fifth by Carrion-Crows. In each case the nest was at the top of the pylon, at a height of about 55 feet. Some were bulky structures resting on a conveniently shaped cup at the apex of the framework, and were plainly visible at a considerable distance. Others appeared to consist of little more than a few sticks lining the cup and could easily be passed by unnoticed.

LESSER REDPOLL (*Carduelis f. cabaret*). Two were seen at Little Stoke on February 18. Also seen, in small parties, at Dyrham on October 22 and 31.

CORN-BUNTING (*Emberiza calandra*). Continues to breed locally on the Cotswolds. At least four were in song between Old Sodbury and Lyegrove on May 7, while several were heard between Dyrham and Marshfield on the 29th.

CIRL BUNTING (*Emberiza c. cirrus*). The following are reported—three on Clifton Down, January 30* (H. G. Alexander); a male near Portbury, June 23; several pairs nesting, May-July, in the Hutton and Uphill area, and a male at Hallen on December 19.

TREE-SPARROW (*Passer m. montanus*). Again reported from several localities on the Gloucestershire side of the City. Two or three were noted at Severn Beach on January 30, while, between Dyrham and Doynton, up to thirty were seen on various dates from early February to the end of April. Noted also in the Dyrham area from late July onwards—about seventy on September 10 being the highest total. Frequently met with in small numbers at Little Stoke, where a pair, seen almost daily in May, was accompanied by several fledged young on June 9, and had undoubtedly nested nearby. Heard in a cornfield at Littleton-on-Severn on August 6.

WOOD-LARK (*Lullula a. arborea*). Breeding was again confirmed in the Bleadon Hill area—two nests being found at Loxton early in April.

RED-BACKED SHRIKE (*Lanius c. collurio*). As in the previous year a pair nested in a rough hedgerow on building estate land at Patchway.

PIED FLYCATCHER (*Muscicapa h. hypoleuca*). A male was present at Little Stoke throughout the evening of April 8—an exceptionally early date. Only two earlier arrivals have been recorded for the British Isles (cf. *The Handbook of British Birds*, Vol. I, p. 307). One, evidently a young bird, at the same place on August 16 and 17 had lost its mottled appearance but the under-parts still retained the buffish-white of immaturity.

CHIFFCHAFF (*Phylloscopus c. collybita*). Twice met with in winter—one in a Fishponds garden on January 30 and one along the River Frome, between Fishponds and Stapleton, on December 12.

WOOD-WARBLER (*Phylloscopus sibilatrix*). Two were in full song in a small roadside copse at Petty France, near Badminton, on May 7. Although known as a regular summer visitor to various suitable habitats in South Gloucestershire, there is apparently no previous record for this particular locality.

GRASSHOPPER-WARBLE (*Locustella n. naevia*). Three were seen or heard near Clevedon on April 20, and a bird was heard "reeling" on the outskirts of Leigh Woods on the 23rd. Four were located at Weston-in-Gordano on June 18.

FIELDFARE (*Turdus pilaris*). Unusually abundant between Patchway and Stoke Gifford late in March. A flock of two hundred, or more, was seen on the 28th and several subsequent dates. All had apparently departed by April 8.

WHINCHAT (*Saxicola rubetra*) and STONECHAT (*Saxicola t. hibernans*). Late in May a pair of each was found nesting in close company on rough land adjoining a railway embankment near Patchway station. Although Whinchats nest commonly on railway land in this area, it is only at irregular intervals that a pair of Stonechats is to be found breeding.

REDSTART (*Phœnicurus ph. phœnicurus*). A male was seen at Little Stoke as early as April 7.

BLACK REDSTART (*Phœnicurus o. gibraltariensis*). Two, probably immature birds, were watched about the walls of Walton Castle, Clevedon, on October 15 (H. C. Playne).

NIGHTINGALE (*Luscinia m. megarhyncha*). As a result of observations in recent years, it appears evident that the Nightingale breeds regularly over a wide area, and that in some localities on the Gloucestershire side of the district the bird is becoming more plentiful. During the present year there was certainly a marked increase in the Stoke Gifford area where, on various dates in May, no less than three males were found to be occupying closely adjoining territories in Savage's Wood. Although it was not ascertained that all were paired it is known that at least one brood was brought off. Five young were reared by a pair in the nearby copse—Sherbourne's Brake.

DIPPER (*Cinclus c. gularis*). One was seen along the River Frome at Stapleton on two dates in the first week of February and again on the 24th.

SWALLOW (*Hirundo r. rustica*). An unusually early bird was seen at Sea Mills on March 24.

NIGHTJAR (*Caprimulgus e. europæus*). One was disturbed on the outskirts of High Wood, adjoining the Filton by-pass, on May 21 (H. S. Brown).

LESSER SPOTTED WOODPECKER (*Dryobates m. comminutus*). "Drumming" by both sexes was noted at Dyrham on March 20 and by a male as late as June 17. One was seen near Failand on September 19.

PEREGRINE FALCON (*Falco p. peregrinus*). One was observed along the Severn near Avonmouth on March 11. Also seen, a single bird, in the Avon Gorge on July 9 and on various dates in November and December.

HOBBY (*Falco s. subbuteo*). Twice noted overhead near Stoke Gifford—one on July 18 and one on September 6. A single bird is reported as being seen at Barrow Gurney on September 10.

COMMON BUZZARD (*Buteo b. buteo*). One (perhaps two) was watched in flight at Loxton, near Weston-super-Mare, on June 21. Single birds were either seen or heard in the same locality on July 30 and August 15.

COMMON HERON (*Ardea c. cinerea*). Sixteen occupied nests were counted at Brockley Combe on May 20. A census at the Banwell Heronry could not be undertaken.

MUTE SWAN (*Cygnus olor*). Thirty were counted at Blagdon reservoir on July 30.

PINTAIL (*Anas a. acuta*). Twice noted at Blagdon—a pair on October 25 and two males on November 25.

SHOVELER (*Spatula clypeata*). At least thirty at Cheddar reservoir on April 5 and about fifty at the same place on November 29 are the highest numbers recorded for the year.

TUFTED DUCK (*Aythya fuligula*). Unusually plentiful at Blagdon from late October onwards, and perhaps present in greater numbers than at any time in previous years. Between three hundred and fifty and four hundred were seen on October 25, and again on December 6. On the latter date a single compact flock numbered two hundred birds. Also abundant at Cheddar reservoir in November when about two hundred and fifty were seen on the 29th.

GOLDENEYE (*Bucephala c. clangula*). Up to seven or eight were noted at Blagdon on various dates from January to April, adult males totalling five on February 17 and April 7. Five adult males were counted at the same reservoir on November 25 and four on December 31. Of seven Goldeneye at Cheddar on November 29 only one was an adult male.

SMEW (*Mergus albellus*). The following were observed at Blagdon—eight, including two adult males, on January 9; fourteen, including three adult males, on February 17, and two on December 6. Two, one an adult male, were on No. 1 reservoir, Barrow Gurney, on March 12.

CORMORANT (*Phalacrocorax c. carbo*). Five, seen at Barrow Gurney

reservoirs on the evening of September 10, alighted at dusk in the top of a large tree as though intending to roost there.

GANNET (*Sula bassana*). During a south-westerly gale one was picked up dead at Uphill, Weston-super-Mare, on September 3. Another, evidently a victim of oil pollution, was found dead at Severn Beach on the 24th.

GREAT CRESTED GREBE (*Podiceps c. cristatus*). Three nests, with eggs, were located at Blagdon reservoir on May 29.

BLACK-NECKED GREBE (*Podiceps n nigricollis*). Twice met with at Blagdon—two, assuming breeding plumage, on March 22 and two on October 25. One was seen at Barrow Gurney on November 26.

LITTLE GREBE (*Podiceps r. ruficollis*). Again noted in unusually large numbers at Blagdon in the autumn. As many as sixty were counted on October 25.

GREAT NORTHERN DIVER (*Colymbus immer*). One at Cheddar on November 29 provides the first recorded occurrence for this reservoir.

RED-THROATED DIVER (*Colymbus stellatus*). On March 9 a Diver was found dead in a field adjoining Barrow Gurney reservoirs by Mr. H. J. Boyd, who identified the bird as being a specimen of *C. stellatus*. Identification was confirmed from feathers subsequently sent to the Bristol Museum.

BAR-TAILED GODWIT (*Limosa l. lapponica*). Twice seen along the Severn—three, including one red bird, at Littleton on April 23 and one at Severn Beach on September 24.

BLACK-TAILED GODWIT (*Limosa l. limosa*). Single birds were present at Blagdon on July 30 and on the Severn bank near Littleton on August 6. Although known to occur at irregular intervals at the reservoirs—usually in autumn, the bird has been but rarely met with in the Severn Estuary.

WHIMBREL (*Numenius ph. phaeopus*). A party of twenty-eight was feeding along the river bank at Littleton-on-Severn on April 23.

WOODCOCK (*Scolopax rusticola*). One was put up from a ditch at Sherbourne's Brake, Stoke Gifford, on November 18. One or two reported from Leigh Woods in December.

JACK SNIFE (*Lymnocyptes minimus*). Five were flushed at the Ubley end of Blagdon reservoir on October 25. Three were seen at the same spot on December 6.

GREY PHALAROPE (*Phalaropus fulicarius*). A single example of this irregular autumn visitor was watched by several observers at the

Ubley end of Blagdon reservoir on September 5. The bird, showing characteristic tameness, seemed quite indifferent to being viewed at close range, and was seen both running and swimming, and later in flight. This is the first record since the occurrence of one, also at Blagdon, in October, 1935 (cf. *Report on Somerset Birds*, 1935, p. 31).

TURNSTONE (*Arenaria i. interpres*). More than usually plentiful at Severn Beach on August 20 when the number was estimated at little short of two hundred.

KNOT (*Calidris c. canutus*). A few were noted at Severn Beach on two dates in August, and about twenty at the same place on September 3. Several were seen at Woodspring Bay on September 10.

SANDERLING (*Crocethia alba*). The only records for the Severn Estuary are those of one at Severn Beach on August 26 and one, perhaps the same, on September 3.

RUFF (*Philomachus pugnax*). Recorded once only—a single bird at Blagdon reservoir on September 5.

GREEN SANDPIPER (*Tringa ochropus*). Frequently met with from late July to mid-September at Barrow Gurney and Blagdon where apparently more plentiful than usual. Two were put up from a rhine near Clevedon on August 2. The only record for the Gloucestershire side of the district is that of two seen near Aust Cliff on August 24.

COMMON REDSHANK (*Tringa t. britannica*). As breeding in South Gloucestershire has seldom been reported, it may be of interest to record that a Redshank watched along the Severn bank at Oldbury on June 25 appeared to be one of a nesting pair. The bird was under observation for more than an hour, throughout which, in marked contrast to a party of about thirty feeding out on the tide-line, it flew to and fro overhead, alighting at intervals, and calling incessantly. While the evidence is not entirely conclusive, the bird's general demeanour strongly suggested that it was nesting or had young nearby.

SPOTTED REDSHANK (*Tringa erythropus*). Two at Blagdon on October 8 were clearly identified by their spotted appearance and relatively long bills, and, as compared with a Common Redshank, their longer legs and the absence of white secondaries when in flight.

GREENSHANK (*Tringa nebularia*). One was seen at Blagdon on September 5 and one, perhaps the same, on the 10th.

GOLDEN PLOVER (*Pluvialis apricaria*). About sixty were noted overhead near Stoke Gifford on February 5. Twenty-four were counted at Marksbury, on the Somerset side of the district, on December 4.

BLACK TERN (*Chlidonias n. niger*). The following were seen at Blagdon—one on July 30, another on the 31st, two on September 5 and four on the 24th. With one exception all appeared to be immature.

COMMON TERN (*Sterna h. hirundo*). Three Terns watched at Blagdon on September 5 were undoubtedly of this species. A single bird seen in flight at Littleton-on-Severn on August 6 was either this or an Arctic Tern (*Sterna macrura*).

KITTIWAKE (*Rissa t. tridactyla*). One was clearly identified during rough weather at Severn Beach on September 24.

CORN-CRAKE (*Crex crex*). A dead bird picked up at Burnett, near Keynsham, on August 27 was apparently a victim of overhead wires.

WATER-RAIL (*Rallus a. aquaticus*). Good views were obtained of one at Blagdon reservoir on February 19.

COOT (*Fulica a. atra*). As many as thirty-two nests with eggs were counted during a complete circuit of Blagdon reservoir on May 29.

RED-LEGGED PARTRIDGE (*Alectoris r. rufa*). Three, apparently all adults, were seen at close quarters on fallow ground near Stoke Gifford on several dates in the second half of July.

QUAIL (*Coturnix c. coturnix*). Reported from several widely separated localities. In South Gloucestershire calling was heard at Dyrham and Pucklechurch on a number of dates from late May to the third week of July, and in the Marshfield and Cold Ashton area on various occasions in June, while a pair was found breeding at Stoke Gifford in August. The presence of birds at the latter place was not detected until the characteristic call was heard on the unusually late date of August 14—breeding being confirmed on the 16th when two adults and five or six half-fledged young were seen in a thin oat crop. Calling continued until the 18th or later. On the Somerset side a bird was heard in a cornfield at Hutton on several dates from July 11 to the end of the month.

Leopold Hartley Grindon: his life and contributions to Bristol Botany

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I.

LEOPOLD HARTLEY GRINDON, a Bristolian by birth, spent the major part of his life in Manchester, where he became a well-known figure. He lived in Bristol only for the first twenty years of his life, and so, although a keen and able botanist, his opportunities for contributing to Bristol botany were limited. The eldest of a family of eleven children born to Sophie Mary and Joseph Baker Grindon, the latter an attorney-at-law and for some fifty years the Bristol City Coroner, young Grindon was baptised on 27 March, 1818, at the church of St. Michael the Archangel. The family, however, appear to have been connected with Bedminster Parish Church rather than St. Michael's, and it was the former that Grindon attended as a child and where some at least of his brothers and sisters were baptised.

His earliest school days (from 1827) were spent at Wrington, where he learnt something of History, Geography, Latin, Greek, French and Mathematics, and also, but not at school, of Astronomy, Chemistry, Geology, Zoology and Mechanics—an omnivorous diet for a boy not yet in his teens. At that time there existed at Wrington a "dame's" school kept by a lady who took boarders, and at Northover (in Langford parish, but only just outside Wrington) was a boarding school, and it was probably at one of these that Grindon was educated, attending Wrington Parish Church meanwhile. A few years at Wrington were followed by attendance at "College" in Bristol until he attained the age of sixteen. By then Grindon had developed an interest in plants which never waned through the rest of his long life of eighty-six years. At thirteen he had begun to collect and press plants, mounting the dried specimens on the ordinary, "square" letter-paper (12" × 9") then in use. A few of these sheets are still in existence. This early interest in plants no doubt owed something to the gardening activities of his father, which found expression in the cultivation and care of the garden of the Grindon establishment at 13 Bishop Street. His interest may

too have been stimulated by a "medicine" shop kept by a Grindon (possibly a relative) in Redcliffe. This must have been largely a "herbalist's" shop and some of the quaint remedies vended may have accounted for the scorn which in later life Grindon had for "yarb (herb) doctors." About this time Grindon attended a course of lectures on Botany given by Rootsey (Botanical Lecturer in the Bristol Medical School). Rootsey encouraged Grindon by naming specimens for him and on one occasion exclaimed to him—"Why, you have got a herbarium in your pocket." These lectures, which introduced Grindon to the Linnæan system, must have done much to systematise Grindon's interest in plants and to set him on the path of scientific study. When about eighteen or nineteen he conceived the idea of a herbarium which would illustrate the vegetation, if not of the whole world, at least of British soil and British gardens. For this he procured everything within reach, wild and cultivated plants and garden plants grown from seed in the Bishop Street garden. These specimens were mounted on the third page of sheets of foolscap, and each specimen was named and labelled with the locality and date of collection. Many of these specimens were gathered on walks and rambles to Leigh Woods, the Boiling Well and Hanging Garden (at Ashley), and to the Frome via Baptist Mills. For a while Grindon was employed in his father's office and, amongst other duties, visited farmers and others at Bedminster and Bishport, collecting tithes due to the Rev. M. R. Whish of Redcliffe, for whom his father acted as solicitor. Occasionally these visits took him to Dundry and Backwell, and on all these journeys he collected flowers diligently. All of them were incorporated in his herbarium, to which he continued to add for some years until it totalled about 2,000 specimens.

At this time Grindon joined the "Examiner" Literary Essay and Discussion Society, whilst a little earlier he had been instrumental in founding the Philo-botanical Society of Bristol, the members of which made botanical excursions (to Leigh Woods especially) in the summer and compared specimens at their winter meetings. No written record of the societies' activities appear to exist, but the Grindon herbarium contains one specimen labelled "*Bupleurum procumbens*, brought to Philo-botanical society by H. O. Stephens 4th Sept. 1838."

Expected to follow his father's profession, a short period in his father's office was followed by six months in a London warehouse. Then, after an interval spent in Bristol, Grindon went to Manchester

in the autumn of 1838 and resided there until his death in 1904. He became a cashier in the firm of John Whittaker & Co., a firm of spinners at Hurst. This was no curb to his botanical and other activities and he soon joined a local Essay and Discussion Society and the Natural History classes at the Mechanics Institute. Here he was in congenial company, for these classes were attended by many of the "working men" botanists for which Manchester and, indeed, the whole of south-east Lancashire was at that time famous. A little later Grindon began to give private lessons in Botany himself. These had perforce to be given in the evenings and attained considerable popularity, and although he did not advertise, a constant stream of pupils came to him. The interest thus stimulated in Botany helped to make possible the founding in 1860 of the Manchester Field Naturalists' Society, of which Grindon was one of the founders and the first secretary. The society held excursions in the summer, and soirées, which were often brilliant social functions, in the winter. In its heyday the society's membership was over 500, and besides arranging excursions and meetings, the secretary's duty included the compilation of an annual report (often running to fifty or more pages) and lecturing at the end of each excursion. All the while Grindon continued to add to his herbarium, but had found that foolscap sheets were too small for many specimens, which had to be mounted on larger (19" × 12") sheets, and so in 1853 he began to mount all his specimens on these large sheets, and this marked the beginning of his third and final herbarium in which the earlier sheets were incorporated by mounting the sheet and its specimen together on the new larger sheets. Into this herbarium, to which he continued adding until shortly before his death, he introduced printed matter, descriptions and illustrations of plants, especially of those difficult to preserve (Cacti, etc.) and of those that he was unable to procure, notes and particulars of uses, and medicinal properties. These were obtained from some fifty standard botanical works and journals including Curtis's *Botanical Magazine*, Dillenius *Hortus ethamensis*, Hooker *London Journal of Botany*, Paxton's *Flower Garden*, Parkinson's *Theatrum botanicum*, Sweet *The British Flower Garden*, *Le Naturaliste*, *The Garden*, *Gardener's Chronicle*, etc. The herbarium was now a teaching instrument, and Grindon desired to make it a herbarium and botanical library combined, and all who have had occasion to use it for teaching purposes can testify to the success which attended his efforts. This project progressed gradually, specimens being added continually. They were obtained from all sources.

Some were collected locally, some on visits to other parts of England (especially Bristol), many were obtained on visits to Botanic gardens at Kew, Oxford, Manchester, Glasgow, Dublin, Hull and Clifton College, and many from nurseries (including Garraway's, Clifton) and friends' gardens; whilst relatives and friends supplied Grindon with material from North America, South Africa and the Antipodes, and the collection obtained in this way was augmented by purchase and exchange.

Meanwhile, Grindon had been appointed Lecturer in the Manchester Royal School of Medicine, a position which he held from 1852 to 1877. As he remained in the employment of Messrs. Whittaker, his lectures in the School of Medicine had to be given during the lunch hour until in 1864 he resigned his post with Messrs. Whittaker. The twenty-five years that followed, in which Grindon was free to devote himself to teaching and to botanical pursuits, mark a period during which he made innumerable additions to his herbarium and when most of his writing was done. His fluent pen had early been active, and before leaving Bristol he had written a paper on "The wisdom and goodness of God in the construction of plants and flowers." This was followed, shortly after leaving Bristol, by a number of notes in the first volume of the old *Phytologist*, some of which referred to his own observations on the Bristol flora. After this there were few further contributions to botanical journals and he devoted himself to the writing of books, pamphlets and press articles. Some of his botanical books were written especially to assist his pupils in their studies, and amongst others he wrote *Manchester Walks and Wild Flowers*, 1859; *Manchester Flora*, 1859; *Manual of British and Foreign Plants*, 1861; *British and Garden Botany*, 1864; *Phenomena of Plant Life*, 1864; *Trees of old England*, 1868; *Fairfield Orchids*, 1872; *Pathways to Botany*, 1872; *History of the Rhododendron*, 1876; Botany articles (42) in Ward Lock's *Universal Instructor*, 1878; *Food for Everybody*, 1879; *The Shakespeare Flora*, 1883; *Scripture Botany*, 1883; *Fruits and Fruit Trees*, 1885. Many of his books reflect his philosophical views, which were coloured by a friendship with the Rev. J. H. Smithson (of the Swedenborgian church), and this is especially true of *The two worlds; one visible, another invisible* (1850); *Life, its nature, varieties and phenomena* (1856); *Cremation* (1874); *Reasonable grounds for belief in a future state* (1858); *The divine benevolence in the little things of life* (1865), whilst his interest in the town of his adoption led to his writing not only on local botany but on *Manchester banks and bankers*; *The*

(*Manchester*) *infirmiry sites question*; *Lancashire—brief historical and descriptive notes*, and numerous articles (many of a popular botanical nature) in the local press. He shared an interest in literature with other members of his family (his sister Rosa wrote *Shakespeare and his plays*) and this led, no doubt, to the production of the *Shakespeare flora* and also to *Figurative Language*, 1851 (and 1874); *Emblems*, 1869 (?); and other writings.

Such an output of writing could have left little time (had he possessed the aptitude) for sport, and although he had learnt to ride and row at school, he did not later indulge in these recreations.

Grindon's appointment in the Manchester School of Medicine terminated in 1877, when the School was incorporated with Owen's College (now the University), and after this less than a dozen years of active life remained to him. Always possessed of indifferent health, shortly after reaching seventy he became very infirm and was no longer able to take his customary walks. He was far from affluent, and in 1890 his friends and admirers subscribed and presented him with £350, and in 1898, on reaching his eightieth birthday, £500 was presented to him as the result of a public subscription (which included £100 from the Treasury). Additions to his herbarium now depended entirely on the gifts of his friends, and the last specimens were sent to him in 1902 by Miss Martin (of Bath) so that of the 21,000 sheets in the Grindon herbarium the earliest and the latest derive from the Bristol area. After his death in his eighty-seventh year (in 1904), his widow retained his herbarium, but presented it in 1910 to The Museum, Manchester University. Many of the specimens were tied together with their appropriate labels in bundles but have since been mounted, and the herbarium forms a fitting memorial to a long and industrious life in which plants formed the main interest.

II.

Grindon's herbarium and writings contain a good deal of interest to Bristol botany and botanists. In his *British and Garden Botany*, which includes a flora, he gives Bristol localities for many species. Whereas, however, in the *Manchester Flora*, Grindon gives the authority for every locality cited, he fails to do this in *British and Garden Botany*. Hence it is not possible to say how far they are based on personal observation. Some certainly are quoted from Withering's *British Botany* but without an acknowledgment of the source, and there

are very few stations quoted that are not mentioned by White in *The Bristol Flora*. The only records (and they are unsubstantiated) worth quoting are :—

<i>Polygonum dumentorum</i>	-	near Keynsham
<i>Galium tricorre</i>	- - -	Horfield, near Bristol
<i>Eryngium campestre</i>	- -	Weston-super-Mare
<i>Linaria purpurea</i>	- - -	becoming naturalised as at Horfield and Brislington
<i>Veronica spicata</i>	}	- - distinguished as two species, and St. Vincent's rocks given for both
„ <i>hybrida</i>		
<i>Allium sphaerocephalum</i>	-	St. Vincent's rocks
<i>Polygonatum officinale</i>	-	Leigh Woods
<i>Briza minor</i>	- - -	in the neighbourhood of Kelston growing amongst wheat and barley which it frequently overtops.

Of these the last is the most surprising and, in the absence of specimens, can hardly be accepted.

The herbarium contains much more of interest, and many hundreds of the specimens included in it came from Bristol. Grindon maintained friendship with Canon Ellacombe of Bitton and with Dr. Davies of Clevedon, and innumerable cultivated plants in his herbarium came from their gardens. On many of his Bristol visits he obtained specimens from Garraway's and other Bristol nurseries, and both wild and cultivated plants were sent to him by Miss A. E. Martin of Bath. The herbarium contains many indigenous plants collected in the Bristol area before Grindon left Bristol in 1838, and specimens obtained from Rootsey and Thwaites, which have a special interest as both the Rootsey and Thwaites herbaria have been lost. There are a few specimens collected by T. B. Flower, but these came mainly from N. Wraxall, Wilts. Most of the Bristol plants are of Grindon's own collection. Altogether eighty-five sheets of the herbarium seem worth a mention. There would have been more but for the fact that Grindon often discarded his earlier, imperfect or badly preserved specimens and replaced them with perfect ones, and for many years did not poison his plants, and so many were destroyed by the depredations of beetles, and it is likely that losses from both of these causes fell mainly on the earlier (and hence Bristol) specimens. Further, localities are not always given fully and "Clifton" may represent Clifton, Bristol or Clifton, Manchester; there is an Alderley in Cheshire and another near Bristol; Yatton and Tatton as written by Grindon are not easily distinguished but, whereas the former is in Somerset, the latter is a Cheshire locality. For the list of plants given below no doubts of this sort exist. Some of the specimens mentioned antedate anything

seen by White (see *The Bristol Flora*), some confirm doubtful localities cited by White on the authority of Grindon, Thwaites, Rootsey or Flower, and some represent the only known specimen from old (and now built over) but well authenticated stations. In the list, in order to make comparison easy, I have, whenever possible, followed the nomenclature used in White's *Bristol Flora*.

SPECIES	LOCALITY	DATE	REMARKS
<i>Thalictrum minus</i> <i>Helleborus viridis</i>	Cheddar Cliffs (1) Roman Wall, Leigh Woods	July 1887 31 May 1871	Polly
<i>Radicula palustris</i> (= <i>Nasturtium terrestris</i>)	(2) Bath Half-dry ditch near Duke of York tavern, Baptist Mills	27 May, 1889 6 July, 1837	
<i>Arabis alpina</i> <i>Cardamine impatiens</i>	Clevedon Frome glen	no date May 1842	ex herb. G.H.K. Thwaites
<i>Cochlearia anglica</i>	Avon Banks, near Bath Bridge	June 1875	
<i>Hutchinsia petrœa</i>	(1) St. Vincent's rocks (2) do.	24 March 1836, 1841 and 1842	marked (1) G. H. K. T. and (2) Thwaites
<i>Senebiera coronopus</i> (= <i>Coronopus ruellii</i>)	Clevedon	1872	
<i>Reseda lutea</i> " <i>alba</i> <i>Helianthemum polifolium</i>	Walton, Clevedon Weston-super-Mare Brean Down	July 1866 27 June 1836 1 May 1879	Mr. S. Rootsey ex Rev. W. H. Painter
<i>Dianthus glaucus</i> (= <i>D. cæsius</i>)	(1) Mr. Button's garden. The root from Cheddar (2) St. Vincent's rocks	1879 16 June 1838	gathered by T. F. Cooke T. B. Flower
<i>Stellaria palustris</i> (= <i>Stellaria glauca</i>)	Kingsdown, Bath	June 1859	
<i>Cerastium aquaticum</i>	(1) Ditch, Baptist Mills (2) Walton-in- Gordano	28 August 1838 September 1872	
<i>Spergularia rubra</i>	Cumberland Basin side (capsules only)	5 July 1866	
<i>Hypericum hirsutum</i>	Under St. Vincent's rocks	25 June 1876	
<i>Geranium rotundifolium</i>	Wick Lane, Brislington	July 1841	(Miss Anna Worsley)
<i>Erodium maritimum</i> <i>Rhamnus alternus</i>	Weston-super-Mare Clevedon	July 1888 April 1876	Miss E. Martin
<i>Medicago arabica</i> (= <i>M. maculata</i>)	(1) Brandon Hill, by side of the path leading to Lime Kiln lane, near the World's End (2) Clevedon	25 May 1836 May 1877	

SPECIES	LOCALITY	DATE	REMARKS
<i>Trifolium scabrum</i>	Tickenham Hill	17 June 1838	G.H.K.T.
„ <i>squamosum</i> (= <i>T. maritimum</i>)	Shirehampton	1843	
<i>Vicia bithynica</i>	(1) Wood at Butcombe	25 June 1837	
	(2) Stock Wood Lane towards Whitchurch	June 1841	
„ <i>hybrida</i>	Garden. Seeds originally brought from Glastonbury Tor Hill	no date	T.B. Fr or Fl ?
„ <i>lathyroides</i>	Kewstoke Lane	26 April 1883	
<i>Lathyrus tuberosus</i>	Durdham Down Nursery	11 Sept. 1938	
<i>Onobrychis sativa</i>	(1) Ashley, Bristol	no date	
	(2) Butcombe	June 1837	
	(3) Walton	June 1879	
<i>Hippocrepis comosa</i>	St. Vincent's Rocks	June 1838 and 8 July 1880	
<i>Prunus insititia</i>	Clevedon	1874	
<i>Alchemilla vulgaris</i>	Pasture at Redland near Dugarts (?) wood	1 July 1837	
<i>Epilobium lanceolatum</i>	Conham	1843	G.H.K.T.
<i>Apium graveolens</i>	(1) "wild," Clevedon	September 1872	
	(2) Bank of Avon near Netley (?) dam	17 August 1837	
	(3) Hotwells	August 1842	
[White mentions a label	"River side, Hotwells,	July 1842. Leo	H. Grindon"]
<i>Petroselinum segetum</i>	(1) Avonmouth	June 1865	G.H.K.T.
	(2) Sea Mills	August 1843	
<i>Sison amomum</i>	(1) Avonmouth	June 1865	
	(2) Kenn Road, Clevedon	Sept. 1872 and October 1883	
<i>Sium erectum</i> (<i>S. angustifolium</i>)	(1) Ditch near Boiling Wells	7 August 1837	
	(2) Clevedon	September 1872	G.H.K.T.
<i>Bupleurum tenuissimum</i>	(1) Banks of Avon, Shirehampton	September 1842	
„ <i>procumbens</i>	brought to Philo-Botanical Society by H. O. Stephens	4 Sept. 1838	
<i>Oenanthe phellandrium</i>	Ditches at Glastonbury	July 1839	T. B. Flower
<i>Apinella glauca</i> (= <i>Trinia glaberrinia</i>)	(1) St. Vincent's rocks, nr. Clifton turnpike	June 1838	ex herb. G.H.K. Thwaites name of collec-Grindon
	(2) St. Vincent's rocks	June 1842	
<i>Trinia vulgaris</i>	Worle	no date and no tor but sent to	G.H.K.T.
<i>Aegopodium Podagraria</i>	Redland (with remarkable leaves)	21 May 1878	
<i>Torilis infesta</i>	(1) Cornfield, Westbury	August 1842	G.H.K.T.
	(2) „ Bristol	July 1842	G.H.K.T.
	(3) Durdham Down, near Coke house	29 June 1837	
<i>Scabiosa columbaria</i>	(1) Weston-super-Mare	27 July 1863	
	(2) Foot of St. Vincent's Rocks	Sept. 1872 and Oct. 1875	

SPECIES	LOCALITY	DATE	REMARKS
<i>Inula conyza</i> (= <i>C. squarrosa</i>)	(1) Clevedon (2) St. Vincent's rocks	May 1872 6 October, 1875	
<i>Carduus tenuiflorus</i>	Walton Castle Hill Clevedon	July 1877	Polly
„ <i>pratensis</i>	Felton Meads	June 1842	ex herb. G.H.K. Thwaites
<i>Helminthia hieracioides</i>	Clevedon	July 1877	Polly
<i>Hieracium aurantiacum</i>	Bath	July 1889	Miss A. E. Martin
<i>Campanula trachelium</i>	Hedgebank at Butcombe	2 Sept. 1838	
„ <i>rapunculoides</i>	Frome glen, Stapleton	1843	G.H.K.T.
„ <i>patula</i>	Oldbury Court Woods, Stapleton	August 1841	ex herb. G.H.K. Thwaites
<i>Gentiana amarella</i>	(1) Wick cliffs (2) St. Vincent's rocks	14 Aug. 1838 3 Sept., 1872	
<i>Cuscuta europæa</i> (on nettle)	Bath	August 1888	Miss A. E. Martin
<i>Lycopsis arvensis</i>	close to Bitton station	2 October 1873	
<i>Anchusa sempervirens</i>	Clevedon	May 1871	
<i>Pulmonaria officinalis</i>	Bitton	6 June 1873	
<i>Lithospermum arvense</i>	Cornfield at Horfield	27 June 1836	
„ <i>officinale</i>	(1) under St. Vincent's rocks	22 June 1876	
„ <i>purpureo- cæruleum</i>	(2) Hanging gardens Cleeve wood, Somerset	June 1836 June 1842	ex herb. G.H.K. Thwaites
<i>Orobanche minor</i> (on Ivy)	Tickenham Vicarage	3 Sept. 1882	A.M.G. (?)
<i>Linaria elatine</i>	Cornfield at Horfield	19 July 1838	
„ <i>viscida</i> (= <i>minor</i>)	(1) Cornfields at Horfield	June 1842	ex herb. G.H.K. Thwaites
„ <i>purpurea</i>	(2) under St. Vincent's rocks	Sept. 1872 and Oct. 1875	
„ <i>spuria</i>	near Bath	July 1888	Miss A. E. Martin
<i>Lysimachia nummularia</i>	Cornfield at Horfield moist meadow near Boiling Well	23 July 1837 July 16 (probab- ly before 1842)	
<i>Mentha gentilis</i> (= <i>M. sativa</i> v. <i>gentilis</i>)	Lane between Dundry and Bishport	Aug. 1843	G.H.K.T.
<i>Clinopodium acinos</i> (= <i>Acinos vulgaris</i>)	Wick cliffs	16 June 1838	
<i>Ballota nigra</i>	Hedge bank (at Ashley)	8 June 1836	[at Ashley, written in later]
<i>Ajuga reptans</i> (rose coloured)	near Clevedon	7 June 1873	
<i>Chenopodium murale</i>	near Crews Hole	June 1842	ex herb. G.H.K. Thwaites
<i>Rumex hydrolapathum</i>	Stapleton	July 18 (44 ?)	G.H.K.T.
<i>Thesium humifusum</i> (= <i>T. linophyllum</i>)	near Bath	August 1888	Miss A. E. Martin
<i>Euphorbia pilosa</i> (<i>E. epithymoides</i>)	Prior Lane, nr. Bath	July 1842	W. H. Moreton (?)
<i>Spiranthes autumnalis</i> (= <i>Neottia spiralis</i>)	Pasture at Butcombe	24 Sept. 1837	
<i>Cephalanthera pallens</i> (= <i>C. grandiflora</i>)	near Bath	June 1888	Miss A. E. Martin

SPECIES	LOCALITY	DATE	REMARKS
<i>Butomus umbellatus</i>	In the Frome at Stapleton	before 1838	
<i>Gagea fascicularis</i> (<i>G. lutea</i>)	Bath	27 March 1889	Miss A. E. Martin
<i>Convallaria majalis</i>	Leigh Woods	4 June 1837	
<i>Schœnus nigricans</i>	Seashore at Walton	6 May 1842	
<i>Carex humilis</i> (<i>C. clandestina</i>)	(1) Meadow at Bish- port	9 May, 1836	
	(2) St. Vincent's rocks	no date	
<i>Alopecurus bulbosus</i>	St. Philip's Marsh	16 June 1838	gathered and given me alive by S. Rootsey
			S. Rootsey
<i>Agrostis alba</i> var. <i>stolonifera</i> (= <i>A. stolonifera</i>)	meadow	June 1836	
<i>Kœleria cristata</i>	St. Vincent's Rocks and Durdham Down	June 1876	
<i>Bromus madritensis</i> (= <i>B. diandrus</i>)	St. Vincent's rocks by the river	no date	
<i>Brachypodium pinnatum</i>	Strawberry Hill Clevedon	5 July 1880	

Although White had access to Grindon's writings and almost certainly corresponded with him, he could hardly (had he wished) with ease have consulted Grindon's herbarium. White's period of activity in Bristol Botany covered the time of Grindon's infirmity and the time after his death when his widow retained possession of the herbarium, which, with its many thousands of unmounted plants tied together in bundles, was not readily used by persons unfamiliar with it. Nevertheless, White gives several stations based on Grindon's authority and this examination of his herbarium provides confirmation of many of these (e.g. *Vicia bithynica* at Stockwood, *Apium graveolens* at Hotwells, *Schœnus nigricans* at Walton, etc.). It provides, however, no confirmation of others, the accuracy of which had not convinced White. Amongst these may be noted *Vicia sylvatica* at Stockwood (Grindon gives only *V. bithynica* from this station), *Juncus compressus* at Clevedon, *Allium oleraceum* at Clevedon and *Phleum asperum* at Tickenham.



NIGHTINGALE AT NESTING SITE
May 26, 1944

Photo: R. P. G.

{To face p. 37}

Notes on the Nightingale and Great Spotted Woodpecker

By R. P. GAIT.

(Received, Dec. 7, 1944. Read in title, March 15, 1945)

THE following remarks are written to amplify the accompanying plates. In obtaining the photographs, both of which were taken in the Patchway and Stoke Gifford area, the writer had the help of Mr. H. H. Davis, M.B.O.U.

It has been suggested that Nightingales visit the above mentioned area in greater numbers now than in former years. This fully agrees with my own experience. I have known the Patchway district since boyhood, and birds sing regularly now in spots where one never used to hear a Nightingale, for example High Wood.

I have been fortunate in finding Nightingales' nests. About the middle of May, I mark down the singing male, who is never very far from his sitting mate. Then I look for the nearest oak tree and start searching in its immediate vicinity. Usually the nest is not far away, but may be in a variety of positions. The favourite site in my experience has been on or near ground level among nettles. My diary records nests in oak and hazel stumps, maple seedlings, at the foot of a hawthorn, in bramble and nettles, ivy and nettles and once in long grass among brambles. The highest position was the oak stump where the nest was built at a height of four feet. One curious experience I am unable to explain. A nest near Stoke Gifford in 1942 had a pale-green, empty egg-shell incorporated in the fabric of the nest, so that, when the shell was removed, a hollow was revealed, showing that the nest must have been built around it. The egg had a small hole in the side and the surface was gritty. The nest contained five normal eggs.

In May 1943 I was in a friend's car on the Melksham road. We stopped at the top of Box Hill. As soon as the noise of the engine ceased, I heard a Nightingale singing. Following the usual procedure, the nest was located in a quarter of an hour from leaving the car. The site was unusual, in the corner of a field where a little undergrowth grew beneath two oaks and an elm. Another similar site at Saltford in 1942 yielded a nest, and the same year I strongly suspected a nest in

this open field situation near Almondsbury, but had not time to investigate.

About twelve years ago I obtained some Nightingale photographs but the dark situation and bad light caused very mediocre results. The same heavily lighted positions recurred with each nest found until the Saltford nest. Unfortunately, this was unsuitable for photographic work as the nest was within twenty feet of a road much frequented by village boys.

In the spring of 1944, however, I was shown a nest in an ideal position. In an open space on the fringe of a small wood, this nest was made on the ground with very little cover. Best of all, between 5 p.m. and 6.30 p.m., the sun shone fully on the site. I used an electrically operated, remote control, no hide and a fully exposed camera. The birds took very little time to become accustomed to the camera and I worked from cover about forty feet away. The parent birds were bringing small green caterpillars (see plate 1) which I could see them gathering in the nearby oaks. In intervals of feeding, the hen would brood the chicks for a while. Both adult birds used the "tweet" "tweet" note, somewhat similar to the Willow Wren call only louder and not so sweet. When I showed myself to change slides, the male would hop round in full view giving his croaking alarm note which sounded like "wark" "wark."

I always receive a thrill when viewing a well built, Nightingale's nest, with the usual dead oak leaves round the rim, containing a clutch of beautiful greenish-brown eggs, the colour of which, I understand, in artistic terms is celadon.

The second of my birds, the Great Spotted Woodpecker, has also increased in the Bristol district. I have no actual date records, but I remember when the sight of one of these birds was an event. Nowadays it is quite common, which is more than can be said of its smaller relative the Lesser Spotted Woodpecker, which appears to be decreasing in numbers. This may be to some extent due to the fact that the Lesser spends most of its time in the topmost branches of tall trees. Still, the high pitched "kee-kee-kee" is very distinctive and carries a long way, yet it is seldom heard.

For years I had waited for a nesting hole which was both low enough and sufficiently well lighted to be photographed. Not until 1943, when I was shown a tenanted hole in a partially dead apple tree in an orchard was I successful (see plate 2). The hole was about ten feet up and well lighted. The statuesque poses adopted by Woodpeckers led



GREAT SPOTTED WOODPECKER AT NESTING HOLE
May 28, 1943

Photo: R. P. G.

[To face p. 38



me to expect an easy time. The reverse, however, was very evident after a little time spent in the hide. The adult Woodpeckers were not in the least camera-shy, but when they were feeding at the hole their heads were never still, and a constant to and fro movement made exposures possible only at high speeds at open stops. Although I spent an aggregate of seven hours in the hide and exposed a number of plates, I only obtained one passable negative. This was of the female bird, spoilt by her head being in the shade.

While waiting for the sun, which was slightly behind the birds, to move into position, I was amazed to see the male bring what at first I imagined to be raw meat. This turned out to be chopped worms of the very red variety such as one sees in dung heaps. He would also frequently fill his beak with the small caterpillars which were descending on threads from the apple trees.

Another curious incident occurred at a later visit. Noticing the male Great Spotted Woodpecker flopping about on the grass, I turned my glasses on him. He was vigorously belabouring a Great Tit. If the Great Tit had not managed to escape, I believe that the Woodpecker would have killed it. As it was, the small bird had to sit for quite a long time in a tree to recover from its beating.

I see by my notes that I only noticed the female emerging with excrement, never the male. The young birds remained in the hole for seventeen days, being very vociferous towards the end of this period. This reminded me of a similar family which could be heard two fields away. The hole was in a most unlucky position, about three feet from a hollow in which a Kestrel had young. I think that the Hawk must have looked upon those young birds as his reserve ration. Anyway, one day all was silent and the Kestrel's nest full of black and white feathers.

A marked difference in the temperaments of the Great Spotted and Green Woodpeckers was apparent in this same orchard. Away on my right, about fifty yards distant, one of the Green variety had a family in another apple tree. I was contemplating turning my attention to this subject later until I found out how very shy these birds were. While I was waiting for my sitters, the Green only visited her nest once, and that very quietly after a long wait on the offside of the trunk. On another occasion a friend and I watched through glasses from the far side of the orchard for over an hour and only saw one visit. By their behaviour, it was perfectly evident that the birds were aware of our presence.

To end these notes, perhaps I may be permitted to express my own opinion of the vexed question of Woodpeckers' drumming. I started by thinking that the drumming was mechanical but without much personal evidence to support that view. Then I was somewhat shaken by the facts put forward by those who believed that it was vocal. Finally, I returned to a firm belief in its mechanical origin. I once watched, in ideal light, from a short distance through prismatics, a Lesser Spotted Woodpecker drumming on the metal cap of a telegraph pole. The resultant sound was as one would expect, metallic. Again, in April, 1944, I had the clearest view I have yet had of a Great Spotted drumming at Little Stoke. Through glasses I saw him operate on three different branches in the same oak, and the pitch differed in each case. In support of my theory, when Dr. Ludwig Koch paid his memorable visit to the Ornithological Section of B.N.S., the question was put to him as to whether drumming was mechanical or vocal. His reply was emphatic, "Mechanical, and the bird chooses its drumming spots with all the care with which a violinist chooses his fiddle." Again, Mr. Richard Perry, in his excellent article in *Country Life*, June 16, 1944, states that he definitely found bill pricks on a sounding patch which the bird had just left. On tapping this patch with a florin he obtained a feeble but almost perfect reproduction of the drumming. This disposes, I think, of the principal item in the vocal theory, namely that the drumming bird leaves no marks on the tree.

Notes on White-Flowered *Viola Odorata* L. in the Bristol District

By S. M. WALTERS, B.A.

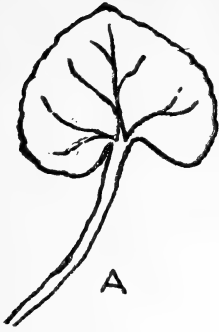
(Received, Jan. 25, 1945. Read in title, March 15, 1945)

THE following notes are based on observation and collection of the sweet white violet in the countryside around Bristol during the spring of 1943 and 1944. The abundance of the plant, as also the conspicuousness of the flowers produced so early in the year, make it a particularly favourable object of study.

I had read, in Gregory's *British Violets* (1912) and elsewhere, of the existence of so-called *imberbis* forms of the sweet violet, in which the flowers lacked the tuft of hairs on the lateral petals characteristic of the species: and I began in the spring of 1943 to observe the occurrence of such forms. Rather to my surprise, I found that in the vicinity of Winford, all the white-flowered *odorata* were of this type, whilst specimens from N. Devon, S. Somerset (Minehead) and Cambridgeshire were of the 'normal' bearded type. The '*imberbis*' plants, moreover, differed from the normal in a number of other characters, the most obvious of which was the colour of the flower-spur.

As a result of this, I read the references to white-flowered *imberbis* in the literature, and particularly the original description by Leighton of the plants to which he gave the name (Leighton, 1835, in Loudon's *Magazine of Natural History*, viii, p. 277); and it became quite clear that the white *odorata* in this country consists very largely of two well-defined varieties worthy of equal rank, viz. the var. *dumetorum* (Jord.) Rouy and Foucaud, and the var. *imberbis* Leighton. Few authorities appear to have recognised this; thus Gregory (*British Violets*) and P. M. Hall (1939, in Martin and Fraser, *Flora of Devon*) treat *imberbis* as a forma of var. *dumetorum*, assuming that it exhibits a single character-difference only. This is very likely due to the fact that the beardless flower-character occurs in all the coloured forms of *Viola odorata* (and also in *V. hirta*), and is not in these clearly of classificatory significance.

A comparative description of the two varieties will reveal the more obvious characters which can be used to distinguish them:—

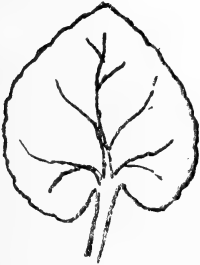


SPRING LEAVES

A. var. *dumetorum*
 Long Stowe, Cambs.
 29-3-44

B. var. *imberbis*
 Wrington, N. Som.
 13-3-44

C. var. *imberbis*
 Winford, N. Som.
 25-3-44



(from Herbarium specimens)
 Natural size

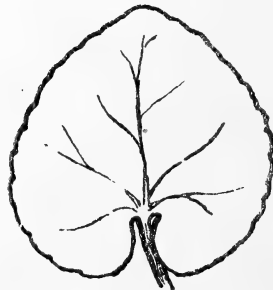
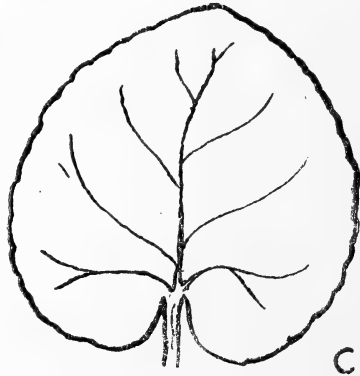
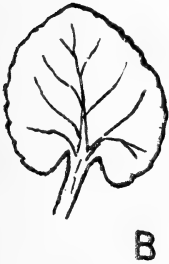
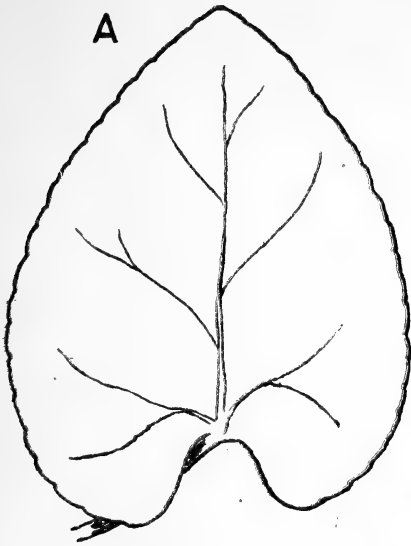


FIG. 1



SUMMER LEAVES

A. var. *dumetorum*

Cleeve, N. Som.

5-7-44

(from Herbarium specimens)

Natural size

B. var. *imberbis*
Leaf of previous year
Ridgehill, N. Som.
11-3-44

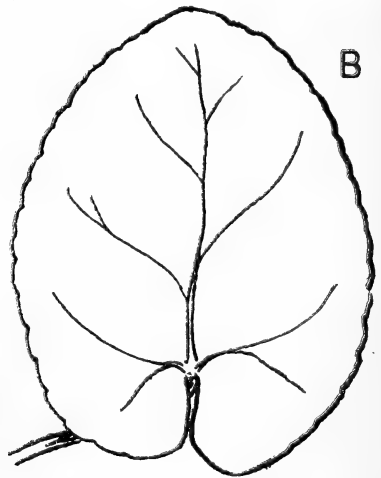


FIG. 2

Var. *dumetorum* (Jord.) R. & F.

Var. *imberbis* Leight.

1. *Habit.*

Well-grown plant usually has a distinct central stock with rather leafy stolons, rooting at the nodes and often producing (in spring) flowers in the leaf-axils before rooting.

Stolons are usually more vigorous and bear fewer leaves along their length, forming a distinct 'rosette' plant readily rooting at the end. Flowers on young unrooted stolons are rare.

2. *Leaf-shape.*

Leaves, especially summer leaves, rather pointed and triangular in outline, with widely-open sinus. Stipules lanceolate-acuminate.

Leaves rounded in outline with a more closed sinus. Stipules broader and rather blunt. (See Figs. 1 and 2).

3. *Hairiness.*

Whole plant strongly hairy; particularly obvious on peduncles, petioles and young leaves.

Plant much less hairy; young leaves often rather shiny and almost glabrous on upper surface. Peduncles more or less glabrous.

4. *Flower.*

Petals white with a variable quantity of violet suffusion on the back; spur violet. Lateral petals bearded. Sepals rather narrow, and acuminate, with small 'pinched-up' appendages.

Petals white, with a variable quantity of reddish-purple suffusion on back; spur deep red-purple. All petals usually broader than in *dumetorum*. Laterals quite beardless. Sepals broader and blunter (cf. stipules) with large conspicuous appendages.

5. *Fruit.* (Information incomplete). Capsule more or less spherical.

Probably capsule more oval in shape. The larger sepal-appendages (which persist in both varieties) further distinguish it.

Knowledge of the distribution of the two varieties in the Bristol district is by no means complete, but the records already collected show that var. *dumetorum* is present in the lowland coastal area, e.g. Berrow, Loxton, Compton Bishop, Cleve, Weston, Clevedon, and N. of Bristol on the Gloucester Road; whilst var. *imberbis* is abundant on the lime-

stone hills and inland Lias soils. Over large inland areas var. *dumetorum* appears to be completely absent, and so far I have only a single record for it on upland limestone (a small patch on the Clifton side of the Avon Gorge). Taking the country as a whole, var. *imberbis* seems to be the common form on basic upland soils of the south, whilst var. *dumetorum* is more widely-distributed on less basic soils. The completeness with which *imberbis* replaces *dumetorum* on N. Somerset limestone is remarkable, and the boundary of the two distribution areas is worthy of further study. In two such localities (Uphill and Compton Bishop), where an upland *imberbis* population meets *dumetorum* on the alluvial soils, plants with intermediate characters have been found, in all probability part of a hybrid population in these areas.

Specimens of the two varieties (and other varieties and hybrids of *Viola odorata*) collected in the Bristol district are in the herbarium of Mrs. Bell and can readily be consulted.

Additions to Bristol Insect Fauna (Diptera) since 1942

(See *Proceedings*, Vol. IX, Part IV, 381-5, 1942)

By H. L. F. AUDCENT, M.Sc.

(Received, Feb. 8, 1945. Read in title, March 15, 1945)

FUNGIVORIDAE (MYCETOPHILIDAE).

Macrocera maculata Mg. S. Tickenham (A.) 19/6/43.

TENDIPEDIDAE (CHIRONOMIDAE).

Chironomus paganus Mg. G. Walham (T. B. Fletcher) 19/8/43.

STRATIOMYIIDAE.

Odontomyia (S.G. *Hoplodonta*) *viridula* F. G. Walmore (T. B. Fletcher) 1/7/43.

DOLICHOPODIDAE.

Hypophyllus discipes Ahr. S. Clevedon (H. Bird) 26/6/43.

Medetera apicalis Zett. S. Clevedon (A.) 30/7/42.

SYRPHIDAE.

Epistrophe (*Syrphus*) *euchroma* Kow. G. Coombe Dingle, Bristol (E. E. Lowe) 4/5/43.

Doros conopseus F. S. Cossington (J. Cowley) 15/6/44; Loxley Wood, Shapwick (J. Cowley) 19/6/44. A rare fly.

Rhingia rostrata L. S. Clevedon (A.) 27/5/44. A rare fly.

Volucella zonaria Poda G. Redland, Bristol (E. Livingstone) 7/43. A rare fly.

CONOPIIDAE.

Zodion cinereum F. G. Rodborough, Stroud (T. B. Fletcher) 17/6/43.

LARVAEVORIDAE (TACHINIDAE)

Chryosomopsis aurata Fall. G. Rodborough, Stroud (T. B. Fletcher) 17/7/43. First British record.

Macronychia unguans Pand. S. Clevedon (A.) 8/7/44.

MUSCIDAE (ANTHOMYIIDAE).

Pegomyia rufina Fall. S. Shepton Mallet (A.) 5/10/44.

TRYPETIDAE.

Cryptaciura rotundiventris Fall. G. Chalford (T. B. Fletcher) 26/6/43.

PSILIDAE.

Psila merdaria Coll. A new species split off from *P. fimetaria* L.
G. and S. Common.

Psila pallida Fall. S. Easton, Wincanton (G. H. Verrall) 1889.

HELOMYZIDAE.

Morpholeria Kerteszi Cz. S. Clevedon (B. N. Blood), 9/4/44.

ASTEIIDAE.

Asteia concinna Mg. S. Tickenham (B. N. Blood) 19/6/43.

SOME RECENT LITERATURE

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3. Blair, K. G. Galls of *Lipara lucens* Mg. *ibid.*, **80**, 6-7 and 189-190, Jan. and Aug. 1944.
4. Coe, R. L. The British species of the genus *Chamaemyia*. *ibid.* **78**, 173-180, Aug. 1942.
5. Collin, J. E. The British species of *Psilopa* Fall. ad *Discocerina* Macq. (*Ephydriidae*). *ibid.*, **79**, 145-150, July 1943.
6. — Preliminary notes on Capt. Goffe's article on the synonymy of some genera of *Syrphidae*. *ibid.*, **80**, 152-5, July 1944.
7. — The British species of *Helomyzidae*. *ibid.*, **79**, 234-251, Oct.-Nov. 1943.
8. — The British species of *Psilidae*. *ibid.*, **80**, 214-224, Sept.-Oct. 1944.
9. Goffe, E. R. Matsumura's generic names in the *Syrphidae*. *ibid.*, **79**, 202-3, Sept. 1943.
10. — The generic name *Leiota* Rond. *ibid.*, **80**, 28-9. Feb. 1944.
11. — The synonymy of *Zelima* Mg., *Tubifera* Mg. and allied genera. *ibid.*, **80**, 109-117, May 1944.
12. — Some changes in generic nomenclature in *Syrphidae*. *ibid.*, **80**, 128-132, June, 1944.
13. — The genera *Cheilosia* Panz., *Chilomyia* Shannon and *Cartosyrphus* Bigot. *ibid.*, **80**, 238-247, Oct.-Nov. 1944.
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"Rerum cognoscere causas."—Virgil.

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CONTENTS

	PAGE
Council 1945	50
Members at March 31, 1946	51
Report of Council	59
Congratulatory Address to the Royal Asiatic Society of Bengal	60
Hon. Treasurer's Statement of Accounts	61
Hon. Librarian's Report	62
Report of Botanical Section	63
Report of Entomological Section	64
Report of Field Section	65
Report of Geological Section	66
Report of Ornithological Section	67
Account of Annual and General Meetings	68
Obituary: A. J. W. Selley	69
Bristol Botany in 1945, by Cecil I. Sandwith	70
Ornithological Notes, Bristol District, 1945, by H. H. Davis, M.B.O.U.	79
Owen's "Observations," by Stanley Smith, M.A., D.Sc., F.G.S.	93
Record of Circular Structures in Vein-Calcite at Abbots Leigh, near Bristol, by I. S. Loupekine, B.Sc., F.G.S.	104
Additions to the Bristol Insect Fauna (Diptera) since 1944, by H. L. F. Audcent, M.Sc.	107
Studies on the Biology of the Bristol Channel:—	
XVI. The Fauna of Skomer Island: a preliminary sketch, by R. Bassindale, M.Sc.	109
Occurrence of the Pine Marten near Bristol	121

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	Ross, F. Stenhouse	25 Tugela Road, Uplands Estate, Bristol, 3	<i>E.G.</i>
<i>J.</i>	Ross, D. E.	Do.	<i>E.</i>
	Rowley, G. D., B.Sc.	130 Whitmore Road, Harrow	
<i>A.</i>	Rudge, Miss D. M.	6 Elgin Park, Redland, Bristol, 6	<i>O.</i>
	Rutter, Miss E. M.	32 Henleaze Gardens, Bristol	<i>B.E.</i>
	Rymer, P. G. P.	Middle Farm, Parnington, nr. Ashchurch, Tewkesbury, Glos.	<i>O.</i>
<i>A.</i>	Salmond, P. W.	22 Tyndall's Park Road, Clifton, Bristol, 8	<i>F.G.</i>
	Salter, Miss J. E. R., B.A.	74 Reading Road, Wokingham, Berks.	<i>B.</i>
*	Sandwith, Mrs. C.	26 Canynge Square, Clifton, Bristol, 8	<i>B.</i>
	Saunders, Miss C. E.	25 Robertson Road, Eastville, Bristol, 5	
	Savory, J. H.	Windyridge, Abbots Leigh, nr. Bristol	<i>O.</i>
	Savory, Mrs.	Do.	<i>O.</i>
+	Scase, R. P.	Lower Northend Farm, Batheaston, Bath, Som.	<i>B.</i>
	Shaw, Miss D.	38 Logan Road, Bishopston, Bristol, 7	<i>B.</i>
*	Shaw, Miss T.	12c Kingsdown Parade, Bristol, 6	<i>B.E.F.G.</i>
<i>A.</i>	Shilstone, H. C.	124 Victoria Avenue, Redfield, Bristol, 5	<i>G.</i>
	Shinner, H. S.	The Chase, Kingswood, Bristol	<i>F.G.</i>
	Shinner, Mrs.	Do.	<i>F.G.</i>
*	Skene, Prof. M., D.Sc., F.L.S.	The University, Bristol, 8	<i>B.F.</i>
	Skene, Mrs.	36 Lawrence Grove, Westbury-on-Trym, Bristol	
	Skinner, D. M.	Westacres, Brentry Hill, Bristol	<i>O.</i>
<i>J.</i>	Skinner, R. A.	Do.	<i>O.</i>
<i>J.</i>	Sleigh, R. J.	Wills Hall, Stoke Bishop, Bristol, 9	<i>B.E.F.</i>

	Sloane, Major J. F., B.Sc.	2 The Paragon, Clifton, Bristol, 8	<i>F.</i>
	Smith, D. Munro, M.R.C.S., L.R.C.P.	Norfolk House, Overnhill Road, Downend, Bristol	<i>B.O.</i>
	Smith, P. G. Munro	Do.	<i>B.O.</i>
	Smith, E. L.	18 Carnarvon Road, Redland, Bristol, 6	<i>F.G.</i>
	Smith, J., M.I.M.E.	Chelwood House, Pensford, nr. Bristol	<i>G.</i>
	Smith, S. G., F.R.E.S.	Estyn, Boughton, Chester	<i>E.</i>
*	Smith, Stanley, M.A., D.Sc. F.G.S.	Geology Dept., The University, Bristol, 8	<i>G.</i>
	Smithson, Miss E., M.Sc., Ph.D.	27 Redland Hill, Bristol, 6	<i>B.</i>
	Spiers, D. R.	Armstrong Cottage, East Dundry, nr. Bristol	<i>B.O.</i>
<i>J.</i>	Spink, Miss W.	Downesway, Falcondale Road, Westbury-on-Trym, Bristol	<i>F.O.</i>
<i>J.</i>	Sprague, D.	3 Regent Street, Clifton, Bristol, 8	<i>O.</i>
<i>A.</i>	Stanhope, Rev. A. J.	182 Bishop Road, Bristol, 7	<i>F.G.</i>
	Stock, Miss J.	The Cottage, East Dundry, nr. Bristol	<i>B.O.</i>
	Studer, J. P., B.Sc.	44 Clifton Park Road, Clifton, Bristol, 8	<i>G.</i>
	Sullivan, D. V., B.A.	186 Stoke Lane, Westbury-on- Trym, Bristol	
	Swaine, Miss A. K., F.R.S.A.	Pisang Cottage, Nailsea, Som. . .	<i>B.F.G.</i>
<i>J.</i>	Tadd, A. D.	18 Fitzgerald Road, Lower Knowle, Bristol, 3	<i>G.</i>
	Taunton, W. C.	46 Trelawney Road, Cotham, Bristol, 6	<i>E.O.</i>
	Taylor, Miss A. E.	16 Cotham Road, Bristol, 6	<i>O.</i>
<i>A.</i>	Taylor, G. H.	107 Sylvan Way, Sea Mills, Bristol	<i>F.</i>
	Taylor, Miss M., D.Sc.	The University, Bristol, 8	<i>O.</i>
	Taylor, W. R., M.A.	5 Pembroke Vale, Clifton, Bristol, 8	<i>E.O.</i>
	Tetley, Mrs. H.	4 The Avenue, Sneyd Park, Bristol, 9	<i>O.</i>
	Trapnell, D.	19 Sion Hill, Clifton, Bristol, 8	<i>E.O.</i>
	Trenerry, G. G.	104 Trelawney Road, Peverill, Plymouth, S. Devon	<i>O.</i>
<i>J.</i>	Troon, J. J.	2 Charlton Road, Westbury-on- Trym, Bristol	<i>B.O.</i>
*	Trueman, Prof. A. E., D.Sc., F.R.S., F.G.S.	Department of Geology, The University, Glasgow	<i>G.</i>
	Trueman, Mrs.	c/o The University, Glasgow	<i>G.</i>
	Tucker, B. W., M.A., M.B.O.U.	9 Marston Ferry Road, Oxford	<i>O.</i>
	Turner, H. W., M.A., F.G.S.	Geology Dept., The University, Bristol, 8	<i>G.</i>
	Vanderplank, F. L., B.Sc.	74 Downs Park East, Bristol, 6	<i>E.O.</i>
	Walker, J. C.	10 Grange Avenue, Little Stoke Park Estate, Patchway, nr. Bristol	<i>O.</i>
<i>A.</i>	Wallington, W. A.	75 Great Bickeridge, Westbury-on- Trym, Bristol	<i>O.</i>
*	Wallis, F. S., Ph.D., D.Sc., F.G.S.	City Museum, Bristol, 8	<i>F.G.</i>
<i>A.</i>	Walsh, Miss C. L. B.	8 Alma Vale Road, Clifton, Bristol, 8	<i>F.</i>
*	Walters, S. M., B.A.	St. John's College, Cambridge	<i>B.</i>

	Wareham, Miss C. A. L.	252 Charlton Road, Kingswood, Bristol	O.
	Wareham, Miss F.	Do.	O.
*	Warne, L. G. G., M.Sc., Ph.D.	Botany Dept., University, Man- chester, 13	
	Warren, Miss E.	59 Belvoir Road, St. Andrew's, Bristol, 6	B.F.
	Webb, H. M., B.Sc.	Red Garth, Church Road, Stoke Bishop, Bristol, 9	
	Webb, H. Vicars	58 Belmont Road, St. Andrew's Park, Bristol, 6	O.
	Weir, G. M.	Hursley Hill, Whitechurch, nr. Bristol	O.
	Weir, Mrs.	Do.	O.
J.	Weir, D. A.	Do.	O.
*	Welch, F. B. A., B.Sc., Ph.D., F.G.S.	H.M. Geological Survey, Exhibition Road, London, S.W.7	G.
	Weston, F. H.	The Tynings, Chew Stoke, nr. Bristol	
	Whitehouse, F. W.	Campbell House, Hallam Road, Clevedon, Som.	B.
*	Whittard, Prof. W. F., D.Sc., Ph.D., F.G.S.	The Geological Department, The University, Bristol, 8	G.
J.	Widdowson, R. W.	Kingswood Training School, Kingswood, Bristol	B.G.
J.	Williams, B. H.	50 Upper Cranbrook Road, Redland, Bristol, 6	E.F.O.
J.	Williams, H.	186 Redland Road, Redland, Bristol, 6	B.G.
J.	Williams, Miss M. St. C.	38 Ravenswood Road, Redland, Bristol, 6	O.
	Wills, R. F.	40 Claremont Road, Bishopston, Bristol, 7	O.
	Wills, Mrs.	Do.	O.
	Woodland, P., M.A.	Redwick, Dursley, Glos.	
J.	Wright, M. A.	Rockleaze, Claremont Avenue, Bristol, 7	B.G.
J.	Wring, A. M.	76 Kensington Park Road, Bris- lington, Bristol, 4	O.
A.	Yeatman, J.	45 Downs Cote Park, Westbury-on- Trym, Bristol	F.
*	Yonge, Prof. C. M., D.Sc., F.R.S.	The University, Glasgow	

Honorary Members

- H. Gorvett, B.Sc., Ph.D., "Onaway," Station Road, West Town, Som.
 R. M. Prideaux, F.R.E.S., Brastead Chart, nr. Sevenoaks, Kent
 *J. W. Tutcher, M.Sc., 57 Berkeley Road, Bishopston, Bristol, 7
 *H. Womersley, F.R.E.S., A.L.S.

Affiliated Societies

- Natural History Society, Diocesan Training College, Fishponds, Bristol
 Natural History Society, Secondary School, Dursley, Glos.

REPORT OF COUNCIL

1945

AT the Annual General Meeting, held on 18 January, Sir Lewis Fermor was elected President. Professor W. F. Whittard and Miss M. D. Hiley were elected Vice-Presidents. Mr. R. Bassindale was elected to replace Miss Hiley as Hon. Secretary, and Miss M. E. Habgood, Mr. J. H. Savory, Mr. A. E. Billett, Mr. H. O. Edmonds and Dr. L. H. Matthews were elected to serve on Council. Owing to Mr. Tetley's death in office as President, Mr. H. O. Edmonds gave an address on "The Story of our Roads."

The Field Programme was carried out with success, and with the end of the war and the lifting of the blackout, it was decided to reinstitute the pre-war programme for the winter session of 1945-6. This included monthly evening meetings, one of which was to be a dinner.

During the year nine members have resigned, most of them having left the district, and 51 new members have been elected, giving a total membership of 271. Council regrets to report the death of four prominent members of the Society—Sir Stanley Badock, Sir Ernest Cook, a past president, Mr. A. Selley, an hon. member, and Mr. A. E. Boley, a life member.

Late in the year the Hon. Librarian, Dr. H. Gorvett, accepted a post in Birmingham, and Council congratulates him on his new appointment and thanks him for his eight years of conscientious service, during which time he has evacuated and reinstated the more valuable parts of the library and has card-indexed the journals and reprints. Council was fortunate in being able to replace Dr. Gorvett by Dr. L. H. Matthews.

Your Society has been able to welcome back some of its members who have been on active service or evacuated from Bristol, and in the ensuing year it looks forward to a successful development of its activities.

R. BASSINDALE, *Hon. Secretary*

CONGRATULATORY ADDRESS

to the Royal Asiatic Society of Bengal

AT the end of December, 1945, our President went by air to India as the delegate of the Royal Society of London to attend the celebrations in Calcutta of the Bicentenary of the birth of Sir William Jones, the founder of the Royal Asiatic Society of Bengal. The opportunity was taken to send an address of congratulation from the Bristol Naturalists' Society. The celebrations lasted from January 6th to January 15th, 1946, and on the last day, which is the anniversary date of the foundation of the Asiatic Society, addresses of congratulation were read by delegates and representatives of societies all over the world, the languages used including Sanskrit, Latin, French and English. The address read by Sir Lewis on behalf of our Society is given below :—

THE BRISTOL NATURALISTS' SOCIETY sends cordial congratulations and friendly greetings to the Royal Asiatic Society of Bengal on the celebration of the Bicentenary of the birth of its illustrious founder, Sir William Jones.

Sir William Jones, in founding the "Asiatick Society" in Calcutta in 1784, lit the lamp of research into all matters that relate to man or to nature in Asia—historical, linguistic, archæological, and scientific—a lamp that has burned undimmed ever since. The results of the activities of the Society have been manifold and to one aspect of them in particular we wish to refer, namely, the assembly at an early date by the Asiatic Society of Bengal, using the name by which your Society later became known, of collections representative of the art, archæology, and natural history of India, collections now housed in the Indian Museum founded in 1866. The natural history activities of your Society have also been accentuated by the official survey departments, botanical, geological, and zoological, all now grouped in this Museum ; whilst in the present century the Indian Science Congress Association has been founded under the ægis of the Asiatic Society of Bengal leading to the foundation of the National Institute of Sciences of India, both these new organisations, the child and grandchild respectively of the Asiatic Society of Bengal, providing for the continuance of the study of the natural history of India.

It is indeed encouraging to a small and relatively young society such as the Bristol Naturalists' Society to observe how from small beginnings such splendid results have come ; results so noteworthy that after the celebration of its 150th birthday on the 15th January, 1934, the Asiatic Society of Bengal was justly honoured with the appellation "Royal."

May the Royal Asiatic Society of Bengal continue to flourish and thereby continue to honour the name of its founder.

L. L. FERMOR,
President.

R. BASSINDALE,
Honorary Secretary.

Bristol,
20th December, 1945.

The Hon. Treasurer in Account with the Bristol Naturalists' Society

RECEIPTS AND PAYMENTS FOR THE YEAR ENDING 31 DECEMBER, 1945

Cr.

Dr.	1944 £ s. d.	To Members' Subscriptions:—	£ s. d.	£ s. d.	1944 £ s. d.	By Subscriptions:—	£ s. d.	£ s. d.
	67 10 0	Life Ordinary, 1944	1 5 0	—	1 1 0	Ray Society	1 1 0	
		" " " 1945	69 13 6		3 0 0	Zoological Society	3 0 0	
		" " " 1946	12 6		10 0	S.W. Naturalists' Union	10 0	
	8 10 0	Associate, 1944	5 0	71 11 0	83 9 0	<i>Proceedings, 1944</i>	4 11 0	
		" " " 1945	8 15 0		2 8 9	Stationery and Printing	65 19 8	
		" " " 1946	15 0	9 15 0	5 8 3	Postages, etc.—	10 8 11	
	2 12 6	Junior, 1944	5 0	2 7 6	1 10 9	Hon. Secretary	6 7 7	
		" " " 1945	2 2 6		10 0	Hon. Treasurer	2 1 1	
					15 10	Hon. Editor	12 6	
						Hon. Librarian	16 11	
	78 12 6	Sale of Publications	83 13 6		1 10 0	Fire Insurance	9 18 1	
	13 0 7	Grants towards <i>Proceedings, 1944</i>	1 12 3		1 5 0	War Damage Insurance	1 10 0	
	28 0 0	Donation for Book-binding (from Field Section)	9 13 0		4 0	Periodical (<i>Countryside</i>)	—	4 0
	1 11 7	Interest on Deposit in Post Office Savings Bank	5 0 0		15 0	Book, <i>Further Illustrations of British Plants</i>	—	—
			2 3 3		1 0	Rent (use of Library Room)	—	1 0
	131 4 8	Subscriptions to Sections (per contra)	102 2 0		4 0	Cheque Book	—	4 0
	26 14 6	Balance from last Account	29 8 6			Carriage on return of Library to Bristol	—	9 5 0
			126 6 4			Fares and Expenses of Meetings	—	2 4 0
						Clerical Assistance (per Hon. Sec.)	—	16 0
					103 6 7		—	105 1 8
						Subscriptions to Sections paid over:—		
					2 16 6	Botanical	—	3 3 0
					2 5 6	Entomological	—	5 9 0
					5 7 0	Field	—	5 19 0
					6 18 6	Geological	—	9 3 0
					7 3 0	Ornithological	—	7 14 0
						(6/6 is still due to Sections)	—	31 8 0
						Balance to next Account:—		
					35 11 10	Cash at Bank	—	21 9 5
					89 16 9	Deposit at Post Office Savings Bank	—	97 13 0
					17 9	Cash in hand: Hon. Treasurer	—	2 4 9
								121 7 2
					254 3 5			£257 16 10

A. H. PEACH, *Hon. Treasurer*
8 January, 1946

Audited and found correct.
F. W. EVENS, *Hon. Auditor*
Bristol, 15 January, 1946

HON. LIBRARIAN'S REPORT

1945

IT is a pleasure to be able to report that the library is again in full working order. All books and journals dispersed during the war to places of relative safety in the surrounding countryside have now been returned, and the whole of the library is available once more for the use of members of the Society.

Early in the year it was suggested that, before the books were brought back, more suitable premises might be found. While the Society is extremely grateful to the Authorities for the use of the room in the City Museum, it was felt that it would be a great advantage if the Society had a room, or a group of rooms, which was open to members at all times, provided an attractive atmosphere for study or a pleasant evening's browsing, allowed sufficient room for the continuous expansion of the library, and might be used, not merely as a library, but also as a place of meeting for the Society and its separate Sections. It was further suggested that if this scheme proved to be too expensive, other Societies of a similar type might be willing to share the same premises and thus reduce the cost to each. Accordingly, several local Societies were approached and invited to offer their opinions. Under existing conditions, however, the idea proved to be impracticable, and the books have been returned to their former habitat in the City Museum.

The position, however, might be very much worse, and indeed, the Society is extremely fortunate to have a library at all, for it was not evacuated until after the Natural History Section of the Museum was burnt out, and was separated from a devastating fire only by a narrow passage-way. The library was not affected in any way, and the only damage suffered during the war was the destruction of a few books by water from a defective heating system mentioned in the last Hon. Librarian's Report. The Society is extremely grateful to those people, members and others, who so kindly made room in their homes, often at no little inconvenience to themselves, for sections of the library during the war years.

As a considerable number of members has joined the Society since the library was removed from Bristol, it may be of interest to add a brief description. It is an excellent library of its kind, and contains the best part of 10,000 volumes. It is divided into sections containing books on Geology, Botany, Entomology, Ornithology, General Zoology and General Biology. In addition it contains a large selection of journals of a more general nature, and the Society receives nearly 100 different publications of this type during the course of the year, mostly in exchange for its own *Proceedings*. These come from all parts of the world and include many from the U.S.A. One of the most valuable features of the library is a very representative selection of the journals of local Natural History Societies in all parts of the British Isles, probably the most complete collection of this type of publication in this part of the country. A glance at the recent-addition rack will give some idea of the variety of reading matter pouring into the library.

Certain journals from abroad have not been received during the war. Some of these arrears have since been made good, and others, no doubt, will follow. But it will not be surprising if a few of the European Institutions with which the Society formerly carried out an exchange of publications are found to be no longer in existence.

Now that the library has been reassembled it will be possible to attack the perennial problem of catching up with arrears of binding. For some years this has been the biggest problem facing the Hon. Librarian, and it has grown considerably during the war period. A small sum of money is already available for this purpose, but it is probably no exaggeration to say that at least £200 would be needed to do all the binding necessary.

There are no new exchanges to report, but a number of suggestions for these have been made and will be considered at the next meeting of the Publications and Library Committee. Books have been gratefully received from Prof. S. H. Reynolds, and from the Botanical, Entomological, Geological and Ornithological Sections of the Society.

H. GORVETT, *Hon. Librarian*

REPORT OF BOTANICAL SECTION

1945

THE Botanical Section has completed 20 years since it was revived in the Autumn of 1925 with seventeen members. The late Professor O. V. Darbishire was elected president and the late Miss Roper, chairman. The years have brought changes, the war somewhat scattering our members, but we managed to keep the Section in existence. Now we face the New Year with a membership of over fifty, four of them being original members.

During the year we have held a meeting each month in the Wiglesworth Library.

In the Spring three papers were read :—Mr. H. O. Edmonds gave us "Flowers along a Roman Road" with many photographs of beauty spots on the Fosse Way; Mr. T. H. Payne a talk on "Country Life from a Botanical Point of View" with many amusing anecdotes; Mr. Richard Widdowson read a paper on "Insectivorous Plants" with specimens from the Royal Botanic Gardens, Edinburgh, some of them still holding their victims.

The Summer indoor meetings were spent in naming and discussing specimens collected. The field-walks, taken in the neighbourhood of Bristol, were led by Mr. Ivor Evans, Mr. F. W. Evens and Mr. H. O. Edmonds. Two visits were paid to the University Gardens and Greenhouses, by kind permission of Professor M. Skene.

The Autumn brought three more papers :—Dr. J. H. Davie on the "Umbelliferae" with numerous herbarium sheets; Mr. R. J. Sleight on "Soils" with samples; Mr. F. W. Evens on the "Mycetozoa," showing enlarged drawings giving the structure of these minute plant-animals.

The Exhibition Meeting was held in November. Mrs. Sandwith showed crab-apples, and *Paeonia corallina* flowers and seed; Mr. M. Wright—a collection of native plants in bloom; Mr. Ivor Evans—Geraniaceae; Mr. F. W. Evens—seeds under the microscope; Mr. S. M. Walters—*Vaccinium Vitis-Idaea* and *V. Myrtillus* with their hybrid *V. intermedium*; Mrs. Bell—Hypericaceae and Dip-sacaceae.

ETHEL M. E. BELL, *Hon. Secretary*

REPORT OF ENTOMOLOGICAL SECTION

1945

AT the 81st Annual General Meeting, held on 3 Feb., Mr. J. W. Norgrove was re-elected President and Mr. A. H. Peach, Hon. Secretary and Treasurer. The formal business was followed by a lecture by Mr. J. V. Pearman on The "death watch," when we learnt that the true "death watch" was one of the small psocids (*Atropos pulsatoria*), one of the family commonly called "book lice" and not the beetle which damages old timber.

On 6 January, Dr. H. W. Miles gave a lecture on the larvæ of certain moths which feed on stems and grasses, paying special attention to *Ovia musculosa*, which he observed in its habitat near Salisbury. He had devoted some time to studying its life history and showed slides of the insect and the damage to corn.

On 3 March, Mr. J. F. Bird read a paper giving particulars of butterflies taken and/or observed in the Clevedon district; a very large proportion of the butterflies in the British list were included. Mr. Norgrove followed with a paper on Melanism in Lepidoptera. Exhibits showing Melanism were provided by him and Mr. Peach.

On 7 April, Mr. Peach gave a paper on the Tœnceocampids, a group consisting of 9 species; he exhibited specimens of each, including a long series of *Tœnceocampa gracilis* bred from ova taken at Shapwick.

On 6 October, members gave an exhibition of insects taken during the year; these included Lepidoptera, Diptera, Coleoptera and Hymenoptera.

On 9 November, Mr. W. R. Taylor gave an extremely interesting lecture on "Insects and Instinct" giving the following reasons for the survival of insects: their smallness, agility, armour, ubiquity, profuseness and instinct.

On 1 December, the Section accepted an invitation, by the kindness of Mr. Bassindale, to attend a lecture given by Dr. Butler of Rothamstead on "The foraging habits of the honey bee."

A Field Meeting was held on 16 June, in the Flax Bourton district, at which, in spite of inclement weather, there was an attendance of 18.

Attendances during the year have been satisfactory. As new members we welcome Miss T. Shaw, Drs. Miles and Devonshire, Messrs. F. Raw, Gibbens, Maunder, Vanderplank, F. S. and D. E. Ross, Trapnell, Packham and Curtis.

The membership at the end of the year numbered 40.

A. H. PEACH, *Hon. Secretary*

REPORT OF FIELD SECTION

1945

At the Annual General Meeting of the Section Mr. F. W. Evens was re-elected President with Sir Lewis Fermor as Vice-President.

We record with regret the death of Mr. A. Selley, an ardent naturalist, who, although having taken no active part for many years, was always keenly interested in the activities of the Society.

In arranging the Summer programme it was felt that it would be possible to cover a wider area than during the immediate past and the following notes record the meetings that were held.

On 21 April Mr. H. O. Edmonds led a party to Ashton Gate, Yanley and Colliter's Brook. Members inspected the remains of the Chapel at Yanley. Returning by Colliter's Brook and the Colliery dumps to Bedminster, a good variety of plants was found and an unusual number of butterflies for this early date.

Mr. G. S. Maunder was the leader in the Wrington District on 26 May. From Yatton station members walked to Cadbury Camp from which by footpaths Kingswood was reached, where many orchids were seen. The return journey was along the Yeo bank to Congresbury and Yatton.

On 23 June, at the Annual Field Meeting of the Society, 27 members took part in the all-day meeting at Chepstow and Tintern, this being the first time that an all-day meeting has been attempted. Mr. F. W. Evens was the leader. The route followed Tut's Hill to Tidenham Chase, giving fine views of the River Severn and proceeding to the Devil's Pulpit and Offa's Dyke. The meeting afforded much of interest, particularly to the Botanists, the Chase, woods, ponds and fields yielding a great variety of flowers.

On 21 July Pensford and Dundry were selected, and Mr. G. H. Beacham led the party on the Chew Magna Road to Norton Malreward, Norton Hawkesfield, North Wick and East Dundry.

Mr. F. W. Evens conducted members when, on 8 September, Cadbury Camp and Tickenham were visited. Seeds and their distribution were the principal items studied.

The Field Section again co-operated with the Botanical, Entomological, Geological and Ornithological Sections in giving publicity to their field meetings by the distribution of a printed programme.

M. D. HILEY, *Hon. Secretary*

REPORT OF GEOLOGICAL SECTION

1945

AT the Annual General Meeting held on January 27, Dr. F. S. Wallis was re-elected President; Professor W. F. Whittard, Vice-president; Mr. I. S. Loupekine, Hon. Secretary; Mrs. A. Marsden, Hon. Treasurer; and Mr. G. E. J. McMurtrie, Hon. Auditor. Sir Lewis Fermor, Dr. Stanley Smith, Mr. C. W. Blackburn, Mr. A. Marsden, Mr. G. S. Maunder and Mr. H. W. Turner were appointed Committee Members. The formal business was followed by an exhibition of geological specimens and apparatus.

On February 15, Mr. J. Smith (Manager, Bromley & Pensford Collieries) gave a vividly illustrated lecture on "Practical Coal Mining."

The Annual Invitation Meeting was held on March 8 when, in the presence of about 250 members and guests, Dr. A. E. Dunstan, D.Sc., F.R.I.C. (Anglo-Iranian Oil Co.), introduced a spectacular sound-film on the subject, "Oil Operations in Iran, including Geology and Geophysics."

Four excursions were held during the Summer. Mr. A. Marsden, M.Sc., organised a visit to Kilmersdon Colliery, which was made particularly enjoyable by the kindly interest and hospitality of the Management. The excursions to Greenways Farm and to Aust Cliff were led by Professor Whittard, and proved interesting from the engineering point of view. Finally, Dr. Wallis led a party to Upper Vobster where tectonic structures were studied and where the Management kindly arranged for a demonstration of their excellent laboratories devoted to road reconstruction. A pleasant surprise at Upper Vobster was the addition to the party of Dr. F. B. A. Welch, of the Geological Survey of Great Britain, who was mapping the area at the time.

On October 18, when Mr. F. Davis, F.G.S. (Bath and Portland Stone Firms Ltd.), delivered a profusely illustrated lecture entitled "Stone and how to work it," the section had resumed its pre-war programme of Thursday evening lectures. Throughout the war, lecture meetings had been held on Saturday afternoons.

The last lecture of the session was given by Mr. C. E. N. Bromehead, B.A., F.G.S. (Geological Survey of Great Britain), who rendered a pleasurable treatment of "Geology and Health."

As new members the section welcomes Miss J. Allison, Mrs. M. L. Andrews, Mr. R. Bassindale, Mr. B. F. Brueton, Mr. G. C. Clark, Mr. M. L. K. Curtis, Dr. A. F. Devonshire, Miss J. E. Hague, Mr. E. G. Hallett, Mrs. V. M. Hallett, Mr. W. G. Herrington, Mr. H. Homeshaw, Mr. C. J. Hyde, Mr. L. Iberal, Dr. E. A. J. Mahler, Mr. J. S. Murphy, Mr. S. J. W. Pleeth, Mr. M. R. Puddy, Miss M. H. Rogers, Mrs. D. Shinner, Mr. H. S. Shinner and Mr. J. Smith; it regrets to record the death of Mr. A. J. W. Selly and the resignations of Mr. J. Clendinning, Mr. J. C. How and Mr. and Mrs. Hudson. Membership now stands at 88.

I. S. LOUPEKINE, *Hon. Secretary*

REPORT OF ORNITHOLOGICAL SECTION

1945



THE 22nd Annual General Meeting of the Section was held on January 27, when Mr. J. H. Savory was elected to succeed the late Mr. H. Tetley as President, and Mr. H. H. Davis was re-elected Hon. Secretary and Treasurer.

By kind permission of the Department of Zoology, Bristol University, meetings, six in number, have again taken place in the Wigglesworth Library. The attendance, with a minimum of 16 and a maximum of 52, has been well up to the average of recent years.

At the *January* meeting Mr. H. N. Southern, in a highly instructive lantern lecture entitled "Ecology and Birds," dealt particularly with the study of animals in their natural environments and the factors which control an animal population. A fine series of slides included charts to show fluctuations in Field-Vole populations, the increase of Long-tailed Skuas and Rough-legged Buzzards in Norway during good Lemming years, and the periodical rise and fall in the number of Lemmings and their predators the Snowy Owl and Arctic Fox. "Some Remarks on Bird Anatomy," by Dr. C. F. Druitt was the subject for the first of two meetings in *March*. Among numerous skins and anatomical specimens shown were the skin of a locally killed Bittern, the trachea of the Goldeneye and Goosander, and the sternum and enormous leg bones of the Ostrich. The lecture was concluded with enlightening comments on the use of carbolic acid as a preservative instead of the usual practice of skinning. Later in the month Mr. C. W. G. Paulson in giving a most helpful talk on "Forming a Bird Library" covered many aspects of ornithological literature. He dealt first with books for the beginner, and afterwards with those for intermediate and advanced students. Exhibits included copies of various local reports, some recent U.S.A. publications and a number of original drawings by Abel Chapman and Archibald Thorburn.

Exhibits and communications by members at the *September* meeting were followed by a film showing Peregrines on a Cornish cliff taken by the late Lieut. John Bush, R.N., formerly of Clifton College. Members were also shown a selection of delightful bird paintings by Mr. G. E. Lodge. In *October* Mr. F. L. Vanderplank in speaking on "European Migrants in Tropical Africa" gave a detailed account of species met with in Northern Tanganyika where, for several years, he had made the most of many opportunities for observing bird migration. Finally, at the *November* meeting, Mr. W. E. Mayes gave a lantern talk on "A Visit to the Farne Islands." Slides depicting Kittiwakes, Guillemots, Puffins and other species were chiefly from photographs taken on an expedition to the islands in 1937. The lecture was also illustrated with skins of Sandwich, Roseate, Common and Arctic Terns.

Two evening excursions were again arranged in conjunction with the Field Section. The first, to Leigh Woods, took place on May 9 and was attended by twelve members, but the second, to Blaize Castle Woods on the 30th, was abandoned on account of unsuitable weather.

Owing to relaxation from war-time duties, and the general improvement in travelling facilities, individual members have been able to visit the reservoirs and other good bird haunts with increasing frequency throughout the year. Results of such observational work may be found elsewhere in this issue and in the annual *Report on Somerset Birds*.

Membership now stands at 90 and the financial statement shows a satisfactory balance in hand.

H. H. DAVIS, *Hon. Secretary*

Account of the Annual and General Meetings

1945

THE 82nd Annual Meeting of the Society was held in the Botany Lecture Theatre at the University of Bristol on Thursday, 18 January, at 7.15 p.m., with the Vice-President, Mr. H. O. Edmonds, in the Chair. The Reports of Council, the Hon. Librarian and the Hon. Treasurer were read and adopted. Sir Lewis Fermor was elected President, and Professor W. F. Whittard and Miss M. D. Hiley were elected Vice-Presidents. The remaining officers were re-elected with the exception of the Hon. Secretary. Mr. R. Bassindale was elected to replace Miss M. D. Hiley as Hon. Secretary. Owing to the death in office of the President, the Vice-President, Mr. H. O. Edmonds, gave a talk on "The Story of our Roads." This account dealt with the earliest British roads, their structure and distribution and their development to present-day conditions.

At the General Meeting held on 15 March, Canon C. E. Raven gave a talk on "John Ray—his place in the history of Science." It was unfortunate that the attendance was very poor for, in showing how important Ray and his colleagues were in the development of the science of their period, Canon Raven gave a most fascinating address.

The Annual Field Meeting at Chepstow and Tintern, led by Mr. F. W. Evens, on Saturday, 23 June, was a well attended and successful all-day meeting.

At the Exhibition Meeting held in the Botany Department of the University on 4 October there was a display by members of a variety of plants (fresh and herbarium specimens) and seeds, hoods for hawks, original photographs of birds, original bird paintings by Lodge and butterflies.

The lecturer at the meeting on 1 November was Dr. F. Herbert Smith who talked on the Nature Reserves Investigation Committee of which he is the Hon. Secretary. Dr. Smith gave a detailed account of the various committees set up at different times since 1929 and listed the regions with their regional committees. The actual work of the committees and their recommendations were not dealt with.

The final meeting of the year was held on 6 December and was addressed by Dr. R. Pearce on "Caving and the G. B. Cave." Dr. Pearce outlined the mode of formation of caves in limestone areas by solution and erosion and gave a brief account of the Mendip area. He then described how digging in various swallets there led to the discovery of a suitable crevice which was followed for a limited distance. After about six months, waiting for the water to subside somewhat, the gallery was explored much further and found to lead into the second largest cave in Britain—275 yards by 100 feet by 120 feet high—G. B. Cave. Dr. Pearce gave a graphic account of caving difficulties, particularly those of survey and photography. Nevertheless, his slides which illustrated the lecture were extremely good and aroused much interest and admiration.

R. BASSINDALE, *Hon. Secretary*

Obituary

A. J. W. SELLEY

ALFRED John William Selley died at Arundel, Sussex, on 28 November, 1945, at the advanced age of 91. Born in Devon, he came as a young man to Bristol in 1874 and resided here until he was evacuated during the War.

Science and history owe much to those who devote their leisure hours to the collecting of facts and materials. Selley was a collector with tremendous zeal and enthusiasm and the City Museum owes much to his indefatigable labours.

He was mainly responsible for the discovery of the Roman villa at Brislington and carried out much of the work in connexion with the excavations for Roman material at Sea Mills. He was nearly always present when old property was being demolished, and watched with a keen eye almost all excavations within the city boundary; even harbour dredgings provided material for him.

But the main work of his life was carried out in the open countryside and especially on the top and flanks of Mendip. Methodically he examined each ploughed field, year after year, and in this way acquired thousands of surface flint implements all of which are—or were before the air-raid damage of 1940-41—in the City Museum collections. He generally carried out two traverses of each field at right angles to each other. In this way every field was examined yard by yard and viewed from at least two directions. He was a born collector and his keen powers of observation were especially noteworthy in the case of surface flints. He was intensely methodical in all his ways and entered all his "finds" in a series of diaries. These have fortunately been preserved and are in the City Museum.

He became an ordinary member of the Bristol Naturalists' Society in 1905 but joined the Geological Section at an earlier date. In 1939 he was elected an honorary member of the Society in virtue of his distinguished services to the study of local prehistory during a long period.

Selley was modest and retiring. He was an intense individualist and loved nothing better than to cycle and wander alone over the countryside searching for prehistoric or historic material.

F. S. W.

Bristol Botany in 1945

BY CECIL I. SANDWICH

(Received, March 1, 1946. Read in title, March 7, 1946)

THE year 1945 marked the end of the war in Europe: V E Day, May 8, proclaimed the fact. It was a perfect day, one of the few warm sunny days in a rather sunless summer. A general atmosphere of relief prevailed, due no doubt to the promise of Peace and Prosperity to follow. "Blessed is he that expecteth nothing, for verily he shall not be disappointed," was the wise saying of a past generation, but for the Naturalist there is always Something. Nature has been an unfailing consolation through the long and weary years of War. The Bristol Naturalists carried on in spite of difficulties and work was done.

The weather was disappointing. Late frosts spoil the apple crop in this district, though the earlier flowering pears and plums escaped. It was noticeable that many trees which had come into leaf early were cut by frost and cold winds, and in May presented a depressingly brown and withered aspect, but towards the end of June some had recovered and were putting out new leaves. This gave a curious appearance to certain trees in places where the branches were crowned with tender yellow-green young leaves amongst the older dark green foliage which had survived.

It is hoped that members who contribute records for publication will be so kind as to send voucher specimens. In the case of critical plants and varieties it is impossible to publish a record without seeing the specimen.

Thalictrum flavum L. Near the River Boyd in Dyrham parish, G.,
Rev. F. L. Blathwayt.

Ranunculus sardous Cr. In a small roadside pasture in the flats below Brent Knoll, S., C. and N. Sandwith.

Chelidonium majus L. Specimens of the typical form with "double" flowers occurred on waste ground by Portway below Sneyd Park, G., C. and N. Sandwith.

Viola silvestris Lam. Plants with abnormalities of the perianth were rather frequent in April on a wooded, roadside bank on the

S.E. side of Castle Hill, near Clevedon, **S.**, *J. P. M. Brenan*, who writes: "The flowers had mostly four, occasionally five petals, and all had additional spurs, mostly four, sometimes two to three with rudiments of others. It is probable that this may represent one of the patches recorded in *Fl. Bristol*, pp. 175-6, as having been found by Mr. D. Fry near Walton-by-Clevedon; if so, it is an interesting example of how a 'sport' may persist."

V. odorata L. Attention is drawn to Mr. S. M. Walters' interesting paper on the two white-flowered varieties, *dumetorum* (Jord.) Rouy et Fouc. and *imberbis* Leighton, which was published in *Proc. Bristol Nat. Soc.*, 1944, pp. 41-45.

Dianthus Armeria L. The description in the *Bristol Flora* (p. 181) of a locality of this species as "slope under Cadbury Camp, Tickenham side" was misleading—if not intentionally ambiguous—and has caused many fruitless searches. The locality, which is on Cadbury Hill above Yatton, was rediscovered in 1920. The plant grows in fair quantity on a bank among brambles, marjoram and other limestone species, and has every appearance of being a true native. See also Mr. W. D. Miller's notes in *B.E.C.* 1932 Rep., p. 272 (1933).

Saponaria officinalis L. A large patch of the double-flowered form in a rough, open field at Clays End near Twerton, **S.**, *J. P. M. Brenan*.

Cerastium arvense L. In very small quantity on a mole-hill and in turf close by in an open, hilly pasture on top of the ridge on the E. side of Court Hill, between Clevedon and Cadbury Camp, **S.**, *J. P. M. Brenan*. This locality lies at some distance from the small patch on the limestone outcrop below Limeridge Wood which was recorded in "Bristol Botany in 1920 and 1921."

Impatiens capensis Meerb. (*I. biflora* Walt.) In numerous places along the E. bank of the R. Avon from below Warleigh Wood to the aqueduct near Limpley Stoke, **S.**, and extending into Wiltshire, Oct., 1945, *Mrs. J. F. and J. P. M. Brenan*. Also reported from Limpley Stoke in August by *Mr. H. Williams*.

Medicago lupulina L. var. *Willdenowiana* Koch. Very fine in a corn-field between Clays End and Newton St. Loe, **S.**, Oct., 1945, *J. P. M. Brenan*.

Rubus cæsius L. A remarkable form was found on the river-bank under Leigh Woods, **S.**, by *Mr. Ivor Evans*. It has huge, white flowers up to 5.5 cm. across and the sepals are terminated by

conspicuous, foliaceous, cristate-lacerate appendages. One of the leaves on a young shoot is pinnate-quinque. All these features are known to occur in forms of *R. caesioides*, and at present there seems to be no evidence for suspecting that Mr. Evans' plant is a hybrid with *R. Idæus* or any other species, but it is worth watching, and the fruit should be collected.

- Rosa canina* L. (§ *Dumales*) × *stylosa* Desv. var. *systyla* (Bast.) Baker. Two bushes have been under observation for many years behind Knightswood Cottages, Tickenham, S., C. and N. Sandwith. The leaflets are somewhat biserrate, slightly hairy only on the midribs beneath. The pedicels are naked. The styles are glabrous, in a column. The fruit is ovoid or subglobose. The facies is immediately suggestive of *systyla*, which grows near by. Such specimens come under *R. stylosa* var. *Garroutei* (Pug. et Rip.) Rouy, of Col. Wolley-Dod's last revision of *British Roses* (1931).
- R. canina* L. var. *sylvularum* (Rip.) Rouy. Limestone slope, Uphill, S., N. Y. Sandwith. A very small bush with small, ovoid fruit and glabrous styles.
- R. canina* L. var. *verticillacantha* (Mérat) Baker. Two bushes on Chelvey Batch, S., 1921, N. Y. Sandwith. Several scattered bushes on limestone slopes of Cadbury Camp, Tickenham, S., J. P. M. Brenan and N. Y. Sandwith. Specimens from both localities may perhaps be referred to f. *clivicola* (Rouy) W.-Dod.
- R. dumetorum* Thuill. var. *typica* W.-Dod, f. *semiglabra* (Rip.) W.-Dod. A small form of this by roadside near Field Farm, Shepton Mallet, S., Oct., 1944, J. P. M. Brenan.
- R. dumetorum* Thuill. var. *sphaerocarpa* (Pug.) W.-Dod. Bushy ground on limestone, Worlebury Camp, Weston-super-Mare, S., Oct., 1944, J. P. M. Brenan.
- R. dumetorum* Thuill. var. *incerta* (Déségl.) W.-Dod, f. *laevistyla* W.-Dod. A single, small bush in woodland by the path leading along the top of Court Hill towards the Warren, near Clevedon, S., Oct., 1944, J. P. M. Brenan.
- R. obtusifolia* Desv. var. *typica* W.-Dod. Quarry at Wickwar, G., Sept., 1936, J. P. M. Brenan.
- R. agrestis* Savi var. *typica* R. Kell., f. *arvatica* (Pug.) Rouy. Still on Worlebury Camp near Weston-super-Mare, S., Oct., 1944. J. P. M. Brenan.
- Epilobium hirsutum* L. The white-flowered form near Congresbury (see "Bristol Botany in 1944") was recorded from this locality

by *Dr. W. Watson* in 1934, see the Report of the Botanical Section of the *Somersetshire Archæological and Natural History Society* for 1934.

Caucalis arvensis Huds. A considerable number of fruiting plants scattered through a cornfield between Clays End and Newton St. Loe, **S.**, *J. P. M. Brenan*. The *Fl. Bristol* gives no records from anywhere near Bath later than the vague indication "cornfields, frequent" in Babington's *Fl. Bathon.* of 1834, but the species was known for many years on a bank at Lower Weston, **S.**, where it was shown to me by *Mr. T. H. Green*.

Bellis perennis L. A "sport" with ray-florets absent and disc-florets virescent on an open, roadside bank by the road to Cheddar, near Axbridge, **S.**, Apr., 1944, *J. P. M. Brenan*.

Gnaphalium sylvaticum L. Hanham Quarry, **G.**, *I. W. Evans*. An excellent addition to the Gloucestershire side of our area.

Doronicum Pardalianches L. Still in the Glen Frome locality, **G.**, *Michael Wright*.

Senecio sarracenicus L. "In *Fl. Bristol*, p. 382, a 'small patch by the river near the Aqueduct, 3½ miles south of Bath' is recorded on the authority of A. E. Burr. In Oct., 1945, I saw a small patch on the E. bank of the R. Avon quite close to the aqueduct near Limpley Stoke. If, as seems likely, this is the same as Burr's patch, then it should be just in Wiltshire and not in Somerset."—*J. P. M. Brenan*.

S. vulgaris L. var. *radiatus* Koch. On waste ground and in sidings near both the railway stations at Shepton Mallet, **S.**, Oct., 1945, *J. P. M. Brenan*.

S. squalidus L. × *vulgaris* L. Further specimens of this hybrid have been collected in Bristol, on a bombed site in Jamaica Street, **G.**, by *Mr. I. W. Evans*, and in University Road, Clifton, **G.**, by *Mrs. Bell*. The loosely corymbose inflorescence with some of the heads on long, slender branches and peduncles, the longer, spreading golden-yellow ray florets, and the sterile or glabrescent achenes, distinguish convincing specimens from *S. vulgaris* var. *radiatus*.

Hieracium maculatum Sm. Several large patches on the railway embankment between Patchway and Stoke Gifford, **G.**, *I. W. Evans*. Specimens were confirmed by *Mr. H. W. Pugsley*.

Monotropa Hypopitys L. Still persists in Leigh Woods, **S.** Between 30 and 40 plants were seen in June on the excursion of the Botanical Section of the Bristol Naturalists' Society.

- Linaria purpurea* Mill. With white flowers on the railway bank by Portway, G., I. W. Evans.
- Veronica polita* Fr. "*lusus calycida* Abromeit et Scholz" (*sens.* Drabble and Little in *Journ. Bot.* lxi. 202 (1931)). One plant of this form, which is characterised by having toothed sepals, on the steeply sloping side of a shale heap of a (now abandoned) coal mine at Edford, S., 30 Dec., 1943, J. P. M. Brennan, who adds: "I do not find it clear why this should be considered to be a '*lusus*' rather than a mere '*forma*.'" "
- Euphrasia anglica* Pugsf. In short, open turf on hillside in the Stoke Lane Valley, between Edford and Nettlebridge, S., July, 1944., J. P. M. Brennan and Dr. J. N. Mills.
- Cephalanthera pallens* Rich. Common in a wood in Dyrham parish, G., Rev. F. L. Blathwayt.
- Iris foetidissima* L. Recorded from "the top of St. Vincent's Rocks, [G.], Sandwith and Trapnell" [probably about 1924] in Miss Roper's interleaved copy of *The Bristol Flora*. This record was apparently not published. The plant was recorded this year from St. Vincent's Rocks by Mrs. Bell.
- Juncus bufonius* L. var. *congestus* Wahlb. (1820), = var. *fasciculatus* Koch (1837). Abundant on the edge of the Berrow salt-marsh, S., C. and N. Sandwith. Fine, well-grown plants, with the reddish basal sheaths and the truncate, more or less barrel-shaped seeds of var. *halophilus* Buchenau et Fernald and *J. ranarius* Song. et Perr., but differing from authentic material of these two forms (which are almost, if not quite, identical) in characters of the tepals and the smaller capsules. Similar specimens were collected by Mr. J. E. Lousley in 1936 on Sinah Common, Hayling Island, S. Hants. Study of numerous specimens of *J. bufonius* from all parts of its wide range suggests that the characters used for distinguishing varieties are not necessarily found in correlation and sometimes break down even on individual specimens. *J. ranarius* Song. et Perr. is an extreme form of which there are no British specimens at Kew, and British records may prove to be based on misinterpretations.—N. Y. Sandwith.
- Zannichellia gibberosa* Rehb. Abundant in a water bunker on the golf links on Berrow dunes, S., C. and N. Sandwith. The first record of this plant for the district and for N. Somerset. It was collected by the late Mr. H. S. Thompson in the canal at Bridgwater, S. Somerset, in 1888, see the Fifth Report of

the *Watson Bot. Exch. Club*, p. 8 (1889). The characters and status of this plant are discussed by N. Y. Sandwith in a note published in the *North Western Naturalist* this year. When fully ripe the fruits are spinulose-cristate along and near both margins.

Scirpus cernuus Vahl. A single tuft in the salt-marsh at Berrow, **S.**, *C.* and *N. Sandwith*.

Rynchospora fusca Ait. This extremely rare species was rediscovered in July, 1931, in very small quantity on Shapwick peat moor, **S.**, by *Mr. A. W. Graveson*. Owing to the death of *Mr. J. W. White* in 1932, the annual "Bristol botany" notes were suspended until 1935, and this important find has not previously been recorded in them; it was, however, given due mention in the Report of the Botanical Section of the *Somersetshire Archæological and Natural History Society* for 1931, p. 7 (1932), and in *Mr. W. D. Miller's* paper of notes on extinct and rare species of the county of Somerset, in *B.E.C.* 1932 Rep. p. 275 (1933).

Carex acuta L. In wet furrows in a field off Woodend Lane at Hill, **G.**, 1937. Under-sized plants with all (3-5) the spikes staminate, which may be due to the uncongenial habitat: this species usually grows on the margins of streams. *C. riparia* and *C. acutiformis*, too, become more or less sterile and otherwise abnormal when they creep away from streamsides into adjoining meadows. *Boott* (Illustr. iv. 166, t. 551: 1867) has a f. *staminifera* from "Yorkshire" with utricles containing anthers instead of ovaries.—*E. Nelmes*.

C. Pairæi F. Schultz. On Silurian ("trap") rock at Middlemill and in and about Michael Wood, near Damery, **G.**, *E. Nelmes*, who writes: "Usually very short-stemmed when growing in the turf on the hillocks formed by the igneous rock at Middlemill and just outside (east of) Michael Wood, and having flat and bright green leaves in this locality." The first record for the Gloucestershire side of our area.

Avena fatua L. var. *pilosissima* S. F. Gray. A weed in an old field of potatoes between Clays End and Newton St. Loe, **S.**, Oct., 1945, *J. P. M. Brenan*. Confirmed by *Mr. C. E. Hubbard*.

Bromus lepidus Holmb., *B. secalinus* L. and its var. *hirtus* Asch. et Graebn. ex Hegi were found in June in cornfields near South Stoke, Bath, **S.**, by *D. E. Coombe*, who sent specimens to *Mr. C. E. Hubbard*, of Kew.

ALIENS. *Silene Behen* L. Wapping Wharf, G., and Ashton Gate, S., 1941, C. I. Sandwith.

Spiræa salicifolia L. On the side of a rocky path a good way from houses near Hanham Abbots, G., I. W. Evans.

Lactuca macrophylla (Willd.) A. Gray. In a deserted garden at Clevedon, S., Miss E. S. Todd.

Chenopodium ambrosioides L. Bombed site, Jamaica Street, Bristol, G., Mrs. Bell. The material is to be referred to the typical form of ssp. *eu-ambrosioides* Aellen.

Euphorbia virgata Waldst. et Kit., auct. angl. Clover-field between Midford and Combe Hay, S., 1944, D. E. Coombe. Bank by Wookey Station, S., C. and N. Sandwith. None of the numerous British specimens at Kew of this widely spread introduction agrees with the typical plant of Central Europe, the leaves of which are short and stiffly erect, narrowing from the base, while the inflorescence is narrow and sub-racemose. Some of them can be referred, *ex descriptione*, to the forma *esulifolia* Thellung, which has leaves broadest above the middle and long-attenuate to the base. A possible solution of the problem is that our British colonies represent a variable and vigorous hybrid, *E. Esula* × *E. virgata* (*E. intercedens* Podp. 1922, non Pax 1904). In a recent paper in the *American Midland Naturalist*, 33, pp. 231-243 (1945), M. L. Croizat discusses the plants of this complex group which have been found introduced in North America and states that the records usually or always refer to *E. intercedens* Podpera. *E. Esula* L., which has occurred mainly in N. Britain, particularly in the last century, may be distinguished from *virgata* forms *inter alia* by the blunt or rounded and mucronate apex of the leaves, which are broadest above the middle, and their revolute margin which is minutely serrulate near the apex.—N. Y. Sandwith.

HEPATICS. *Cololejeunia Rossettiana* (Massal.) Schiffn. In shade on limestone rocks in Ebbor Gorge, S., J. P. M. Brenan. This is the second locality for this species in North Somerset: it was first recorded by the late Mr. H. H. Knight, from Leigh Woods.

Microlejeunea ulicina (Tayl.) Evans. On a beech trunk in Ebbor Gorge, S., C. and N. Sandwith.

Calypogeia arguta Nees et Mont. Wood at Tickenham, and bank near the Abbot's Pool, S., C. Sandwith.

FUNGI. About 500 coloured drawings made by the late Cedric Bucknall have just been presented to the Kew Herbarium by his daughter, Miss Dorothy Bucknall. Most of the paintings illustrate local species listed by Bucknall in his "Fungi of the Bristol District," published in these *Proceedings* between 1878 and 1891, and some are the original drawings of new species published in that work. The collection also includes a number of paintings of fungi executed by the late Edwin Wheeler, mostly of species collected near Clevedon about 1901.

Mrs. Boley's two papers on the vegetation of Berrow (see *Proc. Bristol Nat. Soc.*, 1942, pp. 427-433 ; 1943, 510-520) are of great value for their careful description of the progressive changes occurring in the salt-marsh and sand-dune communities in this interesting area, and for comparison with the observations of Dr. C. E. Moss (1907), Dr. W. Watson (1918) and Mr. H. S. Thompson (1922, 1930). *Limonium occidentale* is now classed as "locally frequent" in the dune-marsh, and I saw it myself in August in the salt-marsh, near the northern edge. Mrs. Boley's record of *Ænanthe pimpinelloides* as locally abundant in the salt-marsh is likely to refer to *Æ. Lachenalii*. *Carex extensa* is evidently on the increase in the open community towards the north end of the marsh ; while the numerous tufts of *Juncus bufonius* come under the var. *congestus* (see note above). A small patch of *Althæa officinalis* by the trackway separating the land from the salt-marsh has recently been reported by several observers ; I do not know if this is a development from the single plant found near Berrow in 1916 by Mr. J. W. Haines (see Mr. White's "Notes Supplemental" in *Journ. Bot.*, 1918, p. 16).

Dr. L. G. G. Warne's delightful paper on Leopold Hartley Grindon (1818-1904), published in *Proc. Bristol Nat. Soc.*, 1944, pp. 27-36, is an important supplement to the account of this naturalist given by Mr. White (*Flora*, pp. 87-88). Grindon's herbarium of 21,000 sheets, containing many Bristol specimens, was presented by his widow in 1910 to the Museum, Manchester University. Dr. Warne points out that it is doubtful if White ever consulted it, although he almost certainly corresponded with Grindon. The herbarium contains local specimens from Rootsey and Thwaites, from Canon Ellacombe of Bitton, and from Miss A. E. Martin of Bath. A few collected by T. B. Flower (whose herbarium, like that of Thwaites, has not been traced) come mainly from North Wraxall, Wilts. Most of the Bristol specimens, however, were collected by Grindon himself. Dr. Warne tabulates

details of 85 important sheets which present no ambiguities. In his own words, some of the specimens on these sheets "antedate anything seen by White (see *The Bristol Flora*), some confirm doubtful localities cited by White on the authority of Grindon, Thwaites, Rootsey or Flower, and some represent the only known specimen from old (and now built over) but well authenticated stations." This list will be indispensable to the compiler of a supplement to Mr. White's book.

The news that the "Flora of Gloucestershire" is "now in the press—to be published shortly" will be very welcome to Bristol botanists, who anticipate with pleasure the appearance of this long promised work.

My thanks are due to Mr. N. Y. Sandwith for his collaboration in the work done on these notes.

Ornithological Notes, Bristol District, 1945

BY H. H. DAVIS, M.B.O.U.

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IN response to enquiries as to what, for ornithological purposes, is intended by the Bristol District, it may here be pointed out that the area covers a considerable portion of both South Gloucestershire and North Somerset, and includes the islands of Steep Holm and the Denny. The area covered in previous issues of these Notes can be briefly summarised as being that part of Somerset lying north of a line drawn from the county boundary near Frome to Wells and thence along the course of the R. Axe to Brean Down on the coast, and that part of Gloucestershire lying east of the Severn and south of a line drawn from Berkeley to the Glos.-Wilts boundary at Tetbury. As, however, observers are now making frequent visits to the Severn beyond Berkeley, the Gloucestershire portion—in this and subsequent issues—may be considered as that lying south of a line running from the New Grounds, at Slimbridge, to Tetbury. This slight extension, so as to include the New Grounds, thus provides an opportunity to publish records from a haunt which, with its large winter population of wild geese and wild duck, is one of the most interesting bird resorts anywhere in the west country. It should, perhaps, be stated that no observations have been possible at Steep Holm during the war-time years, and that there is no additional information regarding bird-life at the Denny since the publication of a detailed account of the fauna and flora of the island, by Dr. L. H. Matthews, in the *B.N.S. Proceedings* for 1932.

The return to more normal times has enabled observational work to be carried out with greater frequency in 1945 than at any time during the previous six years and, once again, attention has been chiefly directed to the North Somerset reservoirs and the Severn Estuary. Records of particular interest from the reservoirs include those of a family party of Bewick's Swans at Blagdon in February and, at the same place, a Great Northern Diver in November and a Little Gull in September, while at Barrow Gurney a White-fronted Goose arrived for a brief stay during the cold spell in January and two Scaup were seen with Tufted Duck in November. Among autumn occurrences reported

from Cheddar are those of a Shag found dead in November and of a Little Stint in company with Dunlin and Common Sandpipers in September. Smew, including adult males, and Black-necked Grebes were seen on various occasions at all three reservoirs, and Slavonian Grebes, the first to be noted since 1936, were clearly identified at both Blagdon and Cheddar in December.

The Severn area at Slimbridge was visited frequently from the end of August to early October when among many waders noted on the sandbanks off the New Grounds were Bar-tailed and Black-tailed Godwits, Curlew-Sandpipers, Sanderlings, Ruffs, Greenshanks and Grey Plover. Here also a Spoonbill was seen on two successive days in September and a Common Sandpiper, evidently a wintering bird, in the third week of December. Following the usual arrival of wild geese, visits to the New Grounds were continued with equal frequency from mid-October onwards. These reached an exciting climax on December 16 when some 2,000 White-fronts were watched feeding on the saltings and with them about seventy Pink-feet, two Lesser White-fronts, one Grey Lag, one Bean-Goose, one Barnacle and a Dark-breasted Brent. This unique gathering, viewed from a pillbox built on the floodbank and examined almost bird for bird, was under observation for nearly five hours by four observers, who were thus able to report the presence of no fewer than seven species at once and, for the first known occasion in these islands, the occurrence together of all five species of the British grey geese. The only records of particular note for the lower reaches of the river are those of a Curlew-Sandpiper, a Little Stint and two Little Terns on spring passage at Severn Beach, and of Curlew-Sandpipers at the same place in August and September.

Other events of special interest include the appearance of a Black Redstart in the ruined Wine Street area in June, the breeding of Nightjars at Rangeworthy and Bleadon, and the presence of a Merlin at Stoke Gifford in October, a Hen-Harrier on the Mendips in February, a Bittern on Kenn Moor in January and a Spotted Redshank along the Avon, near Hotwells, in October. A Quail was heard on several dates at Stoke Gifford in late May and early June but, in contrast to the breeding event of the previous year, the bird did not remain. Reports of seven Barnacle-Geese on the coast near Clevedon on January 27 and of a similar number at the New Grounds a few days later may, perhaps, refer to the same birds.

With two or three exceptions the following specific notes refer only to 1945 and, unless otherwise stated, are the result of observations by

the following members of the B.N.S. Ornithological Section—R. E. Alley, A. E. Billett, Rev. F. L. Blathwayt, H. J. Boyd, G. E. Clothier, H. H. Davis, Dr. C. F. Druitt, R. P. Gait, B. King, A. C. Leach, W. D. Melhuish, G. Mogg, H. W. Neal, C. W. G. Paulson, R. H. Poulding, R. D. Purchon, J. H. Savory, W. R. Taylor, B. W. Tucker, J. C. Walker and D. A. Weir.

The letters **G.** and **S.** indicate respectively observations from the Gloucestershire side of the district and those from North Somerset.

RAVEN (*Corvus c. corax*). **G.** A single bird was seen and heard at the New Grounds on September 5, and two were frequently noted in, or about, the Avon Gorge from October to December. **S.** Seen as follows—two at Long Ashton on January 25 and on October 30 and 31, two at Abbots Leigh on February 17 and two at Cheddar on December 9. Noted also in the Avon Gorge (*cf.* above). Three young were successfully reared at Brean Down (H. Cox).

STARLING (*Sturnus v. vulgaris*). **G.** A dead bird, with ring bearing the inscription "Universite Lithuanie F 23118" was found by Mr. J. H. Harford at Old Wood, Rangeworthy, on April 6. Mr. Harford reports the roosting of large numbers at Old Wood during the winters of 1943-44 and 1944-45, and again in the last three months of 1945.

HAWFINCH (*Coccothraustes c. coccothraustes*). **G.** Fifteen were counted at Durdham Down, Clifton, on February 4, and odd birds were seen in the same locality on various occasions from March to mid-April. **S.** Three were observed at Abbots Leigh on December 31.

LESSER REDPOLL (*Carduelis f. cabaret*). **G.** Reported only from Dyrham where one or two were seen on October 18.

CIRL BUNTING (*Emberiza c. cirlus*). **G.** Again noted at Durdham Down, Clifton, where a male was frequently met with during the spring. A pair was watched at close quarters on a roadside near Charlton on October 14. **S.** Two were seen and heard between Cheddar station and the reservoir on April 14. Two nests were found in the Bleadon area—one with young on May 28 and the other with eggs on July 1.

TREE-SPARROW (*Passer m. montanus*). **G.** Up to twenty, or more, were noted at Dyrham on various dates from early January to mid-April, and again from mid-November onwards. A few were present at Stoke Gifford in January and again in October and November.

WOOD-LARK (*Lullula a. arborea*). **S.** Probably bred on The Warren, above East Clevedon, where a family party of two adults and three young was seen on May 6 (Miss B. A. Coney).

ROCK-PIPIT (*Anthus s. petrosus*). **S.** One, in close company with Meadow-Pipits, was clearly identified at Barrow Gurney reservoirs on October 7.

GREY WAGTAIL (*Motacilla c. cinerea*). **G.** Bred at Henbury where a nest with three young was found along the R. Trym, near Blaize Castle, on July 13. A pair, or two, nested as usual on the R. Frome at Stapleton.

WHITE WAGTAIL (*Motacilla a. alba*). **S.** Twice noticed at the reservoirs—one at Barrow Gurney on April 18 and one at Cheddar on May 8.

GREAT TIT (*Parus major*). **S.** Three independent residents of Saltford report that on several occasions they witnessed a Great Tit pecking off the cardboard cap of a milk bottle. Having removed the cap the bird proceeded to drink!

RED-BACKED SHRIKE (*Lanius c. collurio*). **S.** Nested near Cheddar reservoir where a pair was watched feeding two young on June 14.

SPOTTED FLYCATCHER (*Muscicapa s. striata*). **G.** A pair at Dyrham Rectory laid two clutches in the same nest. The first eggs (four) unexplainedly disappeared on, or about, June 8. They were replaced by a second clutch of four a few days later, and these had successfully hatched by the end of the month.

GRASSHOPPER-WARBLER (*Locustella n. naevia*). **S.** One was heard at Blagdon on June 29 and at least three near Cheddar on July 2.

STONECHAT (*Saxicola t. hibernans*). **G.** A pair again bred, in close company with Whinchats, on railway land between Patchway and Stoke Gifford.

BLACK REDSTART (*Phœnicurus o. gibraltariensis*). **G.** A male was seen and heard on buildings adjoining the bombed area of Wine Street on June 12. The bird was not reported subsequently, nor was there any evidence that a pair was nesting. In view of the recent increase of the Black Redstart in the British Isles, both as a breeding species and as a winter visitor, close watch should be kept in devastated parts of the City for any further occurrences.

NIGHTINGALE (*Luscinia m. megarhyncha*). **G.** Again nested, one or two pairs, in Savage's Wood, Stoke Gifford.

DIPPER (*Cinclus c. gularis*). **G.** While there is no evidence that it now breeds along the Frome at Stapleton, the Dipper continues to be seen there from time to time. Single birds were met with at two widely separated parts of the river on September 20 and one was seen on November 14.

SWALLOW (*Hirundo r. rustica*). **G.** Two nests, one of which had obviously contained young, were found in a concrete pillbox at the New Grounds on September 24.

NIGHTJAR (*Caprimulgus e. europæus*). **G.** Mr. J. H. Harford reports the breeding of a pair at Old Wood, Rangeworthy, and that he saw a young bird there on August 16. **S.** A pair nested at Bleadon but the eggs were, unfortunately, taken. One was seen at Lawrence Weston on May 10.

KINGFISHER (*Alcedo a. ispida*). **G.** On October 25 a Kingfisher was seen to alight on a twig almost touching the dining room window at Dyrham Rectory and to remain there for about a minute.

GREEN WOODPECKER (*Picus v. pluvius*). **G.** Three were observed in flight over Queen's Road, Clifton, on February 8. As fruit is seldom recorded as food of the Green Woodpecker it may be of interest to state that a bird was watched on October 27 attacking apples in a tree at Fishponds. A subsequent examination of the apples attacked disclosed no sign of larvæ within, and it seemed evident, therefore, that the bird was feeding on the fruit.

LESSER SPOTTED WOODPECKER (*Dryobates m. comminutus*). **G.** One was heard and seen at Westbury Park, Henleaze, on March 13. Frequently met with near Stoke Gifford from March to late July. **S.** One was noted at Abbots Leigh on July 10.

CUCKOO (*Cuculus c. canorus*). **S.** A young bird was seen perched on the back of a horse, and being fed by a pair of Hedge-Sparrows, at Abbots Leigh on July 8.

SHORT-EARED OWL (*Asio f. flammeus*). **S.** One was seen hunting at the Ubley end of Blagdon reservoir on February 4. A dead bird was found on Kenn Moor, Nailsea, on November 7, and two were put up, and a dead bird found, near the Yeo Estuary on the 25th.

PEREGRINE FALCON (*Falco p. peregrinus*). **G.** Single birds were noted in or about the Avon Gorge on a number of dates from January to early April. Two were seen in the same place on September 4 and one on December 25. One was observed over Clifton College on several occasions in April and September. Noted also, a single adult, at the New Grounds on various dates from late September to the end of the year. **S.** Bred successfully at Brean Down where the old birds and two fledged young were seen on May 25. One was watched overhead at Barrow Gurney on October 31. Also reported from the Avon Gorge (*cf.* above).

HOBBY (*Falco s. subbuteo*). **G.** Single birds were identified overhead

at St. George, Bristol, on June 10, and at Sea Mills on August 4. Two were seen chasing Swallows and House-Martins at Dyrham on August 28.

MERLIN (*Falco c. aesalon*). **G.** On October 26 a small sharp-winged falcon was seen to dash in among Chaffinches on arable land at Stoke Gifford. It was viewed at very close range and was clearly identified as a female Merlin.

COMMON BUZZARD (*Buteo b. buteo*). **G.** Single birds were seen overhead between Patchway and Stoke Gifford on May 6, at Rangeworthy on September 6 (J. H. Harford), at Henbury on October 8, and at Clifton on December 3 (Ralph Whitlock). **S.** One was observed over Hursley Hill, Whitchurch, on April 8 and one over Brockley Combe on June 11. In the Bleadon and Loxton area three were watched soaring together on March 4, while single birds were noted in the same locality on April 2, July 15 and August 19. One visited the Pill area in December, 1944. It was first seen on the 10th but, as reported in the local Press, was, regrettably, shot on the 24th.

HEN-HARRIER (*Circus c. cyaneus*). **S.** On February 25 a large brown harrier, with conspicuous white rump and a distinctly barred tail, was watched quartering the ground at Rowberrow, on the Mendips. The bird was viewed at close range and, in view of the date, must certainly have been a female, or immature, Hen-Harrier.

SPOONBILL (*Platalea l. leucorodia*). **G.** Good views were obtained of an adult at the New Grounds on September 4. It was still present on the following day but was not reported subsequently. This is, apparently, the only record for the Severn since one was obtained near Gloucester in February, 1920 (cf. *British Birds*, Vol. XIV, p. 234).

BITTERN (*Botaurus s. stellaris*). **S.** One visited Kenn Moor, Nailsea, during the cold spell in January and was, unfortunately, shot on the 27th. The bird, a female, was forwarded to Dr. C. F. Druitt, of Clevedon, for preservation.

BEWICK'S SWAN (*Cygnus b. bewickii*). **S.** A family party of four (2 adults and 2 immatures) was present at Blagdon reservoir on February 20.

GREY LAG-GOOSE (*Anser a. anser*). **G.** One, an immature specimen, was clearly identified among many White-fronts at the New Grounds on December 16, 23 and 30. This is the first recorded occurrence for the Severn since a single bird was seen at the same place in October, 1939.

WHITE-FRONTED GOOSE (*Anser a. albifrons*). **G.** From 2,000 to 2,500 were present at the New Grounds throughout January and

February. They were still in similar strength on March 5, but about a week later they all departed. Autumn arrivals were first noted in the third week of October when 37 were counted on the 21st. On November 23 the flock numbered 165, and by December 4 had increased to 250. In the second week of December there was a sudden influx of some 2,000 birds, and the total remained at that level to the end of the year. With those seen on November 23 were nine birds (three adults and six immatures) in strikingly dark plumage and with bright yellow bills. These were watched at close range on the saltings, and it was observed that they were keeping together and making no attempt to mix with the normal pink-billed and paler looking examples feeding near by. On the whole company being put up, the nine birds again made no attempt to mix with the rest, but flew round alone for some minutes before following the remainder of the flock to mid-stream. Later, they were again seen on the saltings, and once more were keeping very much to themselves. That they were strangers to the main body was quite evident, and it seems likely that they belonged to the reputed race of dark-plumaged, yellow-billed White-fronts from breeding grounds in W. Greenland (cf. *The Handbook of British Birds*, Vol. III, p. 190, footnote). **S.** About twenty grey geese flying S.W. over Queen Charlton on January 15 were confidently identified as being White-fronts. A single bird was seen on the bank of No. 3 reservoir, Barrow Gurney, on January 28.

LESSER WHITE-FRONTED GOOSE (*Anser erythropus*). **G.** Extremely good views were obtained at the New Grounds on December 16 of two adult specimens of this very rare visitor to the British Isles. One of them, probably a female, was first seen at a distance of about 200 yards, feeding among a number of common White-fronts. From a pillbox overlooking the saltings it was watched in a perfect light and, as it gradually grazed to within a 100 yards' range, was under observation for upwards of two hours by four observers—Lieut. Commander Peter Scott, Messrs. Clive Wilson and John Winter, and the writer. Compared with its companions, the bird looked darker and slightly smaller, and its shape and carriage seemed altogether more delicate. Its generally neater and smoother appearance was, no doubt, accentuated by its short neck and legs, and by the light edges of the mantle feathers being narrower and less prominent than in most grey geese. The bright pink—almost coral pink—bill was noticeably small, thus giving the head, which was much darker than in typical *albifrons*, a somewhat rounded effect. When the bird was viewed head-on the

white blaze on the forehead looked narrower than the usual blaze of the common White-front, and it extended well up between the eyes. Most important, however, of the field-characters noted were the swollen golden-yellow eyelids which were clearly seen by all four observers. The second bird, almost certainly a gander, was seen further out on the saltings and was also in company with common White-fronts. Again, the delicate shape and carriage and the very small bill were clearly noted, while the white blaze, extending in this case right to the top of the head, was most conspicuous. Although this bird was viewed (with telescope) at not less than 400 yards' range, it was just possible to get an occasional glimpse of the golden-yellow eyelids. One was again identified by various observers on December 23, 28 and 30, and it seemed highly probable that both birds were still present on the last named date. A more detailed account of this highly interesting event may be found in *British Birds*, Vol. XXXIX, p. 77.

BEAN-GOOSE (*Anser f. fabalis*). **G.** One was identified, in company with White-fronts, at the New Grounds on February 3 (cf. *British Birds*, Vol. XXXVIII, p. 279). A single immature example among White-fronts on December 16 was seen by several observers and was still present on the 24th and 30th. Both birds were of the "segetum" type.

PINK-FOOTED GOOSE (*Anser f. brachyrhynchus*). **G.** Geese reported as arriving at the New Grounds in very small numbers during the last day or two of September were probably referable to this species. None, however, were identified until October 14, when sixty Pink-feet were counted. From seventy to eighty, including both adult and immature birds, were seen on various dates from October 21 to December 16, but, despite frequent watch being kept, the only subsequent report was that of two (possibly more) seen on December 30. It seems evident, therefore, that the majority departed shortly before Christmas.

BARNACLE-GOOSE (*Branta leucopsis*). **G.** Seven, apparently the highest number yet recorded for the Severn area, were seen together at the New Grounds on January 31 and February 3. One was still there on March 5. A single immature bird was noted among White-fronts at the same place on various occasions from November 25 to December 30. **S.** A party of seven was watched close inshore at Ladye Bay, near Clevedon, on January 27 (Miss B. A. Coney).

DARK-BREASTED BRENT GOOSE (*Branta b. bernicla*). **G.** An immature bird observed among White-fronts at the New Grounds on December 16 was still there on the 24th.

MALLARD (*Anas p. platyrhynchos*). **G.** At the New Grounds on September 16 large numbers were watched flying from the river to settle in an adjoining wheat field, where the crop was much damaged and flattened by heavy rain. The birds were evidently feeding on the corn and when subsequently put up from the crop were estimated at not less than 300 strong.

PINTAIL (*Anas a. acuta*). **G.** Several were noted at the New Grounds on two dates in March and about a dozen were seen at the same place on December 26. **S.** Frequently met with at the reservoirs from mid-February to early April and from mid-September to December. Twenty at Cheddar on February 25, five at Barrow Gurney on December 2 and six at Blagdon on December 9 are the highest totals reported.

SHOVELER (*Spatula clypeata*). **G.** Twice noted on the Severn at the New Grounds—six on March 19 and several on December 28. **S.** The largest number reported from the reservoirs is that of a hundred, or more, at Cheddar on February 25.

POCHARD (*Aythya ferina*). **G.** Single birds were met with on the pond at Stoke Park, Stapleton, on September 8 and on the lake at Eastville Park on December 19. Nine were seen off the New Grounds on December 26. This typically fresh water species is an uncommon visitor to the muddy waters of the Severn. **S.** The maximum total reported from the reservoirs is that of 300 at Blagdon on October 14.

SCAUP (*Aythya m. marila*). **S.** Two, females or immatures, were watched and carefully identified by three observers at Barrow Gurney reservoirs in November. They were first noticed on the 11th and were still present on the 25th.

GOLDENEYE (*Bucephala c. clangula*). **S.** Eighteen at Cheddar on February 25 is the largest number reported from the reservoirs.

COMMON SCOTER (*Melanitta n. nigra*). **S.** Twice seen at Barrow Gurney reservoirs—an adult male on September 2 and a party of five, females or immatures, on November 3.

GOOSANDER (*Mergus m. merganser*). **G.** As this species is seldom reported from the Severn, it may be of interest to record here that five—an adult male and four brown-headed birds—were seen together on the sandbanks off the New Grounds on February 12, 1942.

SMEW (*Mergus albellus*). **S.** Frequently met with at the reservoirs from January to early March and again in December. At Barrow Gurney eight, including three adult males, were seen on January 1 and a similar number, including two adult males, on the 28th. Seven

“red-heads” were noted at the same place on December 23. Among the various reports from Blagdon are those of seven “red-heads” and one adult male on February 18 and 20, five “red-heads” and four adult males on December 2, and eight “red-heads” and four adult males on the 14th. One, an adult male, was seen by Sqdn. Leader J. H. Barrett at Cheddar on December 9. These observations show a greater proportion of adult males than has been recorded in any previous year.

CORMORANT (*Phalacrocorax c. carbo*). **G.** Three were observed in flight over the main streets of Clifton on September 15. Eighteen were counted on October 28 at the New Grounds where the bird is a regular visitor in winter. **S.** One was seen on the Avon at Saltford on November 11.

SHAG (*Phalacrocorax a. aristotelis*). **S.** An immature bird was picked up dead at Cheddar reservoir on November 4. In contrast to the previous species the Shag is very seldom met with at the reservoirs.

GANNET (*Sula bassana*). **G.** An adult was seen dead on the river bank at the New Grounds on August 19.

MANX SHEARWATER (*Puffinus p. puffinus*). **S.** A dead bird was found on the rocks on the south side of Brean Down on May 25.

SLAVONIAN GREBE (*Podiceps auritus*). **S.** Twice seen and clearly identified at the reservoirs—two at Cheddar on December 29 and one at Blagdon on the 31st.

BLACK-NECKED GREBE (*Podiceps n. nigricollis*). **S.** Frequently noted at the reservoirs from early August to early November, after which most, or all, of them departed. The highest numbers reported for each reservoir are those of five at Barrow Gurney on October 7, three at Blagdon on September 23 and October 14, and two at Cheddar on November 4.

LITTLE GREBE (*Podiceps r. ruficollis*). **S.** At least fifty were present at Blagdon reservoir on October 14. Thirty were counted at Barrow Gurney on October 7 and November 3.

GREAT NORTHERN DIVER (*Colymbus immer*). **S.** A diver watched at Blagdon reservoir on November 24 was, on account of its large size and massive bill, confidently identified as being of this species.

RED-THROATED DIVER (*Colymbus stellatus*). **S.** One was seen at Cheddar reservoir on December 29. What was probably the same bird was found dead a day or two later.

WOOD-PIGEON (*Columba p. palumbus*). **G.** On January 20 a Wood-Pigeon, bearing a rubber ring on one leg, visited the farm premises

at Little Stoke where it remained in almost continuous company with domestic pigeons for the following four or five weeks, and on some nights roosted on the outside of the pigeon house. By mid-February it was calling frequently from the roof-tops and was sometimes seen displaying on the ground to its companions. The bird, which had no doubt been reared in captivity, disappeared on, or about, February 20 and was not seen subsequently. As early as March 21 a nest containing one freshly laid egg was found in Savage's Wood, Stoke Gifford.

BAR-TAILED GODWIT (*Limosa l. lapponica*). **G.** Twice identified off the New Grounds—a party of seven or eight on September 7 and a single bird on the 24th. **S.** One was seen along the R. Axe at Uphill on September 9.

BLACK-TAILED GODWIT (*Limosa l. limosa*). **G.** Observed off the New Grounds on various dates from the third week of August to the last week of September. Numbers reported are seventeen on August 26, twenty-eight on September 4 and 7, and twenty-four on the 16th and 24th.

CURLEW (*Numenius a. arquata*). **G.** A large gathering seen at the New Grounds on September 24 was found to contain not less than 300 birds.

WHIMBREL (*Numenius ph. phaeopus*). **G.** Two were seen at Severn Beach on September 14. **S.** One was noted at Clevedon on the unusually early date of April 6 and ten were counted at the same place on May 4. At the reservoirs one was observed at Cheddar on May 8 and one, or two, at Blagdon on September 9.

WOODCOCK (*Scolopax rusticola*). **G.** Ten were killed during a shoot at Badminton on December 21. Four were seen at Dyrham Wood on December 26. Several were put up late in the year at Old Wood, Rangeworthy (J. H. Harford). **S.** Twice reported from Leigh Woods in March—one on the 18th and one on the 30th.

JACK SNIBE (*Limnocyptes minimus*). **S.** At Blagdon reservoir two were seen on September 1, two on the 30th and one on December 9. A single bird was flushed at Barrow Gurney on October 10.

KNOT (*Calidris c. canutus*). **G.** Noted on the Avonmouth-Severn Beach mud-flats on several occasions in both spring and autumn. Twelve, on May 19, is the highest number reported. A single bird was seen in the same place on December 25.

CURLEW-SANDPIPER (*Calidris testacea*). **G.** One was seen among Dunlin at Severn Beach on May 19. The bird was just beginning to assume the red underparts and was confidently identified. The follow-

ing were noted with Dunlin at the same place on autumn passage—two on August 29, two on September 14, one on the 16th. Of six viewed at close quarters off the New Grounds on September 5, one was in partial red plumage. One was identified in flight along the same stretch of river on September 16.

LITTLE STINT (*Calidris minuta*). **G.** A single bird observed among Dunlin at Severn Beach on May 9 provides the first spring record for this side of the district. **S.** One was present at Cheddar reservoir from September 2 to the 5th, or later.

SANDERLING (*Crocethia alba*). **G.** Twice reported from the mud-flats below Severn Beach—a party of six on May 9 and a single bird on August 29. Four or five were met with off the New Grounds on September 7. **S.** One was noted along the R. Axe at Uphill on September 20.

RUFF (*Philomachus pugnax*). **G.** Seven were seen feeding together off the New Grounds on September 5 and two were observed at the same place on the 16th and 24th. **S.** Single birds were seen at Blagdon reservoir on August 12, on two dates in September and again on October 14.

COMMON SANDPIPER (*Actitis hypoleucos*). **G.** One was watched at the New Grounds on the unusually late date of December 16. The bird was feeding at a small pool on the saltings, and was seen and heard by four observers. **S.** One was watched feeding below Pulteney Bridge, Bath, on September 30 (A. V. Cornish).

GREEN SANDPIPER (*Tringa ochropus*). **G.** One was put up at the Frampton end of the New Grounds on September 24 (Pilot Officer A. J. B. Thompson). **S.** The only records from the reservoirs are those of single birds at Barrow Gurney on August 26 and September 4 and 29, and at Cheddar on September 23.

SPOTTED REDSHANK (*Tringa erythropus*). **G.** and **S.** Good views were obtained of a Spotted Redshank along the Avon near Hotwells on October 8. The bird was seen on both sides of the river, and was clearly identified by its characteristic call and the absence of white on the secondaries.

GREENSHANK (*Tringa nebularia*). **G.** The following are reported from the New Grounds—one on August 19 and three on September 16 and 24. **S.** Frequently noted, up to three or four in number, at Blagdon and Barrow Gurney reservoirs from August 4 to September 17.

GOLDEN PLOVER (*Pluvialis apricaria*). **G.** About sixty were seen

at the New Grounds on March 19. Birds were regularly noted at the same place from late October onwards—the highest total being eighty on December 4 and 26. **S.** Ten were observed at Queen Charlton on April 4.

GREY PLOVER (*Squatarola squatarola*). **G.** One was frequenting the mud-flats at Severn Beach on September 14. At the New Grounds a single bird was seen on September 27 and nine or ten were seen on October 21. Heard overhead at the same place on two subsequent occasions.

OYSTER-CATCHER (*Hæmatopus ostralegus occidentalis*). **G.** On March 19 four were watched on the river bank at the New Grounds where the bird is, apparently, of uncommon occurrence.

BLACK TERN (*Chlidonias n. niger*). **G.** A single bird was seen hawking over the river at the Frampton end of the New Grounds on September 16. **S.** Frequently met with at the reservoirs on autumn passage—the largest numbers reported being five or six at Blagdon on September 23 and five at Cheddar on the same date.

COMMON TERN (*Sterna h. hirundo*). **S.** At Blagdon reservoir fifteen, or more, were seen on September 1. Five were noted at the same place on the 2nd and one on the 9th. Single birds were present at Barrow Gurney on September 4 and 23. Some of these may have been Arctic Terns (*Sterna macrura*).

LITTLE TERN (*Sterna a. albifrons*). **G.** Two were identified at close range on the shingle at Severn Beach on May 9. The yellow bill and leg coloration, and other distinguishing characters, were clearly seen. This is the only authentic record within recent years for this side of the district.

LITTLE GULL (*Larus minutus*). **S.** An immature bird reported, and accurately described, was watched, in close company with a Black Tern, at Blagdon reservoir on September 5.

COMMON GULL (*Larus c. canus*). **G.** In the late afternoon of August 19 at least 2,000 were seen on the sandbanks off the New Grounds, while others were arriving in a continuous stream from inland localities. This is evidently a favourite autumn and winter roosting place for many of the birds which resort daily to the Cotswolds.

PUFFIN (*Fratercula a. grabæ*). **S.** Following a strong westerly gale a dead bird was found on Kenn Moor, Nailsea, on October 30 (Dr. H. W. Miles).

CORN-CRAKE (*Crex crex*). **S.** The only report is that of one heard at Tickenham on May 7.

WATER-RAIL (*Rallus a. aquaticus*). **G.** One was shot at Badminton on December 21. A bird was heard in a reed bed at the Purton end of the New Grounds on December 30 (W. B. Alexander). **S.** One was seen at the old reservoir, Barrow Gurney, on January 8.

RED-LEGGED PARTRIDGE (*Alectoris r. rufa*). **G.** One or two were met with on arable land at Stoke Gifford on several occasions from March 12 to May 15. On the latter date one was observed calling from the lower branches of a dead oak, and shortly afterwards from the top rail of a field fence. Three were seen in the same locality on August 5.

QUAIL (*Coturnix c. coturnix*). **G.** A bird was calling daily in a wheat crop at Little Stoke Farm, Stoke Gifford, from May 30 to June 5. It was not heard subsequently.

Fronlispic



J. Mynde sculp.
A View of S^t. Vincent's Rock's and the Hot Well near Bristol.

Owen's " Observations "

BY STANLEY SMITH, M.A., D.Sc., F.G.S.

(Received, Feb. 22, 1946. Read in title, March 7, 1946)

THE earliest account of the minerals and rocks of the Bristol neighbourhood was written by a visitor to the district from London. The work to which I am referring is:—

Owen, Edward.¹ 1754. *Observations on the Earths, Rocks, Stones and Minerals, for some miles about Bristol, and on the Nature of the Hot-Well, and the Virtue of its Water.* Sm. 8vo. pp. (12) + vi + 7-250; frontispiece and two plates. London.

Although the author is mainly concerned with the subjects mentioned in the title, at the same time he gives us occasional glimpses of the century in which he lived and of the Bristol neighbourhood two hundred years ago. In dedicating his work to the Earl of Macclesfield, he modestly disclaims any special knowledge of those matters on which he writes; nevertheless his remarks show him to be conversant with contemporary ideas and closely observant, and to possess originality of thought.

In these notes no attempt is made to cover the entire work. On the contrary, from the very wide range of subjects with which its author deals, I have chosen only a few. The extracts I have made are of interest for different reasons: some reflect contemporary scientific outlook, while others shed side light on economic problems and social customs of the time.

In 1754, it will be remembered, very little was known concerning the constitution of matter, or of the formation and disintegration of rocks. The great discoveries in chemistry and geology which were to revolutionize scientific thought later in the century had not yet been made. Owen writes in the discursive manner of his time, and is apt in places to become unduly expansive and even tedious. Yet anyone interested in ideas formerly held (an integral part of the history of every science) or in 18th Century Bristol, will find much that is both entertaining and profitable in this small volume.

¹ My efforts to obtain information concerning the author have so far met with no success.

Its contents can be most satisfactorily indicated by listing in abridged form the captions of the various chapters. The work is divided into six books and these into chapters. I. i., etc., used throughout in this article, denote Book I Chapter i, etc.

- I. i " . . . face of the country, . . . soil and contents of the valleys and hills."
- ii " . . . King-Road and the Lower Avon, . . . the nature of the stones on the adjoining Downs."
- iii " . . . rocks on Durdham and Leigh Downs, . . . ores and minerals found there."
- iv " . . . useful earths . . . found about Bristol."
- II. i. " . . . crystals and other like substances . . ."
- ii " . . . crystals . . . called Bristol stones."
- iii " . . . manner in which the Bristol stones grow to the stones and ores."
- iv " . . . peculiar form of some crystals . . ."
- v " . . . formation of crystals,"
- vi " . . . colours of crystals."
- vii " . . . spar of uncertain form . . ."
- viii " . . . spars of a finer kind, . . . which are found in somewhat regular lumps."
- ix " . . . spar that forms itself into shoots like crystals."
- x " . . . formation and colouring of . . . spar."
- III. i " . . . manner in which the stone lies ; its substance and uses."
- ii " . . . strength and duration of the stone . . ."
- iii " . . . manner of digging the stone, and blowing up the rocks."
- iv " . . . the effect of that coat which covers stones in and out of the earth, and its nature."
- v " . . . the recovery of this coat of stones, when they have lost it."
- IV. i " . . . of the rise of the Bristol spring, and its general nature."
- ii " . . . the method of drinking the Bristol water on the spot, and elsewhere."
- iii " . . . the origin of the Bristol spring, and of the virtues of its waters."
- V. i " . . . the Cotham stone."
- ii " . . . the outer surface and appearance of the Cotham stone . . ."

- iii " . . . the inside of the Cotham stone."
- iv " . . . the substance, nature, and origin of the Cotham stone."
- v " . . . the stones called snake stones."
- vi " . . . the petrifying and encrusting power of the earth about Bristol."
- vii " . . . the rough stones of Clifton-Hill."
- VI. i " . . . stone and other contents of the earth about Bristol, and their uses."
- ii " . . . Bath stone."
- iii " . . . the stones called grey wethers on Marlborough Downs."
- iv " . . . the nature of the stone of which the grey wethers are composed, and its uses."
- last " . . . few farther remarks on a part of Wiltshire."
" The Conclusion."

DURDHAM DOWNS AND THE BRISTOL CHANNEL

One's attention is arrested in the opening paragraph of I. i., pp. 7 and 8, by the description we are given of the Downs and Leigh Woods as they appeared in the middle of the eighteenth century. "On each side [of the Avon] there are hills, and they are more beautiful in prospect, than useful to the possessor. They are neither fertile in herbage, nor fit for the raising of timber. They are in great part covered with fern and furze bushes, in the manner of our waste land in other places. The grass is short, and the few trees that there are scattered about upon them, especially upon Leigh Down, do not seem to thrive as in better soils."

He also draws the following picture of the Bristol Channel, here spoken of as King Road, and of the pleasure parties which at times were in the habit of visiting its shores. "*King-Road* is a vast sheet of salt water, or an arm of the sea, separating *England* from *Wales*; it is three miles over at the new passage into *Wales*, but its breadth is irregular. This place is so very pleasant in summer time, that most of the nobility and gentry, who frequent the Hot-well, go once to view it; where the gentlemen and ladies divert themselves upon a noble sea beach, in picking up small pebbles of all shapes and colours, many of which are so covered with particles of mundick, and others with those of isinglass, that they seem full of gold and silver, and make a

very beautiful appearance when the sun shines upon them : and as the passage is seldom an hour, and the expense only fourpence for a man, and eightpence for a horse, several persons, merely out of a frolick, take a trip over in the passage boat." (I. i., p. 12.) Mundick is an old name for pyrites. This mineral occurs in the Rhætic Bone Bed at Aust ("New Passage") and pyritous specimens of the rock may well have attracted the attention of the visitors. By isinglass may be meant either calcite or gypsum. Both minerals are present here.

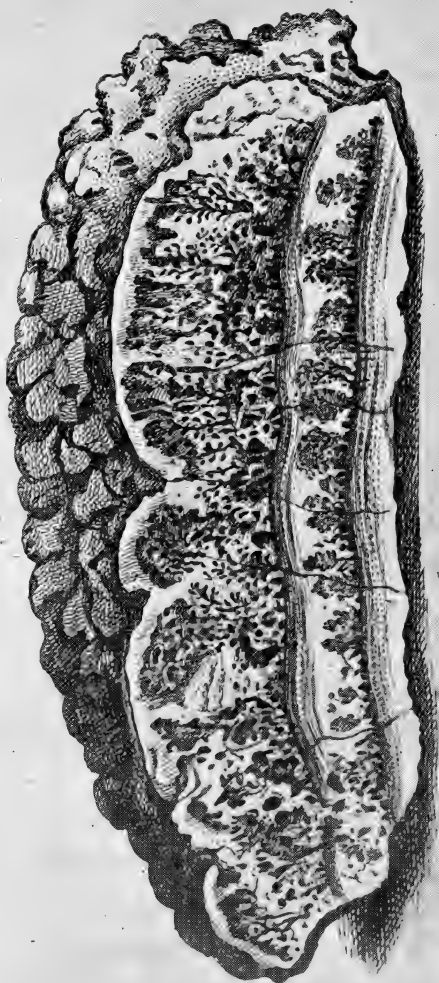
IRON ORES

"Iron ore is frequent among them (i.e., the rocks on Durdham Downs and in the vicinity) and is often very rich." Having thus introduced the subject of ferruginous minerals and rocks the author discusses the question of whether or not iron can occur in nature in the metallic condition. "I have been told of iron found pure and perfect in the earth ; but others it seems dispute whether there be any such thing. That there is pure gold and pure silver in the earth, nobody ever doubted . . . and there is also copper . . . quite pure and fit for use. Why this should not be the case with iron, as well as these metals, I cannot see" (I. iii., pp. 17-18.)

Later he touches on the problem of smelting iron by means of coal. ". . . those who understand minerals, having seen what I brought to *London*, tell me there is scarce any kind of iron ore that I have not got. So that this single part of the kingdom contains almost every kind of ore of this useful metal. If the project that has been some time on foot, of melting iron from the ore with sea coal, should ever be brought to bear, I don't doubt but the neighbourhood of *Bristol* will be one of the most flourishing places in this kingdom. It is pity such things should rest in dispute ; either the ore can be worked with sea coal, or it cannot ; if it can, they have enough of that fuel at hand ; and I should think it worth their while to make any trials." (I. iii., p. 21.) One has here contemporary evidence from an unsuspected quarter of the slow and uncertain progress that had been made in iron smelting during the past forty-five years—the period in which iron production in this country had reached its lowest figure. Abraham Darby, it may be remembered, had in the year 1709 or thereabouts successfully used coke in his furnaces at Coalbrookdale, Shropshire, but as we may gather from Owen's remarks, this success, achieved no doubt through careful attention to detail, was not universal throughout the industry.

face p. 103.

J. Mynde, jr.



The Cotham Stone.

Pla. I.

[To face p. 97

COTHAM STONE

We are indebted to Owen for the name inalienably attached to the lithological curiosity from the Upper Rhætic we less accurately style Cotham 'marble,'¹ and also for the earliest description and figure of the stone. The distinctive features of this compact, argillaceous limestone or, rather, impure, calcareous mudstone are its vermiculate or mammillated upper surface and its internal pigmentation. Most of the bed, which is usually only four to nine inches in thickness, is of a greenish-grey colour, but the lower part, which is finely laminated, exhibits irregular bands of both much darker and much lighter shades. From a dark, almost black, layer, expanding arborescent columns of the same material rise into the more uniformly coloured layer above, and the pattern thus produced, when seen in longitudinal section, conveys the impression of trees growing by the side of water. There are in fact often two 'landscapes,' one above the other, as shown in Owen's figure reproduced as Pl. 4. Owen noticed the similitude and allowed his imagination a loose rein. He writes: "The polished surface afforded a landscape that appeared the work of some masterly hand in painting. There appeared rivers, forests, mountains, grotto's, and everything that could be conceived to embellish a fine picture. In one place specks of a dark colour, and irregular form, resembled clouds seen through some distant opening; in another place is the greatest token of an open country; and in others, trees, bushes, shrubs and hedges, with brooks and rivers running among them." (V. iii., p. 175.)

As in the case of most other rocks and minerals he mentions, Owen discusses the formation of the stone at some considerable length (V. iv., pp. 179-191). The explanation of the landscape he gives is not very different from that put forward by Beeby Thompson in 1894.²

¹ The place from which the stone receives its name is stated by Owen to be Cotham House, near the top of Cotham Hill, in the grounds of which the Homœopathic Hospital now stands. The house still retains its decoration of Cotham marble. The formation has a very wide distribution in the south-west of Gloucestershire.

² *Quart. Journ. Geol. Soc.*, Vol. L, pp. 393-410. Thompson suggests that the escaping gas was produced by the decomposition of the organic matter that gave the particular layers their dark colour. He also attributes the vermiculate surface in part to pressure exerted by the rising gas and in part to contraction, but the vermiculation and mammillation can be attributed to colloidal reaction.

See also paper by H. B. Woodward: *Geol. Mag.*, 1892, pp. 110-117. Woodward interpreted the arborescent markings as dendritic infiltrations of manganese ores, etc., but, as Thompson points out, the tree-like patterns rise from the bottom layer of the bed. They are, it may be added, not films along joints and cracks as in the case of ordinary dendritic introduction of iron and manganese oxides but irregular cones of darker matter introduced into the purer material.

His idea, briefly stated, was that the air escaping from the darker layer carried some of the material up with it into the higher part of the sediment while the whole was still soft.

In the eighteenth century and the early part of the nineteenth, the stone was built into walls, gate posts, etc., as a decoration, the vermiculate surface being exposed to view. Owen makes reference to the practice. "In some places," he says, "about *Bristol*, I met with a very beautiful sort of rustic work in the stone facings of the gateways leading to the better houses." (V. i., p. 164.) ". . . My wonder upon this subject was, after some time, turned another way. I found it was not art and labour, but nature that I was to admire in these wonderful pieces of rustic; that no tool had ever been near them, but they were as they had been found in the earth, and the mason had put them into these places, and claimed no other merit in them." (V. ii., p. 168.)

Examples of this form of decoration still survive. In Cotham Road, for instance, at the end of Cotham Park are two obelisks constructed mainly of Liassic limestone but containing courses of Cotham marble. The material was, we can be quite certain, obtained in the vicinity. Both these stones are susceptible to weathering and some of them in the obelisks have perished. The disintegrated blocks have been replaced by the more durable Bath 'freestone' (from the Oolitic Series), and where this has been substituted for Cotham stone it has been crudely carved to imitate the vermiculate surface.

In the 19th century polished slices of Cotham marble, and small articles of use such as paper weights and pen trays were exposed for sale in Bristol shops. It would seem that Cotham marble was cut and polished at least as early as 1754, for we read, V. v., p. 192: "The gentlemen in this part of the country are not without curiosity. I have mentioned already that I saw in their houses plates of the *Cotham* stone polished and set in frames for its beauty: in some places I also found what are called snake stones, preserved for their singularity."

Snake Stones

In the passage just quoted we have evidence of the growing interest in fossils, which characterises the eighteenth century. The remarks on ammonites which follow, and to which the passage is an introduction, are valuable in so far that they express ideas which then prevailed concerning the organic remains found in rocks. By this time the organic origin of fossils had become generally accepted, but only a very few realised that most fossils represented extinct and not living species.

Owen, although he calls ammonites 'snake stones,' following the common usage of the time, is fully cognisant that these fossils are not petrified serpents as they were then commonly thought to be (an idea even to-day not entirely eradicated from popular belief), but were the remains of "some sea shell." What kind of a shell, he is at a loss to say, but of some living species he imagined, remarking, "there may be thousands of shells in the sea we know nothing of; for we do not go to the bottom, but only find a few that are about the shores." (V. v., p. 201.) In order to convince the sceptic of this, he cites the case of what we can readily recognise as a rhynchonellid. "It is very natural to call a little shell fish, that is as big as my thumb end, and is ribbed all the way down, a cockle; but if we examine these that we so freely call cockles strictly, we shall find that they are no more cockles than they are oysters or muscles; though they very much resemble cockles: they are particular sorts of shell fish that we know nothing of, only as we see them in the stone; and why should we wonder that the great one is unknown to us, when the little ones are the same." (V. v., p. 201.)

Owen was of the opinion that the ammonites and other fossil shells were introduced into the rock adventitiously. He was under the impression that fossils "are mostly lodged in the ground near to the sea shores, or at least where floods might have carried them, or else about the banks of rivers that have a communication with the sea." (V. v., p. 198.) He puts forward, as a reason for believing that the snake stones were introduced into the place where he saw them (between Bath and Keynsham), their 'unhealthy' condition: "The surface of this stone [the Cotham], which is curdled into a sort of rustic work, is hard and fair and healthy, and so would the representations of these snakes if they were the natural features of the stone, and the stone were in health; but instead of that, they are faint and worn out more or less, and defaced so that there is no appearance of the stone being in a healthy state." (V. v., pp. 199-200.)

He considers a rock to be healthy when it is fresh and not in any way decomposed. He held the strange belief that the 'health' of rocks could only be maintained when water was circulating freely through them. "It appears to me, from repeated observation, that springs are, as I may say, the life and support of rocks; and that while the waters flow under them, they will be strong and healthy, and never lose their virtues or their qualities; and, on the contrary, that rocks do lose their weight and soundness, and every quality which before

distinguished them, when by any accident the springs forsake them. . . . I verily think the decayed rocks, which are found at depths under the earth, owe their decay as much to the water's having changed their course and forsaken them, as to extreme old age itself." (IV. iii., p. 144.)

As to when these fossils came into the rock in which they are now found, Owen is not certain. "Many," he says, "have referred their coming to these places, and being sunk in the bodies of stone, to the changes that were wrought upon the earth at the time of Noah's flood. Perhaps a great many of them may be as old as that time: but we know that changes happen in the earth so frequently, that a great many may have come by their present situation otherwise." (V. v., p. 195.)

THE HOT WELL

Book IV is entirely given to the Hot Well, the virtues of its water and the clientele of this once much frequented spa. The water was warm, 70°-76° Fahr., and slightly alkaline. The spring was lost in the latter part of the 19th century, following alterations to the cliffs in the Avon Gorge in 1868. During the middle decades of the 18th century the spa had reached its greatest prosperity.

A few extracts from chapters i. and ii. are given here. In chapter iii. Owen discusses at great length, but to little purpose, the source of the spring. He is chiefly concerned in proving to his own satisfaction that the water did not rise from a great abyss.

"The rock, out of which issues the famous water called the *Hot-well* water, and in other places the *Bristol* water, stands on the north side of the river Avon, and affords a romantic and beautiful prospect." (IV. i., p. 120.) "As this water passes through a vast bed of rocks, and among a variety of different substances, it doubtless borrows taste and virtues from the most particular kinds; and, when drunk at the spring head, it has a fine gentle warmth, nothing like the heat of the *Bath* pump: and a delicate soft milky taste; and it is very grateful to the stomach, and very favourable in many complaints. It is generally allowed to be cooling, cleansing and balsamick; but one of its great qualities is its astringency: this renders it useful in that very terrible complaint the diabetes; and, in consequence of its other qualities, it is drunk with great success in obstructions of the urinary passages from gravel, as also in many of the chronic cases which are least to be relieved by the common course of medicine." (IV. i., p. 121.)

"Everything conspires to render the thing [i.e., the Season at the Hot Well] agreeable. The accommodations of all kinds are excellent, and there is good attendance. The people in general are obliging more than in almost any other place I know, and those belonging to the Hot-well are particularly so. There is always good company; and the many innocent amusements and diversions during the season, which is from *May* to *September*, contribute greatly to the pleasure. For those who love riding, there is the finest country in the world; and, even for carriages, nothing can exceed it; the Downs are spacious and open, and we enjoy the healthful exercise in a pure air." (IV. i., p. 125.) "Clifton, one of the most agreeable villages in the kingdom, presents itself just upon the hill rising from the Hot-well, for lodging. From the mount adjoining to it, there is another extensive and glorious prospect; and the air of this particular spot is so excellent, that it is called the *English Montpelier*." (IV. i., p. 126.) "The principal amusements and diversions of the Hot-well are these: the gentlemen frequently go in pleasure-boats, attended with music, down the *Avon* to *King-Road*, and from thence to view the light-house upon the flat holms, but they always take care to return with the tide, the stream running so prodigiously strong, that there is no such thing as rowing against it. This is a most delightful pleasant voyage, the windings of the river between the rocks and hills beautifully diversifying the scene almost all the way. The gentlemen also have many pleasant rides over *Leigh Down* on the *Somersetshire* side of the *Avon*, even as far as *Falen's Inn*, and *Dundry Tower*, from both which places scarcely any thing can exceed the prospect, the latter being placed as a landmark for ships in their passage up *Bristol* channel. The ladies seldom partake of those pleasures. Their amusements and diversions are pretty much confined to the Pump-room and the Long-room; not but that they have, besides visiting, assemblies, balls and plays alternately, to which they are carried in coaches or sedan chairs, several of these always attending for that purpose." (IV. i., pp. 127-128.) "At the first coming down [to Bristol], the method is to go to the Pump-room in the morning, and drink a glass or two before breakfast; and about five in the afternoon to return and take another or two, most usually two. This is the beginning if the water suits; that is, if the spring tides do not prevent it. The next day the person takes three glasses before breakfast, and three in the afternoon, and this he continues during the time he stays there." (IV. ii., p. 129.) "There is yet one advantage I must needs give to the *Bristol* water upon the spot, over

most other medicines, which is, that it costs nothing, or what is so near to nothing . . . No price is paid for the water: all the expence that attends the drinking of it, is, that every one, when he goes away, makes a present to the master, and a trifle to be divided amongst the servants. This is at his own pleasure, but is generally proportioned to the number of the family, and time of the stay. It is however a very inconsiderable thing when done ever so genteely." (IV. ii., p. 133.) "Those whose affairs will not permit them to leave *London*, and whose constitutions require its assistance, have it here at fivepence the bottle, if they write to *Mr. Barratt*, the master of the *Hot-well*, for a hamper of it to come by sea, a price sufficiently moderate." (IV. ii., p. 132.)

GREY WETHERS

During his stay in the west country Owen visited Wiltshire. There he was much impressed and not a little puzzled by the spectacle of the grey wethers lying scattered over the downs.¹ At that time these blocks of Eocene sandstone were no doubt much more numerous than now.

"These grey wethers upon *Marlborough Downs* are indeed an amazing sight. At a distance they have the appearance of flocks of sheep lying down in different places. As we come up to them, we find them to be all distinct stones, many lying very near, and others at a distance from one another. On examining them, I found them in a strong and healthy condition, like the tops of the rocks on *Durdham* and *Leigh Downs*. Far from having sustained any damage from the air, they have each its coat or crust like the healthy limestone rocks already mentioned, and are perfectly strong and sound within. The coats of these stones are all of a greyish colour, one only excepted, this is white, and looks at a distance like a heap of snow: they are of irregular figures, many of the shape of pebbles; and they are of all sizes, some prodigiously large, and others but small." (VI. iii., pp. 241-242.)

By 'coat' he means the weathered surface a rock acquires, either along the joints when in the ground or on its surface when exposed to the atmosphere. Two earlier chapters (III. iv and v) are entirely devoted to discussing these 'coats on stones.'

Owen was very undecided concerning the origin of the grey wethers. His first impression was that they had been "brought there to build a

¹ The remains of a Tertiary formation removed by denudation.

place of strength, or some place of public worship"¹ (VI. iii., p. 243), but he veers round to the view expressed by the people of the place that they grew where they stood, ". . . the tops of numbers of them, just shooting as it were healthy and strong out of the earth, as if they belonged to large masses growing up within it, seemed to confirm them in that opinion ; but be that as it will, the oldest and most sensible part of the people assured me, it was their stedfast belief, that they had grown very considerably in their time." (VI. iii., p. 242-243.)

I wish to acknowledge assistance from the University of Bristol Colston Society towards the cost of publication of this paper.

¹ Owen was fully aware that megaliths at Stonehenge were fashioned out of grey wethers, but he rightly concluded that this was because the material was the nearest to hand.

Record of Circular Structures in Vein-Calcite at Abbots Leigh, near Bristol

BY I. S. LOUPEKINE, B.Sc., F.G.S.

(Received and read in title, March 7, 1946)

A JOINT-FACE exposed in the old limestone quarry at Abbots Leigh on the Bristol-Portishead Road (440 yds. east of Manor Farm) exhibits circular patches of calcite which do not appear to have been previously recorded.

The beds, which belong to the *Zaphrentis* Zone of the Carboniferous Limestone Series, have an approximate dip of 36° to east-south-east (117°). The vertical joint-face, which runs in the direction of dip, faces south-south-west, and measures about 25 ft. in length. The circular structures, of which over fifty can be counted, occur in varying degrees of development and preservation (pl. 5); the largest attains a diameter of 60 cm. The thickness of the vein material varies, but is usually less than 0.5 cm.

The patches consist of white calcite, and are set in a matrix of transparent grains of colourless to pink calcite. The white calcite exhibits a radial lamellar and feathery structure, each blade or sheaf being 1-2 mm. wide (pl. 6, fig. 1). The material is pigmented in patches by iron oxides, and groups of transparent calcite crystals which are arranged at random show up red on account of the layer below being strongly ferruginous. The circles are remarkably regular, and they are usually sharply defined at their peripheries, the borders being sometimes emphasized by black or red impurities. Between the circles, scalenohedral crystals of calcite, some attaining a length of 3 cm., are developed in places, but are imperfectly preserved. Many exhibit reëntrant angles due to twinning on $\{0001\}$, and a preferred orientation is indicated by the fact that the vertical crystal axes lie in the plane of the joint, in which plane they are also distorted by lateral enlargement.

Powdered material and thin-sections were studied in an attempt to account for the whiteness and opacity of the calcite, which are apparently due to the presence of disseminated dust-fine particles of clayey material. The impurities are concentrated preferentially along cleavage

planes, and thus give rise to the feathery structure (pl. 6, fig. 2). X-Ray powder photographs revealed no diffraction lines other than for calcite.

ORIGIN OF THE STRUCTURES.

There is no evidence which indicates that the structures were developed as surface features after the overhanging wall had been removed: some of the structures are still partially concealed, and thus it is clear that they were developed before the surface was exposed by quarrying. The mode of origin is comparable to ordinary veins which occur abundantly in local limestones. The interest attached to these structures is their radial, bladed character, their circular form, and their relatively large sizes: it is with the origin of these features, and not of the vein-material, that this paper is concerned.

There can be little doubt that the disc-shaped developments of white calcite were preceded and followed by the deposition of granular, transparent calcite, below and between the discs respectively. The stage that gave rise to the structures was no doubt connected with a change in the physico-chemical environment, possibly an admixture of a suspension of clayey matter, and following perhaps a temporary dissolution effect due to compressional agencies. Crystallisation of the calcite seems to have been rapid, thus failing to clear it from the impurities present and, at the same time accounting for the peculiarities of structure. It is significant that the centres of the discs often coincide with bedding planes and joints intersecting the face, for such places would favour the initiation of crystallisation.

The structures may be likened to spherulites developed in two dimensions only, and in this connection it is useful to refer to the experiments of Vater (1893-9) on the crystallisation of calcium carbonate under diffusion conditions: using impure solutions of calcium chloride and potassium bicarbonate, he produced hemispherical aggregates of calcite composed of radially-arranged fibres, and, moreover, attributed the production of disc-like crystallites of calcite to the presence of impurities. Spherulitic and sheaf-like growths were obtained by similar diffusion methods, using gelatine, by Morse and Donnay (1931, 1936) and by Lengyel (1937).

A colloidal reaction for the production of these circular structures is therefore inferred.

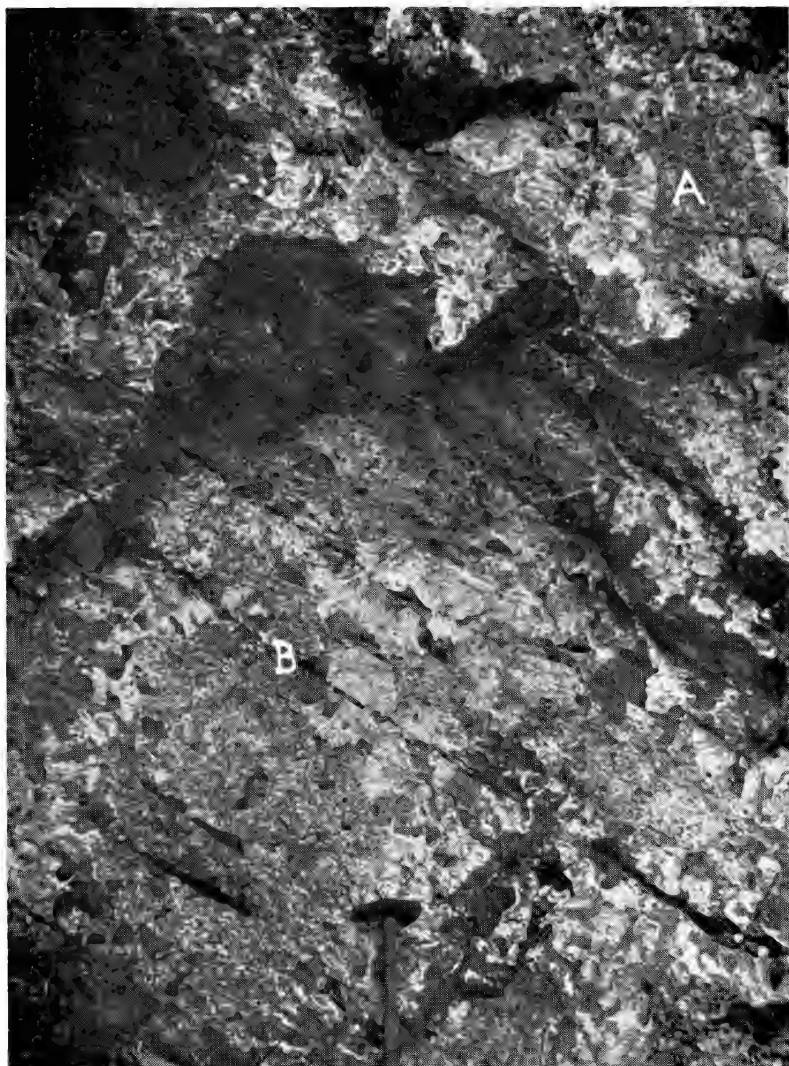
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EXPLANATION OF PLATES

- Plate 5. Circular patches on joint-face of limestone. The radial structure is well displayed by the disc marked A. The bedding plane B is seen to pass through the centres of several discs.
- Plate 6, fig. 1. Photomicrograph of calcite showing bladed structure (x 16 ; between crossed-polaroids).
- fig. 2. Photomicrograph of calcite showing feathery structure (x 16 ; in ordinary light).



STRUCTURES IN VEIN-CALCITE AT ABBOTS LEIGH

Photo: I. S. L.

[To face p. 106

Additions to the Bristol Insect Fauna (Diptera) since 1944

(See *Proceedings* 27, (1), 46-8)

BY H. L. F. AUDCENT, M.Sc.

(Received, Jan. 31, 1946. Read in title, March 7, 1946)

TIPULIDAE (LIMONIINAE)

Molophilus propinquus Egg. **G.** Stow-in-the-Wold (L. W. Grensted) 16/8/44.

SYRPHIDAE

Myiolepta potens Harr. (*luteola* Gmel. nec Scop.) **G.** Coombe Dingle, Bristol (E. E. Lowe) 13/6/45. **S.** Bridgwater (J. Cowley).

CONOPIDAE

Conops vesicularis L. **G.** Moorend (J. Bowden) 4/8/45. **S.** Long Ashton (J. Bowden) 3/8/45.

LARVAEVIORIDAE (TACHINIDAE)

Actia fissicornis Strobl. **S.** Clevedon (A.) 3/8/44.

Dinera grisescens Fall. **S.** Clevedon (H. W. Andrews) 17/6/43.

Stomatorhina lunata F. **G.** Blaise Castle, Bristol (E. A. Fonseca) 25/8/45. A rare fly, probably a migrant.

MUSCIDAE (ANTHOMYIIDAE)

Hylaemyia variabilis Stein. **G.** Olveston (A.) 4/4/23; Hallen (A.) 12/4/26; Mangotsfield (J. Bowden) 2/4/45. **S.** Failand (A.) 30/12/20.

Phaonia bitincta Rond. **G.** Bristol (J. Bowden) 10/4/45.

Phaonia perditia Mg. **G.** Mangotsfield (J. Bowden) 16/9/45.

Phaonia vagans Fall. **G.** Mangotsfield (J. Bowden) 28/4/45 and 9/9/45.

Eustalomyia vittipes Zett. **G.** Moorend (J. Bowden) 15/9/45. **S.** Tickenham (J. Bowden) 27/8/45.

Lispa tentaculata Deg. var. *canariensis* Beck. **S.** Long Ashton (J. Bowden) 10/9/45.

Lispa superciliosa Lw. **S.** Long Ashton (J. Bowden) 10/9/45. Species new to Great Britain.

Hydrotaea similis Mde. **G.** Mangotsfield (J. Bowden) 11/4/45.

ULIDIIDAE

Chrysomyza demandata F. G. Mangotsfield (J. Bowden) 25/8/45.

TRYPETIDAE

Trypeta (Spilographa) artemisiae F. G. Mangotsfield (J. Bowden) 25/8/45.

LAUXANIIDAE (SAPROMYZIDAE)

Sapromyza bipunctata Mg. S. Clevedon (A.) 23/7/45.

CHLOROPIDAE

Chlorops nigrithorax Strobl. S. Long Ashton (J. Bowden) 17/8/45.

Chlorops coxalis v. Ros. S. Long Ashton (J. Bowden) 17/8/45.

CYPSELIDAE (BORBORIDAE)

Dorhniphora (Phora) abbreviata v. Ros. S. Clevedon (A.), 19/7/44.

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Studies on the Biology of the Bristol Channel

XVI

THE FAUNA OF SKOMER ISLAND

A PRELIMINARY SKETCH

By R. BASSINDALE, M.Sc.

(Received, May 3, 1946)

INTRODUCTION

THE main object of a party of Bristol University students on a visit to Skomer Island was a study of the marine fauna. Skomer has been visited by numerous investigators in the past, but, as this was the first party to visit the newly established Field Study Centre of the West Wales Field Society, some general impressions of the fauna may be of interest.

Collections and records were made by all members of the party (notably by R. J. Sleigh and D. M. Vowles) and have been collated by the present writer. The party also included Dr. L. H. Matthews, who was interested in the voles, and, for a few days, Dr. R. D. Purchon, who contributed several marine records. All records were made between April 1 and 11, 1946.*

The expenses of this investigation were in part defrayed by a grant from the Colston Research Fund administered by the University of Bristol.

Skomer is nearly two miles long and a mile and a quarter wide. It lies with its long axis east and west and its eastern tip some three quarters of a mile from the Pembroke coast. The channel between is divided by the quarter-mile wide Midland Isle into the Little Sound, 300 ft. wide, between Skomer and Midland, and Jack Sound, 2,000 ft. wide, between Midland and the mainland. In these two Sounds there is a strong tidal current running northwards at high tide and southwards at low tide. It changes direction at about half tide.

* This paper was received whilst this issue was in the Press, and it has been included to avoid delay in its publication.—Ed. *Proc. B.N.S.*

Skomer consists of a 200 ft. plateau with steep walls to the sea. The walls are indented by gullies, of which the narrow ones are inaccessible from the land but the wider ones are usually accessible. The widest of these are the North and South Havens, which nearly cut the island in two towards its eastern end. The plateau is divided by rock-ridges running east and west along the island, and the shallow valleys between are swampy. Between the valleys and the crests, the island is covered by a springy turf of grass or sea-pink with wide areas of bracken and smaller ones of heather. There are no trees and the few bushes are stunted. Some half dozen springs provide a limited fresh-water habitat with a few shallow pools and small, running streams. A most unexpected feature of the vegetation is the abundance of bluebells which carpet most of the island.

The various rocks of which the island is composed have been described by Cantrill *et al.* (1916). In addition to the very picturesque geology of the island, there are also a stone circle, a camp, a monument (the Harald Stone) and a well preserved hut circle.

Skokholm is in full sight from Skomer to the south, whilst to the west the gannet-inhabited Grassholm is only ten miles away. Eastwards, Midland Isle and the Pembroke coast sweeping northward to the Stacks, fill the skyline.

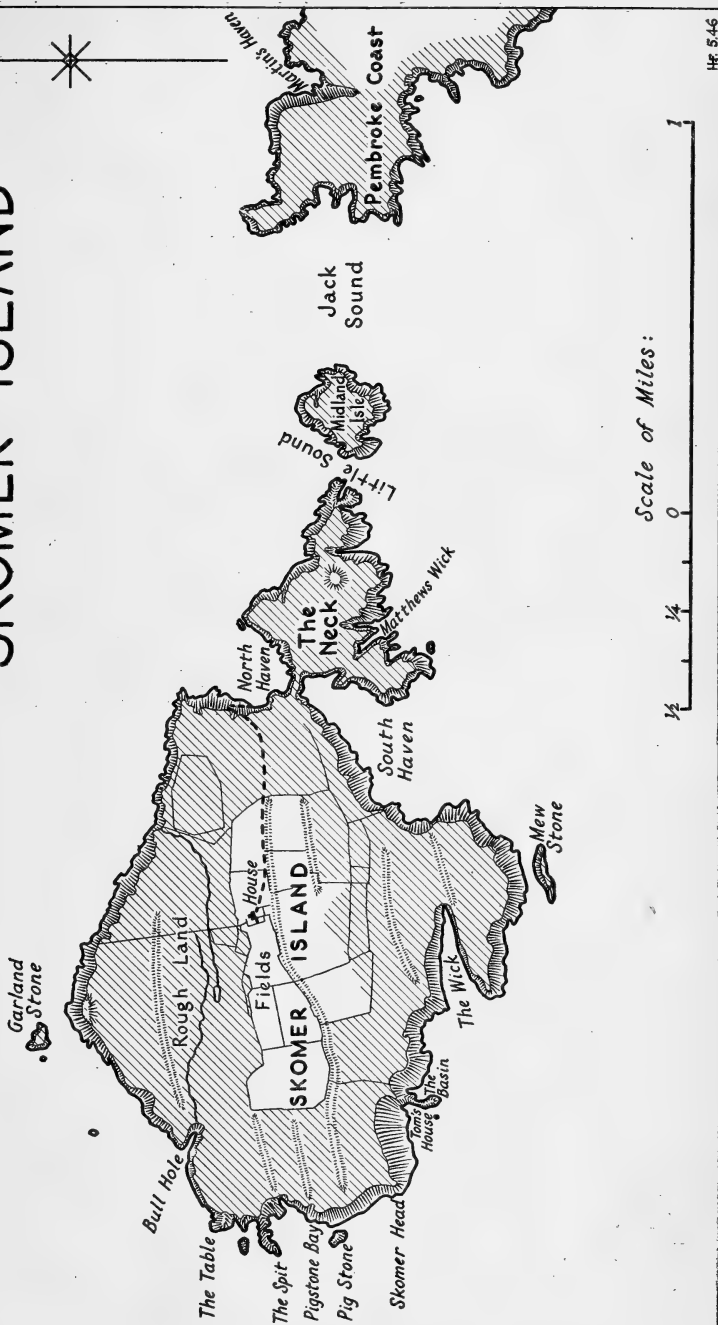
GENERAL FAUNA

Against this very attractive and pleasing background, the fauna of Skomer is not less interesting.

The coastal slopes and cliffs and the plateau provide nesting sites for thousands of herring-gulls, lesser black-backed gulls, kittiwakes, razor-bills and guillemots. In addition, the whole surface of the island is honeycombed by rabbit burrows. In these burrows live thousands of rabbits—including many black ones and an occasional white—together with, in the appropriate nesting season, thousands of shearwaters and puffins. It is a special object of the Field Study Centre to provide facilities for the study of the birds; some idea of the conditions can be obtained from Mr. R. M. Lockley's writings on the neighbouring island of Skokholm.

Skomer is never silent. The gulls call by day and the shearwaters by night. Nor is the bird fauna in any way limited to the abundant species. Small migratory birds rest on the island during their passage north or south (traps have been erected for the purpose of ringing these), whilst jackdaws, buzzards, duck, snipe, raven, crow and

Sketch Map of SKOMER ISLAND



smaller resident birds can be seen daily. The rare chough is also seen regularly.

Among small mammals there seem to be several species of mice and shrews but the most interesting is undoubtedly the Skomer or Drane's Vole. This confiding, russet-coloured species is considerably larger than the mainland species and is found only on Skomer.

Other members of the vertebrate terrestrial fauna seen on this occasion were the slow-worm, lizard, frog, toad and palmate newt.

No particular attention was paid to the insects, but butterflies (mainly the peacock), some moths and humble bee queens were in evidence as well as five species of ant. Ground-beetles are present in some variety but the most noteworthy insect was undoubtedly the dung-beetle, *Ceratophyus typhæus* L. The centimetre-wide burrows of this species are scattered all over the island and the population must be enormous.

Turning to the somewhat limited fresh-water habitat, a representative fauna was discovered. This included the flat-worm *Polycelis nigra*; nematode worms; tubificid worms and the two leeches, *Hæmopsis sanguisuga* and *Helobdella stagnalis*; among arthropods, daphnids, copepods, *Gammarus pulex*, *Velia currens*, corixids, may fly larvæ of apparently one species, caddis larvæ, in sand-grain tubes, apparently of one species, two species of beetle with larvæ, and both red and green chironomid larvæ; and among vertebrates, one frog, *Rana temporaria*, several toads, *Bufo bufo*, with a good deal of spawn, and the palmate newt, *Molge palmatus*, with numerous young stages.

THE MARINE FAUNA AND FLORA

Not all of the coastline of Skomer can be reached from the land and some account of the accessibility of the shore-collecting areas is necessary.

North Haven is easily accessible from the land by means of a cart-track and consists of a steeply walled bay at whose head is an unproductive, shingle beach. The sides of the bay provide a graded series of stones and weed-covered boulders very suitable for shore-collecting. Further out, the intertidal area merges into the steep rock-face which girdles the island and is covered by barnacles, limpets, dog whelks and anemones.

The approach to South Haven is much steeper but is negotiable by all students. The boulder beach gives way on the flanks to the steep rock-face as in North Haven but in the middle of the bay at low tide

is a patch of sand with *Arenicola*. There is no shingle as in North Haven.

A limited but good collecting ground is present between the Mew Stone and the island. The approach here is steep but simple—over a bank of sea-pink tussocks. The boulders are much too large to turn but interesting species are to be found here.

At the Basin the boulders are immense and indicate a more extreme type of storm-washed shore than that of the Mew Stone collecting ground. Much of the remaining shore of the island is even more storm-washed and consists of native rock covered by barnacles. Pigstone Bay and Tom's House are of this type and are both easily accessible over steep slopes. The Basin, on the other hand, is not directly accessible, but can be reached by active collectors from Tom's House. The fauna is restricted but notable for the growths of sponges, corals and ascidians.

The Wick is a deep gully with a precipitous cliff on one side and a steep rock-slope on the other. The approach over the rock-slope is easily negotiated in tennis shoes in dry weather, but leather or nailed boots are definitely unsuitable.

In a general way it seems that the less easily approachable the gully, the less interesting the fauna. The North and South Havens, the Mew Stone and an open shore, as at Pigstone Bay or the coast at the opposite (east) end, probably provide the collector with whatever the island has to offer in the way of intertidal fauna.

THE INTERTIDAL FLORA

On the open, storm-washed rock-coast large weeds are absent. In the bays and gullies, however, large brown weeds are well developed. The species noted in some abundance were:—

Pelvetia canaliculata
Fucus spiralis
Fucus serratus
Fucus vesiculosus
Ascophyllum nodosum
Himantalia lorea
Laminaria digitata
Laminaria cloustoni
Porphyra sp.
Chondrus crispus
Polysiphonia fastigiata

Other weeds were present, for example, *Cladophora*, *Corallina*, *Lithothamnion*, *Rhodomenia* and *Delesseria*, but were not properly determined.

THE FAUNA

Identifications were made by inspection or from Eales (1939) and are subject to the limitations of these methods.

The sublittoral fauna

Two short dredging trips were made, one in the North and one in the South Haven. The latter was not very successful but specimens of *Corystes* and of *Venus* indicated the presence of a soft bottom. In the North Haven both rock and mud were encountered and the following characteristic species together with strands of *Zostera* were obtained :—

Caryophyllia smithi
Pectinaria belgica
Aphrodite aculeata (small)
Balanus improvisus
Eupagurus bernhardus (in *Turritella* shells)
Corystes cassivelaunus
Nassarius reticulatus and egg cases
Gibbula cineraria
Turritella communis (abundant)
Venus fasciata
Cardium edule (small)
Ensis ensis (small)
 Shells of *Tellina tenuis*
 Tellina crassa
 Macoma balthica
 Chlamys sp.
 Brittle Stars: four species.
Echinocardium cordatum (dead shell)

The intertidal fauna

The intertidal fauna was more extensively investigated and will be dealt with under phylum headings.

Phylum PORIFERA

A normal range of species was found, the most noteworthy growths being those of *Pachymatisma* in the Basin.

Leucosolenia clathrus. Under boulders in the Basin.

Grantia compressa. Numerous small colonies in S. Haven under stones.

Halichondria panicea. Common, S. Haven and at the Mew Stone.

Hymeniacidon sanguinea. Common, S. Haven and Mew Stone.

Pachymatisma johnstoni. Very good growths in the Basin: present at S. Haven, Mew Stone and Matthews Wick.

Phylum CEELENERATA

Hydroids were not abundant but anemones were common. The rare *Balanophyllia* was the most noteworthy species of the whole fauna.

Among hydroids *Tubularia* was present in N. Haven and was

common at the Mew Stone and the Basin under boulders or on open rock. Both *T. indivisa* and *T. larynx* appear to be present.

Several species of *Sertularia* or related genera were present in N. and S. Havens and at the Mew Stone.

Alyconium digitatum. One tiny fragment in N. Haven.

Actinia equina. Widespread in all colour varieties.

Anemonia sulcata. Frequent in S. Haven. Not recorded elsewhere.

Tealia felina. Frequent, Mew Stone and N. Haven; rare, S. Haven.

Bunodactis verrucosa. Occasional, N. Haven.

Sagartia sphyrodeta. Frequent, Mew Stone. (Probably this species.)

Caryophyllia smithi. Frequent, Mew Stone, Basin, N. Haven.

Corynactis viridis. Frequent, Mew Stone.

Balanophyllia regia. Frequent, S. Haven, Basin, Mew Stone. The easily accessible and beautiful colony in a crevice on the east side of S. Haven *should be left intact* for all to see.

Phylum NEMERTINEA

Two nemertines, *Lineus longissimus* and another, were obtained in N. Haven.

Phylum ANNELIDA

Numerous species of polychæte worms including polynoids, nereids and tubicolous species were taken, but few were determined.

Polynoids. Short polynoids were common in the N. and S. Havens and at the Mew Stone. *Aphrodite* is recorded in the sublittoral list.

Eulalia viridis. Frequent, N. and S. Havens; rare, Mew Stone: one egg mass, Mew Stone, 5.4.46.

Phyllodoce laminosa. Frequent, N. Haven; present, S. Haven and Mew Stone: spawn common in S. Haven, 2.4.46.

Nereis pelagica. N. Haven.

Arenicola marina. Colony in sand at low-tide level, S. Haven.

Arenicola branchialis. One, N. Haven.

Amphitrite gracilis. Frequent, N. Haven.

Pomatoceros triqueter. Frequent, N. and S. Havens.

Spirorbis spirillum. Common, N. and S. Havens.

Filograna sp. Colonies in the Basin of this genus or *Salmacina*.

Phylum GEPHYREA

Thalassema neptunisp. One, N. Haven.

Phylum ARTHROPODA

A wide variety of crabs is present but the main crustacea are undoubtedly the barnacles which girdle the island.

Balanus balanoides. Forms a continuous ring around the island. In S. Haven a high proportion had egg masses (2.4.46) and nauplii hatched immediately from eggs placed in sea water. Newly settled spat was common and in S. Haven there was a high percentage infection of *Hemioniscus*.

Balanus perforatus. Frequent wherever searched for.

Balanus improvisus. Occasional, Basin.

Balanus sp. A large barnacle, possibly *B. porcatus*, occurs rarely in N. Haven and at the Mew Stone.

Chthamalus stellatus. The distribution of this species conforms to its known requirements of wave action (Moore and Kitching, 1939). It is abundant at Pigstone Bay and along the south side of the island near the Mew Stone. It is rarer in the more sheltered areas inside the Mew Stone and bordering the Little Sound and is absent from the heads of the N. and S. Havens. Where abundant it excludes *Balanus balanoides* from the highest levels, where rarer it is mixed with *B. balanoides* and where absent the *Balanus* is found alone at the high levels.

Verruca stræmia. Common at the Mew Stone and probably elsewhere.

Apseudes talpa. One, N. Haven.

Ligea oceanica. Midland Isle: probably widespread on Skomer.

Idothea sp. Rare, S. Haven.

Janira maculosa. One, S. Haven.

Sphæroma sp. Common in empty barnacle shells, S. Haven: probably widespread.

Hemioniscus balani. A high percentage infection of *Balanus balanoides* in S. Haven; some had ripe larvæ: present but apparently rarer in N. Haven and on Midland Isle.

Orchestia gammarella. N. and S. Havens: some quite terrestrial specimens were taken from a rabbit burrow mouth on Midland Isle about 150 ft. above sea level.

Leander squilla. Two, small, N. Haven.

Athanas nitescens. One, N. Haven.

Eupagurus bernhardus. Common, S. Haven: (dredged, N. Haven).

Galathea strigosa. One, Mew Stone.

Galathea nexa. One of this species or of *G. dispersa*, Basin.

Porcellana longicornis. Common, N. Haven; much less common, S. Haven and Mew Stone.

Porcellana platycheles. Abundant, N. Haven; common, S. Haven; frequent, Mew Stone: one in berry, 4.4.46.

- Carcinus mœnas*. A few, N. and S. Havens.
- Cancer pagurus*. Rare, S. Haven ; commoner, N. Haven ; frequent. Mew Stone.
- Xantho incisus*. Common, N. and S. Havens ; present, Mew Stone : females in berry, 4.4.46.
- Pilumnus hirtellus*. Rare, N. and S. Havens : female in berry, 4.4.46.
- Portunus puber*. Common, N. and S. Havens ; present, Mew Stone.
- Pycnogonid*. One of the long-legged type, S. Haven.

Phylum MOLLUSCA

The usual wide range of gastropod molluscs was present in N. and S. Havens and included *Diodora*, *Trivea* and *Emarginula*.

Lepidochiton cinereus. One, S. Haven.

Two other chitons from the Mew Stone were probably *Tonicella* and *Acanthochitona*.

Patella sp. No attempt was made to discriminate the species of *Patella* but the genus is abundantly represented on every part of the coastline.

Patina pellucida. Not common, N. Haven and Mew Stone.

Patelloida virginea. Common, Mew Stone.

Diodora apertura. Rare, N. and S. Havens, Mew Stone.

Emarginula reticulata. One, N. Haven.

Calliostoma ziziphinum. Frequent, N. Haven, Basin, Mew Stone ; one, S. Haven : several white specimens from the Mew Stone.

Gibbula cineraria. Common, N. and S. Havens ; frequent, Mew Stone.

Gibbula umbilicalis. Common, N. Haven ; not so common, S. Haven ; rare, Basin.

Osilinus lineatus. Common, N. and S. Havens.

Littorina neritoides. Probably widespread and common : some very fine specimens taken at S. Haven and Pigstone Bay.

Littorina littorea. Common, N. Haven ; frequent, S. Haven.

Littorina saxatilis. Common, N. and S. Havens, Mew Stone.

Littorina littoralis. Common, N. and S. Havens : spawn, 2.4.46.

Trivea europea. Frequent, S. Haven.

Trivea arctica. Frequent, N. Haven ; rare, Mew Stone.

Ocenebra erinacea. Rare, N. Haven.

Nucella lapillus. Widespread : egg cases, 2.4.46.

Nassarius reticulatus. Present, N. and S. Havens : also dredged : capsules on weed, 2.4.46.

Nassarius incrassatus. One, N. Haven.

Goniodoris nodosa. Frequent, Mew Stone.

Jorunna tormentosa. One, N. Haven.

Archidoris brittanica. Frequent, N. Haven and Mew Stone: spawn in both places and (probably of this species) in S. Haven.

One each of three other undetermined species of nudibranch were also taken in the Basin, at the Mew Stone and in N. Haven.

Anomia sp. or *Heteranomia*. Frequent, S. Haven and Mew Stone.

Mytilus edulis. Small specimens in greater or lesser abundance were recorded from N. and S. Havens, Mew Stone and Pigstone Bay.

Chlamys sp. Several, N. Haven.

Paphia pullastra. One, Mew Stone.

Hiatella arctica. Several, N. Haven.

Phylum POLYZOA

The Polyzoa were not studied but *Electra pilosa*, *Umbonula* (?) and a *Crisia* were common.

Phylum ECHINODERMATA

A representative echinoderm fauna was present (including at least four species of brittle stars, dredged in N. Haven) but the noteworthy species were *Antedon* and *Henricia* between tide marks.

Antedon bifida. One, Mew Stone.

Henricia sanguinolenta. Two, Mew Stone.

Asterias rubens. Several, Mew Stone; one, N. Haven; one, Midland Isle.

Marthasterias glacialis. Two, Mew Stone.

Ophiothrix fragilis. Common, N. Haven; frequent, Mew Stone.

Ophiocomina nigra. Three, small, N. Haven.

Another brittle star (*Amphiura elegans* ?) was common in S. Haven.

Psammechinus miliaris. Frequent, N. Haven; rare, Mew Stone.

Echinus esculentis. Not recorded on the island but specimens were obtained from the adjacent mainland.

Cucumaria saxicola. Frequent, N. Haven.

Phylum TUNICATA

Ascidians were not studied but both solitary and compound species were represented. A *Ciona*-like type was present in N. Haven and a reddish, gregarious species (*Molgula* ?) was present at the Mew Stone and abundant in the Basin. Only small colonies of *Botryllus* were present in S. Haven and the Mew Stone; colonies of *Morchellium* (?) were numerous at both places.

Phylum VERTEBRATA

- Nerophis lumbriciformis*. One male with eggs, S. Haven, 2.4.46.
Ammodytes tobianus. Two, S. Haven.
Onos mustela. One, N. Haven.
Onos tricirratus. One, N. Haven; one, S. Haven.
Blennius gattorugine. One, large, S. Haven.
Blennius pholis. One, N. Haven.
Centronotus gunellus. One, N. Haven.
Lepadogaster gouanii. Abundant among stones, N. Haven; frequent, Mew Stone; rare, S. Haven.
 Grey seals and 'porpoises' were seen off shore regularly.

Plankton

One plankton haul with a medium net yielded barnacle nauplii, copepods, zœa larvæ, *Sagitta* and eggs of *Littorina littorea* and of fish.

CONCLUSION

From a general consideration of the intertidal fauna and the available collecting stations on Skomer Island it is clear that there is present a good, representative, marine, rocky shore fauna. When compared with the fauna of Porlock Bay (Bassindale, 1942) the presence of echinoderms and ascidians in greater variety indicates the absence of any estuarine effect.

There are differences between the different collecting stations on the island which seem to be due to variations in wave action. It seems possible that the comparison of a series of carefully worked stations—for example, Pigstone Bay, the Basin, the Mew Stone, S. Haven and N. Haven, in which series the size of boulder gets progressively less—might yield interesting information on the habitat requirements of different species. During the present survey only the Mew Stone and the N. and S. Havens were examined at all carefully, although both the Basin and Pigstone Bay were visited. The wave exposure requirements of *Chthamalus stellatus* (Moore and Kitching, 1939) seem to be illustrated by its abundance at Pigstone Bay, its presence at the Mew Stone in smaller numbers and by its absence from the Havens. There are numerous differences between the Mew Stone and the Havens and these may prove to be habitat preferences directly attributable to wave action.

From the point of view of the visiting general zoologist, Skomer offers a good marine fauna of the rocky shore type. The use of a boat,

which is included in the plans of the station, would provide opportunities of visiting the near-by mainland sand-beaches as well as permitting the use of dredge and tow net to investigate the benthic and planktonic fauna which both seem promising. In addition, there is a limited fresh-water fauna, a terrestrial fauna whose limitations are offset by the abundance of an otherwise not easily seen dung-beetle and a vole found nowhere else, the whole set against a background of picturesque scenery and a display of sea birds not to be surpassed in the British Isles.

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Occurrence of the Pine Marten near Bristol

THE Pine Marten, one of the shyest and rarest of British mammals, is a small carnivore resembling a very large stoat with a long bushy tail. The fur is a rich dark brown in colour except for a patch of yellow on the under surface of the neck and breast.

Until the seventeenth century it was a common animal in the British Isles, but since that time it has been exterminated nearly everywhere except in the Lake District, parts of Wales and the Highlands of Scotland. Its extermination was due to the disafforestation which accompanied increasing agriculture, its destruction as vermin, and, formerly, to the demand for its fur. Typically the Pine Marten is a creature of the woodlands and is an expert tree climber, but in this country it has largely abandoned its arboreal habits, for the remote mountains to which it has retreated are mostly treeless.

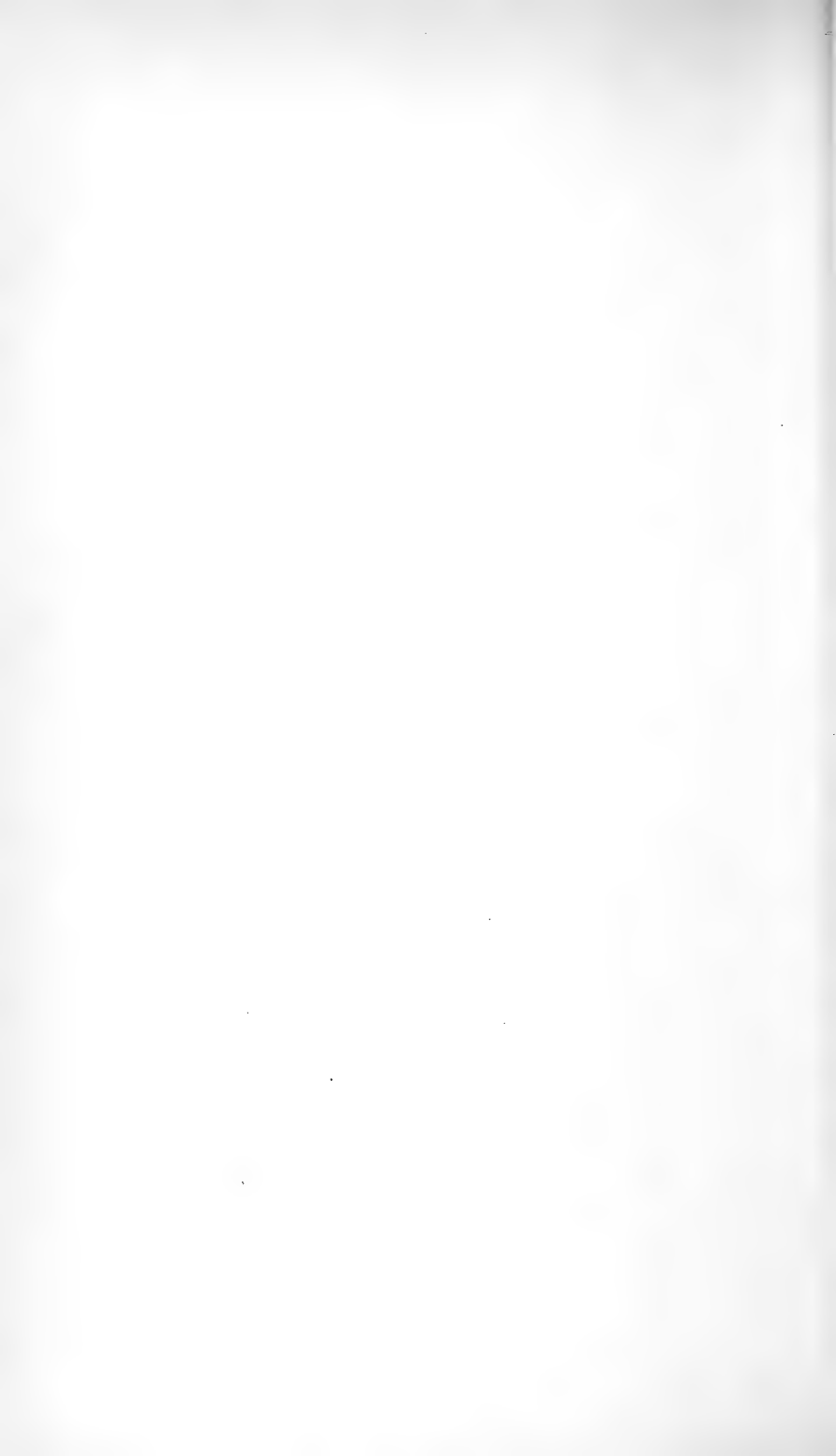
During the last twenty-five years it has increased again in numbers, especially in Scotland and Wales, partly because of the general decrease in game preserving and partly because the Forestry Commission's areas of reafforestation have given it suitable secluded habitats. Nevertheless, it was a great surprise when the report came that one had been found near Bristol for, though Pine Martens are great travellers, our district lies many scores of miles from their nearest known haunts.

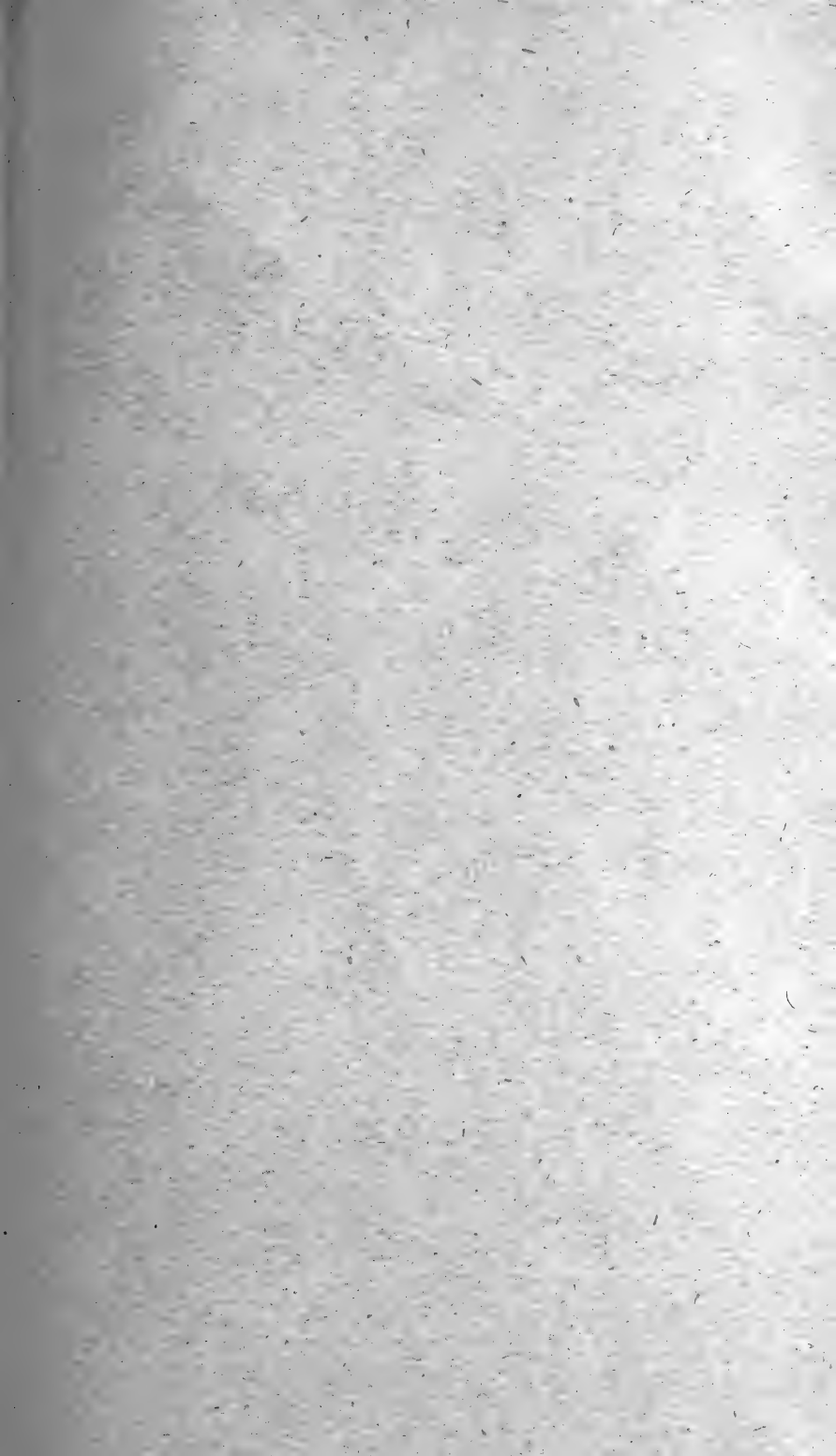
On March 10, 1946, a male Pine Marten was shot in Prior's Wood, Portbury, Somerset, by a gamekeeper who did not know what it was. The animal was presented to the Bristol City Museum where it is now preserved; it was in splendid condition, showing no signs of having escaped from captivity. The measurements were, head-and-body 465 mm., tail 201 mm., hind foot 88 mm., ear 44 mm.; the breast spot was a rich yellow. The origin of the animal could only be a matter for conjecture, though it seemed unlikely that it could have reached this part of Somerset unaided. The matter was of sufficient interest to be noted in the press and for mention of it to be made by the B.B.C. As a result of this publicity, word was received from a gentleman living near Plymouth that two of his captive Pine Martens had escaped in September, 1945. Here, then, was a possible origin for the Portbury animal, though the distance from Plymouth would make a very long journey for so small a beast.

And now in April, 1946, a second Pine Marten has appeared near Bristol. This one is more fortunate than the last for it has not been shot, but is being protected in the wood where it is living. It will probably be best for the sake of the animal not to disclose the exact locality, but one may say that it is in Somerset and not more than ten miles from Bristol. It will be gratifying if this interesting species can again become established in our district for it was a regular part of our fauna a hundred years ago, Knapp's *Journal of a Naturalist* (1829) recording that it was still to be found in the neighbourhood of Thornbury. The last Pine Marten found in the Bristol district before the present occurrences was one captured alive near Berkeley in 1882.

L. HARRISON MATTHEWS.

W. E. MAYES.







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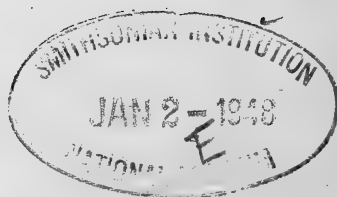


"Rerum cognoscere causas."—Virgil.

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CONTENTS

	PAGE
Council	124
Members at March 31, 1947	125
Report of Council	134
Congratulatory Address to the Cotteswold Naturalists' F.C.	136
Hon. Treasurer's Statement of Accounts	137
Hon. Librarian's Report	138
Exchange and Gift List	139
Report of Botanical Section	141
Report of Entomological Section	142
Report of Field Section	143
Report of Geological Section	144
Report of Ornithological Section	146
Account of Annual and General Meetings	147
Bristol Botany in 1946, by Cecil I. Sandwith	149
Ornithological Notes, Bristol District, 1946, by H. H. Davis, M.B.O.U.	161
Notes on Bucknall's drawings of British Fungi, by A. A. Pearson, F.L.S.	177
The Rhætic and Lower Lias Rocks of Inglestone Common, near Hawkesbury, Gloucestershire, by D. T. Donovan, B.Sc., F.G.S.	181

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A. Roden, Rev. H. C. B., M.A. ... 7 Henleaze Avenue, Westbury-on-Trym,
Bristol
Rogers, Miss M. H., M.A. ... 36 Cotham Park, Bristol, 6
Ross, F. Stenhouse 25 Tugela Road, Uplands Estate, Bristol, 3
A. Ross, D. E. Do.
A. Rudge, Miss D. M. 6 Elgin Park, Redland, Bristol, 6
C. Rymer, P. G. P. Middle Farm, Parnington, nr. Ashchurch,
Tewkesbury, Glos.

- A. Salmond, P. W. 22 Tyndall's Park Road, Clifton, Bristol, 8
- C. Salter, Miss J. E. R., B.A. 74 Reading Road, Wokingham, Berks.
- Sampson, Miss A. 13 Chertsey Road, Bristol, 6
- * Sandwith, Mrs. C. I. 26 Canynge Square, Clifton, Bristol, 8
- Saunders, Miss C. E. 25 Robertson Road, Eastville, Bristol, 5
- Savory, J. H. Windyridge, Abbots Leigh, nr. Bristol
- Savory, Mrs. J. H. Do.
- L. Scase, R. P. Lower Northend Farm, Batheaston, Som.
- C. Scott, Lt.-Cmdr. P., M.B.E.,
D.S.C., M.A. New Grounds, Slimbridge, Glos.
- Shaw, A., A.S.A.A. 34 Whitecross Avenue, Wells Road, Bristol, 4
- Shaw, Mrs. A. Do.
- Shaw, Miss D. 38 Logan Road, Bishopston, Bristol, 7
- * Shaw, Miss T. 12c Kingsdown Parade, Bristol, 6
- Shinner, H. S. The Chase, Kingswood, Bristol
- Shinner, Mrs. D. Do.
- * Skene, Prof. M., D.Sc., F.L.S.
Skene, Mrs. M. Dept. of Botany, Bristol University
- A. Sleigh, R. J. 36 Lawrence Grove, Westbury-on-Trym,
Bristol
- Sloane, J. F., B.Sc. Wills Hall, Stoke Bishop, Bristol, 9
- Smith, D. M., M.R.C.S.,
L.R.C.P. Burwalls, Bristol, 8
- Smith, P. G. M. Lodge Cottage, Lodge Road, Kingswood,
Bristol
- Smith, E. L. Do.
- Smith, J., M.I.M.E. 18 Carnarvon Road, Bristol, 6
- C. Smith, S.G., F.R.E.S. Chelwood House, Pensford, nr. Bristol
- * Smith, Stanley, M.A., D.Sc.,
F.G.S. Estyn, Boughton, Chester
- Southam, E. V., B.A. Dept. of Geology, Bristol University
- Spiers, D. R. 4 Manor Road, Fishponds, Bristol
- A. Spink, Miss W. 46 Repton Road, Brislington, Bristol
- A. Sprague, D. Danesway, Falcondale Road, Westbury-on-
Trym, Bristol
- A. Standing, A. J. 3 Regent Street, Clifton, Bristol, 8
- A. Stanhope, Rev. A. J. 19 Cotham Road, Bristol, 6
- A. Stanley, Miss R. P. 182 Bishop Road, Bishopston, Bristol, 7
- Stinchcombe, F. A. 21 West Park, Clifton, Bristol, 8
- Stock, Miss J. 36 Filton Grove, Horfield, Bristol, 7
- Studer, J. P., B.Sc. The Cottage, East Dundry, Bristol
- A. Sutcliffe, A. J. Shell D'Arcy Exploration Party, c/o U.A.C.,
Box 201, Sekondi, Gold Coast, Africa.
- Swaine, Miss A. K., F.R.S.A. 15 St. Paul's Road, Clifton, Bristol, 8
- A. Tadd, A. D. Pisang Cottage, Nailsea, Som.
- Tasker, L. 18 Fitzgerald Road, Lower Knowle, Bristol, 3
- Taunton, W. C. 4 Whiteladies Road, Bristol, 8
- Taylor, Miss A. E. 46 Trelawney Road, Cotham, Bristol, 6
- A. Taylor, G. H. 16 Cotham Road, Bristol, 6
- Taylor, Miss M., D.Sc. 107 Sylvan Way, Sea Mills, Bristol
- Taylor, S. M., B.Sc.,
S.I.Mech.E. Bristol University
- Taylor, W. R., M.A. 23 St. Alban's Road, Bristol, 6
- Temperley, B. N., B.Sc., Ph.D. 5 Pembroke Vale, Bristol, 8
- Tetley, Mrs. H. Dept. of Geology, University, Bristol, 8
- Trapnell, D. 4 The Avenue, Sneyd Park, Bristol, 9
- C. Trenerry, G. G. 19 Sion Hill, Clifton, Bristol, 8
- A. Troon, J. J. 104 Trelawney Road, Peveril, Plymouth,
Devon
- *C. Trueman, Prof. A. E., D.Sc.,
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- C. Trueman Mrs. A. E. 21 Audley Road, London, W.5
- Do.

- C. Tucker, B. W., M.A.,
M.B.O.U. 9 Marston Ferry Road, Oxford
Turner, H. W., M.A., F.G.S. The University, Bristol, 8
Turner, Mrs. H. W. The Cottage, Kensington Place, Clifton,
Bristol, 8
- *H. Tutchet, J. W., M.Sc.
- Vanderplank, F. L., B.Sc. ... 74 Downs Park East, Westbury Park
Bristol, 6
Do.
- Vanderplank, Mrs. F. L.
- A. Vincent, H. 5 Cotham Road, Bristol, 6
Do.
- A. Vincent, Mrs. H.
- Vine, Miss D. J. 64 The Crescent, Henleaze, Bristol
- Walker, J. C. 10 Grange Avenue, Little Stoke Park Estate,
Patchway, Bristol
- Waller, N. E., A.I.A.S. Clanberris, Gloucester Road, Patchway,
Bristol
- Wallington, W. A. 75 Great Brockeridge, Westbury-on-Trym,
Bristol
Do.
- Wallington, Miss J.
- * Wallis, F. S., Ph.D., D.Sc.,
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- * Walters, S. M., B.A. St. John's College, Cambridge
- Wareham, Miss C. A. L. 252 Charlton Road, Kingswood, Bristol
Do.
- Wareham, Miss F.
- *C. Warne, L. G. G., M.Sc., Ph.D. Dept. of Botany, The University, Man-
chester, 13
59 Belvoir Road, St. Andrew's, Bristol, 6
- Warren, Miss E.
- Watkins, N. A., M.A.,
F.R.E.S. 9 Druid Road, Stoke Bishop, Bristol, 9
- Webb, H. M., B.Sc. Red Garth, Church Road, Stoke Bishop,
Bristol, 9
- Webb, H. Vicars 58 Belmont Road, St. Andrew's Park,
Bristol, 6
- Weir, G. M. Hursley Hill, Whitchurch, nr. Bristol
Do.
- Weir, Mrs. A. M.
Do.
- A. Weir, D. A.
Do.
- A. Weir, Miss M. L.
Do.
- * Welch, F.B.A., B.Sc., Ph.D.,
F.G.S. H.M. Geological Survey, Exhibition Road,
London, S.W.7
- Weston, F. H. The Tynings, Chew Stoke, nr. Bristol
- Whistler, L. D. 8 Dundonald Road, Redland, Bristol, 6
- Whitehouse, F. W. Campbell House, Hallam Road, Clevedon,
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- * Whittard, Prof. W. F., Ph.D.,
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- A. Widdowson, R. W. Kingswood Training School, Kingswood,
Bristol
- A. Williams, B. H. 50 Upper Cranbrook Road, Redland,
Bristol, 6
- Williams, Miss G. C., B.Sc. 11 Percival Road, Clifton, Bristol, 8
- A. Williams, H. 186 Redland Road, Redland, Bristol, 6
- A. Williams, Miss M. St. C. 38 Ravenswood Road, Redland, Bristol, 6
- Wills, R. F. 40 Claremont Road, Bishopston, Bristol, 7
Do.
- Wills, Mrs. R. F.
- *H. Womersley, H., F.R.E.S.,
A.L.S. Museum, North Terrace, Adelaide, S.
Australia
- C. Woodland, P., M.A. Redwick, Dursley, Glos.
- A. Woolls, H. E. J. 14 Russell Grove, Westbury Park, Bristol, 6
- Wotton, M. J. 16 Abbot's Way, Westbury-on-Trym, Bristol

	Wright, A. J. M., M.B., Ch.B.	Harley Cottage, Clifton Down, Bristol, 8
A.	Wright, M. A.	"Rockleaze," Claremont Avenue, Bishopston, Bristol, 7
A.	Wring, A. M.	76 Kensington Park Road, Brislington, Bristol, 4
A.	Yeatman, J.	45 Downs Cote Park, Westbury-on-Trym, Bristol
A.	Yerbury, K.	5 Gloucester Place, St. Michael's Hill, Bristol, 2
*C.	Yonge, Prof. C. M., D.Sc., F.R.S.	The University, Glasgow
	Young, Miss G.	5 Newcombe Road, Westbury-on-Trym, Bristol

AFFILIATED SOCIETIES

Natural History Society, Diocesan Training College, Fishponds, Bristol
 Natural History Society, Secondary School, Dursley, Glos.
 Zoological and Botanical Societies, The University, Bristol, 8

REPORT OF COUNCIL

1946

THE Society has had an active and successful year and its membership has increased to 325.

The Council, elected at the Annual General Meeting of January 16, 1946, included, as President, Sir Lewis Fermor and, as Vice-Presidents, Miss M. D. Hiley and Mr. H. H. Davis. The other Officers remained unchanged except for the replacement of Dr. H. Gorvett as Honorary Librarian by Dr. L. H. Matthews. Miss M. Bowen retired from Council and Mr. W. R. Taylor, Mr. I. Evans, Professor W. F. Whittard and Professor J. E. Harris were added as ordinary members of Council.

Owing to the absence of the President in India in the early part of the year and his absence in Egypt in November and December, the Chair has been taken at most meetings by Mr. H. H. Davis, and we are indebted to him for these services. The President visited India as the delegate of the Royal Society to the Bicentenary Celebrations of the birth of the Founder of the Royal Asiatic Society of Bengal; Sir Lewis made use of the occasion to carry a congratulatory address from our Society. The address was printed in the *Proceedings* for 1945, page 60. Another occasion on which our President represented the Society was at the Centenary Celebrations at Cheltenham in July of our neighbour, the Cotteswold Naturalists' Field Club. Owing to the absence of the President on the first day our congratulatory address (see *Proc.* 1946, p. 136) was read by the other delegate, Miss M. D. Hiley.

In addition to sending the President and Miss Hiley as delegates to these Centenary Celebrations, the Society collaborated with the Cotteswold Naturalists in a Field Meeting at Painswick Beacon on May 4.

The Annual General Field Meeting was also held in collaboration with a neighbour Society, and took place on June 1 at Wookey Hole and Priddy in conjunction with the Bath Natural History Society, which Society has made a welcome return to activity.

A third collaboration has been planned for 1947, as Council has invited the South Western Naturalists' Union to hold its Whitsuntide Conference in Bristol as guests of the Bristol Naturalists' Society. For purposes of organisation a Committee has been appointed, consisting of Sir Lewis Fermor, Mr. A. H. Peach, Miss M. E. Habgood, Mr. H. H. Davis, Mrs. E. M. E. Bell and Miss M. D. Hiley, with power to co-opt. This Committee will meet representatives of the Union to arrange details of the Conference.

An important feature of the year's working has been the amendment of the rules. Early in the year a new rule was approved which permitted the affiliation of school and other natural science societies with our own Society. So far the natural history societies of Fishponds Diocesan Training College, of Dursley Secondary School and of Bristol University only have availed themselves of this privilege but it is hoped that, as the facilities become more widely known, several other Societies will become affiliated.

Later in the year it was decided to revise the whole of the rules. The work involved in this revision was carried out in the first place by a committee of Council, consisting of the President, the Hon. Treasurer, the Hon. Secretary and the Presidents and Secretaries of the Sections.

After consideration by the committee, by Council and by the Society, the amended rules were approved in the manner laid down in the old rules and come into force on January 1, 1947.

The changes in arrangement and wording are considerable but the main changes can easily be summarised. The subscription has been raised slightly. Ordinary members, who used to pay annually 10/- plus amounts varying from 1/- to 2/6 for each of the Sections, are now called Full Members and will pay an *inclusive* subscription of £1 per annum. Additional members from the household of a Full Member will pay 10/-, and the composition fee will be 15 guineas.

New Associate Members will be subject to an age or other qualification so that this class of members will replace the old class of Junior Members; they will pay 5/- per annum, but old Associates will continue at their past rate of subscription. New Country Members will pay 10/- per annum.

The main achievement of the revision, other than the change of subscriptions, is that all members may now attend all Sectional as well as General Meetings. In order, however, to maintain the integrity of the specialised sections, Entomological, Botanical, Ornithological and Geological, and to obtain priority when numbers are limited, members are invited to enrol themselves on the Sectional registers, without fee, by application to the Sectional Secretaries. All members are, however, regarded as members of the Field Section and will receive due notice of Field meetings.

Some minor changes in the rules include the reduction of the maximum term of office of President from three to two years, the election of the Publications and Library Committee by the Annual General Meeting instead of by the new Council, and the provision for the election of a Custodian of the Society's property other than that already in the charge of the Treasurer and the Librarian.

Attention may be directed to the change in the method of entry to the Library, details of which are given in the Librarian's Report.

During the year Council has interested itself in several matters outside the ordinary activities of the Society. At the suggestion of Mrs. Fraser, a letter was sent to the Minister of Town and Country Planning in support of the action taken by the Bristol Corporation with reference to a proposed drive giving access to a house from the open area at the top of Tickenham Hill. Council understands that the Corporation was unfortunately overruled in this matter.

Council has sent a donation of five guineas to Bristol University's Churchill Appeal Fund.

The Society has received two invitations which were passed on to members. One was to attend a meeting of the Ramblers' Association to discuss footpaths in the Bristol district, and the other was to a film show on the life of prehistoric man, from the Bristol Historical Society.

The new rules make provision for the election of Honorary Members by the Annual General Meeting instead of by Council. Dr. H. Gorvett is thus the last Hon. Member to be elected by Council, for during the year he was awarded the honour in recognition of his long service and arduous duties as Honorary Librarian. His duties included the wartime evacuation and the subsequent re-establishment of the more important part of the Library as well as extensive rearrangement and cataloguing. Council is pleased to record that Dr. Gorvett was gratified by this form of acknowledgment.

The year's programme of lectures and Field meetings was carried out successfully; some alterations were necessitated by the President's absence and these will be recorded in the Report of the General Meetings given in the *Proceedings*. We are grateful to Professor Harris and Major Gunston for facilitating the changes of programme.

The attendance at the indoor meetings varied from 27, at the Special General Meeting called to consider the new rules, to a maximum of 73 at the dinner. At lectures there was an average attendance of about 65, and while this number provides a suitable audience for a visiting lecturer, Council feels that it does not represent as keen an interest in meetings as it would like to see and hopes that higher attendances will mark the future.

Council is pleased to note increasing activity among the Sections and would like to congratulate the Sectional Secretaries on the growing attendances at Sectional Meetings. The Ornithological Section has had such large audiences that it has been found necessary for the meetings to be held in a larger room. The Geological Section, with an average attendance of about 40, showed a steady activity, not only throughout the winter season, but also through the summer when a most interesting programme was prepared.

The Botanical and Entomological Sections, although smaller, showed encouraging signs of increasing numbers, and, as all members will in future be free to attend Sectional meetings, we can look forward to still larger audiences. This is very important since, if good audiences are assured, the Secretaries can invite more important lecturers than they have sometimes cared to do in the past.

R. BASSINDALE, *Hon. Secretary.*

CONGRATULATORY ADDRESS

to the Cotteswold Naturalists' Field Club

THE Bristol Naturalists' Society send hearty congratulations and friendly greetings to the Cotteswold Naturalists' Field Club on the celebration of their centenary.

The record of your Club is indeed an enviable one in that for a period of 100 years you have maintained an interest in and enthusiasm for the natural history and archæology of the Cotswold area.

Situated on the main "Limestone Belt" of England, you have used the natural advantages of your position to the fullest extent. In a district world-famed and richly endowed by nature, you have ensured that natural history and archæological studies have been maintained during such a long period and throughout at least two major wars.

The Bristol Naturalists' Society would also congratulate the Club on its lengthy and valuable record of publications. This is a function of local societies which is often neglected on account of its expense but is nevertheless, in the final issue, one of their most valuable assets.

It is indeed a source of gratification that in your Centenary year the Bristol Naturalists' Society should have had the opportunity and privilege of co-operation with you in the field. We value such association and look forward with pleasurable anticipation to many such events in the future.

May the Cotteswold Naturalists' Field Club continue to exercise its influence over its unique district and may its collaboration with its neighbouring societies be even more intensive in the future than it has been in the past.

L. L. FERMOR, *President.*

R. BASSINDALE, *Honorary Secretary.*

HON. LIBRARIAN'S REPORT

1946

THE care and time which Dr. Gorvett spent upon arranging the library after its return from war-time dispersal have greatly lightened the duties during the year of the present honorary librarian, who wishes to express his warm appreciation of Dr. Gorvett's valuable work.

During the year a card catalogue of all the books, apart from runs of periodicals, has been completed and the volumes have been press-marked. The catalogue of periodicals was left complete by Dr. Gorvett, and the checking of this and the press-marking of the volumes is in progress.

Twenty-five volumes damaged during the war have been repaired or rebound, and three volumes damaged beyond repair have been replaced. A start has been made on the arrears of binding, and about 100 volumes of periodicals are now at the binders. The Entomological Section has bound ten volumes, and the Ornithological Section three volumes, of periodicals.

Exchange has been resumed with a further number of institutions abroad, and many arrears have been made good. There are, however, some bodies from whom the Society still awaits replies; no doubt exchange of publications will be re-established with most of these in due course.

New exchanges have been arranged with: the Royal Physiographical Society of Lund University, Sweden; the Carlisle Natural History Society; the Hastings and East Sussex Natural History Society; the Bath Natural History Society; and the Devonshire Association for Science, Art and Literature. Negotiations for exchange are in progress with other institutions both at home and abroad. At the request of the United States Embassy, the Society now sends its *Proceedings* to the Library of Congress, Washington, U.S.A.

Thanks are due to the following members who have presented books to the library: Professor S. H. Reynolds and Messrs. R. E. Alley, Ivor Evans and I. S. Loupekin. Two volumes have been presented by the Trustees of the British Museum (Natural History), and periodicals have been presented by the Botanical, Entomological, Geological and Ornithological Sections. Four volumes of the "New Naturalist" series have been purchased, and the *Zoological Record*, 1943, Zeuner's *Pleistocene Period* (Ray Society Monograph) and *Countryside* have been received by subscription.

Several periodicals and volumes are missing from the library and have not been entered in the borrowing book. The Honorary Secretary will circulate the titles of these as the gaps are found, and any members who may have forgotten to enter them in the borrowing book when taking them out are asked to return them without delay.

Because of the greatly increased use of the Museum lecture theatre adjacent to the library, the City Museum authorities have found it necessary to keep the doors of that part of the Museum building locked. In order to make the library accessible to members with as little inconvenience as possible, Full Members who have paid their subscriptions will receive annually a card, production of which will enable them to obtain the key from the Museum attendant on signing the book provided.

It is satisfactory to report that an increasing number of members are making use of the library for reading as well as borrowing: during the year a total of 206 volumes was borrowed by 36 members.

L. HARRISON MATTHEWS, *Hon. Librarian*

EXCHANGE AND GIFT LIST

BRITISH SOCIETIES

ASHMOLEAN NATURAL HISTORY SOCIETY OF OXFORDSHIRE
 BARROW NATURALISTS' FIELD CLUB AND PHOTOGRAPHIC SOCIETY
 BATH NATURAL HISTORY SOCIETY
 BELFAST NATURALISTS' FIELD CLUB
 BIRMINGHAM NATURAL HISTORY AND PHILOSOPHICAL SOCIETY
 BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
 CARADOC AND SEVERN VALLEY FIELD CLUB
 CARDIFF NATURALISTS' SOCIETY
 CARLISLE NATURAL HISTORY SOCIETY
 ROYAL CORNWALL POLYTECHNIC SOCIETY
 COTTESWOLD NATURALISTS' FIELD CLUB
 COVENTRY NATURAL HISTORY AND SCIENTIFIC SOCIETY
 CROYDON NATURAL HISTORY AND SCIENTIFIC SOCIETY
 DEVON BIRD WATCHING AND PRESERVATION SOCIETY
 THE DEVONSHIRE ASSOCIATION
 DORSET NATURAL HISTORY AND ANTIQUARIAN FIELD CLUB
 EDINBURGH ROYAL BOTANICAL SOCIETY
 SOCIETY FOR BRITISH ENTOMOLOGY
 ESSEX FIELD CLUB
 FRESHWATER BIOLOGICAL ASSOCIATION
 ROYAL GEOLOGICAL SOCIETY OF CORNWALL
 GEOLOGICAL SOCIETY OF GLASGOW
 GEOLOGICAL SOCIETY OF LONDON
 GEOLOGISTS' ASSOCIATION
 GLASGOW AND ANDERSONIAN NATURAL HISTORY AND MICROSCOPICAL SOCIETY
 HASTINGS AND EAST SUSSEX NATURALISTS' SOCIETY
 HERTFORDSHIRE NATURAL HISTORY SOCIETY AND FIELD CLUB
 ROYAL IRISH ACADEMY
 LEICESTER LITERARY AND PHILOSOPHICAL SOCIETY
 LINNEAN SOCIETY OF LONDON
 LIVERPOOL GEOLOGICAL SOCIETY
 LLANDUDNO AND COLWYN BAY FIELD CLUB
 LONDON NATURAL HISTORY SOCIETY
 MANCHESTER LITERARY AND PHILOSOPHICAL SOCIETY
 MANCHESTER MICROSCOPICAL SOCIETY
 MARINE BIOLOGICAL ASSOCIATION
 ROYAL MICROSCOPICAL SOCIETY
 NORFOLK AND NORWICH NATURALISTS' SOCIETY
 NORTHAMPTONSHIRE NATURAL HISTORY SOCIETY
 QUEKETT MICROSCOPICAL CLUB
 SOUTHPORT SCIENTIFIC SOCIETY
 SPELÆOLOGICAL SOCIETY, BRISTOL
 NORTH STAFFORDSHIRE FIELD CLUB
 SWANSEA SCIENTIFIC AND FIELD NATURALISTS' SOCIETY
 TORQUAY NATURAL HISTORY SOCIETY
 ISLE OF WIGHT NATURAL HISTORY SOCIETY
 YORKSHIRE GEOLOGICAL SOCIETY

School Societies

CHELTENHAM COLLEGE NATURAL HISTORY SOCIETY
 MARLBOROUGH COLLEGE NATURAL HISTORY SOCIETY
 RUGBY SCHOOL NATURAL HISTORY SOCIETY

Public Institutions, etc.

BODLEIAN LIBRARY
 BRISTOL CITY MUSEUM
 BRISTOL PUBLIC LIBRARY
 BRISTOL UNIVERSITY LIBRARY
 BRITISH MUSEUM (COPYRIGHT OFFICE)
 BRITISH MUSEUM (NATURAL HISTORY)
 CAMBRIDGE UNIVERSITY LIBRARY
 GEOLOGICAL SURVEY AND MUSEUM, LONDON
 MANCHESTER MUSEUM LIBRARY
 NATIONAL LIBRARY OF SCOTLAND
 NATIONAL LIBRARY OF WALES
 SCIENCE MUSEUM, LONDON
 TRINITY COLLEGE LIBRARY, DUBLIN

EUROPEAN SOCIETIES, ETC.

Belgium—ROYAL MUSEUM OF NATURAL HISTORY
 BELGIAN GEOLOGICAL SOCIETY
France—LINNEAN SOCIETY OF LYONS
Finland—FINNISH FAUNA AND FLORA SOCIETY
Holland—NETHERLANDS GEOLOGICAL BUREAU
Norway—THE UNIVERSITY, OSLO
Poland—ZOOLOGICAL MUSEUM, WARSAW
U.S.S.R. (Latvia)—ZOOLOGICAL INSTITUTE, RIGA
Sweden—UNIVERSITY LIBRARY, LUND
 ROYAL UNIVERSITY, UPSALA
 ROYAL PHYSIOGRAPHICAL SOCIETY, LUND
Switzerland—CENTRAL LIBRARY, ZURICH
 VAUDOIS NATURAL SCIENCE SOCIETY, LAUSANNE

DOMINION SOCIETIES, ETC.

Australia—AUSTRALIA AND NEW ZEALAND ASSOCIATION FOR THE ADVANCEMENT
 OF SCIENCE
 QUEENSLAND MUSEUM, BRISBANE
Canada—ROYAL CANADIAN INSTITUTE
India—GEOLOGICAL SURVEY OF INDIA

UNITED STATES SOCIETIES, ETC.

AMERICAN MUSEUM OF NATURAL HISTORY
 BOSTON NATURAL HISTORY SOCIETY
 BROOKLYN INSTITUTE OF ARTS AND SCIENCES
 UNIVERSITY OF CALIFORNIA, BERKELEY
 CALIFORNIA ACADEMY OF SCIENCES, SAN FRANCISCO
 UNIVERSITY OF COLORADO
 LIBRARY OF CONGRESS, WASHINGTON
 CONNECTICUT ACADEMY OF ARTS AND SCIENCES
 DENNISON SCIENTIFIC ASSOCIATION
 INDIANA ACADEMY OF SCIENCE
 LLOYD LIBRARY AND MUSEUM, CINCINNATI
 MICHIGAN ACADEMY OF SCIENCE
 MISSOURI BOTANIC GARDENS
 PEABODY MUSEUM OF NATURAL HISTORY
 PHILADELPHIA ACADEMY OF NATURAL SCIENCES
 SAN DIEGO SOCIETY OF NATURAL HISTORY
 SMITHSONIAN INSTITUTION
 ST. LOUIS ACADEMY OF SCIENCE
 UNITED STATES NATIONAL MUSEUM
 VANDERBILT MARINE MUSEUM
 WISCONSIN ACADEMY OF SCIENCES, ARTS AND LETTERS
 NEW YORK ZOOLOGICAL SOCIETY

REPORT OF BOTANICAL SECTION

1946

THE monthly indoor meetings have been continued throughout the year with additional field meetings in the summer.

On January 21 Dr. L. E. Hawker gave a talk on Mushrooms and Toadstools with lantern slides lent by the British Museum, and on October 5 she led a "Fungus Foray" in Leigh Woods, collecting a basket of over 50 species.

On February 18 Dr. L. C. Luckwill gave us the story of the Tomato from the middle of the sixteenth century, when it was first introduced into England as a curio from Southern Mexico; he illustrated his talk with slides and herbarium specimens. On June 22 he led us round the Long Ashton Research Station, describing the work carried out there.

During the summer fresh material was plentiful at the indoor meetings, and visits were paid to the University Gardens and Greenhouses by kind permission of Prof. Skene. Mr. Ivor Evans conducted walks in districts round Iron Acton, Hanham and Whitchurch, and Mr. F. W. Evens led parties to Cadbury Court Estate and from Cambridge Batch.

At the October Exhibition Meeting the following were shown:—by Mrs. Sandwith, herbarium sheets of foliaceous Plantains; by Mrs. Bell, British Thistles; by Mr. F. W. Evens, seeds under the microscope; by Mr. M. Wright and Mr. H. Williams, a collection of fresh wild flowers.

On October 16 the meeting was devoted to Grasses. Mr. F. W. Evens read a description of the family while Mr. Ivor Evans and Mrs. Bell passed round 130 specimens.

On November 18 Mr. T. H. Payne gave a talk—"Jottings from my Notebook" and in his inimitable way told us many amusing nature stories.

On December 9 Mr. Ivor Evans read a paper by Grant Allen written in 1881, "The Romance of a Wayside Weed," dealing with the rare *Euphorbia pilosa*. Other rare plants were also mentioned and a sketch of the origin of the British Flora was given.

The new *Flora of Gloucestershire* has been purchased by the Section and, on publication, will be placed in the Library.

Membership has now reached 72.

ETHEL M. E. BELL *Hon. Secretary*

REPORT OF ENTOMOLOGICAL SECTION

1946

THE 82nd Annual General Meeting of the Section was held on 2 February, 1946, in the Wigglesworth Library, University of Bristol, when Mr. J. V. Pearman was elected President and Mr. A. H. Peach was re-elected Hon. Secretary and Treasurer for the ensuing year.

On 6 March a lecture was given by Mr. F. L. Vanderplank on "Mating Mechanism of Insects." Species mentioned included Lepidoptera, Diptera, Acridiidae, Locustidae and Hymenoptera. Living specimens of the tsetse fly were exhibited.

On 4 October the winter session opened with an exhibition meeting, the Section joining in the general exhibition of the Parent Society. Exhibits by Messrs. Taunton, Bassindale, Peach and Vanderplank were shown.

On 7 November the Section attended the lecture given to the Parent Society by Dr. Miles on "Insects and the Soil."

On 13 December a lecture was given by Mr. R. Bassindale on "Inheritance in Butterflies." This was specially given on account of the chapter on genetics by Mr. E. B. Ford in "Butterflies" in the *New Naturalist* Series. Mr. Bassindale was able, with the aid of diagrams, to assist in the better understanding and appreciation of what to the amateur is a difficult subject.

The Section is much indebted to all these lecturers for such interesting lectures, and a vote of thanks was enthusiastically passed at each meeting.

In April the Section was invited to Bath by the Bath Natural History Society to hold a joint discussion on general entomology.

On 4 May the Section joined the Field Section for a day on the Cotswolds in collaboration with the Cotteswold Naturalists' Field Club. Fleet Paymaster Bainbrigg Fletcher acted as leader of our Section. On 1 June the Section joined the Parent Society, which met at Wookey Hole in collaboration with the Bath Natural History Society, afterwards proceeding to Priddy. Both days were cold and dull and very few insects were to be seen.

On 15 June the Section visited the Almondsbury district under the leadership of Mr. R. Bassindale.

We are glad to report that membership now numbers 50. We welcome ten new members elected during the year—Miss Darch, Miss Rogers, Col. E. C. Brown, and Messrs. C. B. Antram, R. A. Davies, N. J. Durrant, H. G. Phelps, W. C. Taunton, W. R. Taylor and N. A. Watkins.

A. H. PEACH, *Hon. Secretary*

REPORT OF FIELD SECTION

1946

AT the Annual General Meeting of the Section Mr. F. W. Evens was re-elected President and Sir Lewis Fermor Vice-President.

With increased facilities for transport, it was decided to hold six meetings during the Summer, to one of which the whole day should be devoted.

On April 18, Mr. T. H. Payne led a party to the Eastern Mendips. Members proceeded by motor coach to Harptree Hill and then walked to the East Harptree lead mines where the old workings were examined. Much interest was taken in the numerous small streams which ran on the surface of the hilltop for a few yards and then disappeared in swallets. Harptree Combe provided a variety of material for the botanists.

The second meeting took place on 4 May and occupied the whole day. It was held in collaboration with the Cotteswold Naturalists' Field Club and the leader was Mr. W. R. Price, F.L.S., who met the party at Painswick Beacon. Mrs. E. M. Clifford gave a short history of the Camp, illustrating her remarks with maps, after which members proceeded to Fiddlers Elbow. This was the first occasion on which collaboration with the Cotteswold Naturalists' Field Club had been possible and it afforded an excellent opportunity of studying the natural history of the Cotswolds under expert guidance. The Society is also indebted to Messrs. R. J. Channon, T. Bainbrigge Fletcher and J. W. Haines for their leadership in Geology, Entomology and Botany respectively.

The Annual General Field Meeting of the Society on 1 June at Woocky Hole and Priddy was held in collaboration with the revived Bath Natural History Society. The party inspected excavations which were being carried out at Badger Hole by Mr. H. E. Balch who described the cave fauna and associated material that had been found. After tea the Societies visited Priddy Pool where Major H. C. Gunton, Messrs. E. H. R. Lubbock and H. C. Rainbird and Miss E. H. Stevenson (all members of the Bath Natural History Society) undertook leadership. The weather being cool and overcast, observation was not good for the ornithologists and entomologists, but among the interesting plants seen by the botanists were *Botrychium lunaria*, *Carex pilulifera* and, in the pool, *Equisetum limosum*, *Carex rostrata* and several examples of moss including *Sphagnum*, *Aulacomnium*, *Campylopus* and *Polytrichum* species.

On 6 July Dr. Wallis led a party to Winscombe and Axbridge, the object being to study a typical part of West Mendip scenery and to note the relationships between the underlying rock, surface contours and vegetation. A useful series of notes, kindly supplied by Professor Lily Newton of University College, Aberystwyth, served to illustrate the major floral differences which could be easily correlated with the geology of the area.

Mr. G. E. J. McMurtrie undertook leadership to St. Catherine on 17 August. Major Geoffrey Strutt kindly allowed members to go over the garden and he also gave a history of the Church and the Court. Mr. P. M. Matthews gave an account of the Batheaston coal-boring.

On 7 September members, under the leadership of Mr. H. O. Edmonds, proceeded by motor coach via Yate Rocks, Wickwar, Kingswood and Hillsley to Alderley where Mr. H. S. Shinner gave a brief survey of the surrounding geological formation. Boxwell was next visited and then, after tea at Westonbirt, Mr. H. J. Mitchell conducted members through the Arboretum, by kind permission of the Earl of Morley.

The Field Section again co-operated with the Botanical, Entomological, Geological and Ornithological Sections in giving publicity to their field meetings by the distribution of a printed programme.

M. D. HILEY, *Hon. Secretary*

REPORT OF GEOLOGICAL SECTION

1946

NINE General Meetings, at which the average attendance was 40, were held during the year.

At the Annual General Meeting held on January 24, the following elections were made: Mr. H. W. Turner, President; Dr. F. S. Wallis, Vice-President; Mr. I. S. Loupekin, Hon. Secretary; Mrs. A. Marsden, Hon. Treasurer; Mr. G. E. J. McMurtrie, Hon. Auditor. Mr. C. W. Blackburn, Sir Lewis Fermor, Mr. A. Marsden, Mr. G. S. Maunder, Dr. Stanley Smith and Professor W. F. Whittard were appointed Committee Members. The formal business was followed by a paper read by Mr. R. Hughes on " 'River Drift' and 'Cave' type tools from the Avon Valley," which was illustrated by specimens obtained mainly at Chapel Pill, Somerset.

An Exhibition Meeting, comprising fourteen individual exhibits on various branches of Geology, was held on February 21. The Section was particularly indebted to Professor W. T. Gordon, of King's College, London, for an exhibit on "Diamond," which included numerous choice specimens of highly interesting crystallography.

On March 21, Dr. A. E. Dunstan, D.Sc., F.R.I.C. (Anglo-Iranian Oil Co.), introduced two interesting sound-films entitled "An English Oil-Field" and "Distillation." In the talks that preceded the showing of the films, Dr. Dunstan dealt with the principles of oil migration and accumulation; he reviewed the history of oil-exploration in Great Britain, emphasizing the part that geophysical methods played in the discovery of oil-fields in the Eakring and other districts; and, after demonstrating how the oil is worked, proceeded to explain the complex process of distillation of the crude oil.

Four Field Meetings were held during the Summer. On April 27, Mr. J. Parfitt ably led a party to Pensford Colliery where the Management provided generous hospitality. On May 25, the working of Bath Stone at Corsham was demonstrated by Mr. F. Davis, F.G.S. A highly successful meeting took place on July 13 when Dr. Stanley Smith led an excursion to the iron-ochre deposits at Winford and the recently exposed Carboniferous volcanic rocks at Goblin Combe. Finally, on September 21, Mr. T. R. Fry led a party to Corston and Stantonbury Hill to examine exposures in the Lower Lias and Inferior Oolite. Unfortunately, bad weather prevented a visit to Chapel Pill, under the leadership of Mr. R. Hughes, arranged for the evening of Thursday, June 20.

On October 17, Mr. G. A. Kellaway, B.Sc., F.G.S. (H.M. Geological Survey of Great Britain), gave a stimulating lecture entitled "Geological Structures of Superficial Origin." Mr. Kellaway dealt with superficial structures which are due to a differential unloading of a land surface—land-slips, and the recently named 'cambers,' 'dip-and-fault' structures, 'gulls,' 'bulges' and 'sags.' Mr. Kellaway carefully analysed each type, and by reference to examples selected from the Pennines, Midlands, and the local district, showed how the effects are, or can be, connected with plastic flow in incompetent beds such as clayey rocks.

The last lecture of the session was given at an Open Meeting on November 21 by Professor F. W. Shotton, M.B.E., M.A., F.G.S., on the topical subject, "Geological Work and the Invasion of N.W. Europe." Professor Shotton, who had been on the Staff of the Chief Engineer with 21st Army Group from September, 1943 to VJ day, described how the work fell into two parts—the planning stage and the operational stage. The planning stage involved the choice of a suitable landing point in which the geology had to be taken into consideration—not only the materials and structures of the invasion beaches, but also the soil conditions

of potential airfield sites inland. By aerial photography and other means, detailed maps were prepared, and analogous examples in Great Britain were selected for operational experiments. Other geological activities during the planning stage were the preparation of water intelligence maps, the provision of information on the foundations of the enemy's defences, on sources of road metal, sand and gravel, the submarine geology of ports and the effect of magnetite in igneous rocks on mine detectors, and the detailed study of certain rivers with a view to assault crossings. The operational stage included the development of certain activities such as the preparation of soil maps and water supply intelligence. Further beach intelligence work was done in Holland, and for the final attack across the Rhine, the bed and approaches of the river were investigated in detail with a view to amphibious operations.

Membership on December 31 stood at 98.

I. S. LOUPEKINE, *Hon. Secretary*

REPORT OF ORNITHOLOGICAL SECTION 1946



THAT the study of birds is becoming popular among an ever increasing number of people is clearly evident from the rapid growth of the Ornithological Section. Membership during the year has risen from 90 to 142, and at meetings, seven in all, there has been an average attendance of 56, with a maximum of 82 for a lecture by Dr. E. A. R. Ennion in November. Meetings were again held in the University, but the consistently large attendance finally necessitated the abandonment of the Wiglesworth Library Room for the more spacious Physiology Lecture Theatre.

In *January* Mr. A. C. Leach, in lecturing on "Bird-life in North Cornwall," dealt especially with the many interesting observations by members of the Clifton College Natural History Society during their residence at Bude from 1940 to 1945. At the *February* meeting a lantern talk entitled "A Bird Trip to Shetland" was given by the Rev. C. J. Pring. A comprehensive account of the various breeding species included remarks on the finding in 1936 of a nest and eggs of the Whimbrel. In *March* the Secretary, in an illustrated lecture called "Ten Days on Skomer Island," described a visit to the island in the spring of 1945. Particular reference was made to Choughs, Storm-Petrels and Manx Shearwaters and to the results of a census of Herring and Lesser Black-backed Gulls.

The *September* meeting was again devoted to Exhibits and Communications by members. A number of interesting exhibits were shown, and in addition to other short talks, Mr. G. E. Clothier gave an illustrated account of a recent visit to Steep Holm. At the *October* meeting Mr. J. H. Savory, in speaking on "Lundy, its Scenery and Bird-life," showed an excellent series of slides and described fully the island's history, landscapes and great population of breeding birds. In *November* members were fortunate in hearing a highly instructive talk on "Sketching Birds" by Dr. E. A. R. Ennion of the Flatford Mill Field Centre. Many useful hints on the best methods of drawing birds were followed by an exhibition of a large number of the lecturer's fascinating studies in colour and in black and white. At the final meeting in *December* the Section welcomed an old member, Dr. C. J. F. Coombs, whose talk "Some Investigations on the Rook" was heard with keen interest. Valuable information on field counts, roosts and nesting behaviour was accompanied by drawings, maps and charts on the screen. Dr. Coombs also exhibited some of his recent oil paintings of Carrion-Crow, Magpie, Nutcracker and other Corvine species.

For the promotion of more active field-work a Co-operative Field-work Committee was formed in March, and a suggested census of Rookeries within the City boundary was later carried out. Detailed results of the census were submitted at the September meeting and are given in brief in the Ornithological Notes in the *Proceedings* for this year. Arrangements were also made for the provision of more time at meetings for discussion and short talks, with Mr. R. P. Gait as leader.

Two evening excursions—to Leigh Woods on May 1 and to Blaize Castle Woods on the 29th—took place in conjunction with the Field Section, and both were well attended.

In addition to its usual contributions to *British Birds*, the British Trust for Ornithology, and the Ornithological Section of the Somerset Archæological and Natural History Society, the Section has now assumed membership of the Royal Society for the Protection of Birds.

H. H. DAVIS, *Hon. Secretary*

ACCOUNT OF THE ANNUAL AND GENERAL MEETINGS

1946

THE 83rd Annual Meeting was held on January 16 and, in addition to the dinner on February 7, the Exhibition Meeting of October 3 and a Special General Meeting on November 14, there were three lecture meetings, viz., on March 7, November 7 and December 5. The attendance has ranged from 27 at the Special General Meeting and 50 at the Exhibition Meeting to 73 at the dinner, the numbers at lectures averaging approximately 65.

The President, being in India, was absent from the Annual Meeting in January and the Chair was occupied by Professor W. F. Whittard and, as it was not possible to have the Presidential Address, Professor J. E. Harris kindly consented to give his talk, which was originally scheduled for March.

Professor Harris described a visit to the Dry Tortugas and the work he carried out there. The Marine Station is only occupied during the summer and then only by men. All stores and equipment must be brought by boat each season. Professor Harris himself had spent his time studying fishes and for this purpose had used a diving helmet. His description of the things to be seen and also of the dangers from large fish and from the diving helmet itself fascinated the audience, and after numerous questions Professor Harris was heartily applauded for his interesting address.

The February Meeting was the Annual Dinner held at the Victoria Rooms, with the Headmaster of Clifton College, Mr. B. L. Hallward, M.A., as the Guest of Honour, and, in the continued absence of the President, with Mr. H. H. Davis in the Chair. In his address after the dinner, Mr. Hallward, who proved to be very interested in flower gardens, looked forward to the day when there should be a large and comprehensive Botanical garden, possibly of civic ownership and possibly associated, at some convenient spot on the other side of the Suspension Bridge, with a new, enlarged and modern Zoological garden. In addition, he suggested that a comprehensive ecological survey of the Bristol district would constitute a valuable contribution to Natural History knowledge and would be the sort of project which a Society such as ours, with its various experts, could and should undertake. We cannot fail to agree with Mr. Hallward on all three points. After the speeches there was a musical entertainment, arranged by Mrs. H. W. Turner, which was much appreciated.

As the President was still in India for the March Meeting, it was again impossible for him to give his Presidential Address and the Society was fortunate in securing the services of Major H. C. Gunton, M.B.E., F.R.Ent.S., F.R.Met.S., Director of the Phenological Report of the Royal Meteorological Society. With Mr. H. H. Davis in the Chair, Major Gunton gave an interesting and charming account of his somewhat erudite subject. The Annual Phenological Report for which he is responsible attempts each year to correlate meteorological conditions with the flowering period of common plants and the emergence of common insects. For this purpose, observers at stations all over the country send in reports which are tabulated and interpreted in the Report. After many years' observation it is possible to give an average date for the flowering or emergence of many species and these can then be arranged in a time sequence. Each annual report can then record the advancement or delay in the appearance of bloom or adult insect and these deviations can be correlated with local variations in the temperature, rainfall or other physical conditions. Major Gunton was heartily thanked for his presentation, and it is with regret that Council has to report that so far as it is aware no volunteer observers for the Bristol district have been recruited for this work from members of the Society.

The 1946-7 programme opened with the Exhibition Meeting on October 3, when Sir Lewis Fermor was in the Chair. Many members had contributed to fill the Senior Botany Laboratory with as interesting a set of exhibits as had been shown for some time. These included, as well as plants, seeds, Lepidoptera and a few geological specimens, an extensive display of African insects, a very fine set of lantern slides of marine animals, and living specimens of pond organisms under the microscope. The Honorary Librarian contributed a selection of new books and journals from the Society's library.

The November Meeting, once more under the Chairmanship of Mr. Davis, because the President was now in Egypt, was held in conjunction with the Entomological Section to hear Dr. H. W. Miles talk on "Insects in the Soil." Dr. Miles, of the Long Ashton Research Station, proved to be an interesting lecturer and illustrated his account with very fine slides from his own photographs. As well as giving a clear account of the life histories of different species, Dr. Miles divided the insects into ecological groups according to their habits and showed that a large number of scavenging and carnivorous forms were of inestimable benefit to man, particularly in permanent pastures and woodland. In these situations the scavengers were responsible for initiating the rapid breakdown of plant detritus which would otherwise remain unavailable for further plant growth, and the carnivorous group was responsible for keeping down the numbers of plant-eating pests. In other ecological groups it was shown how a detritus-eating habit was combined with browsing on living tissues, either of root or stem or leaf, and under crop growing conditions, where the detritus was regularly ploughed in, some of these insects might eat the only available material—the crop plants—and so become pests. In the control of these and other insect pests, Dr. Miles pointed out that the widespread use of D.D.T., particularly on permanent pastures, might prove more harmful than beneficial unless some provision was made for replacing the activities of the useful scavengers which would also be killed off. In proposing a vote of thanks, which was heartily accorded, Mr. Taylor drew attention to the extremely important work that the Agricultural Entomologists, such as Dr. Miles, had performed during the war years in helping the farmer to produce maximum crops. Nowhere, perhaps, is the work of the academic biologist so noticeable or so easily understood by the general public as in this type of work.

Mr. Davis again presided at the December Meeting and introduced the well known archaeologist, Mrs. E. M. Clifford of the Cotteswold Naturalists' Field Club, to talk on "Roman Villas in Gloucestershire." In proposing the vote of thanks, Dr. Wallis pointed out that Mrs. Clifford is the pre-eminent archaeologist of the County and much of the work she described was, in fact, carried out by Mrs. Clifford herself. Dr. Wallis hoped that she could be induced to publish a much needed account and guide book of the antiquities about which she knew so much. In her address, Mrs. Clifford gave an account of the ground plans, probable structure and mode of functioning of the several Roman villas of Gloucestershire. In addition to the excellent slides, a notable feature of the lecture was the manner in which Mrs. Clifford endowed these ancient ruins with life. The audience felt that they knew something of the everyday life of the people who lived in these homes and got some idea of the craftsmanship, habits and relations to the countryside of our predecessors of the Cotswold country.

The Special General Meeting of November 14 was called to consider the amended rules which, after considerable discussion in Council, had been circulated to all Ordinary Members of the Society. There was a poor attendance of only twenty-seven Members, but after a good deal of discussion and some amendments the rules were approved. These new rules were again approved at the December Meeting and so came into effect for 1947.

R. BASSINDALE, *Hon. Secretary*

BRISTOL BOTANY IN 1946

BY CECIL I. SANDWITH

*(Read in title at General Meeting, March 6, 1947.**Received, March 10, 1947)*

1946 was a year of disappointment. There was little frost in January, but much rain, hail and storm. During the first ten days of February continuous rain caused damage and dislocation throughout the country. There was no real summer, and September will be remembered for gales, rain and floods everywhere, with a belated harvest and black stalks of ungathered potatoes left standing in water-logged fields. December 26 ended locally with something in the nature of a 'tornado.' At 3.20 p.m. suddenly the westerly wind blew with more than gale force, accompanied by rain and hail, and the temperature fell almost immediately about 6° F. This lasted about three minutes. Mr. Clothier, of Long Ashton Research Station, told me that their anemometer was not in service, so no record was obtained, but from visual observation he was able to confirm these facts. At Tickenham the storm seemed to take a direct line within a limited area: breaking in half a tall Pine in my orchard, it travelled E.N.E. and uprooted a large tree in the wood beyond.

Absence of sunshine and too much rain caused a lamentable scarcity of bees, but ants seem to have been a plague in many places. Trees were very late coming into leaf, while gooseberry bushes coming into young leaf in December were nipped by frost.

The ploughing-up of the primitive heathland of Yate Common, one of the few large surviving tracts of the ancient Forest of Kingswood, is a disaster for the Floras of Bristol and Gloucestershire. Presumably, such rare and interesting species as *Moenchia*, *Genista anglica*, *Rubus dumnorriensis*, *Scutellaria minor*, *Polygonum minus* and *Carex binervis* may not have survived there. The loss of the *Carex* would be particularly unfortunate: there was no other station on the Gloucestershire side of our area, and no specimens exist in Herb. White or Bucknall to verify the record in Mr. White's *Flora*. Considerable tracts of Sodbury Common were also a sea of flax at the end of June.

In the following notes the names of certain contributors are abbreviated in the interests of space: B.W. = Mrs. B. Welch; C.I.S. = Mrs. C. I. Sandwith; D.C. = David Coombe; I.W.E. = Ivor W. Evans; J.P.M.B. = J. P. M. Brenan; N.Y.S. = N. Y. Sandwith.

Helleborus viridis L. A strong colony in the valley below Cold Ashton, well in Glos., *Rev. F. L. Blathwayt*.

Nasturtium uniseriatum Howard et Manton. In a recent paper in the *Annals of Botany* (vol. X, No. 37, 1946), Mr. H. W. Howard and Dr. (now Professor) I. Manton have distinguished and described under the above name a second wild species of Watercress, differing from *N. officinale* mainly in the longer and narrower fruits with the seeds in a single row instead of two rows, the meshes of the reticulation of the seeds being smaller and far more numerous. The authors have shown that this second species is an allotetraploid, half of its chromosomes being homologous with those of the diploid *N. officinale* while the other half originated in another source, at present unknown, but suspected to be a species of *Cardamine*. A triploid hybrid between *N. officinale* and *N. uniseriatum* is also described. It is already known that *N. uniseriatum* is widely distributed in Britain, but no details have yet been published. It may prove to be nearly as plentiful, at any rate in some areas, as *N. officinale*. British botanists have not often collected Watercress for their herbaria, and extensive field observations must therefore be undertaken before the distribution and frequency of the two species can be estimated. Plants can be identified with certainty only when in ripe fruit. At present I have seen only two herbarium collections of *N. uniseriatum* from our area, viz., dyke below Brean Down, S., June, 1921, C.I.S.; and canal, Limpley Stoke [? S.], 1899, C. Bucknall (Herb. Univ. Bristol). The last-named locality may be in Wilts.

Sisymbrium officinale (L.) Scop. var. *leiocarpum* DC. In some quantity by the R. Avon between Old Bridge and the gasworks; also noticed in cultivated ground in Queen Square, Bath, S., July, J.P.M.B.

Minuartia tenuifolia (L.) Hiern. In small quantity on limestone rocks high up on Crook Peak, S., June 26, J. E. Lousley. This appears to be the first record for this plant from the Mendip limestone.

Stellaria Holostea L. In B.E.C. 1943-44 Rep., pp. 840-846, Messrs. J. P. M. Brenan and J. E. Lousley have a paper on floral variations in this species. The form with deeply, narrowly and acutely bilobed petals found near Keynsham by I.W.E. (see "Bristol Botany in 1941") is referred to var. *Lousleyi* (Druce) Brenan and Lousley. Another form with the petals completely absent or very small, viz., var. *apetala* Asch. et Graebn., is recorded from roadside near Lancherley Cross, Wells, S., 1883, R. P. Murray in *Fl. Somerset*, p. 51.

Scleranthus annuus L. Green lane on Milbury Heath and in an arable field between Grovesend and Itchington, G., B.W.

- Melilotus alba* Desr. A few plants on waste ground by Shepton Mallet railway station (Somerset and Dorset line), **S.**, Sept., *J.P.M.B.*
- Trifolium filiforme* L. Green lane on Milbury Heath and at Middlemill Quarry (The Rockies), Stone, **G.**, *B.W.*
- Prunus insititia* L. Several bushes in a field hedge on the limestone hillside above Ham Lane, near Shepton Mallet, **S.**, *J.P.M.B.*
- Rosa arvensis* Huds. var. *ovata* (Lej.) Desv. One bush, among abundance of normal *R. arvensis*, by a rough, damp, thicketed enclosure, Hollow Marsh, between Farrington Gurney and Hinton Blewett, **S.**, *J.P.M.B.*
- R. canina* L. var. *globularis* (Franch.) Dum. Tom Tiddler's Ground, near Keynsham, **S.**, Sept., *J.P.M.B.* Between Kewstoke village and the sea, **S.**, *J.P.M.B.* "The Keynsham bush is very weakly biserrate and much less glandular than usual, thus approaching var. *spherica* (Gren.) Dum. in the § *Lutetianæ*."
- R. dumetorum* Thuill. var. *incerta* (Déségl.) W.-Dod f. *levistyla* W.-Dod. Roadside hedge between Maesbury Castle and Thrupe, **S.**, *J.P.M.B.*
- R. Sherardi* Davies var. *omissa* (Déségl.) W.-Dod. One bush in a roadside hedge between Thrupe and Croscombe, **S.**, *J.P.M.B.*
- Cratægus monogyna* Jacq., forma *fructibus luteis*. One tree by a stone bridge connecting fields over the Cam Brook near Midford, **S.**, Sept., *J.P.M.B.*, who writes: "First brought to my notice by Miss F. M. Barton, of Bath, who gave a description of the locality to Mr. N. D. Simpson, who passed the information on to me. The haws, when mature, go from pale greenish to lemon-yellow, with no suggestion of red. An apparently similar form has been collected from Tweedside, near Galashiels, Selkirk, 29 Sept., 1911, by Miss I. M. Hayward, of which I have examined specimens in Herb. Druce."
- Cotoneaster microphylla* Lindl. Wyck Rocks, **G.**, *D.C.* Recorded from here (without date) by Miss I. M. Roper in her interleaved copy of *Fl. Bristol*. Cromhall, **G.**, *I.W.E.* South Stoke, **S.**, *D.C.*
- Epilobium montanum* L. × *parviflorum* Schreb. Very tall in a small, overgrown clearing by the path in the upper part of Ham Woods, near Croscombe, **S.**, *J.P.M.B.*, confirmed by Mr. G. M. Ash.
- E. adenocaulon* Haussk. Several plants on side of platform by siding at Yatton station, **S.**, *J.P.M.B.* One plant seen near Weston-super-Mare station, **S.**, *J.P.M.B.*
- Anaphalis margaritacea* (L.) Benth. Near the top of Cheddar Gorge, **S.**, *J. Booth.*

Artemisia Absinthium L. Near a farm at Tytherington, G., July, B.W.

Cirsium vulgare (Savi) Ten. (*C. lanceolatum* (L.) Scop.). With white florets at Long Ashton and in Beggar's Bush Lane, S., Michael Wright.

Hypochaeris glabra L. Having repeatedly failed to find this species on our N. Somerset coast dunes, my son and I began to wonder if it really occurs in our area and we proceeded to investigate the evidence for the various records. To begin with, we found no local specimens in the herbaria of Messrs. White, Bucknall and D. Fry and Father Reader, all now preserved at Bristol University; while Dr. W. Watson writes that none exist in the herbarium at Taunton. The records are as follows. In White's *Flora of Bristol* (p. 396): Kewstoke Bay, with var. *Balbisii*, Mrs. Gregory; sandhills at Berrow, G. C. Druce; Brean Down, E. S. Marshall in *Fl. Som.* In White's "*Notes Supplemental*" (*Journ. Bot.* 1918, p. 45): var. *Balbisii*, Berrow sand-dunes, 1915, Miss Roper (also written in her interleaved copy of the *Flora*). In White's "*Bristol Botany in 1923*": Old Down, Tockington, G., and Purn Hill, Bleadon, S., C. G. Trapnell. Mr. Brenan has found no Berrow specimen in Dr. Druce's herbarium at Oxford; and Mr. H. Gilbert-Carter has traced no Brean Down or other N. Somerset specimen in Marshall's herbarium, which is now at Cambridge University. Miss Roper's herbarium at Leeds University seemed a more hopeful source of information, and we therefore wrote to Dr. W. A. Sledge to ask him if he could find her Berrow specimen of var. *Balbisii*. He replied that there was only one sheet from the Bristol area in the *H. glabra* cover in *Herb. Roper*. It was labelled *Hypochaeris glabra* var. *Balbisii*, Berrow, N. Somerset, 23.9.1915. He added, "But it is, I think, undoubtedly a form of *H. radicata*." It is significant that no mention of *H. glabra* on the Berrow dunes is made in the ecological papers of C. E. Moss, H. S. Thompson and Mrs. Boley. Mr. Colin Trapnell, who now resides in Rhodesia, presented his local collections to Clifton College. Dr. J. H. Davie, who is in charge of the school herbarium, tells us that he cannot find specimens substantiating Mr. Trapnell's two records of *H. glabra*, but the Purn Hill record is entered in a list of his notes in which *H. glabra* is described as on "limestone ledges. In bud"; while the site is indicated in an accompanying photograph illustrating some of the rare limestone species on Purn Hill noted by him on April 28, 1923. Each of Trapnell's localities, on a limestone hill, is a most unlikely one for *H. glabra*, and we do not think that the records should be accepted until they are confirmed by specimens

There remained the Kewstoke records of Mrs. Gregory, which alone were accompanied by a note of exclamation indicating "personal inspection" of the specimens on the part of Mr. White (*Flora*, p. 103). We therefore hoped that the Kewstoke plant would be represented in Mrs. Gregory's collection, which is now at the herbarium of the British Museum at South Kensington. At our request, Mr. A. J. Wilmott kindly searched for *H. glabra* in Mrs. Gregory's herbarium, and writes, "I find that there was no specimen there, nor in any other of our herbaria, from North Somerset." Our attempt to prove the existence of *H. glabra* on our dunes has therefore failed so far, but continued search should be made for the living plant, especially in Kewstoke Bay. The species should not be confused with *H. radicata* by anyone familiar with it in southern and eastern England. Although it is decidedly not a plant of the west, Dr. Watson writes that he found it some years ago on Minehead Warren, in South Somerset, a locality given in Murray's *Flora of Somerset*. There are good scattered localities in Devon, but the only satisfactory evidence for the existence of this plant in Gloucestershire is Mr. Riddelsdell's record from the extreme north of the county, at the end of the Malvern Range, in v.c. 34.

Verbascum Blattaria L. One plant on a wall at Stoke Gifford, G., *H. Williams* and *Michael Wright*. The white-flowered form has been found on a blitzed site in Park Street, Bristol, G., by *Miss M. E. Habgood*.

Linaria repens (L.) Mill. \times *vulgaris* Mill. On rubble by the railway between Avonmouth and Severn Beach, at Chittingen Warth, Hallen Marsh, G., *Michael Wright*. This, I learn from *Miss Bowen*, is a more accurate description of her locality, "disused railway bank, Hallen," reported in "Bristol Botany in 1936."

Mimulus guttatus DC. Hanham Abbots, G., *I.W.E.* I have not seen a specimen.

Orobanche Picridis Hol. This very rare species, recorded chiefly from the south-east of England, was added to the Bristol flora ("Bristol Botany in 1927") on the strength of a plant gathered at Brislington by *D. Fry* and identified by Prof. G. Beck von Mannagetta. Other gatherings were reported, but with doubt, from the Berrow sand-hills, S. The latter were perhaps *O. minor* Sm. var. *compositarum* Pugsley in *Journ. Bot.*, 1940, p. 111, a form distinguished from typical *O. minor* by its suberect, narrower (3-4 mm.) and more glabrous corollas. This variety generally grows on *Crepis capillaris* and *Hypochaeris radicata* and is cited from Brean, N. Somerset, by Mr. Pugsley; but specimens observed recently on Compositæ on the Burnham dunes had the characters of typical *O. minor*.

O. Hedera Duby. Steep Holm, S., R. P. Gait. This appears to be an addition to the flora of the island, as listed by McLean and Hyde in *Journ. Bot.*, 1924, pp. 167-175, and by Prof. Skene in the Survey of Steep Holm, published in *Proc. Bristol Nat. Soc.*, 1938. The island is not strictly within the limits of the area defined by Mr. White.

Mentha rubra Sm. In a ditch in a wet pasture below Tom Tiddler's Ground near Keynsham, S., J.P.M.B.

Prunella laciniata (L.) L. In good quantity on a limestone down at Tytherington, G., July, B.W. An excellent discovery, the first record for vice-county 34 and for the Gloucestershire side of our area.

Plantago lanceolata L. var. *sphaerostachya* Mert. et Koch (var. *capitellata* Koch). "A ribwort seen growing in great abundance in July, 1946, by the stream in Shipham Bottom, on Mendip, S., seems best named as above. It attracted attention by its remarkably narrow, almost linear, leaves up to 12 mm. wide but usually less. The spikes were mostly subglobose to ovoid, but on the most robust plants shortly oblong. In spite of their abundance, the plants were strikingly uniform except in height, varying from less than 10 cm. to occasionally more than 35 cm. high. It is possibly only a habitat form, but if so a very marked one and surprisingly variable in size; in any event it seems worth further observation."—J.P.M.B. Very dwarf specimens with leaves only about 2 mm. wide and small ovoid-subglobose heads were collected in the same locality in Sept. 1923, by N.Y.S. and Mrs. Wedgwood, and were referred to the same variety.

Orchis latifolia L. sec. Pugsley (*O. incarnata* L. of British authors). Marshy pasture by the Boyd between Doynton and Dyrham, G., Rev. F. L. Blathwayt. Guided by Mr. Blathwayt's directions, we visited the spot on June 7, and were delighted to see a good quantity of plants, the majority with the beautiful flesh-coloured flowers of the typical form, but a few purple-flowered plants were also seen. There was some variation in the markings of the labellum, since some plants with flesh-coloured flowers showed only dots (though otherwise typical), while others with both flesh and purple labella had the normal boundary line as well as the dots. More interesting was the presence of two plants of undoubted *O. prætermissa* Druce, right on the edge of the area of *O. latifolia*, and easily distinguished by the characteristic, more bluish-green, colouring of the nearly solid stem, and the more spreading leaves, as well as the well-known distinctions afforded by the labellum.

O. prætermissa Druce. In a clearing in Priest Wood, Cromhall, G., Dr. David Prowse.

- Lemna gibba* L. Flowering freely in a dyke near Brent Knoll Station, S., August, C.I.S.
- Scirpus sylvaticus* L. Marshy ground by a roadside ditch near Doynton, G., C.I.S. and J.P.M.B.
- Blysmus compressus* (L.) Panz. ex Link. Plentiful in a boggy meadow on the E. side of Windsor Hill, near Shepton Mallet, S., J.P.M.B.
- Carex polyphylla* Kar. et Kir. (*C. Leersii* F. Schultz of *Bristol Fl.* p. 626, not of Gmelin). Limeridge Wood, Tickenham, S., May, 1920, C.I.S. and N.Y.S. Roadside bank near Axbridge, S., May, 1936, E. Nelmes, who has confirmed both gatherings, which are the first records for the Somerset side of our area.
- C. pallescens* L. One fine clump in Ham Woods, near Croscombe, S., J.P.M.B.
- C. distans* L. \times *extensa* Good. (probably \times *C. Tornabonii* Chiov. in *Annali di Botanica*, xvii (1927), 83, teste Brenan and Simpson, *N.W. Nat.* for 1945, 202-206, 1946). With the parents, Berrow salt-marsh, S., June 26, J. E. Lousley and Dr. C. West. This hybrid was recently added to the British flora by Messrs. Brenan and Simpson and was discussed in the paper cited above. Mr. Lousley, finding the two parents growing together in quantity at Berrow, made a special search for the hybrid and was duly rewarded. He writes: "Two forms of the hybrid were found. Of the first (Ref. A.) there was a fair-sized patch. The spikes were congested as in *extensa*, but the fruits did not form regularly and many of the female spikelets terminated in a few male flowers. The leaves were slightly glaucous but less so than in *extensa*. Of the second form (Ref. B.) there was only one small patch. Most of the spikelets were spaced down the stem as in *distans* but very much stouter and formation of fruit was irregular. The leaves were yellowish-green but broader than those of *distans*. Material of this very convincing hybrid has been deposited at Kew and South Kensington. Having regard to the numbers of the parents, the hybrid must be regarded as very rare at this locality. Only the two plants mentioned were found after a lengthy search, though it is possible that there may be other forms of the hybrid closely resembling each of the parents which were passed over as atypical *distans* or *extensa*."
- C. vesicaria* L. "In moor ditches ('rhines'), Axbridge, Somerset, June 27, 1877," W. B. Waterfall, several splendid fruiting specimens (perhaps taken from a single tuft) correctly named in his herbarium, which was recently presented to Kew (see "Bristol Botany in 1941"). These outstanding local specimens, found in a herbarium which narrowly escaped destruction in Bristol during the late war, have been confirmed by Mr. E. Nelmes. This is a first record for North Somerset,

and the species was unknown in the entire county until its discovery in 1924 near Muchelney, Langport (see *Journ. Bot.*, 1924, p. 308; *B.E.C.*, 1924 Rep., p. 600). It is surprising that the specimens did not come to the notice of Mr. White, who printed many of Waterfall's records and may even have gone through his herbarium. It is pleasant to be able to add that on May 31, 1947, while these notes were in the press, my son and I made a special excursion to the moorland below Axbridge and were delighted to rediscover *C. vesicaria* in Mr. Waterfall's locality. We found the plant in small quantity, extending for a few yards along two rhines.

Spartina Townsendii H. and J. Groves. *Dr. L. H. Matthews* reports the appearance of small tufts of this grass at Portishead, **S.**

Brachypodium pinnatum (L.) Beauv. A large patch on the railway embankment at Boiling Well, under Ashley Hill, **G.**, *C.I.S.* and *N.Y.S.* This forms part of the native vegetation covering the high embankment. It cannot be a recent introduction and it is remarkable that it has escaped notice for so long.

Agropyron pungens (Pers.) R. et S. \times *repens* (L.) Beauv. Alluvial flats by the Avon below Shirehampton, **G.**, Aug., 1945, *C.I.S.*, det. *C. E. Hubbard*. The specimens have glabrous, strongly ribbed leaves, brownish awned spikelets along a hairy rhachis, and no pollen. Apparently a first record for Gloucestershire.

Dryopteris Borreri Newm. (*Lastrea Filix-mas* var. *paleacea* Moore of *Bristol Fl.*, p. 681). Deep, wooded stream-valley between West Horrington and the Wells to Chewton Mendip road, **S.**, much less common here than the ordinary male fern, *J.P.M.B.* This fern is now generally regarded as a distinct species, differing from the male fern in its habit, the fronds remaining erect and green throughout the winter, as well as in such characters as the massed, golden or brownish, chaffy scales and the shape of the yellowish-green pinnules.

Phyllitis Scolopendrium (L.) Newm., *lusus*. Deep, wooded stream-valley between West Horrington and the Wells to Chewton Mendip road, **S.**, *J.P.M.B.* "One plant with all its fronds repeatedly dichotomous towards apex, each frond thus ending in a spreading, many-fingered tuft. This condition must be similar to that described as *Scolopendrium vulgare* var. *multifidum* S. F. Gray, although the fronds of our plant were not especially wavy."

ALIENS. *Lepidium neglectum* Thell. A re-examination of alien material of *Lepidium* in our herbarium results in the following additional Bristol records for this species: waste ground, Stapleton, **G.**, 1917; and Bedminster, **S.**, 1927, *C.I.S.*; while *J.P.M.B.* reports it from Ashton Gate, **S.**, in 1940. On the other hand, the Portishead specimens (1921) referred to

L. neglectum in the *Adventive Flora* prove to be *L. virginicum* L., which was frequent in the area during the 1914-1918 war, but is rarely met with now.

Crataegus orientalis M. Bieb. Mr. A. E. Wade writes that this is the correct name for the tree recorded as *C. Azarolus* L. from Durdham Down, G., in *B.E.C.*, 1924 Rep., p. 570. He also refers to *C. orientalis* specimens collected by C. Bucknall near Clevedon Court, S. The correct identification of the Shapwick Moor bush with this species was reported in "Bristol Botany in 1942."

Sedum spurium M. Bieb. Abundant in a rough, open field, where there are numerous outcrops of limestone rock, between Beryl and Knapp Hill, near Wells, S., July, *J.P.M.B.* "Confined to the outcrops of rock, where it forms low and often extensive mats, but produces its heads of pink flowers rather sparsely and shyly. Most, if not all, of the British records of *S. stoloniferum* S.T. Gmel. rest on misidentifications of *S. spurium*."

Solidago canadensis L. A patch in a lane far from houses at Hollow Marsh, between Farrington Gurney and Hinton Blewett, S., *J.P.M.B.*

Anthemis Wiedemanniana F. et M. Rubbish-tip, Ashton Gate, Bristol, S., May, 1939, *C.I.S.* Compared with specimens of Mr. White's 1911 gathering which were named by Thellung, now in *Herb. Druce*.

Lactuca macrophylla (Willd.) A. Gr. Hedge of a field near Thornbury, G., *Dr. David Prowse*.

Buddleja Davidii Franch. Many bushes, some large, in an old, derelict limestone quarry on the E. side of Windsor Hill, near Shepton Mallet, S., *J.P.M.B.*

Achusa hybrida Ten. Rubbish tip, Ashton Gate, S., 1939-1940, *C.I.S.* Native of the Mediterranean Region. New to the Bristol adventive flora.

A. stylosa M. Bieb. Rubbish tip, Ashton Gate, S., May, 1939, *C.I.S.*

Veronica filiformis Sm. Bath, S., *E. H. R. Lubbock*.

Herniaria glabra L. Ellenborough Park, Weston-super-Mare, S., on a site occupied by American troops, *G. Nichols*.

Amaranthus blitoides S. Wats. Fowl-run, Baptist Mills, Bristol, G., 1925, *C.I.S.* and *N.Y.S.* This gathering was incorrectly recorded in the *Adventive Flora of the Port of Bristol* as *A. Thunbergii* Moq., a species which has not yet been collected in our area. Waste ground, Ashton Gate, Bristol, S., 1940, *C.I.S.* and *J.P.M.B.* The specimens have been determined at Kew by *J.P.M.B.* and *N.Y.S.* *A. blitoides* is a native of North America, not previously correctly recorded from Britain: its characters will be fully discussed in the *B.E.C.* Report for 1946.

- Helxine Soleirolii* Req. One large patch on the stone retaining wall of the stream flowing past the sewage-farm between Bowlish and Croscombe, S., July, J.P.M.B.
- Avena byzantina* C. Koch. Rubbish tip, Portway, G., C.I.S. First record for our area. This is a "cultigen" known as Algerian or Mediterranean Oat, and is derived from *A. sterilis* L. in the same way that *A. sativa* has been derived from *A. fatua*.
- Poa palustris* L. On bombed site, Bridge St., Bristol, G., June 24, J. E. Lousley and Dr. C. West.
- HEPATIC. *Fossombronina pusilla* (L.) Dum. With perianths in Leigh Woods, S., January, C.I.S. and N.Y.S.
- Scapania aspera* Bernet. A large patch in turf overlapping a block of stone (oolite) at Bathford Hill, Bath, S., D.C.; growing with moss and some *Cephaloziella Hampeana* (Nees) Schiffn.
- Microlejeunea ulicina* (Tayl.) Evans. On birch at Stratton Common, Edford, S., Sept., D.C.

Miss Roper's interleaved copy of the *Flora of Bristol* was bequeathed, with her herbarium, to the University of Leeds where it can now be consulted. As she had entered in it many of the discoveries and records made since the publication of the *Flora* up to the time of her death in 1935, its removal from Bristol was regarded as an unfortunate loss by local botanists. Accordingly, Mr. Ivor Evans very kindly undertook the task of borrowing the volume and copying Miss Roper's notes found on the interleaved pages (see "Bristol Botany in 1936"). A typed copy of his work is now deposited in the Library of the Bristol Naturalists' Society. It must be emphasized that these notes could not possibly be used, as they stand, as the basis for a Supplement to Mr. White's *Flora*. Most of the records are undated, while many are accredited either to no named botanist or not to the original discoverer of the new locality. The fact is that very many of these records have already been correctly published in detail in our *Proceedings*, or in the *Journal of Botany*, or in the Reports of the Botanical Section of the Somersetshire Archæological and Natural History Society, or those of the Botanical Society and Exchange Club of the British Isles; and it is these published records which, when collected together, would form the basis of a Supplement. There remain, of course, a considerable number of unpublished records and localities, mostly of less important species or critical varieties, and many of these would have to be verified by the examination of the relative specimens in Miss Roper's herbarium. With these important reservations, this book of notes is a useful and convenient guide to the Bristol records made between 1912 and 1935; and it is necessary that it should constantly be consulted before new records are

printed, so that Miss Roper may be given due credit when she was the first to note the existence of any given plant in a new locality.

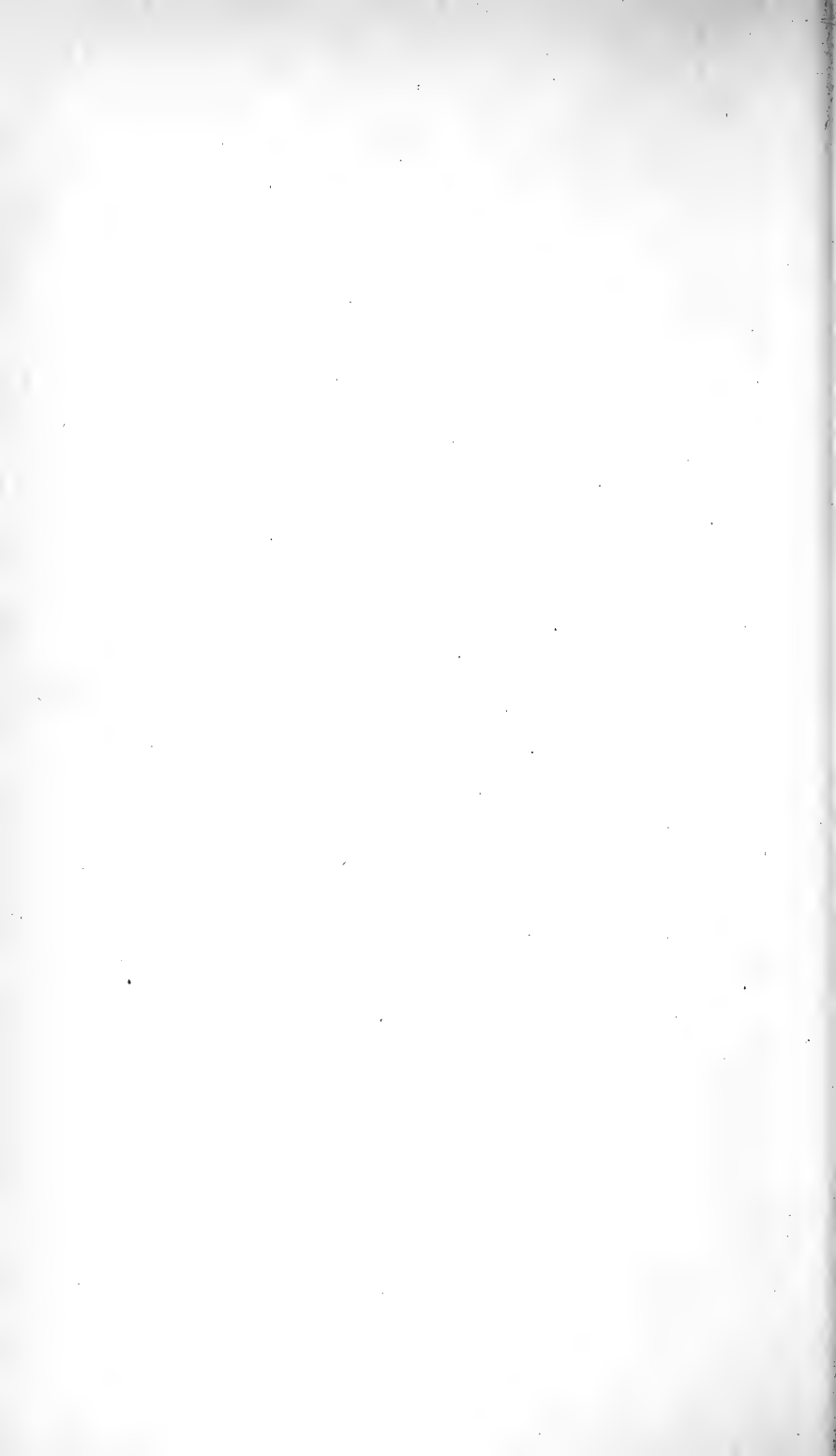
The publication of the "Check-List of British Vascular Plants," compiled by Prof. A. R. Clapham for use by contributors to the *Biological Flora of the British Isles* (now being issued in parts by the British Ecological Society), marks a great step forward in the effort to standardise the names of British plants in accordance with the International Rules of Plant Nomenclature. No varieties, and few hybrid binomials, are given, while, apart from natives, only naturalized aliens and some commonly encountered casuals are included. The List has been prepared with the help of specialists in both taxonomy and nomenclature, but it does not claim to be either authoritative or final. It marks a complete break with the past of Druce's List and the London Catalogue in its careful application of the Rules to specific names and its attitude to generic segregation, fearlessly adopting views which have for long been accepted on the Continent. Every serious botanist will welcome it with relief and will use it with confidence. Special lists of Rubi and Hieracia have been added as appendices, and the list of Rubi concludes with a valuable key to the sections, subsections and series of the great subgenus *Eubatus*. The List is obtainable from the publishers, Cambridge University Press, 200 Euston Road, London, N.W.1 (price 2s. net, plus postage).

The Editor of the *Flora of Gloucestershire*, Mr. W. R. Price, B.A., 64 Elsworth Road, London, N.W.3, writes as follows:—

As it is likely that the many subscribers to the *Flora of Gloucestershire* may be becoming anxious for news of its progress at the hands of the printer, the Editor feels that some information is called for. The actual 'Flora' section, comprising three-quarters of the book, has been typeset and corrected. This constitutes the most technical part. There remain about 170 pages of introduction, lists, etc., to be set and illustrations and maps to be printed. The printers have been at work steadily since December, 1945, with only one break—at the end of 1946. The uncertain factor is the binders, who are in a difficult position and cannot give dates for delivery. The printers wrote me on February 19, 1947:—"If matters progress as they are doing now, we should say some time in the autumn should see publication, but a great deal depends on the binders."

Mr. Price will be glad to receive orders for the book at publication price—£2 2s. od., but payment should not be made yet. Invoices will be sent on publication.

My thanks are again due to Mr. N. Y. Sandwith for his collaboration in the preparation of this paper.



ORNITHOLOGICAL NOTES, BRISTOL DISTRICT, 1946

COMPILED FROM THE REPORTS OF MEMBERS OF THE
B.N.S. ORNITHOLOGICAL SECTION

BY H. H. DAVIS, M.B.O.U.

*(Received, Feb. 27, 1947. Read in title at General Meeting,
March 6, 1947)*

THE year 1946 has been one of continual activity on the part of observers and, as usual, attention has been focussed largely on the North Somerset reservoirs where, despite the invariably high water-level and the consequent scarcity of waders on both passages, observations have proved to be no less interesting than those given in previous issues of these Notes. Important records from Blagdon include those of six Bewick's Swans in January, Gadwall in March and April, Garganey from March to June and again in August, a Black-throated Diver in April and an Osprey in May, while from Cheddar there are reports of three Whooper Swans and a Gadwall in January, and a Long-tailed Duck and two Little Gulls in May. An American Wigeon seen at Blagdon in the last week of January remained until early February or later, and what was, no doubt, the same bird was reported from Cheddar in March and again at the end of December. From Cheddar also there are records of exceptionally large numbers of Teal and Shoveler in January, and of a Great Northern Diver in November and December. Slavonian Grebes were reported from Barrow Gurney, Blagdon and Cheddar between early January and the middle of March.

The New Grounds geese continued at great strength and were under frequent observation from January until their departure in March. Of the two Lesser White-fronts identified in the previous December one was repeatedly seen and remained until the fourth week in February or later. On the arrival of the first autumn flocks, observations were resumed, and among the various reports are those of a Pale-breasted Brent in company with Pink-feet from late September to late November, and of a Grey Lag, a Lesser White-front and several Bean-Geese among a huge gathering of common White-fronts in the last fortnight of December. From this same area there are also reports of an American Wigeon in March, two Common Scoters in October and two Whooper Swans in December. Responsibility for the protection of wildfowl at the New Grounds is now in the hands of Lieut. Commander Peter Scott, under whose direction the pillboxes overlooking the goose-marsh have been greatly improved and a number of additional

observation huts built. As no such amenities for close up observations are available at any similar haunt in the British Isles, it is to be hoped that the recently inaugurated Severn Wildfowl Trust, with the intensive study of wild geese and other birds, the ringing of wild duck at the adjoining decoys and the formation of a comparative collection of live waterfowl as its chief objects, will be enthusiastically supported.

Spring migration records from the Severn include those of a remarkable gathering of waders seen on the mud-flats below Severn Beach in the second week of May and consisting of Dunlin and Ringed Plover in very large numbers, eight Bar-tailed Godwits (three in red dress), fourteen Knots (all red birds), and seven Grey Plover, of which three or four were in full breeding plumage. Among the many waders noted on autumn passage off the New Grounds were Bar-tailed and Black-tailed Godwits, Knots, Curlew-Sandpipers, Little Stints, Sanderlings, Ruffs and a Greenshank.

From other parts of the district there are reports of a Willow-Tit near Stoke Gifford in September, Merlins at Clevedon in April, Garganey on Kenn Moor in the last week of March, a Spotted Redshank on the R. Axe in August and a probable Iceland Gull at Hotwells in January. Among breeding records of particular interest, attention may be drawn to the successful nesting of Grey Wagtails in the heart of the City, and of Hobbies near Berkeley, Buzzards in the Mendip area and Shoveler at Blagdon reservoir. Special mention may also be made of the nesting of Herons (a pair, or two pairs) at the New Grounds, and of a pair of Robins near Pilning in the third week of December.

Steep Holm was visited by ornithologists for the first time since 1939, and bird-life, despite war-time activities on the island, was reported as having in no way diminished. During a visit at the end of May, both Raven and Peregrine were seen, the Cormorant colony was found to be flourishing, and more Great Black-backed Gulls were noted than on any occasion in pre-war years. Among migrants observed were Willow-Warbler, Whitethroat, Cuckoo and Common Sandpiper. A ringing expedition was carried out by several members on the last day of June when the combined population of Herring and Lesser Black-backed Gulls was estimated at not less than 1,000 pairs, and the increase of the Great Black-backed Gull was again noted. Rock-Pipit, Blackbird and Hedge-Sparrow were proved to be breeding, a flock of eight Starlings was seen, a Song-Thrush was heard, and Wrens were either seen or heard in various parts of the island.

A census of rookeries in the City and County of Bristol, undertaken by about twenty-five members as part of a spring and summer field-work programme, showed that very few Rooks were breeding within the City boundary. Though the whole area was carefully

investigated, only nine colonies were located—giving a total of 115 nests and an average of 12·8 nests per rookery. Thus, in an area extending to 36·3 square miles and one by no means deficient in suitable sites, there was found to be the surprisingly low density of 3·1 nests per square mile. No account was taken of the old established site at Eastville Park which, following the completion of five nests, was deserted, while the College Green trees, last used about 1942, were reported as being still unoccupied. The largest rookeries were those at Ham Green, Brislington Hill and Purdown with 44, 24 and 16 nests respectively. At six rookeries the nests were solely in Elms—the exceptions being Queen Square, a total of seven in Plane trees; Frenchay Park, three, all in a Copper Beech; and Ham Green, where the nests were in trees of not less than six kinds—Elm, Oak, Beech, Lime, Horse-chestnut and Scots Pine.

Unless otherwise stated the classified notes below refer only to 1946 and are the result of observations by the following members—R. E. Alley, A. E. Billett, Rev. F. L. Blathwayt, H. J. Boyd, G. E. Clothier, H. H. Davis, Dr. C. F. Druitt, Miss A. J. Dunn, R. J. Eastwood, Miss P. Farmer, Miss M. L. Flemming, R. P. Gait, B. King, A. C. Leach, W. D. Melluish, G. Mogg, Dr. J. M. Naish, H. W. Neal, R. H. Poulding, J. H. Savory, W. R. Taylor, B. W. Tucker and D. A. Weir. The following non-members have also contributed—J. S. Ash, H. Cox, J. H. Harford, E. G. Holt, W. J. Langley, H. C. Playne, Lieut. Commander Peter Scott, Capt. K. D. Smith, A. J. B. Thompson and C. Wilson. The appropriate initials are given with all observations. **G** indicates records from the Gloucestershire side of the District, and **S** those from North Somerset. The area covered by the Bristol District for ornithological purposes is that given in the *Proceedings, B.N.S.*, 1945, p. 79.

RAVEN (*Corvus c. corax*). **G**. The only report is of two at Severn Beach on August 19 (H.W.N.). **S**. Nested as usual at Brean Down but no young were reared (H.C.). Pair seen and nest located on Steep Holm, May 29 (E.G.H.). Noted elsewhere as follows—two at Clevedon on January 2 (A.C.L.), one in the Yeo Estuary on October 7 and two over Long Ashton on December 7 (G.E.C.)

HOODED CROW (*Corvus c. cornix*). **G**. A single bird seen at the New Grounds on October 20 remained until November 10 or later (P.S., H.H.D. and others). **S**. One was observed feeding with Rooks in a field at the foot of Brean Down on October 26 (H.C.).

CARRION-CROW (*Corvus c. corone*). **S**. From March to the end of the year, Carrion-Crows were repeatedly seen in unusually large numbers at the Bath Sewage Farm, near Saltford. Between 50

and 100 were frequently noted, while the maximum counts were 112 on May 19, 102 on July 21 and 126 on November 30. In contrast, Rooks were seldom seen in excess of half a dozen at a time, despite the existence of a large rookery nearby (B.K.).

STARLING (*Sturnus v. vulgaris*). **G.** Enormous numbers reported by J.H.H. as roosting at Old Wood, Rangeworthy, from January to the middle of March, after which there was a rapid decrease and by April 10 the site had been deserted. The roost was again in full use from the last week of October to the end of the year.

HAWFINCH (*Coccothraustes c. coccothraustes*). **G.** Twice noted on Durdham Down, Clifton—four on January 3 and two on May 2 (R.P.G. and R.H.P.). Two were seen at Coombe Dingle on May 1 (R.P.G.). **S.** The only note is of a single bird near the top of Brockley Combe on March 31 (G.E.C.).

SISKIN (*Carduelis spinus*). **S.** Eighteen were watched in an Alder spinney at Blagdon reservoir on March 17 (A.E.B. and B.K.) and three were seen in the same place on December 29 (R.H.P.). A single bird was noted at Saltford on March 20 (B.K.).

LESSER REDPOLL (*Carduelis flammea cabaret*). **G.** A party of ten was seen at the New Grounds on October 13 (B.K.). **S.** Six were observed in Alders at Barrow Gurney reservoirs on December 15 (B.K.).

BRAMBLING (*Fringilla montifringilla*). **S.** From twelve to fifteen were frequently seen at the Long Ashton Research Station from January 12 to March 3 (G.E.C.).

CORN-BUNTING (*Emberiza calandra*). **G.** Single birds were seen or heard on the Cotswolds at Hawkesbury Upton and near Petty France on May 12, and near Old Sodbury on June 9 (H.H.D.).

CIRL BUNTING (*Emberiza c. cirrus*). **G.** Frequently noted on Durdham Down, Clifton, in winter—twelve or more on January 3 (R.H.P.) being the highest total reported. At least four pairs nested successfully in the Sneyd Park area (R.P.G.). **S.** Twice seen at Cheddar—single birds on January 20 and June 2 (R.E.A. and H.H.D.).

TREE-SPARROW (*Passer m. montanus*). **G.** Reported as follows—numerous at Dyrham on January 21 (F.L.B.); a dozen or more with House-Sparrows at Acton Turville on March 13 (H.H.D.); two near Stoke Gifford on April 6 (H.H.D.); several at the New Grounds on October 24 and 27 (K.D.S. and H.H.D.). **S.** A single bird was seen at Failand on June 11 (G.E.C.).

WOOD-LARK (*Lullula a. arborea*). **S.** Met with in a number of localities during the year and is evidently increasing. A single bird was noted on Backwell Hill on March 31 and April 7 (G.E.C.), and two were seen near Barrow Gurney on April 14 and 20 (G.E.C. and R.H.P.). Reported also from the Clevedon area—two on May 26 (A.C.L.), and from Cheddar—two on June 9 (B.K.).

At Long Ashton two were seen on May 30, and one was heard overhead on various occasions throughout the summer, but no nest was located (G.E.C.). Breeding was proved near Failand, a nest with four or five fledged young being found on June 11 (G.E.C.). Subsequent notes from Failand were of two seen on August 17 and one on September 2 (R.H.P.).

ROCK-PIBIT (*Anthus spinoletta petrosus*). **S.** observations at Steep Holm on June 30 showed that at least five pairs were nesting (R.H.P.). A single bird was identified at Barrow Gurney reservoirs on December 1 and 15 (B.K.).

GREY WAGTAIL (*Motacilla c. cinerea*). **G.** Again nested near Henbury (H.W.N.), also along the R. Frome, near Stapleton, where two pairs with fledged young were seen on July 10 (H.H.D.). A report from W.J.L. that a pair was breeding in a bombed building at the junction of King Street and Queen Square, and at little more than two hundred yards from the Centre, was investigated by H.H.D. and H.W.N. and found to be correct. The birds were first noticed on July 17, and the nest was subsequently located in the ruined masonry at about twenty feet from ground level.

WHITE WAGTAIL (*Motacilla a. alba*). **S.** Among several spring passage records is that of six at Cheddar reservoir on May 5 (B.K. and G.E.C.).

BLUE TIT (*Parus cæruleus obscurus*). **G.** A pair seen nesting in a wall at Clifton on May 17 was using a hole only one foot from the ground (A.C.L.).

WILLOW-TIT (*Parus atricapillus kleinschmidti*). **G.** A single bird, identified by the characteristic nasal call-note, was heard by H.H.D. in a hedgerow near Stoke Gifford on September 23. Identification was fully confirmed on the 24th when the same observer obtained excellent views and clearly noted the sooty-brown crown, the light secondary patches and the well marked buffish flanks.

RED-BACKED SHRIKE (*Lanius c. collurio*). **G.** The only report is of a female and two young seen at the New Grounds on August 11 (B.K.).

GRASSHOPPER-WARBLER (*Locustella n. naevia*). **G.** One was heard between Dyrham and Doynton on April 23 (F.L.B.). **S.** Single birds reported as heard on Kenn Moor on April 22 (H.H.D.) and near Cheddar reservoir on May 5 and 19 (B.K., R.P.G. and others), while six or more were reeling in the Clapton-on-Gordano area on the 23rd (G.E.C.).

FIELDFARE (*Turdus pilaris*). **S.** A flock of between fifty and sixty was noted at Abbots Leigh as late as May 1 (A.E.B.).

SONG-THRUSH (*Turdus e. ericetorum*). **G.** Three fledglings, just out of the nest, were watched by H.H.D. at Little Stoke on June 5 being fed by a female Blackbird (*Turdus m. merula*) as well as by one

of their parents. The birds were under observation for not less than an hour, during which they were seen to be fed four or five times by the Blackbird for every one occasion by the Thrush.

REDSTART (*Phœnicurus ph. phœnicurus*). **G.** A male, perhaps one of a nesting pair, was seen at Swangrove, between Badminton and Didmarton, on June 9 (H.H.D.).

BLACK REDSTART (*Phœnicurus ochrurus gibraltariensis*). **S.** Single birds, females or immatures, were noted on Brean Down on January 17 and 19 and on March 10 and 24 (H.C.), and near the railway station at Weston-super-Mare on December 31 (P.F.).

ROBIN (*Erithacus rubecula melophilus*). **G.** A freshly built nest with five eggs was found in the dashboard pocket of a disused car at Northwick, near Pilning, in mid-December. Incubation was seen to be in progress on the 15th and again on the 16th, but subsequent visits to the site showed that the birds had deserted. The nest and eggs were finally taken and sent to the City Museum (H.H.D.).

DIPPER (*Cinclus c. gularis*). **G.** Single birds were seen on the Little Avon between Stone and Michaelwood on May 12 (H.H.D.), and on the River Frome, Stapleton, on July 3 and 10 (G.M. and H.H.D.).

SWALLOW (*Hirundo r. rustica*). **G.** Late birds were reported from the New Grounds—one on October 27 (B.K. and H.H.D.), and from Chipping Sodbury—three on the 28th (J.M.N.).

SAND-MARTIN (*Riparia r. riparia*). **S.** Unusually large numbers—estimated at between 400 and 500 birds—were hawking over Cheddar reservoir on May 5 and 6 (B.K. and H.H.D.).

NIGHTJAR (*Caprimulgus e. europæus*). **S.** Several were seen or heard in the Portishead area during the latter half of June, and a female, brooding two recently hatched young, was found in the same locality on the 24th (A.E.B., R.H.P. and H.H.D.). Single birds were met with at Cheddar on June 9 (B.K.) and in Leigh Woods on June 22 and July 2 (J.H.S.).

LESSER SPOTTED WOODPECKER (*Dryobates minor comminutus*). **G.** Close views were obtained of a male near Frenchay on April 7 (A.J.D. and H.H.D.). **S.** One was seen at Long Ashton on July 27 (G.E.C.).

SHORT-EARED OWL (*Asio f. flammeus*). **S.** The following were reported—one on Black Down, Mendips, on October 29 (W.R.T.) and three at Kingston Seymour on December 27 (H. Bird per C.F.D.).

PEREGRINE FALCON (*Falco p. peregrinus*). **G.** Noted in the Avon Gorge—one on May 5, two on August 4 and one on October 27 (A.C.L., H.W.N. and R.H.P.). One, evidently an adult female, was present at the New Grounds on various dates from October 13 to the end of the year (P.S., D.A.W. and others). **S.** Bred as usual

at Brean Down, two young being reared (H.C.). Twice seen at Steep Holm—one on May 29 (E.G.H.) and two on June 30 (G.E.C. and A.E.B.)—but no eyrie was located. A pair was watched off Clevedon on November 17 (B.K.).

HOBBY (*Falco s. subbuteo*). **G.** The location of a breeding pair in the Berkeley area provided one of the most noteworthy events of the year. The birds were first noticed on August 4 (H.H.D.), and the eyrie, containing two fully fledged young (one of which was secured and ringed) and the remains of a Swift, was found by H.W.N., R.H.P. and others on the 11th. The adults and both young were frequently seen in the vicinity until the last few days of September. Good views were obtained of single birds overhead near Stoke Gifford on July 25 and August 5 (H.H.D.). **S.** Two were identified near Cheddar on June 9 and one over Blagdon reservoir on the 23rd (B.K.).

MERLIN (*Falco columbarius asalon*). **S.** Two small falcons, undoubtedly Merlins, were watched near Clevedon on April 28 (A.C.L.).

COMMON BUZZARD (*Buteo b. buteo*). **G.** Single birds were seen over Clifton on January 13 (A.C.L.), and over Dyrham Wood on January 9, May 26 and November 23 (F.L.B.). **S.** Reported on several occasions from the Mendip area where a pair was found breeding and the young birds (three) were ringed on June 9 (R.H.P.). Breeding almost certainly took place in a second locality in the same area (R.H.P. and H.H.D.).

OSPREY (*Pandion h. haliaetus*). **S.** A large hawk seen by R.E.A. and H.J.B. at Blagdon reservoir on May 23 was, although in view for no more than 90 seconds, confidently identified as an Osprey. When first noticed at about 400 yards the bird was descending toward the reservoir. It finally levelled out to about 40 feet over the water, to which, by its head movements, it was evidently being attracted, and passed, moving in circles, within 60 yards of the observers before being lost to sight. H.J.B. reports that, owing to bad light, colour determination was difficult, but that the upper parts looked slaty-brown rather than red-brown, while the head, which projected well beyond the wings, appeared whitish, with a dark streak on side. Other details noted were the dirty-white under-parts with a dusky band across the upper breast, and the almost uniform width of the wings, which were angled back slightly at the carpal joint.

COMMON HERON (*Ardea c. cinerea*). **G.** An occupied nest was found in a small wood at the New Grounds on April 19 by J.S.A. who reports that incubation was in progress and that "it was only after kicking the tree several times that the bird was induced to leave." The same observer also reports that two other birds were put out from the wood and that he discovered another large nest

but did not see a bird actually leave it. **S.** A census undertaken at the Brockley Combe and Banwell Heronries on May 26 showed that there were sixteen occupied nests at Brockley and twenty-one at Banwell (B.K. and R.H.P.). A party of nine was seen at Barrow Gurney reservoirs on July 20, and fifteen were seen together at Blagdon on the 28th. Almost all were immature birds (B.K. and R.E.A.).

WHOOPEE SWAN (*Cygnus cygnus*). **G.** Two adults were watched in flight by B.K., H.H.D. and other observers at the New Grounds on December 22. **S.** Three, two adults and an immature, made a brief visit to Cheddar reservoir during a hard frost in January. They were first seen on the 20th (R.E.A. and H.J.B.) but had departed by the 22nd.

BEWICK'S SWAN (*Cygnus b. bewickii*). **S.** A family party, two adults and four immatures, visited Blagdon reservoir late in January. They were first noticed on the 27th (B.K.) but had left by the following day.

GREY LAG-GOOSE (*Anser a. anser*). **G.** One, an immature bird, arrived at the New Grounds with the main body of White-fronts in mid-December. It was first identified on the 15th and was still present at the close of the year (P.S., B.W.T., H.H.D. and others).

WHITE-FRONTED GOOSE (*Anser a. albifrons*). **G.** Reported from the New Grounds, up to 2,000 or more, throughout January, February and the first week of March. The majority were seen to leave in a N.E. direction on March 8, the remainder departing in the following few days (P.S. and H.H.D.). The first autumn reports were of 19 on October 6, and 295 on the 13th (P.S.) A gradual increase to about 450 during the next seven weeks was followed by a great influx on December 14 and 15. By the 22nd the number was estimated at not less than 4,000, and from a careful approximation on the 30th, it appeared evident that the geese were slightly in excess of that record total (P.S. and H.H.D.). On December 26 about 350 were watched feeding in a field between Newport and Oakleaze Farm, about five miles south of the New Grounds (H.H.D.). **S.** A single bird was seen in the Yeo Estuary on March 10 (R.H.P.), and the following, almost certainly White-fronts, were noted during the last three days of December—21 over Blagdon on the 29th, a small party over Saltford on the 30th, and 42 over Barrow Gurney, 23 over Whitchurch, and a single bird on Cheddar reservoir on the same date (R.E.A., H.J.B., B.K. and D.A.W.). Four were seen to alight on Blagdon reservoir on the 31st (R.E.A. and H.J.B.).

LESSER WHITE-FRONTED GOOSE (*Anser erythropus*). **G.** Frequent watch for the two adults identified on the New Grounds in the previous December (cf. *Proc.*, *B.N.S.*, 1945, p. 85) showed that

both birds may have remained until January 13 or later. One was certainly seen on that date, and subsequently on the following occasions—January 27 and February 13 and 24 (H.H.D., B.K., B.W.T. and others). Clear views were obtained by P.S. on December 28 and by the same observer and H.H.D. on the 30th, of a single adult among a great gathering of common White-fronts—thus suggesting the possibility that this species, hitherto regarded as no more than an extremely scarce visitor to the British Isles, may occur not infrequently among flocks of typical *albifrons* from continental breeding areas.

BEAN-GOOSE (*Anser f. fabalis*). **G.** A single immature bird, first noticed toward the close of the previous year, remained at the New Grounds until February 23 or later (F.L.B., B.W.T., H.H.D.), while half a dozen or more different individuals (adults and immatures) were identified among White-fronts at the same place during the last three weeks of December (P.S.).

PINK-FOOTED GOOSE (*Anser fabalis brachyrhynchus*). **G.** The only reports from the New Grounds early in the year were of half a dozen seen on January 13 (D.A.W. and H.H.D.) and a party of 17 on the 19th (P.S.). The first autumn geese at the New Grounds, about 20 on September 29, were probably of this species, while 41 seen on the 30th were definitely Pink-feet (P.S.). Subsequent counts were of 74 on October 13, 85 on the 24th and 95 on November 10 (P.S. and H.H.D.). All had evidently departed by the last week of November. Odd birds, sometimes two or three, were, however, noted among White-fronts on several dates in the last fortnight of December (P.S., H.H.D. and others).

BARNACLE-GOOSE (*Branta leucopsis*). **G.** The following were seen at the New Grounds—one on January 13 (B.K. and D.A.W.), four on the 27th and February 9 (H.H.D. and others), and two on various occasions from December 19 to the end of the year (A.C.L., B.W.T. and others).

DARK-BREASTED BRENT GOOSE (*Branta b. bernicla*). **G.** Reports from the New Grounds were of one on January 27 (H.H.D.), two on February 3 (B.K.), and a single bird on several dates from February 13 to March 3 (F.L.B., P.S., B.W.T. and others). One arrived at the same place on December 15 and was still present at the end of the year (P.S. and H.H.D.).

PALE-BREASTED BRENT GOOSE (*Branta bernicla hrota*). **G.** A single bird, clearly identified as being of this form, was seen at the New Grounds on September 30 and on various occasions subsequently (P.S., K.D.S. and H.H.D.). It arrived among Pink-footed Geese, with which it remained in constant company, and evidently departed with them late in November. The only previous record for the district is that of one reported from the same place, February-March, 1941 (cf. *Proc. B.N.S.*, 1943, p. 505).

SHELD-DUCK (*Tadorna tadorna*). **G.** As many as 105 were counted off the New Grounds on September 1 (B.K.). **S.** At the reservoirs, single birds were seen at Blagdon on January 13 and 20 and at Cheddar on February 26 (R.E.A. and H.J.B.). Two were present at Blagdon on May 19 (R.E.A. and H.J.B.).

GADWALL (*Anas strepera*). **S.** One, a male, was noted among Mallard at Cheddar reservoir on January 22 (H.H.D.), while at Blagdon a single bird was seen on March 28 and a pair on April 1 (H.J.B.).

TEAL (*Anas c. crecca*). **S.** Unusually abundant at Cheddar reservoir in January—numbers on the 6th being estimated at little short of 1,500 (H.H.D.). Many, probably 1,000 or more, were still present on the 22nd (H.H.D.).

GARGANEY (*Anas querquedula*). **S.** A pair was seen on Kenn Moor on March 26 (M. J. Wotton per H.J.B.). Two pairs visited Blagdon reservoir in the last week of March, remained throughout April and May and were still present on June 5 or later. Despite a close watch, there was no evidence of either pair attempting to nest (B.K., W.D.M., H.H.D. and others). What were almost certainly six Garganey were seen at the same reservoir on August 2 and 7 (R.E.A. and H.J.B.).

AMERICAN WIGEON (*Anas americana*). **G.** Good views were obtained, at about 150 yards range, of a male, among common Wigeon and Teal, on the Severn between Frampton and the New Grounds on March 9 (A.J.B.T.). **S.** A male was clearly identified among common Wigeon at Blagdon reservoir on January 27 and 28 (B.K., R.H.P. and H.H.D.), and again on February 4 and 5 (R.E.A.). It could not be found there on February 10, but what was undoubtedly the same bird was seen by A.E.B. and B.K. at Cheddar reservoir on March 2 and 17. (For detailed accounts of this and the Gloucestershire occurrence and for editorial remarks on the probability of the records referring to different individuals cf. *British Birds*, Vol. XXXIX, pp. 219-220.) A male, no doubt the same as that reported from the reservoirs in the previous winter, was seen by R.E.A. and H.J.B. at Cheddar on December 30.

PINTAIL (*Anas a. acuta*). **G.** Noted on several dates off the New Grounds—about twenty on January 13 and February 24 (R.H.P.) being the highest totals reported. **S.** Two were seen at Barrow Gurney reservoirs on February 13 (W.R.T.), and four at Blagdon on January 13, March 10 and November 3 (R.E.A., H.J.B. and H.H.D.). Seven were counted at Cheddar on January 22 (H.H.D.), and about a dozen on two occasions in the last week of December (H.J.B. and others).

SHOVELER (*Spatula clypeata*). **G.** Reported from the New Grounds area on various dates—the maximum totals being about forty on March 24 (R.H.P.) and twenty on October 13 (P.S.).

S. Unusually abundant at Cheddar reservoir early in the year—numbers on three occasions in January being estimated at not less than 450 (R.E.A., H.J.B. and H.H.D.), while 150 or more were still present on March 2 (R.H.P.). The breeding of a pair at Blagdon reservoir was proved when a female, accompanied by three ducklings, was seen on June 17 (R.E.A. and H.J.B.).

POCHARD (*Aythya ferina*). **G.** The following were seen off the New Grounds—thirty on January 13 (R.H.P.), nine on September 29 (H.H.D.), and twenty-five on November 24 (P.S.). Four were seen on the Duchess' Pond, Stapleton, on December 29 (A.J.D.).

TUFTED DUCK (*Aythya fuligula*). **G.** Five (3 males and 2 females) were noted off the New Grounds on January 13 (R.H.P.), and a single male was seen, in company with Pochard, at the same place on September 29 (H.H.D.).

SCAUP (*Aythya m. marila*). **S.** As in the previous year, two, females or immatures, visited Barrow Gurney reservoirs in November. The birds, seen on the 16th, were watched under good conditions and were clearly identified (G.E.C.).

GOLDENEYE (*Bucephala c. clangula*). **G.** What appears to be the only authentic record for the New Grounds area is that of an immature specimen on the decoy pool on November 13, 1944. The bird, viewed under cover of the screens, was seen at very close range and was repeatedly diving (H.H.D.). **S.** Twelve at Cheddar on December 30 and ten at Blagdon on the 31st were the largest totals reported from the reservoirs (R.E.A. and H.J.B.).

LONG-TAILED DUCK (*Clangula hyemalis*). **S.** A male, stated to have been still in winter plumage, arrived at Cheddar reservoir on the afternoon of May 5. It was seen, at close quarters, resting on the concrete slope at the west end by G.E.C. and B.K. who report that it was definitely not at the reservoir earlier in the day. Despite a careful search, there was no sign of the bird on the 6th.

COMMON SCOTER (*Melanitta n. nigra*). **G.** Two adult males were seen off the New Grounds on October 14 (P.S.), and a female was found dead at Severn Beach on December 3 (H.H.D.). **S.** Single adult males were noted at Blagdon reservoir on January 13 (R.E.A.) and Barrow Gurney reservoirs on March 31 (R.H.P.).

GOOSANDER (*Mergus m. merganser*). **S.** The following red-headed birds were reported—one at Barrow Gurney reservoirs on December 22 and 30, and two at Cheddar reservoir on December 30 (R.E.A., H.J.B. and R.H.P.).

SMEW (*Mergus albellus*). **S.** Frequently seen at Blagdon reservoir from early January to the end of March, the largest numbers reported being as follow—twelve, including four adult males, on January 20 (R.E.A.); twelve, including two adult males, on March 15 (R.E.A. and H.J.B.); twenty, including two adult males, on March 19 (H.H.D.). A single red-head was still at the

same place on April 1 (H.H.D.). Two, adult male and female, were seen at Barrow Gurney reservoirs on March 21 (A.C.L.), and an adult male was noted at Cheddar reservoir on December 15. (R.E.A. and H.J.B.).

CORMORANT (*Phalacrocorax c. carbo*). **S.** About fifteen pairs were estimated as breeding on the north cliffs, Steep Holm, on May 29 (E.G.H.). This compares favourably with pre-war estimates of eighteen pairs in 1939 and sixteen in 1937.

GANNET (*Sula bassana*). **G.** An adult was found dead on the mud-flats below Severn Beach on February 24 (R.J.E.), and another, also adult, was picked up at the same place on July 21 (H.H.D.).

STORM-PETREL (*Hydrobates pelagicus*). **S.** Following strong westerly gales, a small petrel, reported by H.C. as being of this species, was picked up alive at Weston-super-Mare on November 26. It was subsequently taken to Brean Down and, on being released, flew directly out to sea.

GREAT CRESTED GREBE (*Podiceps c. cristatus*). **S.** Seventy-two were counted at Cheddar on November 10 (R.H.P.). This is the largest number yet reported from the reservoirs, and a remarkably high total for the time of year.

SLAVONIAN GREBE (*Podiceps auritus*). **S.** Noted with greater frequency at the reservoirs than in any previous year. A single bird was seen at Blagdon on various occasions from January 4 to March 10 (R.E.A., W.R.T. and H.H.D.), while one was identified at Barrow Gurney on January 14 and 16 (B.K. and A.C.L.). At Cheddar two were present on January 20, 22, and February 10 (R.E.A. and R.H.P.), and a single bird was observed on several dates from mid-February to the third week of March (R.E.A., A.E.B. and B.K.). One was noted at the same reservoir on December 8 and two were seen there on the 15th (R.E.A. and H.J.B.).

BLACK-NECKED GREBE (*Podiceps n. nigricollis*). **S.** Single birds were seen at the reservoirs as follows—Cheddar, January 20 (R.E.A.), February 10 and November 10 (R.H.P.); Barrow Gurney, February 13 (W.R.T.) and various dates from August 28 to December 1 (G.E.C. and R.H.P.); Blagdon, several occasions from August 25 to mid-September (R.E.A.).

GREAT NORTHERN DIVER (*Colymbus immer*). **S.** One was seen at Cheddar reservoir on November 24 (B.K.). What was, perhaps, the same bird was noted at intervals during December and was reported as being still on the reservoir at the end of the year (R.E.A., H.J.B. and R.H.P.).

BLACK-THROATED DIVER (*Colymbus a. arcticus*). **S.** At Blagdon reservoir on April 1 good telescopic views were obtained by H.H.D. of a diver which was clearly identified as being of this species. It remained until the 9th or later and was seen under excellent

conditions by five other observers—R.E.A., H.J.B., B.K., W.R.T. and D.A.W. Among field characters particularly noted were the pale, greyish-brown head, the conspicuously white foreneck and breast and the almost uniformly blackish-brown mantle. Apart from a few large white spots in the region of the scapulars, there was little evidence of summer plumage being assumed. Compared with Great Northern Diver, the bird was slighter in build, while its bill was less massive and noticeably more pointed. This is the first record of a Black-throated Diver for the district.

RED-THROATED DIVER (*Colymbus stellatus*). **S.** Single birds were met with at Cheddar reservoir on February 10 and 27 (B.K., R.H.P. and others) and at Barrow Gurney reservoir on March 5 and 7 (A.C.L.).

TURTLE-DOVE (*Streptopelia t. turtur*). **S.** A nest, with two eggs, was found in larches at the Ubley end of Blagdon reservoir on May 2 (G.E.C.).

BAR-TAILED GODWIT (*Limosa l. lapponica*). **G.** Reported from the Severn on various occasions in spring and autumn, the largest totals being eleven near Severn Beach on May 11 (R.E.A.) and ten off the New Grounds on October 5 (R.H.P.). **S.** Two were seen near Clevedon on May 17 (G.E.C.).

BLACK-TAILED GODWIT (*Limosa l. limosa*). **G.** As in the previous year, Black-tailed Godwits were met with off the New Grounds in August and September. Twelve on August 4 and a similar number on September 1 were the highest counts reported (H.H.D., H.C.P. and C.W.). Three were seen at Aust on October 1 (R.E.A.). **S.** A single bird was identified in the Yeo Estuary on August 17 (R.H.P.).

CURLEW (*Numenius a. arquata*). **G.** Many, probably not less than 300, were seen at the New Grounds on August 4 (H.H.D.), while the number was estimated at approximately 500 at the same place on October 5 (R.H.P.). About 200 were present at Severn Beach on September 5 (A.C.L.). **S.** A flock of 200 was seen in the Yeo Estuary on August 17 (R.H.P.).

WHIMBREL (*Numenius ph. phaeopus*). **G.** Noted in small numbers at Aust and Severn Beach in May (F.L.B. and H.H.D.), and on autumn passage at Severn Beach and the New Grounds (A.C.L. and H.H.D.). **S.** Reported on both passages from Clevedon and the Yeo Estuary (G.E.C. and R.H.P.).

WOODCOCK (*Scolopax rusticola*). **S.** Single birds were flushed at Abbots Leigh on February 24 and March 3 (J.H.S.), and in Leigh Woods on December 15 (R.H.P.).

TURNSTONE (*Arenaria i. interpres*). **G.** Three seen by B.K. off the New Grounds on August 11 provided the first record for this part of the Severn.

KNOT (*Calidris c. canutus*). **G.** Twenty-five were counted near

Severn Beach on May 11 (R.E.A.), and fourteen, all in red plumage, were found near the same place on the 13th (R.H.P. and H.H.D.). A flock of 400 or more, the largest number yet reported from the Severn, was seen off the New Grounds on August 12. Of these, a few were still in partial red dress (H.H.D.). Two were noted at Severn Beach on September 5 (A.C.L.). **S.** The only report is of two near Clevedon on May 17 (G.E.C.).

DUNLIN (*Calidris alpina*). **G.** A partially albino bird was seen on the mud-flats below Severn Beach on March 24 (H.H.D.).

CURLEW-SANDPIPER (*Calidris testacea*). **G.** Observed off the New Grounds on several occasions in September—up to ten or twelve being counted on the 15th (B.K., H.H.D. and C.W.). Two were identified among Dunlin near Severn Beach on September 13 and one was noted there on the 21st (H.W.N.).

LITTLE STINT (*Calidris minuta*). **G.** Two were seen off the New Grounds on September 14 and 15 (B.K. and R.H.P.), and five in the same place on the 29th (B.K. and H.H.D.).

SANDERLING (*Crocethia alba*). **G.** Twice noted at Severn Beach on spring passage—one on May 11 and two on the 14th (R.E.A. and R.H.P.). Several parties, perhaps fifty birds in all, were seen at the New Grounds on August 12 (H.H.D.), while up to twelve or fifteen were reported from the same place on two occasions in the first ten days of September (B.K. and R.H.P.). **S.** Reported from Cheddar reservoir on various dates in May, a party of fourteen being seen on the 19th (B.K. and H.H.D.). One winter record—that of a single bird at Weston-super-Mare on December 27 (B.K.).

RUFF (*Philomachus pugnax*). **G.** A single bird was seen off the New Grounds on August 12 (H.H.D.), and three were present in the same place on the 31st (R.H.P. and C.W.).

COMMON SANDPIPER (*Actitis hypoleucos*). **G.** One was watched feeding at the lake in Badminton Park on May 12 (A.J.D.) and two were present at Tortworth Court lake on the same date (H.H.D.). **S.** A single bird was seen on the rocks at Steep Holm on May 29 (E.G.H.).

GREEN SANDPIPER (*Tringa ochropus*). **G.** The following were reported—one near Berkeley on February 6 (M.L.F.); two on flooded pastures at Stoke Gifford on August 31, and a single bird in the same place on September 1 and 7 (H.H.D.); one at the New Grounds on November 3 (R.H.P.). **S.** One was put up at Barrow Gurney on a number of dates from early August to mid-November (G.E.C.), and one in a field near the Yeo Estuary on August 17 (R.H.P.).

COMMON REDSHANK (*Tringa totanus*). **S.** A flock, estimated at not less than 400, was seen in the Yeo Estuary on August 17 (R.H.P.).

SPOTTED REDSHANK (*Tringa erythropus*). **S.** One was clearly

identified at the mouth of the River Axe on August 18 (D.A.W.).

GREENSHANK (*Tringa nebularia*). **G.** A single bird was noted off the New Grounds on September 1 (B.K. and C.W.).

RINGED PLOVER (*Charadrius h. hiaticula*). **G.** Many, probably not less than 350, were present on the mud-flats below Severn Beach on May 13 (B.K. and H.H.D.). Although occurring regularly in similar abundance near Severn Beach in autumn, this is the largest spring passage total yet reported.

GOLDEN PLOVER (*Pluvialis apricaria*). **G.** A party of six was seen overhead near Stoke Gifford on February 6 (H.H.D.). Noted in moderate numbers at the New Grounds on various dates from late September to the end of the year (D.A.W. and H.H.D.). **S.** Abundant on Lansdown, near Bath, in October and November—200 on October 29 being the highest total reported (F.L.B.).

GREY PLOVER (*Squatarola squatarola*). **G.** Of seven seen on the mud-flats below Severn Beach on May 11 and 13, three or four were in full summer plumage (R.E.A. and H.H.D.). Twice reported from the New Grounds—two on October 5 (R.H.P.) and two on the 24th (K.D.S. and H.H.D.). **S.** Eight were counted in the Yeo Estuary on March 10 (R.H.P.).

OYSTER-CATCHER (*Hematopus ostralegus occidentalis*). **G.** Three were observed as far up the Severn as the New Grounds on August 4 and again on the 11th (H.H.D. and B.K.). **S.** A single bird was met with at Blagdon reservoir on April 1 (H.H.D.).

BLACK TERN (*Chlidonias n. niger*). **G.** Three were seen off the New Grounds on August 31 (R.H.P. and C.W.) and as many as twelve were counted at the same place on September 1 (B.K.). **S.** Spring passage records from the reservoirs include those of one at Barrow Gurney on May 1 (R.H.P.), three at Cheddar on the 12th and 19th (R.E.A. and others), three at Blagdon on the 20th and one at the same place on June 20 (B.K.) Among the very few autumn records is that of two at Blagdon on August 21 (W.R.T.).

SANDWICH TERN (*Sterna s. sandvicensis*). **S.** A tern seen in flight over Cheddar reservoir on December 6, 1945, was found dead later on the same day and was identified as a Sandwich Tern (cf. *British Birds*, Vol. XXXIX, p. 93).

COMMON TERN (*Sterna h. hirundo*). **S.** Reservoir records are of two at Cheddar on May 10 (B.K.) and a single bird at Blagdon on the 12th (R.P.G.).

LITTLE GULL (*Larus minutus*). **S.** Two, an adult and an immature, were clearly identified by R.E.A., B.K. and R.H.P. at Cheddar reservoir on May 12. Two, evidently the same birds, were again seen on the 19th (R.E.A. and B.K.).

GREAT BLACK-BACKED GULL (*Larus marinus*). **S.** Three were seen at Cheddar reservoir on March 2, and a single bird was present at the same place on February 27 and on two occasions in

May (B.K.). About eighteen pairs, nine of which were proved to be nesting, were noted at Steep Holm on May 29 (E.G.H.).

[ICELAND GULL (*Larus glaucoides*). **G.** and **S.** An immature bird seen on the Avon between Ashton swing-bridge and Hotwells on several dates in the first half of January was believed to be this rather than a *small* Glaucous Gull (*L. hyperboreus*). It was first noticed, by H.H.D., on the 6th, and was in company with an immature Herring-Gull, with which it corresponded in size but, apart from the uniformly dusky-white plumage, differed in its more tapering appearance. B.K., who saw the bird under excellent conditions on the 13th, reports that in size it closely resembled immature Herring-Gulls with which it was associating, and that, when at rest, its long pointed wings extended well beyond the tail. Similar characters were noted by A.C.L. and W.R.T. on the 10th and 15th.]

KITTIWAKE (*Rissa t. tridactyla*). **S.** An adult was seen at Cheddar reservoir on March 2 and again on the 17th (A.E.B., R.P.G. and B.K.). A single adult was noted off the coast at Clevedon on November 17 (B.K.).

CORN-CRAKE (*Crex crex*). **G.** One was heard at Rangeworthy on several occasions in June, but there was no subsequent evidence of a pair having bred (J.H.H.).

NOTES ON BUCKNALL'S DRAWINGS OF BRITISH FUNGI

BY A. A. PEARSON, F.L.S.

(*Read in title at General Meeting, March 6, 1947*)

(*Received, March 22, 1947*)

IN the years 1877—1891 records of the fungi of the Bristol district were published in these *Proceedings*. They were by Cedric Bucknall and there were 13 Parts, the last of which contained an index of all the species he had recorded. A few paintings and black and white drawings were published with some of the parts.

Bucknall was an enthusiastic collector of fungi, and everything he picked up was scrutinised, carefully sketched or painted and duly recorded. His range was wide and included the ascomycetes, for the study of which the microscope was essential, and his published figures of this group give all the necessary details. Phillips named his discomycetes, including several new to science. Bucknall was in correspondence with all the specialists of his day, and such names as Berkeley, Cooke, Plowright and Broome frequently occur in his lists—but he himself must have had a remarkable *flair* for species. The present writer recently had the pleasure of looking through his paintings of the Agarics and Boleti which, some years ago, were acquired by the Royal Botanic Gardens, Kew. They are of a high quality. There are some hurried sketches of no value, but the finished drawings are first rate and represent the fungi so well that they can be named with little hesitation. Most of them are correctly named, and one is full of admiration for the perspicacity of these old mycologists who could acquire an accurate knowledge of species without knowing any of the microscopic features which to-day we should consider indispensable, at least for the smaller species of Agarics. We have been through Buckland's water-coloured drawings, and the following critical notes may be of some value in correcting the original determinations of some of the more interesting species :

* Signifies drawing made from the published collection.

† " " " " Bristol collection but not that published.

Published No.	MS. No. of drawing	Published Name	Corrected name
*1241	(1827)	<i>Agaricus solitarius</i>	<i>Amanita echinocephala</i>
* 692		" <i>asper</i>	" <i>pantherina</i>
*1025	(1599)	" <i>polystictus</i>	<i>Lepiota irrorata</i>
*1026	(1612)	" <i>albo-brunneus</i>	<i>Tricholoma ustale</i>
*1245	(1853)	" <i>amplus</i>	form of <i>Tricholoma melaleucum</i>
278	(64 & 523)	" <i>fumosus</i>	<i>Tricholoma cinerascens</i>
506	324 (1142)	" <i>metachrous</i>	<i>Clitocybe vibecina</i>
* 962	(1531)	<i>Hygrophorus murinaceus</i>	<i>Hygrophorus nitratu</i> s
339	162 (430)	<i>Marasmius insititius</i>	<i>Marasmius Vaillantii</i>
*1099	(1655)	" <i>omadelpus</i>	" <i>ramealis</i>
287	(601)	<i>Agaricus leptoccephalus</i>	<i>Mycena alcalina</i>
"	201 (490)	" "	" <i>metata</i>
847	(1339)	" <i>lineatus</i>	" <i>chlorantha</i> var. <i>pallida</i> Pearson = <i>M. lineata</i> sensu Lange
1249	53 (51)	" <i>stanneus</i>	" <i>metata</i>
"	218 (522)	" "	" <i>ammoniaca</i>
* 704	(1275)	" <i>sudorus</i>	<i>Leptonia sericella</i>
* 704		" <i>electricus</i>	<i>Mycena tenerrima</i>
* 944	(1527)	" <i>griseus</i>	" <i>cinerella</i>
* 942		" <i>pseudo-androcaceus</i>	" <i>speirea</i>
332	45 (33) & 160 (428)	<i>Lactarius exsuccus</i>	<i>Russula delica</i>
1335	1919	<i>Russula sardonias</i>	" <i>veterosa</i>
1337		" <i>pulchralis</i>	" <i>veterosa</i>
*1337	(1657)	" "	" <i>lutea</i>
338	(48) (36) (88)	" <i>alutacea</i>	" <i>exalbicans</i>
867	158 (417)	" <i>integra</i>	" <i>pseudo-integra</i>
867	154 (413)	" "	" <i>æruginea</i> and a small <i>vesca</i>
867	265 (746) (97)	" "	" <i>exalbicans</i>
"		" <i>rubra</i>	" <i>atropurpurea</i>
*1338	(1825)	" <i>ochracea</i>	" <i>fellea</i>
337	(238)	" <i>fragilis</i>	" <i>venosa</i> Melz. or <i>nitida</i> Fr.
706	(1310)	<i>Agaricus prunuloides</i>	<i>Entoloma</i> sp (?) not <i>prunuloides</i>
*1087	(1656)	" <i>repandus</i>	" <i>prunuloides</i>
946	(71)	" <i>jubatus</i>	" <i>porphyrophæum</i>
519	55 (54) & (982)	" <i>pascuus</i>	<i>Nolanea staurospora</i> Bres.
* 710		" <i>asprellus</i> , corrected to <i>vilis</i>	<i>Ecclia undata</i>
*1087	(1250)	" <i>vilis</i>	" "
310	(800)	" <i>reticulatus</i>	<i>Pluteolus aleuriatus</i>
711	(810)	" <i>pudicus</i>	<i>Pholiota ægerita</i>
* 949	(1515)	" <i>ombrophilus</i>	" <i>erebia</i>
296	(124)	" <i>mycenoides</i>	" <i>togularis</i> Fr. non Ricken
* 712	(1312)	" <i>muricatus</i> v. <i>gracilis</i>	" <i>erinacea</i>
305	(443) & (473)	" <i>flocculosus</i>	<i>Inocybe umbrina</i>
† 520		" <i>fastigiatus</i>	" <i>asterospora</i>
† 520	(520)	" "	" <i>scabella</i>

Published No.	MS. No. of drawing	Published Name	Corrected name
521	(1028)	<i>Agaricus geophyllus</i> v. <i>lateritius</i>	<i>Inocybe Godeyi</i>
*1402	(447)	„ <i>asterospora</i>	„ <i>napipe</i> Lange
55	(416)	„ <i>fibrosus</i>	„ <i>lucifuga</i>
56	(176)	„ <i>rimosus</i>	„ <i>geophylla</i>
† 522		„ <i>scabellus</i>	„ <i>obscura</i>
1254	(1281)	„ <i>lubricus</i>	<i>Flammula lenta</i>
† 307		„ <i>alnicolus</i>	„ <i>gummosa</i>
307	(811)	„ „	„ „
525	(1027)	„ <i>rubi</i>	<i>Naucoria effugiens</i>
856	(1395)	„ <i>Phillipsii</i>	<i>Crepidotus variabilis</i>
716	251 (717)	} „ <i>melinoides</i>	<i>Tubaria furfuracea</i>
716	(726)		
*1150		„ <i>sparteus</i>	(?) <i>Crinipellis stipitarius</i>
717	(1320)	„ <i>vestitus</i>	<i>Galera appendiculata</i>
*1259	(1808)	<i>Cortinarius cyanopus</i>	more like <i>C. infractus</i>
† 529	322 (1102)	„ <i>largus</i>	<i>Cortinarius albo-violaceus</i>
*1260	(1829 b)	„ <i>scaurus</i>	„ <i>callisteus</i>
1404	(1454)	„ <i>testaceus</i>	„ <i>rufo-olivaceus</i>
* 723	214 (513)	„ <i>claricolor</i>	„ <i>delibutus</i>
† 530		„ <i>Riederi</i>	„ „
*1155		„ <i>penicillatus</i>	„ <i>humicola</i>
326	(824)	„ <i>decoloratus</i>	„ <i>crystallinus</i>
862 or	(1626)	„ <i>sublanatus</i>	„ <i>cotoneus</i>
51	(47)	„ <i>callisteus</i>	„ <i>bulbosus</i>
863	(1280)	„ <i>raphanoides</i>	„ „
*1262	(1852)	„ <i>camurus</i>	„ <i>rigens</i>
1333	(1927)	„ <i>injucundus</i>	„ <i>armillatus</i>
*1263	1828	„ <i>bivelus</i> , corrected in index to <i>C. laniger</i>	„ <i>bivelus</i>
1095	(1109)	„ <i>macropus</i>	Doubtful
*1047	(1609)	„ <i>helveolus</i>	„
728	215 (518)	„ <i>licinipes</i>	„
*1049	(1524)	„ <i>dilutus</i>	„
* 330	285 (794)	„ <i>armeniacus</i> (corrected to <i>saturninus</i>)	„
†1054		„ <i>germanus</i>	<i>Cortinarius erythrinus</i>
* 532	325 (1219)	„ <i>acutus</i>	„ <i>incisus</i>
951		<i>Agaricus stercorarius</i>	<i>Stropharia semi-globata</i>
* 527		„ <i>epixanthus</i>	<i>Hypholoma capnoides</i>
*1152	(1586)	„ <i>egenulus</i>	„ <i>Candolleum</i>
† 65	261	„ <i>appendiculatus</i>	„ „
85	(11) (700b)	„ <i>fimiputris</i>	<i>Panæolus sphinctrinus</i>
857	1316	„ <i>pennatus</i>	<i>Psathyra pennata</i>
	no number	„ „	„ <i>gossypina</i>
1257	(685)	„ <i>hydrophilus</i>	doubtful
322	(421)	„ <i>pronus</i>	„
67	161 (429)	„ <i>corrugis</i>	(?) <i>Psilocybe coprophila</i>
† 316	295	„ <i>comptulus</i>	<i>Psathyrella gracilis</i> var. <i>corrugis</i>
316	(66)	„ „	„ <i>gracilis</i>
323	254 (721)	<i>Coprinus tomentosus</i>	<i>Coprinus niveus</i>
859	(1381)	„ <i>nycthemerus</i>	„ <i>plicatilis</i>
747	(1297)	<i>Boletus candicans</i>	<i>Boletus albidus</i>
†1340	(1661)	„ <i>castaneus</i>	„ <i>badius</i> (form)
306	(1046)	„ <i>spadiceus</i>	„ <i>badius</i>

Published No.	MS. No. of drawing	Published Name	Corrected name
*1414	(1922)	<i>Boletus tenuipes</i>	<i>Boletus cramesinus</i>
746	(1309)	„ <i>varicolor</i>	„ <i>crocipodius</i>
107	(456)	„ <i>chrysenteron</i>	„ <i>sub-tomentosus</i>
745	63 (72)	„ <i>subtomentosus</i>	<i>Porphyrellus porphyrosporus</i>
304	(1044)	„ <i>pachypus</i>	<i>Boletus albidus</i>
*1345		<i>Clavaria lilacina</i>	<i>Clavaria amethystina</i>
1063		„ <i>umbrina</i>	„ <i>botrytis</i>
143	205 (493)	<i>Typhula Grevillei</i>	This or <i>T. candida</i>

In addition to the above there are a large number of unpublished original drawings by Cedric Bucknall, most of which are unnamed. We have been through these and they include many species which may not have been recorded in the Bristol district. As the localities are not mentioned, it cannot be stated with certainty that they were found within easy reach of Bucknall's home, but they probably were, so a few of the less common species may be given :

<i>Lepiota castanea</i>	<i>Lactarius lilacinus</i>	<i>Tubaria crobulus</i>
<i>Armillaria ramentacea</i>	„ <i>volemus</i>	<i>Inocybe sambucina</i>
<i>Mycena inclinata</i>	<i>Hygrophorus erubescens</i>	„ <i>umboninata</i>
<i>Omphalia rustica</i>	<i>Entoloma ardosiacum</i>	<i>Cortinarius turbinatus</i>
<i>Marasmius caudicinalis</i>	„ <i>ameides</i>	„ <i>triformis</i>
<i>Russula exalbicans</i>	<i>Leptonia sarcita</i>	„ <i>penicillatus</i>
„ <i>rosea</i> Quel	<i>Nolanea fumosella</i>	„ <i>decolorans</i>
<i>Lactariu flexuosus</i>	<i>Tubaria autochtona</i>	<i>Psilocybe physaloides</i>

(Thanks are due to Dr. R. W. G. Dennis, of the Herbarium, Royal Botanic Gardens, Kew, whose help was given unstintingly in the preparation of the above lists.)

THE RHÆTIC AND LOWER LIAS ROCKS OF INGLESTONE COMMON, NEAR HAWKESBURY, GLOUCESTERSHIRE

BY DESMOND T. DONOVAN, B.Sc., F.G.S.

(Read in title at General Meeting, March 6, 1947.

Received March 28, 1947)

FEW sections through the Lower Lias are known between Bath and Gloucester, a distance of 36 miles. In 1940 a system of shallow trenches to carry a water pipe-line was dug in the neighbourhood of Inglestone Common, about 15 miles due north of Bath. The trenches were nowhere more than four feet deep, and in many places solid rock was not reached; moreover, certain lengths of trench were infilled before the excavations could be examined. The record is therefore incomplete, but a number of horizons in the Lower Lias have been recognised. The Lower Lias and Rhætic rocks appear in natural exposures nearby and these have also been described in order to make the account as complete as possible. Only passing reference will be made to strata higher than the Lower Lias.

The geological examination of the trench was made in 1940 by Prof. W. F. Whittard, assisted by Dr. Stanley Smith and Mr. E. W. Seavill. The other exposures have been examined by the writer.

I am indebted to Dr. L. R. Cox and Dr. L. F. Spath for assistance in the determination of the lamellibranchs and the ammonites respectively. Dr. W. D. Lang has named the belemnites.

I also wish to acknowledge the receipt from the University of Bristol Colston Society of a grant towards the cost of publication of this paper.

RHÆTIC

Rhætic beds are exposed in Saltmoors Ditch and in the Little Avon River. The former occurrence was referred to by Richardson (1904, p. 534). The best exposures are at Shepherd's Knap and along the Little Avon southwards from this point for a distance of about 800 yards.

The section along the stream is as follows:—

	ft.	ins.
Blue limestone, abundant lamellibranchs	2	0 seen
Grey, paper shale	0	4-5
Flaggy, grey limestone with lamellibranchs	0	2
Black, paper shale, ferruginous weathering	0-1	0
Cotham Marble	0	0-9
Laminated, grey clay	2	0 plus
Micaceous, calcareous sandstone, upper surface ripplemarked	0	0½
Laminated, grey clay	0	6-11
Grey marl, nodular	0	10
Grey clay	2	0
Grey marl	0	5
Grey clay	3	0 seen

The Cotham Marble is variable in thickness, thinning from 9 inches to nil within a distance of two feet; the top surface of the bed is uneven and mammilated. At Shepherd's Knap (31)*, a double "landscape" is developed. Hard limestones, somewhat similar in texture to the Cotham Marble but lacking the "landscape," are found in lenses at about the same horizon. A limestone with *Naiadites* sp. has been found but its exact stratigraphical position is not certain.

Where the basal limestones of the Lower Lias rest upon the Cotham Shales, and sometimes where they rest upon the Cotham Marble, there is developed a bed, up to 2 inches in thickness, containing pebbles of Cotham Marble and oysters. There appears therefore to have been erosion of the Cotham Beds prior to the deposition of the Lower Lias.

Little can be said as to the lithology of the Westbury Beds, which are poorly exposed. The Bone Bed has not been encountered in the present investigation but was found by Richardson (1904, p. 534) and by Whittard and Smith (1944, p. 68) just west of the present area.

The base of the Rhætic beds has been located 170 yards west-north-west of the exposure at Shepherd's Knap.

The Cotham Beds show a general similarity of lithology to the various exposures in the immediate vicinity of Bristol, and are typical of the predominantly argillaceous facies which replaces northwards the more calcareous development which characterises the Carboniferous Limestone islands of Bristol and Mendip. The ripplemarked bed which occurs in the clay below the Cotham

* Throughout this paper fossil localities are given by numerals enclosed in brackets, and their position is indicated on the accompanying map.

Marble is paralleled by similar beds, in a similar position, in several temporary sections in Bristol. (Kellaway, 1931, pp. 288, 292).

LOWER LIAS

The zonal and subzonal scheme used in the following account is that proposed by Spath (1942).

HETTANGIAN

Zone of *Pleuromya tatei*

The basal beds of the Lias consist of dark, flaggy limestones with shaly partings, and are exposed in Saltmoors Ditch and along the Little Avon. In the former section (37) the following succession was observed :

	ins.
Blue-grey limestone, lenticular, with <i>Mactromya arenacea</i> (Terquem) and <i>Protocardia phillipiana</i> (Dunker) ..	2—5
Shale	2
Light-grey, flaggy limestone with <i>Ctenostreon terquemi</i> (Tate), <i>Lima (Plagiostoma) valoniensis</i> Defranc, <i>Mactromya arenacea</i> , <i>Ostrea irregularis</i> Münster, <i>Pleuromya striatula</i> Agassiz, <i>P. tatei</i> Richardson and Tutcher and <i>Protocardia phillipiana</i>	4
Shale	3
Dark-grey, flaggy limestone with <i>Modiola levis</i> Sowerby, <i>M. wickesi</i> Richardson and Tutcher, <i>Paralalodon hettangiensis</i> (Terquem), <i>Pleuromya striatula</i> Agassiz and <i>Protocardia phillipiana</i>	10

Zone of *Psiloceras planorbis*

The subzone of *Caloceras johnstoni* was proved in stream sections. Grey shales with hard, nodular limestones, and mudstones with the index fossil (32, 34) outcrop along the east-west tributary which joins the Little Avon at Shepherd's Knap. Beds of similar lithology occur in Saltmoors Ditch at a number of points between (37) and the "Fox and Hounds" and are probably of the same age, although no fossils have been recovered.

LOWER SINEMURIAN

Zone of *Ammonites bucklandi*

The rocks belonging to this zone in the trench were brown-weathering, blue clays with nodular limestones. Irregular beds of limestone, 3 to 5 inches thick and separated by blue-grey shales with *Gryphaea obliquata* Sow., appear in the stream at Bucklesbury

Farm (33) and probably fall into this zone. The following fossils were found in the trench :

<i>Oxytoma sinemuriensis</i> (D'Orb.)	(2)	
<i>Gryphea obliquata</i> Sow.	(1)	Possibly not <i>in situ</i> .
<i>Piarorhynchia radstockiensis</i> (Dav.)	(3)	
<i>Spiriferina</i> sp.	(3)	

Large ammonites were represented by fragments not specifically identifiable.

Zone of *Arnioceras semicostatum*

Blue clays with fossiliferous limestone nodules represented this zone. The subzones of *Agassicerias scipionianum* and *Euagassicerias sauzeanum* were proved by their index fossils. In addition to the trench exposures, the beds are developed in the stream about 900 yards east of Bucklesbury Farm.

The following fossils were recovered :

<i>Agassicerias scipionianum</i> (Dum.)	(4)
<i>A. transformatum</i> (Simpson)	(6, 22)
<i>A. nodulatum</i> (S. Buckman)	(18)
<i>Arnioceras bodleyi</i> (J. Buckman)	(8)
<i>Coroniceras</i> aff. <i>forficatum</i> (Strickland—J. Buckman)	(18)
<i>Euagassicerias sauzeanum</i> (D'Orb.)	(5, 7)
<i>Gryphea</i> aff. <i>incurva</i> Sow.	(20-23)
<i>Chlamys æqualis</i> Quenst.	(19)

The specimens recorded as *Coroniceras* aff. *forficatum* differ from the typical form of this species in that the costae are not inclined backwards and the lateral keels are less distinct and tend to merge with the tubercles at the ends of the costae. In the style of ribbing, some specimens collected approach the form figured as *Ammonites aussoniensis* by Reynès (1879, Pl. IX, figs. 13, 14).

Fragments of large specimens of a *Euagassicerias* of *sauzeanum* type were collected at (8, 23).

Arnioceras bodleyi occurred in abundance at (8) to the virtual exclusion of other fossils.

On the northern branch of the trench, *Spiriferina tumida* (Quenst.) and "*Rhynchonella*" ? *lineata* Young and Bird (a small form) were found, the latter in abundance. Their horizon is uncertain but is possibly *semicostatum* zone which was proved 150 yards to the south-east at (22).

Zone of *Arietites turneri*

The zonal fossil only was found, in brown-weathering, blue clays (9).

UPPER SINEMURIAN

Zone of *Asteroceras obtusum*

The subzone of *Promicroceras planicosta* and *Asteroceras stellare* have been proved. The lithology is mainly brown-weathering, blue clays, but there occur thin, flaggy limestones with *Promicroceras* and septarian nodules with *Asteroceras obtusum*. The fauna includes :

<i>Asteroceras obtusum</i> (Reynès)	.. .. .	(12-14)
<i>A. stellare</i> (Sow.)	.. .. .	(15)
<i>Promicroceras</i> sp.	.. .. .	(10)
<i>Xiphoceras binodulatum</i> S. Buckman	.. .. .	(11)

The *Promicroceras* is probably *planicosta* (Sow.) but is not sufficiently well preserved for certain identification.

Zone of *Oxynticeras oxynotum*

The only evidence for this zone was a single specimen of *Gagaticeras gagateum* (Young and Bird) in hard, blue limestone at (13).

Zone of *Echioceras varicostatum*

The zone is represented by a single fragment of *Deroceras spicatum* (Simpson) (16) ; it was not found *in situ*.

LOWER PLEIENSACHIAN

Zone of *Tragophylloceras ibex*

Along the southern branch of the trench there was no evidence for Lower Lias rocks higher than the zone of *Echioceras varicostatum*, but along the northern branch the subzone of *Acanthopleuroceras valdani* was identified, the following fossils being obtained :

<i>Liparoceras cheltiense</i> (Murchison)	.. .. .	(26)
<i>L. rusticum</i> Spath	.. .. .	(26)
<i>Lytoceras fimbriatum</i> (Sow.)	.. .. .	(27)
<i>Passaloteuthis</i> sp.	.. .. .	(25, 26)
<i>Pseudohastites</i> sp.	.. .. .	(25, 26)

The belemnites occurred in abundance. The horizon corresponds to the upper part of the Belemnite Marl on the Dorset coast.

Eastwards from (27) the clay became lighter in colour and more sandy, and at (28) was shaly in texture. At (29) hard, blue, limestone bands occurred, succeeded by soft, blue clays.

MIDDLE LIAS

Micaceous, yellow-weathering clays were exposed on the southern and northern branches of the trench (17, 30) and yielded *Goniomya* sp. and *Æquipecten equivalvis* Sow. Grey clays exposed in the stream which flows northwards from Lovettswood Farm yielded from limestone bands at (36) a lamellibranch fauna including *Æ. equivalvis*. Middle Lias rocks are also seen in roadside exposures in Hillsley village (35) and provided lamellibranchs and a small amaltheid ammonite.

CONCLUSIONS

Reliable dips could not be obtained in the trenches but in the stream sections the dips are small, and all the evidence points to a generally low dip towards the east throughout the area. The thickness of the zones could not be reliably estimated, but several interesting points emerge in this connection. The zone of *Scammoceras angulatum* has not been detected in the area, and if present must be very thin. The zone of *Arietites turneri* is much attenuated and is impersistent, since at (10) it was developed between the zones of *Arnioceras semicostatum* and *Asteroceras obtusum* while at (15) the two latter zones are in contact. The zone of *Tragophylloceras ibex* is associated with abundant belemnites and resembles in this respect the development on the Dorset coast, where the Belemnite Marl occurs at this horizon.

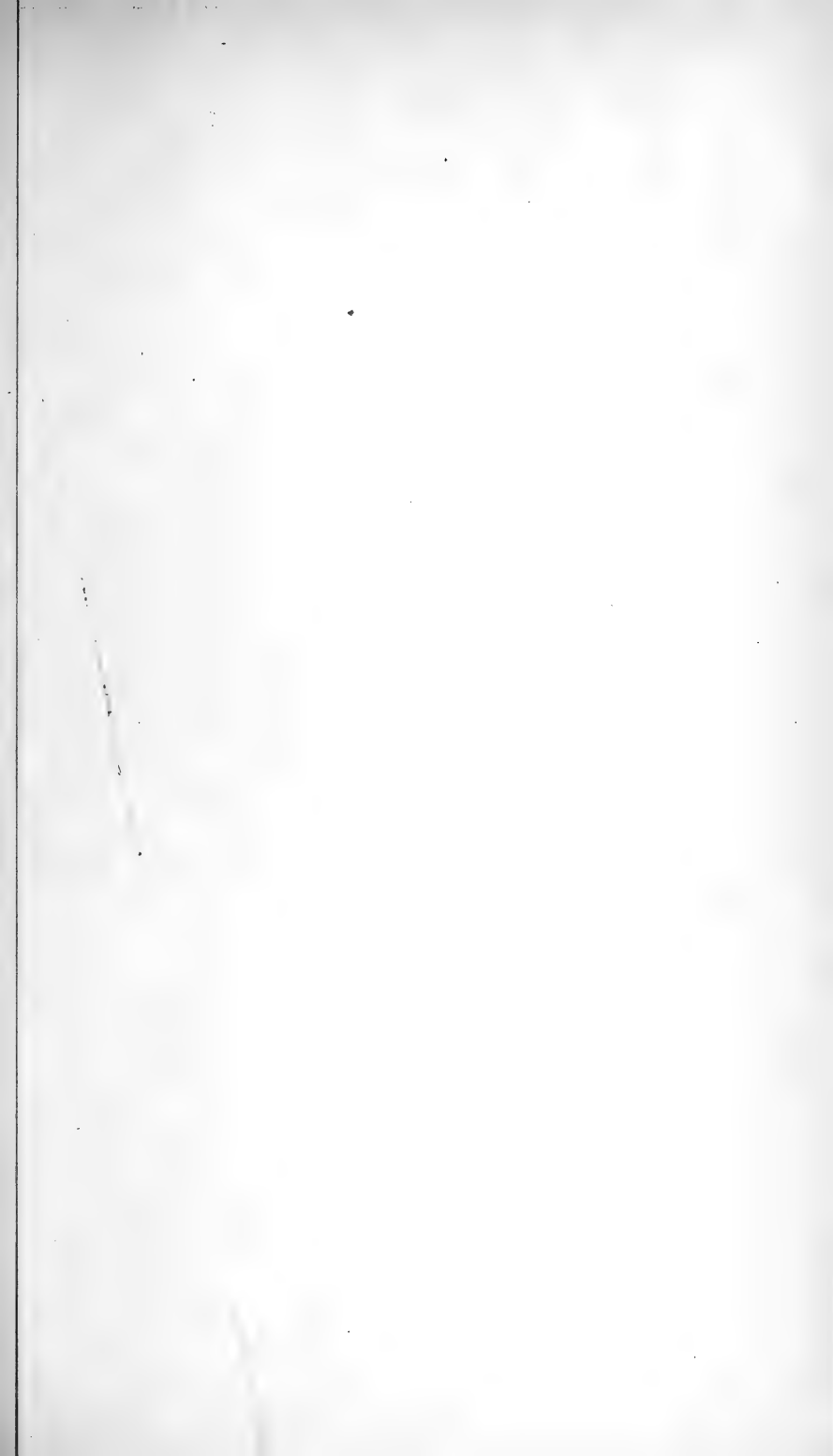
Faulting must be assumed on the northern branch of the trench, between (24) and (25), and along the southern branch between (15) and (17). In the former case, strata of *semicostatum* age are brought against those of *ibex* age, five complete zones being missing. The ground slopes downhill to the east at this point, and the *semicostatum* beds are on the same topographical level as the Middle Lias rocks at (35). This fault is possibly the one which displaces the Marlstone feature by about 50 feet vertically in the neighbourhood of Abbot's Well.

Along the southern branch of the trench, beds of *obtusum* age occur at (15), while Middle Lias was found at (17), about 300 yards to the east.

The reappearance of beds with *Caloceras johnstoni* to the east of the outcrop of the *bucklandi* zone at Bucklesbury Farm may also be due to strike faulting, but may equally well be caused by a slight undulation in the dip.

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SKETCH MAP
OF THE FOSSIL LOCALITIES
OF INGLESTONE COMMON,
NEAR HAWKESBURY, GLOS.

0 $\frac{1}{4}$ $\frac{1}{2}$ MILE

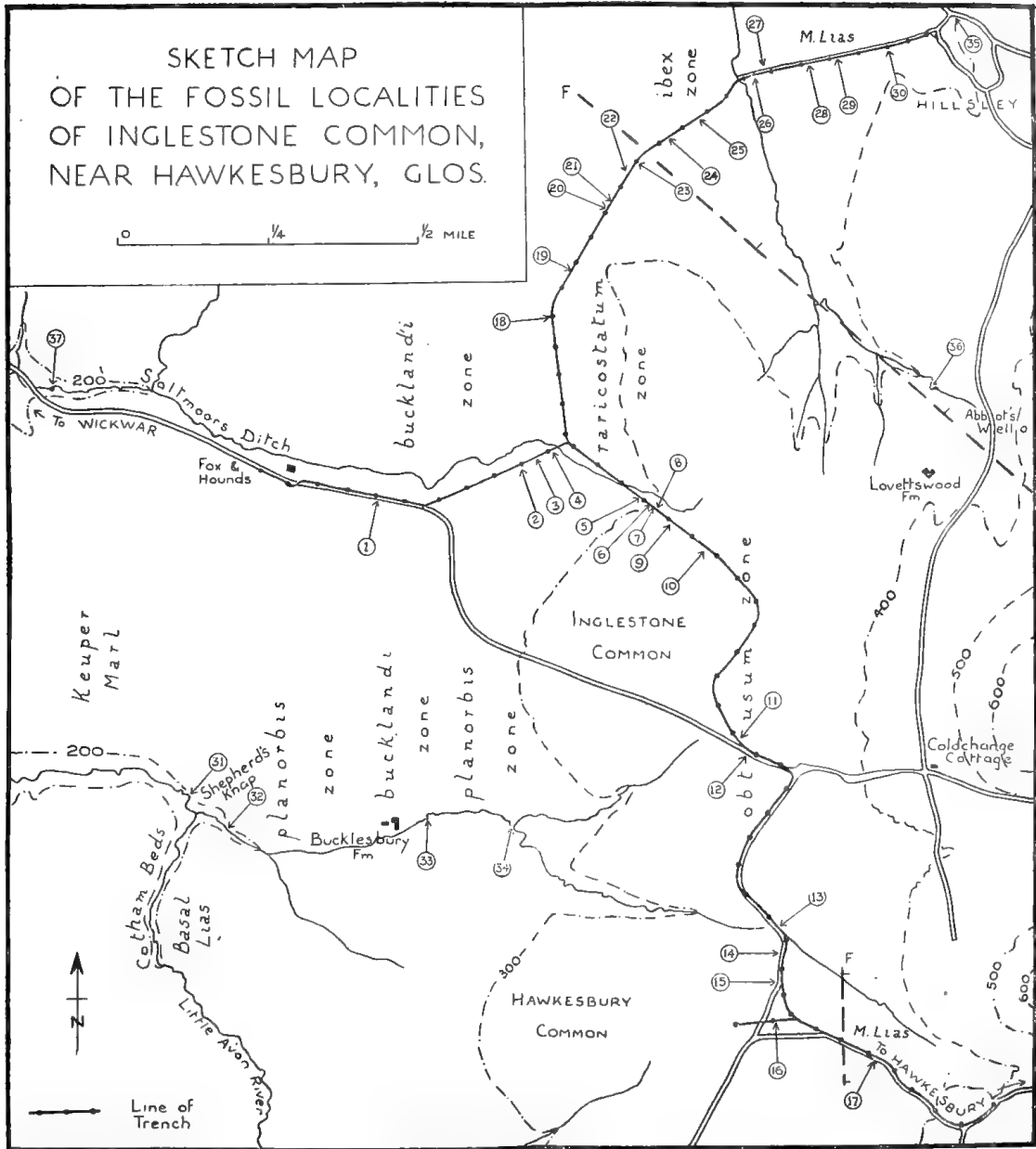
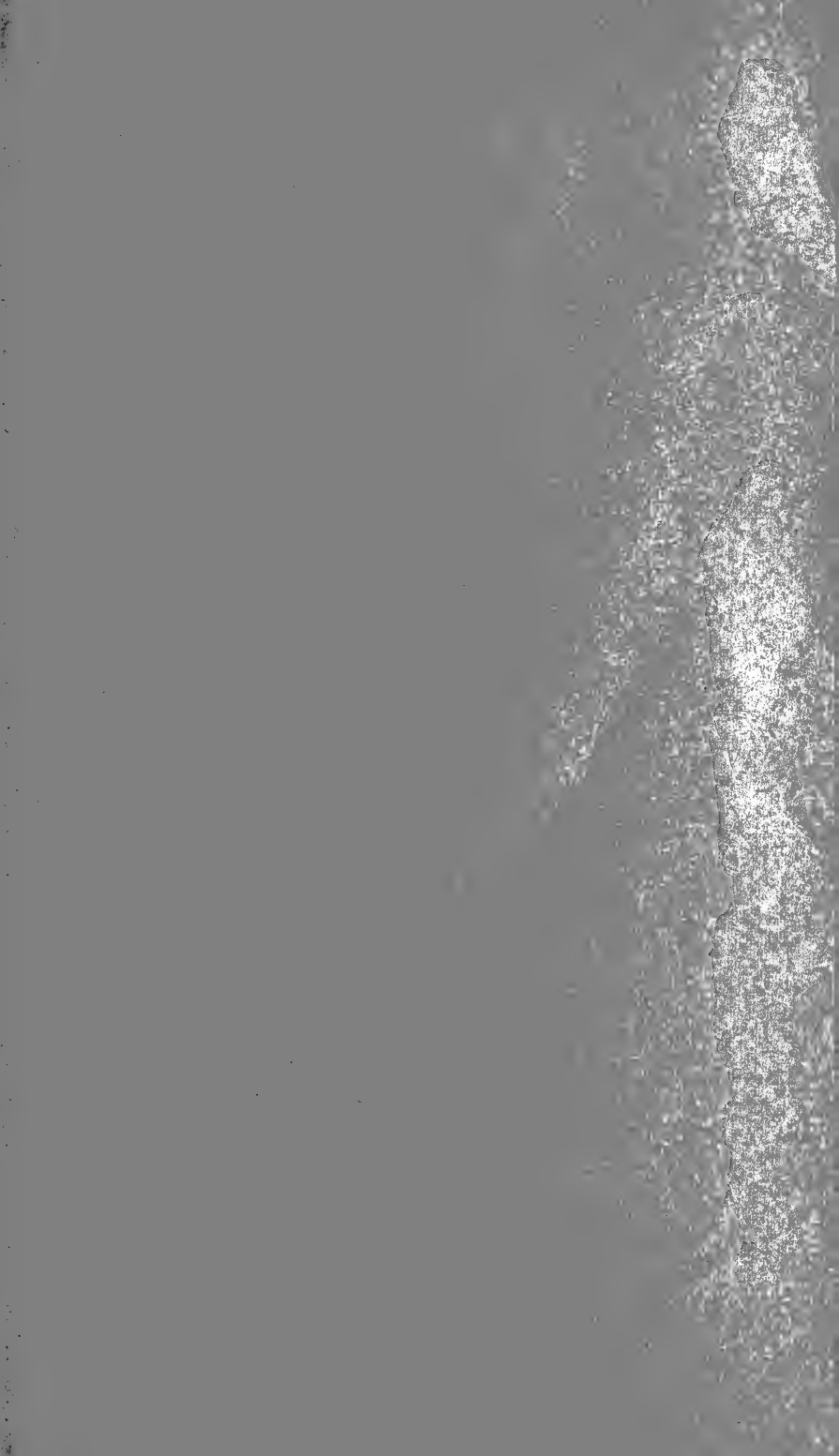


FIG. 4





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"Rerum cognoscere causas."—Virgil.

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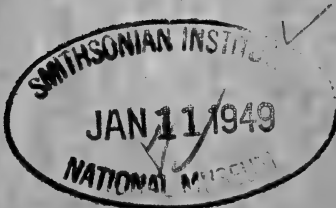
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CONTENTS

	PAGE
Council	188
New Members	189
Changes of Address	191
Report of Council	192
Obituary	192
Hon. Treasurer's Statement of Accounts	193
The Lyell Medal	194
Hon. Librarian's Report	195
Report of Botanical Section	196
Report of Entomological Section	197
Report of Geological Section... ..	198
Report of Ornithological Section	200
Account of the General Meetings	201
Bristol Botany in 1947, by Cecil I. and N. Y. Sandwith	203
Ornithological Notes, Bristol District, 1947, by H. H. Davis, M.B.O.U.	209
Some Records and Observations of Lepidoptera, 1947, by A. H. Peach	221
Zoological Notes, 1947, by R. Bassindale, M.Sc.	223
A Revised List of the Birds of the Bristol district, by H. H. Davis, M.B.O.U.	225
Additions to the Bristol Insect Fauna (Diptera) since 1945, by H. L. F. Audcent, M.Sc.	269
The Age of the Clifton Gorge, Bristol, by E. Greenly, D.Sc., F.G.S.	283
Studies on the Biology of the Bristol Channel :—	
XVII. The Littoral and Sublittoral Fauna of the Northern Shores, near Cardiff, by R. D. Purchon, B.Sc., Ph.D.... ..	285
Temporary Exposures and Borehole Records in the Bristol area :—	
I. Records of boreholes sunk for the new Severn and Wye Bridges, by W. F. Whittard, D.Sc., Ph.D.	311
II. Some exposures in the Jurassic rocks at Bath, by D. T. Donovan, B.Sc., F.G.S.	329
The Plesiosaurs in the City Museum, Bristol, by W. E. Swinton, Ph.D., F.R.S.E.	343

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REPORT OF COUNCIL

1947

MEMBERSHIP of the Society has now reached 400 and, particularly in view of the increased subscription rate, this is regarded as highly satisfactory.

At the Annual General Meeting Sir Lewis Fermor was re-elected President, with the support of Mr. H. H. Davis and Dr. L. H. Matthews as Vice-Presidents. The other officers remained unchanged but with the addition of Miss M. E. Habgood as Honorary Assistant Secretary. During the year Miss A. Dunn has also been added to Council as an Honorary Assistant Secretary and these two assistants are now responsible for the duplication and despatch of the winter circulars. Other officers and members of the 1947 Council are listed on p. 188 of this issue of the *Proceedings*.

As last year, our President's services as a geologist were in demand and, during his absence in Rhodesia, Mr. Davis deputised.

The Society acted as host for the Whitsuntide Conference of the South-Western Naturalists' Union and made all arrangements for meetings and the accommodation of delegates. A successful gathering included, on the Friday evening, a Reception by the Lord Mayor at the City Museum, where an exhibition was organised by Dr. Wallis, a lecture by Mr. Bassindale on the biology of the Bristol Channel, on Saturday evening, and excursions to Blaise Castle, Goblin Combe, the Cotswolds, and the Severn Wild Fowl Trust at Slimbridge.

The Field Section has been reorganised so that the summer activities of the Society are now brought into line with the winter activities and are controlled in a similar way. This change has the desirable result of giving the officers who arrange the summer programme the same status as those who arrange the winter programme.

The whole of the year's meetings, both lectures and field meetings, have been well attended and an air of activity pervades the Society.

The Society regrets the loss of Miss Rutter, Miss Walsh, Dr. Druitt, Mrs. Fraser and Miss Grignon who died during the year. Miss Grignon was one of our oldest members and died at the age of 94 years.

R. BASSINDALE, *Hon. Secretary*.

OBITUARY

MISS ADELAIDE ELIZA GRIGNON

THE Society lost a very interesting personality from its membership by the death on December 23, 1947, of Miss A. E. Grignon, at the age of 91. She was a most assiduous attendant at lectures and field meetings until near the end of her long life.

The Editor is indebted to Mr. Laurence Currey for the following information about her :—

The only child of the Rev. William Grignon, she was named after her mother who was a goddaughter of Queen Adelaide, wife of William IV. Her father was for twenty years headmaster of Felstead School in Essex, and it was here that her early years were spent. On Mr. Grignon's retirement, his daughter accompanied him on extensive travels in Europe and the Near East. Subsequently they made a home at Frenchay, but after her father's death she moved to London where she did much philanthropic work. In 1921 she came to Bristol and very soon joined the Society. Her principal interest was in botany, and in the 1920's she exhibited at a meeting of the Society a collection of wild plants growing in the streets of Bristol, which aroused considerable interest.

Mrs. Barke writes :—I first met Miss Grignon in 1925 at a field meeting of the Geological Section ; the rain poured down but, undaunted, she visited every exposure : that was typical of her for she was full of vitality and a most painstaking naturalist. Her activities were by no means confined to intellectual pursuits for she was a true humanitarian, helping all with unstinted generosity, and I think this impressed me even more than her clear, alert brain.

PRESENTATION OF THE LYELL MEDAL OF THE GEOLOGICAL SOCIETY OF LONDON

TO

DR. STANLEY SMITH

IN the *Proceedings* for 1928 (pp. 24-5) an account is given of the Medal and of its award to Prof. S. H. Reynolds in that year.

The Medal has again been awarded to one of our members—Dr. Stanley Smith, who received it in 1947.

The presentation took place at the Annual General Meeting of the Geological Society on 19 March, 1947, and was rendered the more interesting to us because it was made by another of our members, Dr. A. E. Trueman, who was President of the Society that year.

The Editor is indebted to the Council of the Society for permission to extract the following from its *Quarterly Journal* :—

The PRESIDENT then presented the LYELL MEDAL to Dr. STANLEY SMITH, and said :—

Dr. STANLEY SMITH : It is a great pleasure to me to hand the Lyell Medal to you in recognition of your great service to palaeontology and stratigraphy. Much of your work has related to the Palaeozoic corals, and in this branch of study you have long had an international reputation. Your work, at first on the Carboniferous corals, and later on those of the Ordovician, Silurian, Devonian and Permian, has been characterized by a masterly clarity of statement and of illustration. I recall that fully thirty years ago, when I was beginning to write palaeontological papers, I was advised to read your papers on Carboniferous corals, published in our *Journal*, and to use them as a model : I hope I may be forgiven for falling short of your standards. Later, when I was for a time your colleague, I saw with what care those papers were prepared and learned how many times they were re-cast before they emerged as finished products.

Your coral studies have furnished a solid foundation for further work on this group, and many have followed in your footsteps. But you yourself have been called in to undertake work on corals from many countries—France, Belgium, China, Canada, India and Australia. Among your papers many have included discussions of the fundamental principles of palaeontology, none more important than that with Dr. W. D. Lang in which the concept of genomorph is introduced.

A good palaeontologist is not content to work in a laboratory, and you have always been active as a field worker. Your stratigraphical studies, especially in Northumberland and the Bristol area, have been chiefly concerned with Carboniferous rocks, and you have added much to our knowledge of those areas. But your discovery of Cambrian rocks in the low-lying areas of the Tortworth inlier is of peculiar interest.

Many geologists who have benefited by your enthusiastic leadership of excursions or for whom you have named specimens, will wish me to pay tribute to this generosity, which has always extended particularly to younger workers. In the hope that your enthusiasm will never grow less, I welcome this opportunity to hand you the Lyell Medal, which you have so richly deserved.

Dr. STANLEY SMITH said in reply :—

Mr. PRESIDENT : To receive one of the awards of the Geological Society is an honour of which anyone may well be proud and I thank the Council for this—the Lyell Medal. I also thank you, Sir, for the kindly way you have spoken of my work. The pleasure that the award gives me is increased by the fact that I am receiving it at your hands. It is a happy reminder of the time when you held the Chair of Geology at Bristol. "Men of the North Country," wrote Belloc, "love their cold grey fells". This is true in my case. It was the fells of Northumberland that attracted

me to the Carboniferous Limestone and in the first instance provided me with the material which led to my taking up the study of Palaeozoic corals.

On an occasion such as this we realize how much we owe to others—our teachers, our fellow workers and our students. It is the student who keeps our memory fresh and our interest catholic. I have special reason to remember with gratitude and affection Professor G. A. Lebour. I owe a very great deal to him. I have also good cause to be grateful to Professor T. McKenny Hughes and others at Cambridge, particularly to Professor Marr and Mr. Henry Woods. My early work brought me into close contact with Dr. Arthur Vaughan, and the help and encouragement I received from him at the beginning of my career must not pass unacknowledged. Much of my work has been carried on in association with Professor S. H. Reynolds and Dr. W. D. Lang. It is with intense pleasure I look back upon the time spent in the field with Professor Reynolds and with Dr. Lang, and with the latter and Dr. H. Dighton Thomas in the British Museum. Nor can I overlook the help and many kindnesses I have received from good friends on the Geological Survey and in the Department of Geology in Bristol University. It is pleasing to recall that Dr. Vaughan, Professor Reynolds and Dr. Lang were all recipients of the Lyell Medal.

If I have been able to help a few embarking on palaeontological investigation, it is but a small return for all the aid I have myself received. Naturally the greater part of my work now lies behind me, but I trust that a few years of usefulness still lie ahead, and I am stimulated and encouraged by this medal and your remarks to further effort.

HON. LIBRARIAN'S REPORT

1947

DURING the year further progress has been made in the collation, arrangement and press-marking of periodicals. This work takes considerable time and is not yet complete. When gaps are found in the sets of periodicals, the missing parts are obtained if possible, and thanks are due to the following institutions for presenting back numbers to fill these spaces:—

- The American Museum of Natural History: Bulletin 8 parts and 1 volume; Natural History 16 parts.
- Boston Natural History Society: 4 parts.
- Geological Institute of Upsala: 14 parts.
- Lloyd Library, Cincinnati: 9 parts.
- Indiana Academy of Science: 13 vols.
- Zoological Institute of Riga: 2 parts.
- San Diego Society of Natural History: 1 part.

The binders have returned 100 volumes of periodicals sent to them for binding in 1946 and hope shortly to return 30 volumes still outstanding. A further 46 volumes have been sent for binding and the return of these with less delay is expected.

Three hundred and eighteen parts or volumes of periodicals have been received in exchange for the Society's *Proceedings* during the year. Four volumes have been presented and thanks for these are due to the Botanical Section, Dr. F. S. Wallis, Mr. H. H. Davis, and Mr. C. Trapnell (through Mrs. Sandwith). Subscription volumes have been received from the Ray Society and *Zoological Record* Committee. One volume of the *New Naturalist* series has been purchased.

Several unbound parts of periodicals are missing from the library and not entered in the borrowing book. Members are earnestly requested to be particular in recording all books borrowed and to return without delay any that they may have forgotten to enter in the book.

More members have used the library than during the previous year: 264 volumes have been borrowed by 50 members.

L. HARRISON MATTHEWS, *Hon. Librarian*

REPORT OF BOTANICAL SECTION

1947

THE twenty meetings held by the Section during the year were highly successful, mainly due to those members who kindly came forward and gave talks or led the field walks in the neighbourhood.

On January 20, Mr. R. P. Scase gave a talk on British Orchids, with lantern slides of many photographs he had taken, giving hints for getting the best results with the camera. On February 17, Dr. L. E. Hawker described penicillin and some other anti-biotic substances, and the culture of the organisms producing them. On March 17, Mr. F. W. Evens gave us his results from searching through folklore regarding plant names.

The Parent Society invited the South Western Naturalists' Union to visit Bristol at Whitsuntide. Our members helped with the excursions, and staged a display of fresh wild flowers, and herbarium specimens of the rarities of the Avon Gorge, at a Reception given by the Lord Mayor at the City Museum.

Field Walks. Mr. F. W. Evens led walks along the left bank of the Avon, and over Broadfield Down; Mr. Michael Wright to Wraxall and Failand; Mr. Ivor Evans to Hanham and Willsbridge, to Iron Acton, and a third to the Feeder tips in search of aliens. On June 21 we went to Oaklands, Almondsbury, where Mrs. Hiatt Baker kindly showed us round her garden, which, although not quite back to pre-war splendour, has a never failing interest. Visits were paid to the University Gardens and Greenhouses by kind permission of Professor Skene. On November 4, Dr. L. E. Hawker took us again through Leigh Woods searching for fungi. The weather had been rather dry, so the number of specimens fell short of last year's, being just over forty, which she described and named on returning to the Plateau before dispersing.

On October 20 the Rev. R. Jeffcoat showed films he had taken on a visit to South Africa. The films, in colour, were mainly of flowers of the Cape, Namaqualand and the Kruger National Park. On November 17, in a joint meeting with the Entomological Section, Dr. L. E. Hawker talked on "Fungi and Insects". The lecture, which was illustrated by lantern slides, dealt with:— (1) Insects which feed on fungi. (2) Fungi parasitic on insects. (3) Cultivation of fungus gardens by certain ants, termites and ambrosia beetles. (4) Symbiosis between certain insects and yeasts. (5) Dissemination of fungal spores by insects, and the effect of this on the spread of certain fungal diseases in plants. On December 15 Mr. H. O. Edmonds spoke on "Common Names and Folklore of Wild Flowers."

At the Exhibition Meeting the following were shown:—plants from Saltash, by Mr. Ivor Evans; seed under the microscope and plant illustrations, by Mr. F. W. Evens; seed of *Bertholletia excelsa*, by Mrs. G. S. Wakefield; a collection of fresh flowers, by Mr. Michael Wright; Life history of Fungi, by Dr. L. E. Hawker; Grasses and Sedges, by Major MacGeorge; conifers commonly met with in the Bristol District, by Mrs. Bell.

Wonders of Wild-Flower Life by F. Martin Duncan has been purchased and placed in the Library.

We regret to report the death of Miss A. E. Grignon at the age of 91. Miss Grignon joined the Section when it was revived in 1925, and was for many years a regular attendant.

ETHEL M. E. BELL, *Hon. Secretary*

REPORT OF ENTOMOLOGICAL SECTION

1947

AT the 83rd Annual General Meeting of the Section held on 8 January, 1947, Mr. J. V. Pearman was re-elected President and Mr. A. H. Peach re-elected Hon. Secretary and Treasurer.

On 12 February a lecture was given by Dr. E. T. Burt of the University Zoology Department on "The Red Spider and its Enemies." Exhibits of the eggs and perfect insect of the red spider and of stages of many of its predators were shown.

On 12 March a lecture was given by Mr. F. Raw, of the Ministry of Agriculture and Fisheries' Advisory Service, on "Some British Chafers", with a series of exhibits.

On 8 October the meeting was devoted to exhibits and observation records of the past season. Exhibitors were Mr. J. F. Bird, various Lepidoptera from Somerset; Mr. S. Balthwayt, a series of *Colias croceus* and varieties; and Mr. Norman Watkins, *Agriades covidon* taken at Worth, Dorset, and *Colias croceus*, mostly bred from insects taken in Devon and Cornwall. It is a matter for regret that there were no other exhibitors and it is hoped that next year a greater number will exhibit.

On 17 November the meeting was held in conjunction with the Botanical Section, when Dr. J. E. Hawker, Lecturer in Botany in the University, gave a lecture on "Fungi and their Insect Visitors."

On 11 December a lecture was given by Mr. R. A. Davis (a member of the section, now living in London), on "Insect Pests of Stored Products," illustrated by lantern slides and living and "set" insects.

The Section is much indebted to all these lecturers for such interesting and varied subjects. A vote of thanks was proposed and carried with acclaim at each meeting.

The weather during the early part of the year was severe and, in the circumstances, attendances were satisfactory, being up to the average of former years; but with the increased number of members it is hoped that more support will be forthcoming, which will encourage the Officers to arrange the programmes with less misgiving.

On 28 June the Section visited Savage's Wood, Stoke Gifford, by the kind permission of Mr. H. H. Davis. In spite of heavy rain during the morning, about a dozen members attended, but owing to the dreary conditions very little was observed.

On 5 July, the Hon. Secretary was invited to lead the Section at a Field Meeting of the Society at Frome, but only three Entomological members were present. Although the weather was dull, there were occasional gleams of sun which brought out a few insects.

The Section has been responsible for binding the *Entomological Magazine* and the *Entomologist's Monthly Magazine* to date for the Society's Library.

A. H. PEACH, *Hon. Secretary*

REPORT OF GEOLOGICAL SECTION

1947

TWELVE General Meetings, at which the average attendance was 41, were held during the year.

At the Annual General Meeting held on January 23, the following Officers were elected: Mr. H. W. Turner, President; Dr. F. S. Wallis, Vice-President; Mr. I. S. Loupekine, Hon. Secretary; Mrs. A. Marsden, Hon. Treasurer; Mr. G. E. J. McMurtrie, Hon. Auditor. Mr. C. W. Blackburn, Mr. D. T. Donovan, Sir Lewis Fermor, Dr. A. Marsden, Mr. G. S. Maunder, Dr. Stanley Smith and Professor W. F. Whittard were appointed Committee Members. The formal business was followed by an Exhibition of Members' Collections, which comprised 24 individual exhibits and a general exhibit of Specimens Collected at the Section's Summer Field Meetings, 1946.

On February 20, in place of a lecture from Dr. A. E. Trueman who was unfortunately not able to attend, Dr. Stanley Smith, M.A., D.Sc., F.G.S., kindly consented to give, at very short notice, an alternative lecture entitled "Some Geological Pioneers". Dr. Smith delivered a pleasant address in which, as he stated, he endeavoured to paint the portraits of a number of eminent geologists in whom personality was the main characteristic. After briefly tracing the position of geology during the Renaissance, and mentioning Leonardo da Vinci, Lamarck and Lyell, Dr. Smith spoke of Werner, "the brilliant teacher of Freiberg"; James Hutton, "the Champion of Liberty"; Playfair; William Smith, "the Father of Stratigraphy"; Buckland; Agassiz; Sedgwick; Murchison; H. C. Sorby; and finally, Charles Lapworth, "the last of the Giants".

On March 20 the audience was disappointed once more in not being able to hear the advertised lecture on "Air Photography and Geology", but the Section was fortunate in securing Mr. D. T. Donovan, B.Sc., F.G.S., to talk on "Geological Aspects of Mendip Caves". Mr. Donovan reviewed the general structure and stratigraphy of Mendip and explained the essential mechanism of water-circulation in that area. He dealt in detail with the formation of caves and swallets, and emphasised the geological uses of cave-exploration, such as the revelation of structural details, and the opportunities of studying the various processes and products of physical geology as relating to caves.

Six Field Meetings were held during the Summer, one of which was a whole-day excursion, three were afternoon excursions, and two were evening excursions. On May 10 Mr. H. W. Turner led a coach-party to Woodspring and Spring Cove, Weston-super-Mare, where fine exposures of Carboniferous Volcanic rocks were seen. On June 7 the Section, under the leadership of Mr. D. T. Donovan, visited the Bath area for Mesozoic stratigraphy and palaeontology and for the study of local physiographic features. On June 25 a visit, under the leadership of Mr. R. Hughes, was made to Chapel Pill to examine a "stony loam" connected with the finding of Prehistoric implements of "Drift" and "Cave" types, and members were rewarded not only with fine weather this time, but also with the finest exposure yet seen on this site. On July 19, for the whole-day excursion, Professor W. F. Whittard led a coach-party to May Hill, Glos., where a wide range of stratigraphical horizons of great interest was examined. On August 21, under the able leadership of Dr. Stanley Smith, a successful visit was paid to the Clifton side of the Avon Gorge, where the Carboniferous Limestone succession was worked out both in broad outline and in detail. Finally, on September 20, Dr. A. Marsden led a large party to Old Mills Colliery, near Radstock, to examine the underground and surface workings, including the Washeries; the party was received generously by the National Coal Board to which the Section's thanks are due.

On October 16 two sound-films were shown to a large audience. The first film, entitled "Buried Treasure", gave a detailed account of coal-mining in a modern pit. The second film, entitled "Waterworks" and obtained through the courtesy of the Bristol Water Company, gave a picturesque account of the utilization of the water resources in the country.

November 20 was the gala evening of the year, for the Section had the privilege to welcome back Dr. A. E. Trueman, F.R.S., to speak on "Some Features in the Scenery of Scotland". Dr. Trueman gave a vivid outline of the various scenic features of Scotland and showed how they could be correlated with the natural geological subdivisions which separate the country into three broad tracts—the Southern Uplands in the south, the so-called Midland Valley in the centre, and the Highlands in the north.

The last meeting of the year was held on December 11 with the main object of discussing the activity of the Section in recording the geology of temporary exposures in the district. An intensification of this activity was agreed to, and Mr. D. T. Donovan was elected Recorder for the scheme. Following the business meeting, practical demonstrations were given by Mr. D. T. Donovan on "Cleaning and Preparing Fossils"; by Mr. T. R. Fry on "Practical Hints on Collecting"; and by Mr. I. S. Loupekine on "Simple Section-Making".

The composition of the Section, as shown by the Sectional Register, on December 31, was as follows: 1 Hon. Member; 64 Full Members (including 1 Life Member); 10 Country Members; 24 Associate Members. The total membership is thus 99, to which must be added 1 Affiliated Society. The latter is the Geological Society of the University of Bristol Union, which the Section welcomes. Among resignations, the Section regrets the loss, owing to departure from the district, of Mr. C. W. Blackburn, who for many years has been an active and helpful member of the Section's Committee; and of Mr. H. C. Shilstone who served for many years as Hon. Secretary of the Section. The Section also learns with regret of the death of Miss A. E. Grignon, a veteran supporter of the Section.

I. S. LOUPEKINE, *Hon. Secretary*

REPORT OF ORNITHOLOGICAL SECTION

1947



THIS Section has enjoyed another extremely successful year and, since the re-organisation of the B.N.S. in January, its membership roll has increased to 175. Eight meetings have been held—the attendance averaging 64, with a maximum of 100 at a joint regional meeting with the British Trust for Ornithology, at the Royal Fort, in November.

At the Annual General Meeting in *January* Mr. J. H. Savory was elected President for a third year and Mr. H. H. Davis was re-elected Honorary Secretary. The immediate preparation of a field-card scheme to provide members with an easy and attractive method of

making regular returns of their observations was discussed and approved. In *February* Mr. Peter Scott, in a most entertaining lecture entitled "In Search of Wildfowl," began with a delightful blackboard drawing of a Red-breasted Goose, and went on to give details of an expedition to Hungary, the Danube Delta and the Caspian Sea. Illustrating his remarks with slides and photographs, the lecturer continued with a vivid description of wild geese at the New Grounds, Gloucestershire, and concluded by outlining the objects of the newly formed Severn Wildfowl Trust. At the first of two meetings in *March*, a talk, accompanied by photographs and coloured plates, was given by Mr. W. D. Lea Rayner on "The Homing Pigeon in Peace and War." The descent of the modern racing pigeon was traced from the wild Rock-Dove, *Columba livia*, following which the speaker mentioned some remarkable racing performances and made reference to the valuable work accomplished by the Air Ministry Pigeon Section during the War. Later in the month members heard a highly instructive lantern lecture on "The Natural History of the Southern Ocean" by Dr. L. H. Matthews who dealt especially with the life histories of various albatrosses, petrels and penguins, and afterwards referred to operations at the South Georgia whaling stations.

At the *September* meeting some excellent photographs and other exhibits were shown, and short communications were given by several members. In *October* Mr. R. P. Gait lectured on "The Life-cycle of the Wren"—the outcome of intensive observations on a breeding pair at Henleaze in 1945. A unique series of slides from photographs by the lecturer showed many aspects of the bird's nesting behaviour. A large and enthusiastic audience gathered for the *November* meeting when Mr. David Lack spoke on "The Significance of Family Size in Birds." Many interesting facts were brought to light in this stimulating talk, which was followed by a film "Birds and Reptiles of the Galapagos," depicting Giant Tortoises and other strange forms. Mr. Lack also showed a short film to illustrate the reactions of a Robin when confronted with a stuffed specimen. In *December* Mr. J. H. Savory, in lecturing on "The Ancient Sport of Falconry," dealt with the subject in considerable detail, illustrating his talk with a comprehensive series of slides and with hoods, bells, jesses and other equipment used in the management of hawks.

Despite unfavourable weather, about 75 British Trust for Ornithology and B.N.S. members took part in a motor-coach excursion on November 22 to see the New Grounds geese and the Severn Wildfowl Trust's collection of live waterfowl.

The Monthly Field Card scheme, in operation from April to the end of the year and actively supported by nearly 40 members, has contributed much useful information on the distribution locally of many of the commoner birds.

We regret to record the death of Mrs. H. G. Fraser, an ardent supporter of the Section; also of Dr. C. F. Drutt, an accomplished naturalist, who at all times took a keen interest in our activities.

H. H. DAVIS, *Hon. Secretary*

ACCOUNT OF THE GENERAL MEETINGS

1947

THE Eighty-fourth Annual General Meeting was held on January 16, the Annual Dinner on January 9, and an Exhibition Meeting on October 2, and there were lecture meetings on February 6, March 6, November 6 and December 5. These lecture meetings were addressed by four eminent lecturers—Mr. Peter Scott, Professor M. Skene, Mr. D. P. Wilson and Mr. B. Vesey-Fitzgerald. Attendances ranged from 20, on a very inclement evening, to 120, 150 and over 200 at other meetings. There were also five General Field Meetings.

The dinner at the Victoria Rooms was attended by 88 members and friends. The Guest of Honour was Sir Philip Morris, Vice-Chancellor of Bristol University, and after his toast of the Society, Mr. J. Fursdon, of the West Wales Field Society, showed films of his Society's work on the islands of Skomer, Skokholm and Grassholm.

At the Annual General Meeting, business was conducted with despatch, and Sir Lewis Fermor then gave his Presidential Address to an audience of 47 members. In describing his "Natural History Reminiscences from India," Sir Lewis spoke of the interesting plants, animals and minerals to be seen there and entertained the audience with some account of the difficulties of the geologist in the remoter parts of India.

The February meeting was a notable occasion when an audience of nearly 300 members and friends assembled in the Large Physics Theatre to hear Mr. Peter Scott talk on "Wild Geese" and to see his films. Mr. Scott, so well known as a wild fowl observer and painter, described how he came to choose the flats at Slimbridge for his new field station and showed photographs of the observation huts and of the geese themselves. New records had already been made and the films finished off one of the most entertaining meetings of the year. It is worth noting that the Society has on three occasions this year organised excursions to see the field station and some 200 members have visited it.

Owing to the very inclement weather on March 6, the audience for Professor Skene's lecture on "The Humus question" was extraordinarily poor. The lecture, however, was extraordinarily good. Professor Skene described the nature and origin of humus and its value in the soil. He went on to show how it could be assisted by artificial fertilisers and how, in fact, our ancestors had availed themselves of first one and then another artificial until the modern farmer had a large choice available.

Some 60 members attended the Exhibition Meeting in the Botany Laboratories on October 2. The Exhibition occupied two laboratories and was the best that has been staged for some years, occupying some 160 feet of bench space. Thanks are due to the members who contributed and it is hoped that next year's exhibition will be even better.

On November 6 members filled the Physiology Theatre to capacity to hear Mr. D. P. Wilson and to see his photographs of marine life. Mr. Wilson has won three medals from the Royal Photographic Society for his photographs, and members were amply repaid for their attendance, not only by the slides but by the authoritative and interesting account that Mr. Wilson gave of the animals he portrayed.

The last General Meeting of the year was also well attended when 150 members heard Mr. Brian Vesey-Fitzgerald give an intimate account of his contacts with the animals that live in his district and with those he keeps at his home. Members were highly appreciative of this talk and were much interested in hearing of the life and habits of the bats, snakes and badgers with which Mr. Fitzgerald lives.

FIELD MEETINGS

The first meeting was held at Providence, Long Ashton, and Flax Bourton on 12 April under the leadership of Mr. F. W. Evens and Mr. G. S. Maunder. The route taken was to the top of Providence Lane and over the golf links and fields to Cambridge Batch. Owing to the backwardness of the season, plants were not numerous. Barrow Court and Barrow Gurney village were also visited.

On Saturday, 3 May, the meeting was held in collaboration with the Cardiff Naturalists' Society. Members proceeded by train to Caerleon where they were met by Lady Fox and Dr. V. E. Nash-Williams, who acted as guides. Lady Fox gave vivid descriptions of the various parts of the Roman Legionary Fortress and the excavations which she had conducted there. Later a visit was paid to the Museum at Caerleon, where the collection represents the bulk of the material found, including some pottery, tiles, glass implements and a large number of inscribed stones, some of which furnish fixed points in the chronology of the fortress.

The Field Committee collaborated with the Bath Natural History Society on 14 June and visited Hunters Inn and Oakford Valley. The profusion of *Symphytum* was noted, and especially the red, pink, blue and white colour of the flowers. Maidenhair Fern growing in a wall near Batheaston Church was found to have survived despite the severe winter, possibly having been sheltered by a snow drift. Miss E. H. Stevenson, Messrs. J. Fry, E. H. R. Lubbock and H. C. Rainbird, members of the Bath Society, acted as leaders.

On 5 July Dr. F. S. Wallis led a party to Vallis Vale. At the junction of Mells Stream and Egford Brook he gave a detailed description of the geological formation of this district, after which Messrs. G. H. Beacham, A. H. Peach and R. P. Gait acted as guides for the Botanical, Entomological and Ornithological features respectively. After tea at Frome members were met by the Rev. W. J. Torrance (vicar) who conducted the party round and gave a detailed account of the history of the Parish Church. The return journey was via Beckington, Norton St. Philip, Odd Down and Newton St. Loe.

On 16 August Chew Stoke reservoir and district were visited, the leader being Mr. T. Payne with Mr. F. Weston as co-leader. At Hinton Blewett a commanding view of the Chew and Yeo Valleys and the new catchment area was obtained. The Litton reservoir was also visited. At West Harptree members were shown over Gourney Court by Sir Hippisley and Lady Cox.

Mr. H. O. Edmonds dealt with the Henbury District on 6 September, when Miss M. E. Habgood was co-leader. The route was Lawrence Weston and over King's Weston Down to Blaise Castle House.

R. BASSINDALE, *Hon. Secretary*

M. D. HILEY, *Hon. Secretary, Field Committee*

BRISTOL BOTANY IN 1947

BY CECIL I. and N. Y. SANDWITH

*(Received Feb. 12, 1948. Read in title at General Meeting,
March 4, 1948)*

THE long winter, with snow and frost, and then a cold, late spring were followed by a really old-fashioned summer such as we had not known for years. The effects of the severe weather were noticed in the early months of the season, for instance on Birch trees and the Bog Myrtle, much of which appeared to be bare and dead, while in June, young growth of *Myrica* was coming up from the roots and, in our district, there was no sign of its having flowered. The Gorse notably suffered. It did not flower with its usual profusion, and seemed brown and withered. A letter from Cornwall observed, 'It is odd how the Gorse was killed.' Drought in August browned the hedgerows and some trees lost their leaves, but it was a marvellous summer, and the colours of the leaves in autumn were brilliant, which is a matter for speculation after such a contrast in seasons. Wasps were rare and appeared late.

Berberis vulgaris L. In a hedge near Hale Well, Winscombe, S., Miss M. Ashby.

Papaver Lecoqii Lamotte. A frequent weed in garden ground at Ham Lane, Shepton Mallet, S., J. P. M. Brenan.

Arenaria verna L. On Mendip above East Harptree, S., H. W. Pugsley.

Claytonia perfoliata Willd. Sand Bay, S., 1945, Miss M. Ashby.

Silene Cucubalus Wibel \times *maritima* (Hornem.) With. Varying forms of this hybrid occur on the sides of pits in old mining ground on Mendip, near Rowberrow, S., C.I.S. and N.Y.S. Identification confirmed by Dr. W. B. Turrill.

Cerastium arvense L. Brean Down, S., on the south side, April, 1939, Pleasaunce Catchpool. This record, vouched for by Miss M. Ashby, appeared in *Rep. Bot. Sect. Som. Arch. and Nat. Hist. Soc.* for 1939.

Vicia tenuissima (Bieb.) Schinz et Thell. (*V. gracilis* Lois.). Sparingly on a drove on the peat moor near Mudgley, S., C.I.S. and N.Y.S.

Sedum Telephium L. Sandford, S., Miss M. Ashby.

Epilobium adenocaulon Hsskn. This species is now spreading to the city area: it was seen by us in the summer on a tip by Portway below Cook's Folly, and in cracks of the pavement by Clifton College, G. It has also appeared in garden ground at Tickenham, S.

- Apium nodiflorum* (L.) Lag. var. *longipedunculatum* (F. Schultz) Druce. Specimens referable to the forma *simulans* Riddelsdell of this interesting variety—new to the district—were collected on the marshy border of a pasture on Nailsea Moor, S., in July, 1930, by C.I.S. and N.Y.S. The peculiar, deeply cut leaflets, the conspicuous peduncles and the presence of up to 3 involucre bracts suggest a hybrid between *A. nodiflorum* and *A. repens* (Jacq.) Lag., but the latter rare species has never yet been observed in our area. For the description of Riddelsdell's f. *simulans*, see his interesting paper, "Notes on *Helosciadium*," in *Proc. Cotteswold Nat. F. C.*, xviii, 231-242 (1914).
- Centaureum pulchellum* (Sw.) E. H. L. Krause. In quantity on a peat moor drove south of Shapwick Station, S., C.I.S. and N.Y.S.
- Anchusa sempervirens* L. Lane between Cleeve and Goblin Combe, S., noticed on an excursion of this Society on May 24.
- Veronica aquatica* Bernh. Quarry pool, Wickwar, G., C.I.S. and N.Y.S.
- V. Anagallis-aquatica* L. and *V. scutellata* L. were both noticed in marshy ground near Iron Acton, G., on the excursion of the Botanical Section of this Society on July 12.
- Pedicularis palustris* L. A form with pure white flowers and pale green leaves occurs in a marshy enclosure on the peat moor near Shapwick Station, S., C.I.S. and N.Y.S.
- Mentha piperita* L. Drove on the peat moor near Mudgley, S., C.I.S. and N.Y.S., referred to var. *subcordata* Fraser by Mr. R. Graham. Several colonies of this species are now known in widely separated spots on the peat moors.
- Leonurus Cardiaca* L. Tortworth, G., M. Parsons, see B.E.C. 1945 Rep. p. 67. The record was communicated by Mr. W. R. Price.
- Rumex Hydrolapathum* Huds. × *obtusifolius* L. (× *R. Weberi* Prah). Several plants by a rhine on Walton Heath near Glastonbury, S., C.I.S. and N.Y.S. Our specimens were determined by the Austrian specialist, Dr. K. H. Rechinger, on his visit to Kew last September. For the correct identification with this hybrid of Bristol specimens reported as *R. maximus* Schreb., see "Bristol Botany in 1929."
- Euphorbia dulcis* L. Sparingly on a bushy roadside, by houses, in Leigh Woods, S., I.W. Evans. The first record from the district of this rare escape from shrubberies. Like all other British specimens which have been examined, Mr. Evans's plant comes under var. *purpurata* (Thuill.) Koch, with glabrous and warty capsules.
- Salix purpurea* L. By a drove on moorland below Axbridge, S., C.I.S. and N.Y.S. Near Winscombe, S., Miss M. Ashby, see *Rep. Bot. Sect. Som. Arch. and Nat. Hist. Soc.* for 1939.

Wolffia arrhiza (L.) Wimm. In a rhine on Kenn Moor, S., Miss M. Ashby and Miss E. Rawlins. This locality lies at some distance from the pools by the railway between Yatton and Clevedon, where this species has been known since 1921 (see "Bristol Botany in 1920 and 1921").

Epipactis purpurata Sm. In a wood west of Falfield, G., on a rich, rather sticky clay soil, Dr. David Prowse, who sent a fine specimen in July last to Kew, where it was named by N.Y.S. and V. S. Summerhayes. The first record for the district of this beautiful species, which occurs very rarely in Gloucestershire outside our area and is unknown in N. Somerset. Dr. Prowse writes that he has found *E. latifolia* (L.) All. in other portions of the same wood.

Orchis ericetorum (E. F. Linton) E. S. Marshall. Marshy field, Hallatrow, S., H. W. Pugsley.

O. latifolia L. ("incarnata") × *praetermissa* Druce. This hybrid is found in marshy enclosures on Shapwick Heath, S., C.I.S. and N.Y.S.

Juncus tenuis Willd. (*J. macer* Sm.). Has appeared on a grassy pathway near the Promenade on Clifton Down, G., C.I.S.

Eleocharis uniglumis (Link) Schult. Marshy meadow by the Land Yeo below Knightswood, Tickenham, S., C.I.S. and N.Y.S. The first inland locality to be reported, but the species is well known in marshy meadows in Central England and is probably overlooked. At Tickenham the tall, slender culms are inconspicuous in the lush vegetation of the marsh, where *E. palustris* also grows. The identification is confirmed by Mr. S. M. Walters, who is making a critical study of this group.

Rhynchospora fusca (L.) Ait. fil. Last August we had the good fortune to come across a large quantity of this species surviving on the peat moors in a very limited area at a considerable distance from the tiny patch near Shapwick Station, S. (see "Bristol Botany in 1945"). The interest of the discovery lies in the fact that the locality corresponds, more or less, to the place where Dr. Southby (formerly Gapper) found this very rare plant in August, 1832, and gave specimens to Thomas Clark (see White, *Flora*, p. 616). We believe that the plant has never since been reported from this part of the moors, and we earnestly hope that it will continue to survive here, respected by those who find it, and, if possible, under official protection. The hot, dry summer of 1947 was peculiarly favourable to the growth of both species of *Rhynchospora*, and we have never seen such tall plants, with so many culms and such well-developed inflorescences.

Carex disticha Huds. Marshy ground at Failand tan-pits, S., I. W. Evans.

- C. polyphylla* Kar. et Kir. (*C. Leersii* F. Schultz). In shade on a limestone down above Tytherington, **G.**, *C.I.S.* and *N.Y.S.*
- × *C. axillaris* Good. By a moor ditch below Axbridge, **S.**, *C.I.S.* and *N.Y.S.*
- C. strigosa* Huds. Lane near Winscombe, **S.**, *Miss M. Ashby*; see also *Rep. Bot. Sect. Som. Arch. and Nat. Hist. Soc.* for 1939.
- C. binervis* Sm. With reference to the loss of this species from Yate Common, **G.** (see "Bristol Botany in 1946," introductory comment), Dr. W. A. Sledge has written to us that there are specimens from this locality gathered on June 5, 1920, in Miss Roper's herbarium at Leeds University.
- C. flava* L. In the *Flora of Bristol* (pp. 635, 636) Mr. White gave, as usual, an interesting discussion of the local forms of this aggregate species, but since then much research has been undertaken, and our leading caricologist, Mr. E. Nelmes, has recently expressed his conclusions in a review of the four British species comprising this group (see *B.E.C.* 1945 *Rep.* pp. 95-99, followed by a discussion of the group *C. muricata* L.). Three species of the *flava* aggregate occur in our area. The commonest is *C. tumidicarpa* Anderss., formerly known as *C. flava* var. *minor* Towns. or as *C. Oederi* var. *oedocarpa* Anderss. This is a calcifuge and is the plant met with plentifully in marshy ground in the alluvial Severn Vale, on the Old Red Sandstone, in the North Somerset levels and on the peat moors. The second species, *C. lepidocarpa* Tausch, often a taller plant and with the utricles strongly bent back in the upper half, is a calcicole and is apparently uncommon in our area. Up to the time of writing, specimens have been verified from the peaty meadows near Max Mill, Winscombe, **S.**, where Mr. W. B. Waterfall collected it as long ago as 1877-8, while specimens from this locality were discussed by Mr. White, and we saw the plant there in quantity in the summer. In addition, Mr. J. P. M. Brenan has collected *C. lepidocarpa* on the oolite of Bathampton Down, **S.**, 1936; and in a boggy meadow on Windsor Hill, near Shepton Mallet, **S.**, 1946. This species should be found in wet places among the spurs of the Cotswolds on the Gloucestershire side of the district. The third member of the group, the *C. Oederi* of Mr. White and other British authors, is now to be known as *C. serotina* Mérat: this is the interesting sedge with crowded spikes and small fruits with short beaks (the *C. Oederi* var. *cyperoides* Marsson = *C. chrysites* Link, of White, *Flora*, p. 636), of which tall specimens occur in swampy enclosures in numerous places on the Somerset peat moor, by no means only near Shapwick Station.
- Bromus lepidus* Holmb. One plant on a field border between

Windsor Hill and Bowlish, near Shepton Mallet, S., J. P. M. Brenan.

Botrychium Lunaria (L.) Sw. On Mendip above East Harptree, S., H. W. Pugsley.

ALIENS. *Chrysanthemum coronarium* L. var. *discolor* Urville. Tip at Ashton Gate, Bristol, S., June, 1939, C.I.S. This variety is characterised by its creamy-white rays and golden disk florets. The commoner and typical form, with golden rays and disk, is var. *concolor* Urville.

Dactyloctenium radicans (R. Br.) Beauv. Quarry near Twerton-on-Avon, S., Oct., 1915, C.I.S. and T. H. Green, det. C. E. Hubbard. This Australian grass was recorded from this locality as *D. aegyptium* (L.) Beauv. in B.E.C. 1915 Rep. 287 (1916) and the locality was incorrectly given by Dr. G. C. Druce as "Bristol."

Chloris ventricosa R. Br. Another Australian grass, found with the above at Twerton, S., on the same occasion. The locality was incorrectly given in B.E.C. 1915 Rep. 217, as "near Bristol." This was the first record for Britain, now confirmed by C. E. Hubbard.

Mr. Ivor Evans has noted the colonisation of some unexpected native species on blitzed sites in the city, for instance, *Galium palustre*, *Juncus inflexus* and *Carex remota*.

HEPATICES. *Reboulia hemisphaerica* (L.) Raddi. Cleeve Toot, S., David Coombe.

Pallavicinia Lyellii (Hook.) Gray. On peat near Shapwick Station, S., C.I.S. and N.Y.S. This is new for v.c.6 and for the entire county of Somerset. An unverified report of this species from Black Down was given in Dr. W. Watson's "Liverworts of Somerset," *Proc. Som. Arch. and Nat. Hist. Soc.*, 1920.

Lophozia excisa (Dicks.) Dum. Shapwick Heath, S., 1946, C.I.S. New for v.c.6.

L. incisa (Schrad.) Dum. Westhay Heath, S., 1946, C.I.S. New for v.c.6.

Cephalozia connivens (Dicks.) Lindb. Westhay Heath, S., 1942, C.I.S. and N.Y.S. New for v.c.6.

Lepidozia setacea (Web.) Mitt. Westhay Heath, S., C.I.S. and N.Y.S.

Scapania nemorosa (L.) Dum. Track in Leigh Woods, S., Dr. E. W. Jones.

Attention is drawn to Mr. A. A. Pearson's "Notes on Bucknall's drawings of British Fungi," in *Proc. Bristol Nat. Soc.* xxvii, 177-180 (1946). Corrected names are given of many of Bucknall's published determinations of Agarics and Boleti, but the author pays tribute to

his accuracy and perspicacity, as well as to the high quality of the paintings (for their presentation to the Kew Herbarium, see "Bristol Botany in 1945").

Mr. H. W. Pugsley, the greatest British field-botanist of our generation, who died at Wimbledon last November in his eightieth year, was born at Bristol and educated at the Grammar School. His work at the Admiralty removed him from our district, but he visited it on many occasions and three of his records made this summer are printed in these notes. He was the rediscoverer of *Carex depauperata* in its North Somerset locality, in May, 1911. Mr. Pugsley was the leading authority on such critical genera as *Fumaria*, *Euphrasia*, *Narcissus* and *Orchis*, and had brought order to many other confused groups, while his last and greatest work, a *Prodromus of the British Hieracia*, is now in the press.

ORNITHOLOGICAL NOTES, BRISTOL DISTRICT, 1947

COMPILED FROM THE REPORTS OF MEMBERS OF THE
B.N.S. ORNITHOLOGICAL SECTION

BY H. H. DAVIS, M.B.O.U.

*(Received, Feb. 26, 1948. Read in title at General Meeting,
March 4, 1948)*

THESE Notes, the twelfth of the series, giving the more important observations by forty-three contributors, show that 1947 was, ornithologically, a remarkable year. Among an unusual number of highly interesting records are those of Waxwings in the Bristol and Bath suburbs, a Hoopoe at Winford, a Marsh-Harrier at Frampton-on-Severn (just outside the district), a Red-necked Grebe at Salford and a Kentish Plover at Severn Beach, while from the North Somerset reservoirs there are records of such noteworthy visitors as a Tawny Pipit at Cheddar, Whooper and Bewick's Swans at the same place, Red-necked Grebes at Blagdon and Cheddar, Black-tailed Godwits at Barrow Gurney, and Sandwich Terns at Blagdon. Other events of special interest included an exceptionally large spring passage of Common and Arctic Terns at the reservoirs and the occurrence for the second winter in succession of Lesser White-fronted Geese at the New Grounds.

The very severe weather from January to March was not without its effect on bird life, and with the advent of the nesting season it became clear that, in the district generally, Tree-Creepers, Long-tailed Tits, Wrens and other small passerines had been greatly reduced. Skylarks, Redwings and Lapwings, having probably made a hasty retreat southward, became noticeably scarce from the onset of the cold, but many Fieldfares remained and, forsaking their usual haunts, appeared commonly in suburban gardens at Clifton and elsewhere—several being sufficiently tame in one garden to be taken in traps and ringed. At the reservoirs a gradual—finally a total—freeze up, with ice to a depth of six or seven inches, forced all but a very small number of duck to depart. A few grebes and a considerable number of Coot, however, stayed, and at Blagdon the latter were to be seen in droves eking out a precarious existence on adjoining pastures and even foraging round haystacks. Remains of their less fortunate companions were strewn over the frozen reservoir, providing a welcome menu for the not to be denied Carrion-Crows. At Cheddar also, droves of Coot were to be seen in adjoining meadows.

At Blagdon, on February 16, Messrs. H. J. Boyd and B. King

had the unique experience of finding specimens of all the British grebes present—the count being two Great Crested Grebes, one Red-necked Grebe, two Slavonian Grebes, four Black-necked Grebes and ten Little Grebes. Mr. King reports that with two-thirds of the reservoir frozen, identification was comparatively easy, and that, with the exception of the Black-necked Grebes (seen about 30 yards out), the birds were viewed only a few feet away, swimming in very small, clear patches of water close under the bank. The same observer states that concealment on the part of Mr. Boyd and himself was quite unnecessary as the grebes, when trying to escape by diving, were obliged, owing to the extensive icing, to return each time to their respective patches of water, and that they had insufficient water space in which to take flight.

The classified notes below are the result of observations by the following members—R. E. Alley, A. E. Billett, Rev. F. L. Blathwayt, H. J. Boyd, L. F. Burroughs, Miss K. M. Cary, Miss G. G. Clements, G. E. Clothier, H. H. Davis, Miss A. J. Dunn, W. H. Fegan, Mrs. H. Fox, G. Gadney, R. P. Gait, P. S. Gale, R. G. Hamilton, B. King, A. C. Leach, Miss C. V. M. Leach, G. Mogg, Miss M. Montgomery, Dr. J. M. Naish, H. W. Neal, Miss E. D. Overend, R. H. Poulding, J. H. Savory, Peter Scott, Miss S. K. Taylor, W. R. Taylor, J. C. Walker, H. F. Webb, D. A. Weir, H. E. Woolls, and M. J. Wotton. Non-members who have contributed are W. B. Alexander, J. S. Ash, A. H. Marshall, W. E. Mayes, C. A. Norris, E. Robinson, C. E. Taylor, A. Whitaker and R. Whitlock. The appropriate initials are given with all observations.

G = South Gloucestershire. **S** = North Somerset.¹

RAVEN (*Corvus c. corax*). **G**. One, New Grounds, December 3 (E.D.O. and P.S.). **S**. Nested, unsuccessfully, at Sand Point, the eyrie being deserted early in March (G.E.C., H.W.N. and others). Probably bred on Cheddar Cliffs where R.P.G. and H.W.N. watched building in progress, March 23. Single bird, Abbots Leigh, May 4 (J.H.S.); two, Cheddar, October 5 and 20 (B.K.); and two, Priddy, Mendip, November 30 (H.J.B.).

HOODED CROW (*Corvus c. cornix*). **G**. Single bird, New Grounds, January 26 (R.H.P.), March 3 (R.E.A.) and December 28 (H.H.D.)

CARRION-CROW (*Corvus c. corone*). **S**. Unusually large numbers again noted on various occasions by B.K. at the Bath sewage farm, near Saltford. Maximum counts—130, January 26, and 100, February 15 and August 15.

SISKIN (*Carduelis spinus*). **G**. Two in trees at the New Grounds decoy, November 30 (W.B.A.). **S**. The following reported:—

¹ A more complete list of records for North Somerset will be given in the 1947 *Report on Somerset Birds*.

four, Barrow Gurney, January 12 (R.H.P.), and seven, April 1 (M.J.W.); one, Saltford, February 15 (B.K.); five, Blagdon, February 16 (B.K.), and four, April 8 (R.E.A.); and about fifty in an alder copse on Kenn Moor, March 9 (R.P.G. and H.W.N.).

LESSER REDPOLL (*Carduelis flammea cabaret*). **G.** Two in trees at the New Grounds decoy, April 8 (R.E.A.), and several, same place, November 30 (W.B.A.). **S.** Twelve, Barrow Gurney, January 12 (R.H.P.), and up to twenty frequently seen at Long Ashton, January to April (G.E.C.).

CORN-BUNTING (*Emberiza calandra*). **G.** At least eight in song along road from Old Sodbury to Petty France, May 17 (F.L.B.). **S.** One identified, Saltford, December 14 (B.K.).

CIRL BUNTING (*Emberiza c. cirlus*). **G.** Several seen by H.F.W. at Wotton-under-Edge, May 11. Male seen and heard in the Rectory garden, Dyrham, July 22 (F.L.B.). Four pairs bred in the Sneyd Park area (R.P.G.).

TREE-SPARROW (*Passer m. montanus*). **G.** Several, Slimbridge, March 1, and about a dozen, Olveston, April 12 (R.P.G.). Six, Aust, April 13 (H.W.N.), and several, New Grounds, October 26 (H.H.D.). Two adults feeding fledged young near Oldbury-on-Severn, August 24 (H.H.D.). **S.** The only notice is of one at Yatton, May 11 (G.E.C.).

WOOD-LARK (*Lullula a. arborea*). **G.** During the severe weather in February one was seen daily from the 23rd to the 26th on grass verges, circling the roundabout opposite Patchway Post Office (H.H.D.). Party of four on the Cotswolds, near North Nibley, September 7 (H.F.W.). **S.** Pair with young in nest, Failand, May 17 (A.E.B., G.E.C. and R.P.G.).

TAWNY PIPIT (*Anthus c. campestris*). **S.** At Cheddar reservoir on May 4 R.P.G. and B.K. obtained excellent close-up views of a small wagtail-like bird which they confidently identified as a Tawny Pipit. B.K. reports that it looked slightly larger and relatively longer in the legs than a Yellow Wagtail (*Motacilla f. flavissima*), a few of which were close at hand, and that it immediately attracted attention by its generally light brown plumage, sleek appearance and unusually upright stance. The same observer states that when first noticed the bird was stationary but was later seen to run extremely quickly to and fro, easily outstripping a Yellow Wagtail nearby. The marked similarity of its call to that of *M. f. flavissima* was particularly noted by both observers. Full details of this highly interesting record, the first for the district, are given in *British Birds*, Vol. XL, p. 343.

ROCK-PIPIT (*Anthus spinoletta petrosus*). **S.** Single bird identified, Cheddar reservoir, October 5 (B.K.).

YELLOW WAGTAIL (*Motacilla f. flavissima*). **G.** Four males

seen at the New Grounds on the unusually early date of March 30 (B.K.).

MARSH-TIT (*Parus palustris dresseri*). **S.** Pair seen in late May at nesting hole in the metal upright of an electric light standard, Leigh Woods end of Clifton Suspension Bridge (W.R.T.).

WAXWING (*Bombycilla g. garrulus*). The exceptionally large invasion of Waxwings into the British Isles, which began in Scotland and northern England in October, 1946, did not apparently affect the Bristol district until early 1947, when birds were noted in various suburban areas. **G.** Five, Henleaze, January 5, and up to eight on subsequent dates until February 17 (R.P.G.). Up to four or five in the Stoke Bishop and Westbury-on-Trym areas and near Horfield in the first ten days of February (R.P.G., A.C.L., W.R.T. and others). About twelve, Redland, February 9 (N. P. Sedgman per R.W.), and one, Filton, on the 23rd (C.E.T.). **S.** One, Odd Down, near Bath, February 5, and two on the 11th (B.K.). Two, Bathampton, February 16, and one, March 12 (B.K.). Single bird, Walton-St.-Mary, Clevedon, March 2 (A.H.M.).

PIED FLYCATCHER (*Muscicapa h. hypoleuca*). **G.** Two males and perhaps a female, Oldbury Court Woods, near Frenchay, April 27 (G.M.), and a female, Stoke Bishop, May 3 (R.G.H.). **S.** A female, Butcombe, April 19 (M.J.W.).

GRASSHOPPER-WARBLER (*Locustella n. naevia*). **G.** Heard, Wallshut Wood, Filton, April 17 (A.J.D.), and on the Cotswolds at North Nibley, June 15 and subsequently (H.F.W.).

REED-WARBLER (*Acrocephalus s. scirpaceus*). **S.** Probably nested at Blagdon reservoir where birds heard in two places, June 15 (H.H.D.).

RING-OUZEL (*Turdus t. torquatus*). **G.** One, a male, at the New Grounds, March 30 (B.K. and H.W.N.).

REDSTART (*Phoenicurus ph. phoenicurus*). **G.** A breeding pair reported from two places in the Wotton-under-Edge area (H.F.W. and J.C.W.). Pair nested at the New Grounds, where fledged young seen, June 15 (R.P.G.).

BLACK REDSTART (*Phoenicurus ochrurus gibraltariensis*). **G.** A male, evidently unmated, was present in the heart of the City early in July. It was seen and heard daily from the 8th to the 11th on roof-tops between Baldwin Street and Queen Square (A.E.B., H.H.D., A.C.L., W.R.T. and others).

DIPPER (*Cinclus c. gularis*). **G.** Single bird, R. Frome, Stapleton, August 28 (G.M.). Two, R. Trym, near Henbury, October 4, and one on the 9th (H.W.N.). **S.** Twice seen on R. Chew—one at Pensford, June 7 (G.G.C.), and one, Compton Dando, October 25 (B.K.).

NIGHTJAR (*Caprimulgus e. europæus*). **G.** One found dead, West Littleton, September 25 (F.L.B.). **S.** Nesting reported from Long Ashton (L.F.B. and G.E.C.) and Leigh Woods (R.P.G. and W.R.T.). Heard, May 22, by G.E.C. and others on Cadbury Camp where the bird probably continues to breed regularly.

HOOPOE (*Upupa e. epops*). **S.** Single bird reported, with fully conclusive details, as visiting a garden at Winford, April 17 (H.F. and M.M.).

LESSER SPOTTED WOODPECKER (*Dryobates minor comminutus*). **G.** Two, Slimbridge, January 10 (R.H.P.). Single birds at the New Grounds, March 2 (B.K.), and Wotton-under-Edge, May 12 (H.F.W.). **S.** Probably bred at Saltford, where young bird seen early in August (H.H.D. and B.K.).

WRYNECK (*Jynx t. torquilla*). **S.** One was watched for about half an hour in a garden at White Cross Court, near Whitchurch, August 31 (Dr. Hastings Moore per R.E.A. and H.J.B.).

SHORT-EARED OWL (*Asio f. flammeus*). **S.** One, Blagdon reservoir, January 5 (R.E.A., H.J.B. and B.K.).

PEREGRINE FALCON (*Falco p. peregrinus*). **G.** Single bird, New Grounds, February 3 (J.S.A.), and March 2 and 30 (B.K.). Two, same place, October 26 (H.J.B. and P.S.G.), and single birds, September 27 (P.S.) and December 29 (M.J.W.). Single birds, Avon Gorge, January 23 and 26 (H.W.N. and R.H.P.); May 25 (W.R.T.); and June 15 and August 17 (H.W.N.). **S.** One, Clevedon, November 22 (B.K.). Also recorded from the Avon Gorge (*cf.* above).

HOBBY (*Falco s. subbuteo*). **G.** Single birds reported from the New Grounds, May 11 (J.S.A.) and 27 (R.H.P.). One identified, Stoke Gifford, August 18 (H.H.D.), and two, Severn Beach, September 22 (S.K.T. and W.R.T.).

MERLIN (*Falco columbarius asalon*). **G.** One seen at the New Grounds, January 26 (J.S.A.), and one, an adult male, March 10 (R.E.A.). Single birds reported from same place, November 15 (C.A.N.) and December 7 (P.S.).

COMMON BUZZARD (*Buteo b. buteo*). **G.** Single birds recorded from Dyrham Wood, January 22, on various dates in September, and December 23 (F.L.B.); Almondsbury, April 9 (M.J.W.); Savage's Wood, Stoke Gifford, July 23 and 24 (H.H.D.); New Grounds, November 9; and Wotton-under-Edge, November 9 and 15 (H.F.W.). **S.** One, Blagdon, January 26 (H.W.N.); one, Ashton Park, February 1 (A.C.L.); one Rickford, February 1 and 2 (W.H.F. and R.P.G.); and two near Cheddar (R.E.A. and H.W.N.).

MARSH-HARRIER (*Circus e. æruginosus*). **G.** An immature specimen visited marshy ground at the Frampton-on-Severn gravel pits in the autumn and remained for three weeks or longer.

The bird was first reported on October 26 (A.W.) and was subsequently seen by H.J.B., H.H.D., R.P.G., P.S. and other observers. A.W. records that it was still present on November 16. (N.B.—Frampton-on-Severn, about two miles north of Slimbridge, is just outside the district.)

SPARROW-HAWK (*Accipiter n. nisus*). **S.** At the Long Ashton Research Station on January 22, a Sparrow-Hawk, and a Blackbird (*Turdus m. merula*) which it was closely pursuing, crashed into a greenhouse window. Both birds were killed, the hawk going right through the glass (G.E.C.).

COMMON HERON (*Ardea c. cinerea*). **S.** A bird ringed as a juvenile at Banwell, June 6, 1946, was found dead at Thorpe Mandeville, Northants, January 7, 1947 (R.H.P.). Eighteen at Blagdon reservoir July 29, and twenty-one, same place, August 10, were almost all immatures (R.E.A.).

BITTERN (*Botaurus s. stellaris*). **S.** One shot on Kenn Moor in January was sent to the City Museum (W.E.M.). One visited Blagdon reservoir in January and stayed fourteen weeks or longer (presumably the same bird throughout). It was first noticed on January 18 (E.R.) and was subsequently under frequent observation. On March 2 the bird, no doubt weakened by the prolonged spell of cold, was surrounded in a small clump of reeds and was caught and ringed (W.B.A., H.H.D., R.H.P. and others). It was last reported on April 26 (R.E.A. and H.J.B.).

WHOOPEL SWAN (*Cygnus cygnus*). **S.** Four adults, Cheddar reservoir, November 30 (B.K.), December 4 and 9 (B.K. and H.H.D.), December 14 and 24 (H.J.B. and A.C.L.), and 29 (S.K.T. and W.R.T.).

BEWICK'S SWAN (*Cygnus b. bewickii*). **S.** The following reported from Cheddar reservoir in January:—four, 2 adults and 2 immatures, on the 12th (H.J.B. and H.H.D.); one immature on the 15th (R.E.A.); and five, 3 adults and 2 immatures, on the 19th (B.K.).

GREY LAG-GOOSE (*Anser a. anser*). **G.** One seen at the New Grounds, December, 1946, was still present during the first fortnight of January (F.L.B., B.K. and P.S.).

WHITE-FRONTED GOOSE (*Anser a. albifrons*). **G.** About 200 geese, no doubt White-fronts, overhead at Chipping Sodbury, January 2 (J.M.N.). Seventeen overhead, Stoke Gifford, January 11 (H.H.D.) and same number on river bank, near Severn Beach, on the 15th (S.K.T. and W.R.T.). At the New Grounds numbers varied in early January from 2,000 to 4,000 or more, but at the onset of the severe weather many left the locality while others became widely dispersed over the surrounding country. P.S. reports that by early March at least 2,500 were again present, also that the final departure was unusually late—600 being still

on the saltings, March 21. Last seen—a party of eight, March 29 (P.S.). First of the season at the New Grounds, about 60, October 13 (E.D.O.). Approximately 500 by late October and 800 or more in late November (H.H.D. and P.S.). Considerable influx in December—numbers reaching 3,000 by the 27th (P.S.). **S.** Fourteen over Cheddar reservoir, January 5 (R.E.A. and H.J.B.).

LESSER WHITE-FRONTED GOOSE (*Anser erythropus*). **G.** In continuance of observations in late December, 1946, when a single adult was seen among common White-fronts, close watch was kept at the New Grounds, and during the first week of January it became clear that three adults were present. On January 18 and again on March 1 all three birds were seen and satisfactorily distinguished one from another by P.S. and other experienced ornithologists. For full details cf. *British Birds*, Vol. XL, p. 280.

BEAN-GOOSE (*Anser f. fabalis*). **G.** Records from the New Grounds are of one, January 4, and two on 5th (F.L.B., H.H.D. and P.S.). Also of one, December 1, and another on the 20th (E.D.O. and P.S.).

PINK-FOOTED GOOSE (*Anser fabalis brachyrhynchus*). **G.** The only New Grounds records for early in the year are of two seen on various dates in January and in the first week of March (F.L.B., H.H.D. and B.K.). First autumn birds at the New Grounds were twenty, September 24 (E.D.O. and P.S.). Total about 120 by October 6, remaining at that level to late November when about half departed (P.S.). Ten still present, December 11, but only a single bird left on 13th (P.S.).

BARNACLE-GOOSE (*Branta leucopsis*). **G.** Three, among White-fronts, at the New Grounds early in January (H.H.D. and P.S.) and three, probably the same birds, in the first week of March (J.S.A., B.K. and P.S.).

DARK-BREASTED BRENT GOOSE (*Branta b. bernicla*). **G.** Single bird at the New Grounds, January 3 (P.S.); February 28 (W.B.A. and H.H.D.); and March 1 and 15 (P.S.).

CANADA GOOSE (*Branta c. canadensis*). **G.** Ten visited the New Grounds area early in March, remaining for a fortnight or longer (H.H.D., B.K. and P.S.).

SHELD-DUCK (*Tadorna tadorna*). **G.** 260 or more at the New Grounds, July 6 (H.H.D. and P.S.G.).

GADWALL (*Anas strepera*). **S.** Single males reported from Cheddar reservoir, January 22 (H.J.B. and H.H.D.) and December 9 (H.H.D.).

TEAL (*Anas c. crecca*). **S.** Very large numbers, probably not less than 1,200, Cheddar reservoir in the first three weeks of January (B.K.). At least 1,000, same place, December 9 (H.H.D.).

GARGANEY (*Anas querquedula*). **G.** Twice taken at the New

Grounds decoy—two, male and female, April 7, and an immature bird, August 23 (P.S.). **S.** Observations by R.E.A., H.J.B. and others show that two pairs were present at Blagdon reservoir throughout the nesting season, and there is some evidence that one of them bred. A.E.B. reports that the excited behaviour of a female which he disturbed on May 27 was strongly suggestive of breeding and that he actually found two or three ducklings in reeds close by, but could not prove conclusively that they belonged to the old bird in question. Two or three, perhaps all, of a party of eight ducks at the same reservoir, July 29, were Garganey (R.E.A.).

WIGEON (*Anas penelope*). **S.** Largest total reported from the reservoirs—470 at Cheddar, January 19 (B.K.).

AMERICAN WIGEON (*Anas americana*). **S.** A male, undoubtedly the same bird as that reported in 1946, was seen at Cheddar reservoir, January 5 and 19 (R.E.A., G.E.C. and R.H.P.), and was still there on the 26th (B.K.).

PINTAIL (*Anas a. acuta*). **G.** Noted in very small numbers off the New Grounds, January 12 and on several dates in March (R.E.A., H.H.D., H.W.N. and others). **S.** Seen on various dates at the reservoirs—six, Blagdon, December 14 (B.K.), and seven, Cheddar, on the 22nd (M.J.W.), being the highest numbers reported.

SHOVELER (*Spatula clypeata*). **G.** Of two immatures caught and ringed at the New Grounds decoy on October 12, one was recovered in Co. Wexford, Ireland, December 3, and the other in the Gulf of Morbihan, Brittany, December 9 (P.S.). **S.** A pair bred at Blagdon reservoir—the nest, with seven eggs, being found by R.H.P., May 26, and photographed by R.P.G. on June 3.

COMMON POCHARD (*Aythya ferina*). **G.** Reported from the New Grounds on several occasions, January-March and again November-December. Highest totals—150, November 16 (P.S.), and 104, December 21 (J.S.A.). **S.** About thirty on the lake, Orchardleigh Park, near Frome, November 23 (H.H.D.).

TUFTED DUCK (*Aythya fuligula*). **G.** A few visited the Severn off the New Grounds during the severe frost, January-March (J.S.A., H.W.N., P.S. and others)—the largest number reported being thirty, March 2 (B.K.). Eight, probably birds driven out from the frozen reservoirs, seen in the Cumberland Basin docks, February 2 (R.H.P.).

SCAUP-DUCK (*Aythya m. marila*). **S.** Females or immatures, up to four in number, were clearly identified at Barrow Gurney reservoirs, October 19 (H.J.B.) and on several dates, November and early December (H.J.B., G.E.C. and B.K.). Female or immature bird twice seen at Cheddar reservoir in November (B.K.).

GOLDENEYE (*Bucephala c. clangula*). **G.** Three, including one adult male, off the New Grounds, March 2 (B.K.). **S.** Highest total noted at the reservoirs—eighteen, including four adult males, Blagdon, April 7 (H.H.D. and B.K.). A pair, Emborough Pond, November 23, were the only ducks present (H.H.D.).

COMMON SCOTER (*Melanitta n. nigra*). **G.** Party of five off the New Grounds, October 19 (P.S.). **S.** Single male, Barrow Gurney reservoirs, April 16 (H.J.B. and H.H.D.), and single females, Blagdon reservoir, on the 12th (A.C.L.) and 14th (H.J.B. and H.H.D.); and at Barrow Gurney on the 27th (G.E.C. and B.K.).

GOOSANDER (*Mergus m. merganser*). **G.** One off Avonmouth, February 2 (W.H.F.). **S.** The following reported from Cheddar reservoir:—two or three on various dates in January (R.E.A., H.J.B. and H.H.D.); two, February 22 (R.E.A.); one, March 16 and 23 (H.W.N.); and up to four or five on various occasions in December (B.K., A.C.L. and M.J.W.). Two, Blagdon reservoir, January 26 (H.W.N.), and one, Barrow Gurney, on three dates in early April (B.K., A.C.L. and M.J.W.). The above records all refer to red-headed birds.

SMEW (*Mergus albellus*). **S.** More than usually plentiful at the reservoirs during the severe weather, January-March. Largest numbers recorded:—Barrow Gurney, nine (3 ad. males), January 9 (S.K.T. and W.R.T.), and eleven (5 ad. males), February 23 (H.W.N.); and Blagdon, sixteen (3 ad. males), January 17 (D.A.W.), and twenty (6 ad. males), February 16 (R.E.A.). Six (2 ad. males) at Cheddar, January 18 (M.J.W.), and a single adult male, R. Avon, Saltford, March 5 (B.K.).

GANNET (*Sula bassana*). **G.** Injured bird caught at the New Grounds, January 14 (P.S.).

RED-NECKED GREBE (*Podiceps g. griseigena*). **S.** One at Blagdon reservoir from February 10 to 16 or later was identified by R.E.A., H.J.B., H.H.D., B.K. and other observers. What may have been the same bird was seen on the R. Avon, at Saltford, February 23 (B.K.) and March 9 (R.E.A. and H.J.B.). One visited Cheddar reservoir in early December and remained to the end of the year (B.K., A.C.L., S.K.T., W.R.T. and others).

SLAVONIAN GREBE (*Podiceps auritus*). **S.** The following were definitely identified at the reservoirs:—two, Cheddar, on three occasions, January 12 to 22 (R.E.A., H.J.B. and H.H.D.); one, Barrow Gurney, February 8 (M.J.W.) and two on the 20th (A.C.L. and W.R.T.); and two, Blagdon, on various dates, February 11 to April 10 (H.J.B., H.H.D. and B.K.).

BLACK-NECKED GREBE (*Podiceps n. nigricollis*). **S.** Single birds, Barrow Gurney reservoirs, January 9 (S.K.T. and W.R.T.); August 29 and September 2 (G.E.C.); and September 24 and

October 6 (R.E.A.). One, Cheddar reservoir, January 12 (H.H.D.). At Blagdon two were present on January 15 (H.J.B.); four on the 16th (H.J.B. and B.K.); a single bird on March 16 (H.W.N.); two on June 10 and 15 (R.E.A. and H.H.D.) and one on September 27 (H.J.B.).

GREAT NORTHERN DIVER (*Colymbus immer*). **S.** One, Barrow Gurney reservoirs, January 9 (S.K.T. and W.R.T.), and one, Cheddar reservoir, January 12 to 22 or later (R.E.A., H.H.D., D.A.W. and others).

BAR-TAILED GODWIT (*Limosa l. lapponica*). **G.** Three on R. Avon, near Sea Mills, February 26 (A.C.L.); four, New Grounds, May 11 (J.S.A.); and one near Severn Beach, September 20 (H.E.W. and M.J.W.) and 21 (G.G.C. and H.H.D.).

BLACK-TAILED GODWIT (*Limosa l. limosa*). **G.** Single bird reported from the New Grounds, March 16 (P.S.). **S.** A party, varying from thirteen to eighteen, was seen almost daily from September 1 to 13 at Barrow Gurney reservoirs. The birds were usually to be found at No. 1 reservoir, where the water level was exceptionally low (G.E.C., G.G.C., H.H.D. R.P.G. and others).

WHIMBREL (*Numenius ph. phaeopus*). **S.** Three, Cheddar reservoir, May 24 (H.W.N.), and twenty-five, Kingston Seymour, on same date (R.P.G. and B.K.).

WOODCOCK (*Scolopax rusticola*). **G.** Single birds flushed at the New Grounds, February 23 (P.S.), and Sea Mills, March 3 (H.W.N.). One shot, Dyrham Wood, February 28 (F.L.B.).

KNOT (*Calidris c. canutus*). **G.** Up to twenty or more in red plumage, Severn Beach, May 4 and 5 (H.H.D., A.C.L. and W.R.T.). About twenty-five, same place, September 18 (A.C.L.), and two on the 21st (G.G.C. and H.H.D.).

DUNLIN (*Calidris alpina*). **G.** At least 2,000, Severn Beach, May 4 (H.H.D.).

CURLEW-SANDPIPER (*Calidris testacea*). **G.** One near Severn Beach, August 17 (G.G.C.), and two, September 18 (A.C.L.).

LITTLE STINT (*Calidris minuta*). **S.** Two, Cheddar reservoir, August 25 and September 16 (R.E.A.).

PURPLE SANDPIPER (*Calidris m. maritima*). **G.** Single bird, among Turnstones, Severn Beach, March 30 (H.H.D.).

SANDERLING (*Crocethia alba*). **G.** Three, Severn Beach, May 4 (H.H.D.), and one on the 5th (A.C.L. and W.R.T.). Four, New Grounds, May 11 (B.K.), and one, Severn Beach, September 13 (M.J.W.). **S.** Three, Cheddar reservoir, August 24 (B.K.).

RUFF (*Philomachus pugnax*). **G.** One, New Grounds, August 30 (H.E.W. and M.J.W.). **S.** Single birds, Blagdon reservoir, August 10, and Cheddar reservoir, September 16 (R.E.A. and H.J.B.).

GREEN SANDPIPER (*Tringa ochropus*). **G.** Single birds, Avonmouth, March 19; at the New Grounds on the 30th (H.W.N.); and at a small pond near Stoke Gifford, December 13 (H.H.D.). **S.** One, Portbury Wharf, March 19 (H.J.B.), and one, Barrow Gurney reservoirs, August 24 to September 3 or later (R.E.A., H.H.D., B.K. and W.R.T.).

GREENSHANK (*Tringa nebularia*). **S.** Three, Blagdon reservoir, August 10, and one, Cheddar reservoir, August 27 (R.E.A.). Frequently seen, either singly or in twos, Barrow Gurney reservoirs, August 29 to September 28 (G.E.C., G.G.C., R.P.G., A.C.L. and others).

KENTISH PLOVER (*Leucopoliis a. alexandrinus*). **G.** Extremely good views were obtained of one, a male, in company with a large mixed gathering of Dunlin, Ringed Plover and other waders, at Severn Beach, May 4 and 5 (H.H.D., A.C.L. and W.R.T.). This is the first recorded occurrence for the district (cf. *British Birds*, Vol. XL, p. 254).

GOLDEN PLOVER (*Pluvialis apricaria*). **G.** Largest numbers reported:—80, Stoke Gifford, January 6, and 50, March 15 (H.H.D.); and about 100, New Grounds, January 10 (R.H.P.). **S.** Largest number reported—65, Lansdown, March 20 (F.L.B.).

LAPWING (*Vanellus vanellus*). **S.** Enormous flock, probably not less than 2,500 birds, Lulsgate aerodrome, January 12 and 15 (H.J.B. and H.H.D.). 526 counted at No. 1 reservoir, Barrow Gurney, October 4 (B.K.).

OYSTER-CATCHER (*Haematopus ostralegus occidentalis*). **G.** One, New Grounds, March 30 (B.K.). **S.** Single bird noted at Cheddar reservoir on several dates March 2 to 30 (B.K. and H.W.N.).

BLACK TERN (*Chlidonias n. niger*). **S.** Seen on several occasions at Blagdon reservoir in May—four on the 4th (R.E.A.), being the highest total reported. Two, Barrow Gurney reservoirs, August 24 (B.K.), and one, September 3 (R.E.A.). Two, Cheddar reservoir, May 4 (B.K.), and one (or two), October 25 (G.G.C. and K.M.C.).

SANDWICH TERN (*Sterna s. sandvicensis*). **S.** Two clearly identified, Blagdon reservoir, April 11 (R.E.A. and H.J.B.).

COMMON TERN (*Sterna h. hirundo*) and **ARCTIC TERN** (*Sterna macrura*). **G.** Four, Common or Arctic, at the Duchess' Pond, Stapleton, April 25 and 26 (A.J.D. and G.M.). The majority of a party of seven at the same place on the 28th were quite evidently Arctics (H.H.D.). **S.** Up to a dozen, Barrow Gurney reservoirs, late April and early May—most of those identified being Arctics (R.E.A., H.J.B. and G.E.C.). Unusually large passage recorded from Blagdon and Cheddar reservoirs, last week of April and early May. R.E.A. reports that Common and

Arctic Terns were identified among 100 or more at Blagdon, April 25 and 27, but that Arctics appeared to be in the majority. Those identified among 100 or more at Cheddar on the 27th were mostly Arctics (R.E.A. and B.K.). Smaller numbers seen subsequently at both Blagdon and Cheddar—stragglers being noted on various dates, latter half of May to early July (R.E.A., H.J.B. and B.K.). A few, Common or Arctic, on the coast at Clevedon, April 27 (G.E.C.).

LITTLE TERN (*Sterna a. albifrons*). **S.** One confidently identified by B.K. at Cheddar reservoir, October 18.

GREAT BLACK-BACKED GULL (*Larus marinus*). **G.** Fifty-three counted at the New Grounds, March 2 (B.K.).

ICELAND GULL (*Larus glaucoides*). **G.** What was probably an Iceland Gull was seen by P.S. at the New Grounds, January 16 and 18. Although reported as being no larger than a Herring-Gull (*L. a. argentatus*), the possibility that the bird was a small example of the Glaucous Gull (*L. hyperboreus*) cannot be overlooked.]

KITTIWAKE (*Rissa t. tridactyla*). **S.** An adult found dead, Cheddar reservoir, January 18 (M.J.W.). Single immature birds noted at the same place, January 19 and March 16 (B.K. and H.W.N.).

CORN-CRAKE (*Crex crex*). **G.** The Bishop of Bristol reports that a Corn-Crake was caught by a cat in his garden at Clifton Hill, June 13. One shot at Dyrham in the autumn (F.L.B.). **S.** Injured bird caught at Abbots Leigh, May 3, and sent to the Clifton Zoological Gardens (G.G.). Heard by R. Avon, St. Anne's Park, June 13 and 26 (A.C.L.). Heard, Saltford, June 22 (B.K.).

WATER-RAIL (*Rallus a. aquaticus*). **S.** One found dead, Chew Stoke, October 26 (R.P.G.).

QUAIL (*Coturnix c. coturnix*). **G.** Several reported from the Dyrham area in late July (F.L.B.). **S.** Calling heard near Abbots Leigh, May 25 and 26 (A.C.L. and C.V.M.L.).

SOME RECORDS AND OBSERVATIONS OF LEPIDOPTERA 1947

COMPILED FROM THE REPORTS OF MEMBERS OF THE
B.N.S. ENTOMOLOGICAL SECTION

By A. H. PEACH

(Received Feb. 15, 1948. Read in title at General Meeting, Mar. 4, 1948)

THE year 1947 was extremely disappointing until towards the end of July when a long period of ideal weather continued until the middle of November.

Rarely have so many butterflies been on the wing during the late summer and autumn, and even those not interested in Lepidoptera must have noticed the general distribution in great numbers of the clouded yellow (*Colias croceus*). Probably the noted year of 1877 for this insect was surpassed.

The data given below refer to 1947 only and to the counties of Somerset and Gloucester. From a vast amount of material submitted, only certain species have been included in this article.

The following members of the Section have contributed:— Messrs. J. F. Bird (J.F.B.), H. W. Bird (H.W.B.), S. Blathwayt (S.B.), J. W. Norgrove (N.) and A. H. Peach (P.)—also one non-member, Mr. J. Ash (A.) of Gosforth, Newcastle-on-Tyne, who was in Gloucestershire during the summer and autumn. Messrs. Bird's and Blathwayt's observations are all from North Somerset, otherwise localities are indicated.

RHOPALOCERA (Butterflies)

Satyrus galathea: at Kings Weston Down in July (N.).

Eumenis semele: Backwell Down (P.).

Aphantopus hyperanthus: common at Brockley Combe and Backwell Down (N. and P.); one in July at Frome, showing albinistic tendency on hind wings (P.).

Argynnis aglaia

Argynnis cydippe

Argynnis paphia

} all at Brockley Combe (N.).

Euphydryas aurinia: very small colony (J.F.B.).

Vanessa atalanta and *V. cardui*: all report abundant; along the sea-banks between Frampton-on-Severn and the New Grounds on 31 August, many hundreds of *cardui* were counted on Sea Aster flowers and they appeared to be migrating eastwards (A.).

Aglais urticae: common; var. *semi-alba*, 5 Oct. (S.B.); along the sea-banks between Frampton, above mentioned and on the same date, there were incredible numbers of this butterfly; they were swarming in thousands, and dozens could be seen at one time round each clump of Sea Aster (A.).

Nymphalis antiopa: at Chaceley, one on 21 September (A.).

Polygonia c-album: generally distributed; on the wing till mid-November

- Polyommatus icarus* : not abundant (N.).
Lysandra coridon : fairly common on grassy slopes of Gully, Clifton (N.).
Lycæna phlæas : second brood very abundant; one var. *obsoleta* taken 5 October (S.B.); abundant Patchway (P.), also observed Kings Weston Down (P.).
Pieris rapæ : one banded on 31 August (S.B.).
Euchlæ cardamines : ova collected for breeding at Blagdon and Long Ashton (P.); 30 pupæ resulted.
Colias hyale : one at Frampton-on-Severn, 5 October (A.).
Colias croceus : common everywhere in the district and was observed to mid-November; var. *helice* and var. *pallida* common in 3rd brood.
Adopæa sylvestris : abundant in Leigh Woods, and Railway Banks, Portway (N.).

HETEROCERA (Moths)

- Herse convolvuli* : 2 September (S.B.).
Macroglossum stellatarum : unusually common throughout the summer.
Cerura furcula : 31 May (S.B.).
Notodonta dromedarius : 9 August (S.B.); at light (H.F.B.).
Lymantria monacha : a few in August (S.B.).
Pæcilocampa populi : very common in December (S.B.).
Drepana binaria and *D. cultraria* : August (S.B.); at light (J.F.B.).
Eilema sororcula : a few in May (S.B.) and *E. Complana* at light (J.F.B.).
Craniophora ligustri : 12 July (S.B.); var. *olivacea* 14 July (J.F.B.).
Lampria fimbria : 28 June (S.B.).
Eumiditis adusta : 12 June (S.B.).
Brachionycha sphinx : several in November (S.B.).
Laphygma exigua : three at light, 31 May to 1 September (J.F.B.).
Aethima xerampelina : a few in September (S.B.).
Tilacea aurago : 23 September (S.B.).
Schrankia costæstrigalis : common in late June and early July.
Nothopteryx polyommata : a few in March (S.B.).
Nictosia obstipata : a few in late August (S.B.); abundant at light 31 May to 1 September (J.F.B.).
Eupithecia dodoneata and *E. exigua* : a few of each in May (S.B.).
E. albipunctata var. *angelica* : 22 June (H.W.B.).
Arenostola fluxa : 25 and 27 July, two at light (J.F.B.).
Rhodometra sacraria : 27 September, one male captured (H.W.B.).
Ouraapteryx sambucaria ab. *Cuspidaria* : 12 October (J.F.B.).
Crambus margaritellus : 14 July at light (H.W.B.).

Mr. J. F. Bird reports light was uncertain but several very attractive nights occurred, e.g., on 14 July 80 species of "macros" and 10 of "pyrales" were recorded.

Among the captures at light, not above mentioned, were:—
Cænopia rufa, *Pyrrhia umbra*, *Hadena conspersa*, *H. chenopodii*, *Ophinea pastinum*, *Plusia festucæ*, *Geometra papilionaria*, *Pheosia gnoma*, *P. tremula*, *Gastro pacha*, *quercifolia* and *Zeuzera pryni*.

ZOOLOGICAL NOTES, 1947

By R. BASSINDALE, M.Sc.

(Received, Feb. 17, 1948. Read in title at General Meeting, March 4, 1948)

Elminius modestus

IN the last few years evidence has been accumulating of the presence in British waters of a species of barnacle native to New Zealand. First identified in 1945 from Chichester Harbour (Bishop 1947), the barnacle was also discovered on ships at Southampton and Harwich. Later it has been found by Crisp and Chipperfield (1948) to be common in all suitable localities on the south-east coasts of England from Norfolk to Dorset. At the instigation of Mr. Chipperfield, the barnacle has been searched for and found in the Bristol Channel by Miss M. Harrison at Blue Anchor and by Dr. R. D. Purchon (a few specimens—see p. 296) near Cardiff. It seems clear that we have here a well established species, new to the British list, which is easily distinguished from our indigenous barnacles, having four wall plates instead of six. It is widely distributed on the shore and seems to be thriving in competition with our native species. In fact it is the dominant species in some localities (Crisp & Chipperfield, 1948, Knight Jones, 1948). It is expected that this new member of our fauna may become a pest because it settles thickly on periwinkles and will probably settle on oysters, and these shell-fish are not acceptable to the market unless they are free from encrusting growths.

It has now been reported also from the coasts of Holland.

Bishop, M. W. H. *Nature*, **159**, 501 (1947).

Crisp, D. J. and P. N. J. Chipperfield *Nature*, **161**, 64 (1948).

Knight Jones, E. W. *Nature*, **161**, 201 (1948).

Craspedacusta sowerbii

Among the hydroids and jellyfishes belonging to the Phylum Coelenterata is a small group of species known as the Trachylina. Of these, several species are fresh water in habit whereas the group as a whole is marine. While mainly confined to tropical regions, one species of the Trachylina—*Craspedacusta sowerbii*—is known from temperate regions. The species was first described in 1880 from the lily ponds at Kew Gardens and since that time sporadic outbreaks have occurred in lily ponds and reservoirs all over the U.S.A. and Europe. A feature of these outbreaks is the abundance of the jellyfish when it appears, the rarity and sporadic nature of the outbreaks, and the fact that all individuals of any one outbreak are of one sex. In October, 1947, an outbreak of

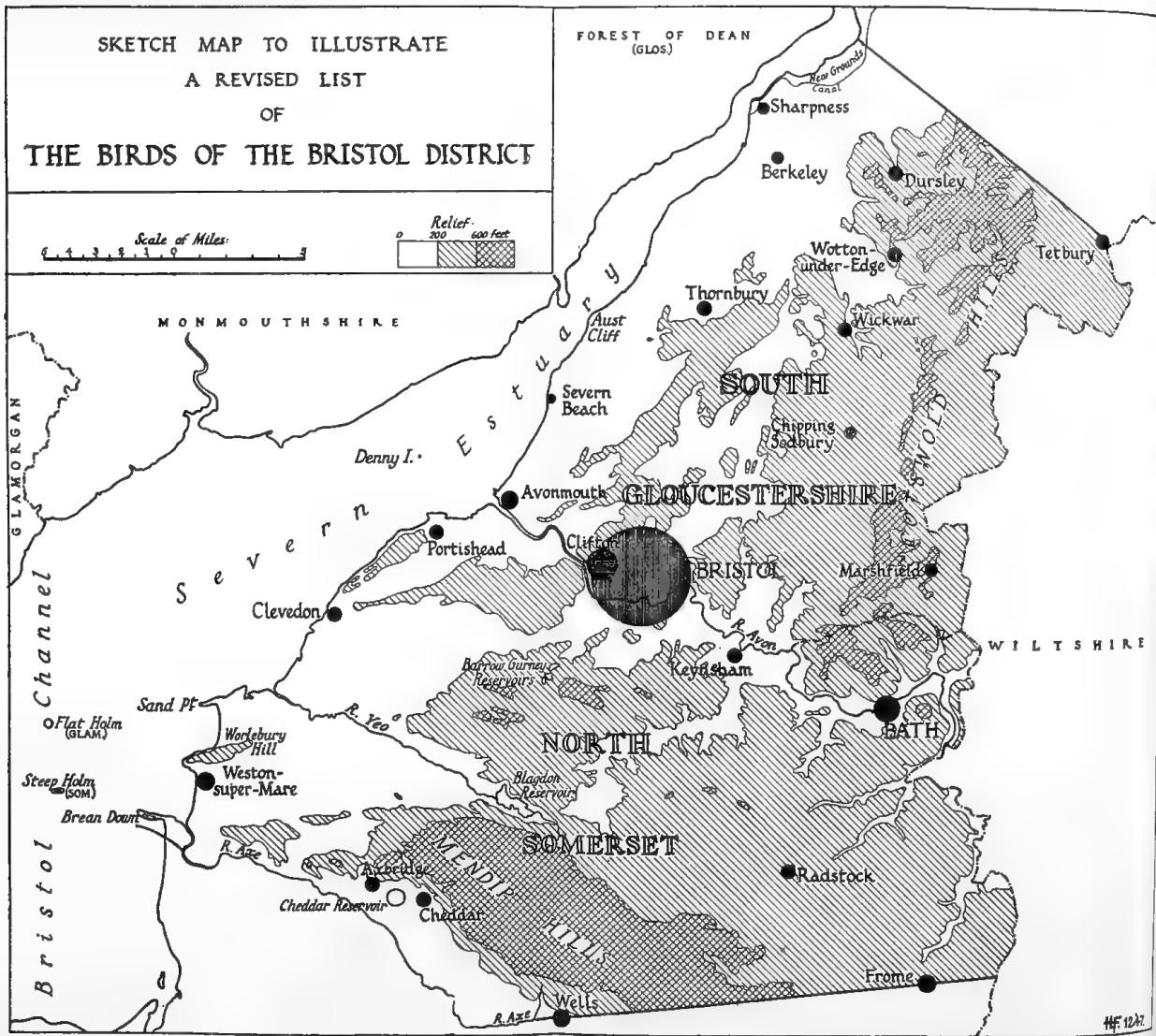
male specimens occurred in the Witcombe reservoirs of the Gloucester Waterworks. The jellyfish is about one inch in diameter and has 70 or 80 tentacles round the margin of the disc. Search by members of the Bristol University Zoology department revealed the presence of the hydroid or polyp stage from which the jellyfish (or medusae) had developed. They are small, tubular creatures about one millimetre long, housed in a soft tube attached to the stones on the bottom of the reservoir. They have no tentacles, are colourless and feed on small animals living on the stones. The medusa probably feeds on the copepods which were abundant in the water (*Diaptomus* sp). This outbreak at Witcombe, which may or may not recur, is of interest because outbreaks are very uncommon and because species of fresh water medusae are so rare. The occurrence does not, of course, affect the reservoir as a source of drinking water.

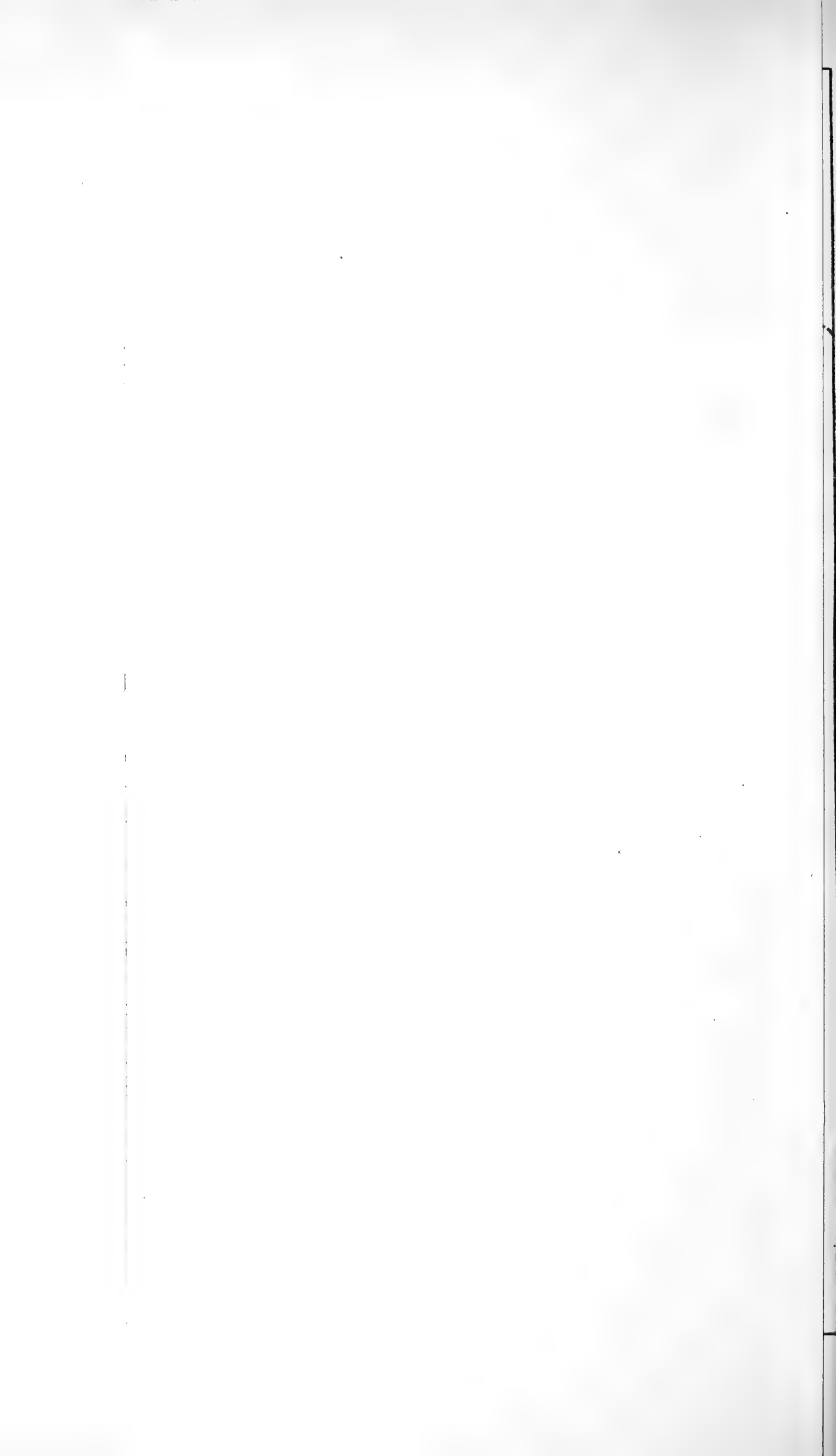
SKETCH MAP TO ILLUSTRATE
A REVISED LIST
OF
THE BIRDS OF THE BRISTOL DISTRICT

FOREST OF DEAN
(GLOS.)

Scale of Miles:
0 1 2 3 4 5

Relief:
200 400 feet





A REVISED LIST OF THE BIRDS OF THE BRISTOL DISTRICT

By H. H. DAVIS, M.B.O.U.

(Received, Feb. 5, 1948. Read in title at General Meeting,
March 4, 1948.)

I. INTRODUCTION

ALTHOUGH the birds of the Bristol District have twice been listed in the *Proceedings*, no attempt has been made for nearly half a century to bring the subject up to date. The original list appeared in the issue for 1875-76 (New Ser., Vol. I, pt. III) and was compiled by Mr. E. Wheeler, who, under the title of "Resident Birds, Summer and Winter Visitors, and occasional Stragglers, observed in the Bristol District," enumerated 168 species. In November, 1896, the first B.N.S. Ornithological Section was formed, and had as one of its main objects the preparation of a more complete avifauna of the neighbourhood. Having accomplished the task, to which the chief contributors appear to have been Messrs. H. J. Charbonnier, H. C. Playne and D. T. Price, and Dr. J. A. Norton, the Section, consisting of about twelve members, was dissolved in February, 1901. The list so compiled totalled 197 species, and was published in the *Proceedings* for 1899 (New Ser., Vol. IX, pt. II).

Taking into account records up to the end of 1947, it is now possible, owing largely to the results of a much widened interest in local ornithology, to give a list considerably longer and more detailed. Moreover, observations have lately been extended to cover a greater area, particularly on the Gloucestershire side of the district, than that dealt with in 1899. Thus, with an increased amount of country under review and a rapid expansion of field activities in recent years, the present compilation, inclusive of both the northern and southern forms of the Dunlin, Golden Plover and Guillemot, and of four birds—Scandinavian Chiffchaff, Yellow-billed Cuckoo, Glossy Ibis and Crane—obtained slightly beyond the boundaries of the district, totals 276 species and subspecies.

No hard and fast rule has been adopted as to what birds should be admitted. Records, especially those of rare visitors, have been judged as far as possible solely on their merits, and the following, recorded without any corroborative details or on very uncertain evidence, have been excluded—Mealy Redpoll, Pine-Grosbeak, Scops Owl, Little Egret, Spotted Sandpiper and Little Crake

(Terry, 1864 and 1888); Goshawk (Terry, 1864, and *Reps. Wells N.H. & A.S.*, 1922 and 1924); Rock-Dove (Smith, 1869, and *Zool.*, 1903); Scandinavian Rock-Pipit (*Zool.*, 1870); Surf-Scoter (*Proc., B.N.S.*, 1875-76); Parrot-Crossbill (*Zool.*, 1888); Red-footed Falcon (Mathew, 1893); Ortolan Bunting, Roller and Wilson's Petrel (Knight, 1902); Sooty Shearwater (Mellersh, 1902); Dartford Warbler (Blathwayt, 1906); Lesser Grey Shrike, Collared Flycatcher and Isabelline Wheatear (*Rep. Som. Birds*, 1911-13). Also excluded are Tengmalm's Owl, the only notice of which is now known to have been due to faulty identification (*cf.* under Little Owl, p. 243), and Ruddy Sheld-Duck, of which the only record does not refer to a genuinely wild specimen (*Proc. B.N.S.*, 1942).

The birds listed here may be classified as :—

Residents	.. .. .	73
Resident in the present century, but now, apparently, extinct	.. .. .	1
Summer-residents	.. .. .	29
Regular winter-visitors and passage-migrants		58
Irregular and occasional visitors, vagrants, etc.		115
		<hr/>
		276
		<hr/>

Of the above total 118 are birds which breed regularly, or have bred on one or more occasions in the present century, and may be summarised as :—

Residents which breed regularly : Raven, Carrion-Crow, Rook, Jackdaw, Magpie, Jay, Starling, Hawfinch, Greenfinch, Goldfinch, Linnet, Bullfinch, Chaffinch, Corn-Bunting, Yellow Bunting, Cirl Bunting, Reed-Bunting, House-Sparrow, Tree-Sparrow, Wood-Lark, Sky-Lark, Meadow-Pipit, Rock-Pipit, Grey Wagtail, Pied Wagtail, Tree-Creeper, Nuthatch, Great Tit, Blue Tit, Coal-Tit, Marsh-Tit, Long-tailed Tit, Goldcrest, Mistle-Thrush, Song-Thrush, Blackbird, Stonechat, Robin, Hedge-Sparrow, Wren, Dipper, Kingfisher, Green Woodpecker, Great Spotted Woodpecker, Lesser Spotted Woodpecker, Little Owl, Tawny Owl, Barn-Owl, Peregrine Falcon, Kestrel, Sparrow-Hawk, Common Heron, Mute Swan, Sheld-Duck, Mallard, Cormorant, Great Crested Grebe, Little Grebe, Wood-Pigeon, Stock-Dove, Common Snipe, Redshank, Lapwing, Herring-Gull, Great Black-backed Gull, Moorhen, Coot, Pheasant, Common Partridge and Red-legged Partridge—70.

Residents which have bred, but are not known to breed regularly : Long-eared Owl, Common Buzzard and Oyster-catcher—3.

Resident and has bred, but now regarded as extinct in the district : Black Grouse—1.

Summer-residents which breed regularly : Tree-Pipit, Yellow Wagtail, Red-backed Shrike, Spotted Flycatcher, Chiffchaff, Willow-Warbler, Wood-Warbler, Grasshopper-Warbler, Reed-Warbler, Sedge-Warbler, Garden-Warbler, Blackcap, Whitethroat, Lesser Whitethroat, Whinchat, Redstart, Nightingale, Swallow, House-Martin, Sand-Martin, Swift, Nightjar, Cuckoo, Turtle-Dove and Lesser Black-backed Gull—25.

Summer-residents which have bred, but are not known to breed regularly: Marsh-Warbler, Hobby, Corn-Crake and Quail—4.

Winter-visitors and passage-migrants which frequently, or very occasionally, remain in summer, and have bred : Lesser Redpoll, Pied Flycatcher, Ring-Ouzel, Wheatear, Teal, Shoveler, Common Pochard, Tufted Duck, Common Curlew, Woodcock, Ringed Plover, Golden Plover and Water-Rail—13.

Irregular and occasional visitors, etc., which have remained to breed : Common Crossbill and Hoopoe—2.

Mention should be made of three birds—Blue-headed Wagtail, Wryneck and Garganey—which have probably bred within the period stated. As a nesting species the Wryneck was evidently not uncommon in some localities toward the close of the last century. Despite its subsequently rapid decline it may well have continued to breed until 1900 or later, and perhaps still nests occasionally in the district. Blue-headed Wagtail has once been reported as breeding, and Garganey twice, but the records are without the necessary conclusive details.

TOPOGRAPHICAL. The district, for ornithological purposes, (see sketch. map, fig. 5), has a land surface of approximately 762 square miles, is generally well timbered and is almost entirely agricultural in character. It lies on both sides of the R. Avon, embracing a wide area of South Gloucestershire and North Somerset, and extends into the Bristol Channel and Severn Estuary¹ so as to include Steep Holm and Denny Isle. The R. Avon, from its mouth to Cumberland Basin and thence through the industrial region of the City docks to a point just beyond Keynsham, forms a natural division between the two counties. Like the docks, it is the haunt at nearly all times of numerous gulls, while the mud-banks along its lower reaches are not infrequently visited by Curlew, Dunlin, Redshank and other waders. Within fairly recent years the Avon Gorge cliffs, despite road, river and rail traffic below, have held eyries of Raven and Peregrine Falcon.

¹ The phrase *Bristol Channel and Severn Estuary* is given throughout the list as the *Channel and Estuary*, while such terms as the *coast* and *coastal areas* refer to the coastline from Brean Down to the mouth of the Avon and also to the Severn reaches from the Avon northwards to the New Grounds.

South Gloucestershire has as its chief physical features the southern portion of the Cotswold Hills and the Severn Vale. The southern Cotswolds, a country of arable fields, stone walls and wooded combes stretching from Dursley and Tetbury down to Bath, reach a maximum height (near Dursley) of rather more than 800 feet and are the home, locally, of Corn-Buntings, and the daily resort in autumn and winter of great numbers of Common Gulls. Lying parallel to the river from Avonmouth to the New Grounds at Slimbridge, the Severn Vale, with its highly fertile pastures, is fringed along its entire length by extensive mud-flats and saltings—the much favoured winter resorts and halting places on migration of wild geese, wild duck and waders. From late summer to early spring the mud-flats and shingle beds off Severn Beach are the feeding grounds of flocks of innumerable Turnstone, Dunlin and other shore-birds, while the famous goose-marsh at the New Grounds and the adjoining sand-banks may justly be described as the haunt of a greater wealth of bird-life than is to be found anywhere else in the district.

North Somerset is for the most part hilly or undulating, the main exception being in the extreme north-west of the county, where low-lying moors and marshy lands predominate, providing suitable nesting ground for Grasshopper-Warblers and other interesting passerines, and for such waders as Common Snipe and Redshank. Its most important feature is that of the Mendip Hills, which, with Black Down (1,068 feet) as their highest level, extend from the Frome area right across the southernmost part of the district. These hills are the resort of Wood-Larks, and until comparatively recent years were the home of a small population of Black Grouse. On the southern side of Mendip the R. Axe forms a convenient natural boundary from the coast-line almost to Wells. The coastal headlands of Brean Down, Worlebury and Sand Point are structurally continuations of Mendip and so is the island of Steep Holm—sixty-three acres over-all and five miles off Weston-super-Mare. Steep Holm, like Brean Down, is a breeding haunt of both Raven and Peregrine, and is the nesting resort of Cormorants and an immense colony of Herring- and Lesser Black-backed Gulls.

No remarks on the topography of the district in relation to its bird-life would be complete without some reference to the reservoirs at Barrow Gurney, Blagdon and Cheddar. These reservoirs, under frequent observation by kind permission of the Bristol Waterworks Company, and from which so many valuable records have been added to Somerset ornithology, are the favourite haunts of wild duck and grebes, the regular halting places of passage waders and other migrants, and the happy hunting grounds of the bird-watcher.

KEY TO LOCALITIES mentioned in the list. As the district covers a portion of two counties, the following key may be found useful. Localities shown in brackets are beyond the limits of the district. An asterisk denotes a place within the City of Bristol boundary.

South Gloucestershire : Alderley, Almondsbury, Alveston, [Arlingham], Ashley Down*, Aust, Avonmouth*, Badminton, Berkeley, Bitton, Charfield, Chipping Sodbury, Clifton*, Cold Ashton, Cotham*, Cowhill, Cumberland Basin*, Dodington Park, Doynton, Dursley, Dyham, Filton, [Framilode], Frampton Cotterell, [Frampton-on-Severn], Hallen, Hambrook, Hawkesbury Upton, Henbury*, Horfield*, Horton, Hotwells*, Kilcott, Kings Weston*, Littleton-on-Severn, Marshfield, [Moreton Valence], New Grounds, New Passage, North Nibley, Oldbury-on-Severn, Old Sodbury, Ozleworth, Patchway, Pucklechurch, Purton, Rangeworthy, Redland*, St. Philip's Marsh*, Sea Mills*, Severn Beach, Sharpness, Sheperdine, Shirehampton*, Slimbridge, Stapleton*, Stoke Bishop*, Stoke Gifford, Stone, [Stonehouse], Tetbury, Thornbury, Tortworth, Wotton-under-Edge and Yate.

North Somerset : Abbots Leigh, Ashton Park, Axbridge, Backwell, [Badgworth], Banwell, Barrow Gurney, Bath, Batheaston, Bathford, Bedminster*, Black Down, Blagdon, Bleadon, Brean Down, [Brent Knoll], Brockley, Buckland Dinham, Burnett, Burrington, Butcombe, Cadbury Camp, Chantry, Cheddar, Chew Magna, Chewton Keynsham, Chewton Mendip, Chew Valley, Claverton, Clevedon, Combe Down, Corston, Dolebury Warren, East Harptree, Emborough, Failand, Flax Bourton, Frome, Hinton Blewett, Hunstrete, Hutton, Kenn Moor, Keynsham, Langford, Lansdown, Laverton, Leigh Woods, Litton, Long Ashton, [Lympsham], Marksbury, [Marston Bigot], Mells, Nailsea, Norton St. Philip, Oakhill, Orchardleigh, Pensford, Portishead, Priddy, [Pylle], Queen Charlton, Radstock, Rowberrow, St. Catherine, Saltford, Sandford, Sand Point, Sidcot, South Stoke, [Stear Island], Steep Holm, Stratton-on-the-Fosse, Tickenham, Ubley, Uphill, Wells, Weston-super-Mare, Whitechurch, Winford, Winscombe, Woodspring, Wookey, Worlebury, Wraxall, Wrington and Yatton.

Denny Isle, usually regarded as belonging to the district for faunal purposes, is about two miles out from the Somerset coastline at Portishead—its nearest point on the mainland. The island is, however, a part of the parish of Magor in the county of Monmouth.

BIBLIOGRAPHICAL. In compiling the present list, full advantage has been taken of the results of many field observations carried

out by B.N.S. members since the formation of the second Ornithological Section in 1922. Such observations, of which some of the more important have appeared in *British Birds* magazine, are contained in the annual *Reports on Somerset Birds* and in *Proc. B.N.S.* These periodicals have been freely consulted throughout. For older records, full use has been made of the *Zoologist*; of the Rev. F. L. Blathwayt's able list of Somerset birds in the *Victoria History of the County of Somerset*; and of a large number of valuable MS. notes left by Mr. H. J. Charbonnier, a member of the B.N.S. from 1863 until his death in 1931 and for many years the leading authority on local ornithology.

A bibliography of works from which information has been chiefly drawn is given on page 268. The only references quoted in the list are those where records of some particular interest need additional qualification, or where recourse has been necessary to works dealing with bird-life in a part other than that under review.

ACKNOWLEDGMENTS. Sincere thanks are extended to all who have helped to make this list possible. Thanks are especially due to the Rev. F. L. Blathwayt, Dr. L. H. Matthews, Mr. A. C. Leach and Mr. W. R. Taylor for reading the original MS. and for helpful suggestions for its improvement; to Mr. H. C. Playne and Mr. B. W. Tucker for assisting with valuable information; to Dr. F. S. Wallis and Mr. W. E. Mayes for allowing frequent access to the collections in the City Museum, Bristol;² to Mr. Charles Green, curator of the Gloucester Museum, for details of several important records; and to Mr. Peter Scott and Mr. R. P. Gait for permission to reproduce here the photographs which show what may be considered the most interesting bird haunts in South Gloucestershire and North Somerset, respectively.

To the late Mr. H. Tetley, who, during his curatorship at the City Museum, 1927-1944, did more than anyone to further the cause of Bristol ornithology, gratitude must be expressed for constant help to the writer in matters regarding local bird-life. But for ill-health, and much additional work occasioned by war damage to the Museum collections, Mr. Tetley would, undoubtedly, have himself compiled a revised list of the birds of the district.

Finally, special acknowledgment is due to the Royal Society for a grant from the Scientific Publications Grant-in-aid towards the cost of publication of this paper.

ORDER AND NOMENCLATURE. Both are in accordance with

² Until April, 1945, the City Museum was a section of the Bristol Museum and Art Gallery.

that of a revised *Check-List of British Birds* (Witherby, 1941) compiled from *The Handbook of British Birds*, 1938-1941.

STATUS may be defined as—*Resident*: Present in the district throughout the year, and breeds. *Summer-resident*: Arrives in spring, breeds, and departs in autumn. *Winter-visitor*: Arrives in autumn or winter and departs in spring or earlier. *Passage-migrant*: Occurs only, or chiefly, on spring and (or) autumn migration.

Of the birds mentioned as summer-residents or as winter-visitors some are equally known as regular passage-migrants, while among the occasional and scarce visitors, etc., and those referred to as vagrants, are some which probably occur on migration more frequently than is supposed. As will be seen from the list, status has in a few instances been fully given. The plan adopted in general, however, is that of giving the status which seems most applicable.

II. SYSTEMATIC LIST

Raven *Corvus corax corax* L.

Resident. Local and chiefly confined to coastal areas. Breeds regularly on Brean Down and Steep Holm and, in some years, on Sand Point. Has bred periodically on the Cheddar Gorge cliffs, and a pair nested annually in the Avon Gorge, 1936-1940 (Glos. side except 1940). Formerly bred at Badminton and Dyrham. Two eggs from the latter place, dated 1849, were for some time in the City Museum, but were destroyed in 1940.³

Hooded Crow *Corvus cornix cornix* L.

Occasional winter-visitor. Latest records are of single birds at Bathford, 1943; Brean Down, 1946; and the New Grounds, 1946 and 1947.

Carrion-Crow *Corvus corone corone* L.

Resident. Common and widely distributed.

Rook *Corvus frugilegus frugilegus* L.

Resident. Common and widely distributed.

Jackdaw *Corvus monedula spermologus* Vieill.

Resident. Common and widely distributed.

Magpie *Pica pica pica* (L.)

Resident. Common and widely distributed.

³ Specimens and eggs referred to in the list as being for some time in the City Museum, but now destroyed, were lost during a severe air attack in November, 1940.

Thick-billed Nutcracker *Nucifraga caryocatactes caryocatactes* (L.)

Very rare vagrant. An example of this form, recently acquired by the City Museum, is stated to have been shot near Wrington, 1887. The bird, originally owned by Mr. C. E. Edwards, was for some years in the possession of Mr. S. Lewis of Cheddar. A Nutcracker (subsp. ?) was reported from Leigh Woods, April, 1925.

British Jay *Garrulus glandarius rufitergum* Hart.

Resident. Common in woodland areas.

Chough *Pyrhcorax pyrrhcorax pyrrhcorax* (L.)

Rare vagrant. A specimen in the City Museum was obtained at Cheddar, 1889. The only records for the last fifty years are of one over the cliff top on the Gloucestershire side of the Avon Gorge, July, 1900, and of single birds at Cheddar, October, 1927; Stratton-on-the-Fosse, January, 1930; and Sandford, winter, 1941-42.

Starling *Sturnus vulgaris vulgaris* L.

Resident. Common and widely distributed. Often in great abundance following winter immigration. Reported in recent years as roosting in very large numbers at Chipping Sodbury, Rangeworthy, Patchway, Failand, Long Ashton, Marksbury and elsewhere. Some thousands roosted in the spire of St. Mary Redcliff, Bristol, November-December, 1929.

Rose-coloured Starling *Pastor roseus* (L.)

Rare vagrant. Single birds were obtained at Axbridge, about 1859; St. Philips Marsh, 1862; and Laverton, 1869. What appears to be the only subsequent notice is that of one at Clevedon, September, 1895.

Golden Oriole *Oriolus oriolus oriolus* (L.)

Very rare vagrant. No authentic, dated record since that of a pair at South Stoke, June, 1893. Of two specimens mounted together in Mr. A. R. Robinson's collection at Backwell House, one is said to have been obtained at Wraxall sometime prior to 1900.

Hawfinch *Coccothraustes coccothraustes coccothraustes* (L.)

Resident. Local, but not uncommon in suitable habitats. Breeds in Leigh Woods and nests have been found on various occasions round Clifton and Bath. Has also been reported as breeding, or in the breeding season, from Chewton Mendip, Winscombe, Pensford, Backwell, Henbury, Tortworth and other widely separated localities.

Greenfinch *Chloris chloris chloris* (L.)

Resident. Common and widely distributed.

British Goldfinch *Carduelis carduelis britannica* (Hart.)

Resident. Common and widely distributed.

Siskin *Carduelis spinus* (L.)

Winter-visitor in varying numbers. Has frequently been reported and is evidently not uncommon wherever Alders occur.

Lesser Redpoll *Carduelis flammea cabaret* (P.L.S. Müll.)

Winter-visitor, occurring not uncommonly over much of the district. Also, perhaps, resident in very small numbers. No recent breeding information, but nests reported in former years from the Bath, Clifton, Flax Bourton, Clevedon, Winscombe and Frome areas.

Twite *Carduelis flavirostris* (L.)

Very scarce visitor. No record for the present century, but perhaps overlooked. The Rev. M. A. Mathew in his Revised List of the Birds of Somerset (1893) mentions having seen it in flocks during winter on sandhills near Weston-super-Mare. Single birds are stated to have occurred at Stapleton, *c.* 1893, and Avonmouth, *c.* 1896.

Linnet *Carduelis cannabina cannabina* (L.)

Resident. Common and widely distributed. Often abundant in autumn flocks.

British Bullfinch *Pyrrhula pyrrhula nesa* Math. & Ired.

Resident. Common and widely distributed.

Common Crossbill *Loxia curvirostra curvirostra* L.

Irregular winter-visitor, occurring periodically in considerable numbers and occasionally remaining to breed. Nesting reported in the present century from Kings Weston and Long Ashton, 1910; Winscombe, 1911; Ashton Park, 1930; and Failand, 1933.

Two-barred Crossbill *Loxia leucoptera bifasciata* (Brehm)

Very rare vagrant. The only record is of a male obtained at Keynsham, February, 1895.

British Chaffinch *Fringilla cælebs gengleri* Kleinsch.

Resident. Common and widely distributed. The continental form, *F. c. cælebs* L., probably occurs in winter, but no specimen has yet been reported.

Brambling *Fringilla montifringilla* L.

Winter-visitor. By no means common, but occurs in most areas. Usually met with in small numbers, often among Chaffinches, Greenfinches, etc., in fields and stackyards.

Corn-Bunting *Emberiza calandra* L.

Resident. Very local, being chiefly known from Marshfield, Hawkesbury Upton, and other parts of the Cotswolds. Has nested on Bleadon Hill and perhaps elsewhere in coastal areas.

Yellow Bunting *Emberiza citrinella citrinella* L.

Resident. Common and widely distributed.

Cirl Bunting *Emberiza cirlus cirlus* L.

Resident. Local, but not uncommon in some parts of the district. In recent years has frequently been found nesting in close proximity to the City,* and breeding has been reported from Cheddar, the Weston-super-Mare area and elsewhere.

Reed-Bunting *Emberiza schœniclus schœniclus* (L.)

Resident. Breeds locally, chiefly in lowland areas. Becomes more widespread in winter.

Snow-Bunting *Plectrophenax nivalis nivalis* (L.)

Irregular winter-visitor in small numbers. Has been noted fairly frequently, usually in coastal areas or on high ground. Latest records are of a party of six near Severn Beach, 1934, and of single birds at Barrow Gurney, 1936; Cheddar reservoir, 1938; and between the New Grounds and Frampton-on-Severn, 1942.

House-Sparrow *Passer domesticus domesticus* (L.)

Resident. Common and widely distributed.

Tree-Sparrow *Passer montanus montanus* (L.)

Resident, but appears to be chiefly a winter-visitor, often occurring in small parties with other finches. As a breeding bird it is evidently very local, though perhaps sometimes overlooked. Has been reported as nesting in the Chew Valley and at Stoke Gifford, Hallen, Sheperdine and Oldbury-on-Severn.

Wood-Lark *Lullula arborea arborea* (L.)

Resident. Local, and in breeding season chiefly confined to Backwell Hill and the Cheddar, Bleadon Hill and other Mendip areas. Has also nested at Clevedon, Failand, Worlebury and doubtless elsewhere. Tends to become more widespread in winter. Probably not infrequent, and perhaps breeds, in the southern Cotswolds, but the only report is of a party of four near North Nibley, September, 1947.

Sky-Lark *Alauda arvensis arvensis* L.

Resident. Common, widely distributed and often in great abundance following winter immigration.

Shore-Lark *Eremophila alpestris flava* (Gm.)

Very rare vagrant. No authentic record since that of one shot at Avonmouth, October, 1894.

Richard's Pipit *Anthus richardi richardi* Vieill.

Very rare vagrant. Inclusion here rests on sight records of two at Clevedon, May, 1893, and two on Brean Down, October, 1920; and on a fully authenticated report of one obtained at

* 'City' throughout the paper implies 'City and County of Bristol.'

Moreton Valence, just beyond the northern limits of the district, December, 1931.

Tawny Pipit *Anthus campestris campestris* (L.)

Very rare vagrant. One record—that of a bird seen at very close range at Cheddar reservoir in the first week of May, 1947.

Tree-Pipit *Anthus trivialis trivialis* (L.)

Summer-resident. Widely distributed, nesting commonly on rough hill sides, railway embankments and other suitable ground.

Meadow-Pipit *Anthus pratensis* (L.)

Resident. Local as a breeding species, though not uncommon in suitable places. Widely distributed and often abundant as winter-visitor and passage-migrant.

Water-Pipit *Anthus spinoletta spinoletta* (L.)

Very scarce visitor, but may occur more frequently than is supposed. The only reliable records are of single birds at Cheddar reservoir, January, 1939, and Hotwells, December, 1940.

Rock-Pipit *Anthus spinoletta petrosus* (Mont.)

Resident. Breeds in suitable places on the coast; also on Steep Holm, and nesting has been reported from Denny Isle. Very scarce inland, though occasionally noted at the reservoirs in autumn and winter.

Blue-headed Wagtail *Motacilla flava flava* L.

Very scarce visitor. Has occasionally been reported in spring or summer, and is stated to have nested near Wells, 1910, but the record lacks conclusive details. An adult female was shot at Lympsham, just beyond the southern limits of the district, in the last week of June, 1920, and a few days later two juveniles, possibly of this form, were obtained in the same locality.

Yellow Wagtail *Motacilla flava flavissima* (Blyth)

Summer-resident. Fairly well distributed, nesting chiefly on low-lying marshy ground and not uncommonly in cultivated fields. Often abundant on migration at the reservoirs and other suitable places.

Grey Wagtail *Motacilla cinerea cinerea* Tunst.

Resident. Breeds on most suitable streams. Widely distributed in winter.

Pied Wagtail *Motacilla alba yarrellii* Gould

Resident. Common and widely distributed.

White Wagtail *Motacilla alba alba* L.

Passage-migrant. Regular on the coast and at the reservoirs, and no doubt occurs in many parts of the district. Most records refer to spring passage—autumn birds being not easily separable in the field from Pied Wagtail.

British Tree-Creeper *Certhia familiaris britannica* Ridgw.

Resident. Common and widely distributed.

Wall-Creeper *Tichodroma muraria* (L.)

Very rare vagrant. One record—that of a bird seen at Mells, September, 1901.

British Nuthatch *Sitta europæa affinis* Blyth

Resident. Local, but fairly common in suitable woodland areas.

Continental Great Tit *Parus major major* L.

One record—that of a ringed bird found dead at Cotham, February, 1938, and sent to the City Museum. It had been ringed as a nestling at Bautzen, Saxony, about 700 miles east, May, 1937.

British Great Tit *Parus major newtoni* Pražak

Resident. Common and widely distributed.

British Blue Tit *Parus cæruleus obscurus* Pražak

Resident. Common and widely distributed.

British Coal-Tit *Parus ater britannicus* Sharpe & Dress.

Resident. Widely distributed, and common in coniferous woodlands, but generally less abundant than either Great or Blue Tits.

British Marsh-Tit *Parus palustris dresseri* Stejn.

Resident. Common and widely distributed, but much less abundant than either Great or Blue Tits.

British Willow-Tit *Parus atricapillus kleinschmidti* Hellm.

Status uncertain. Apparently scarce and very local. Not yet reported as nesting, though once noted in the breeding season between Bristol and Aust (? year). Three skins in the Liverpool Museum are of specimens obtained at Clevedon, August, 1900; September, 1903; and June, 1904. Reliable field observations within the last twenty years or so are of birds near Cadbury Camp, April, 1927, and at Stoke Gifford, September-October, 1940; February, 1941; and September, 1946. A highly probable record is that of one at Clifton, March, 1933.

Northern Willow-Tit *Parus atricapillus borealis* Selys-L.

A specimen in the British Museum (Nat. Hist.), the only one yet obtained in the British Isles, was shot at Tetbury, March, 1907.

British Long-tailed Tit *Ægithalos caudatus rosaceus* Mathews

Resident. Common and widely distributed. Numbers sometimes much reduced following severe winters.

Bearded Tit *Panurus biarmicus biarmicus* (L.)

Very rare vagrant. No record since that of two, male and female, killed near Wells, spring, 1861.

Great Grey Shrike *Lanius excubitor excubitor* L.

Occasional winter-visitor. About twelve reported occurrences. Records for past years include those of birds at Nailsea, 1871; Clevedon, 1883 and 1888; Dyrham, 1891; and Oakhill, 1901. Latest reports are from Wraxall, November, 1920, and East Harptree, December, 1928.

Woodchat Shrike *Lanius senator senator* L.

Very rare vagrant. Has been reported, but not for many years past. What seems to be the only fully substantiated record is that of one killed in North Somerset (near Bristol) sometime prior to 1887 (*cf.* Smith, *Birds of Wilts.*, p. 123).

Red-backed Shrike *Lanius collurio collurio* L.

Summer-resident. Breeds more or less regularly in suitable areas, but is decidedly local and has, apparently, decreased in recent years.

Waxwing *Bombycilla garrulus garrulus* (L.)

Occasional winter-visitor. Has been recorded from various localities including Long Ashton, Butcombe, Winscombe, Wookey, Frome and Wells. Latest records refer to the 1946-47 invasion, when small parties or single birds reported from Henleaze, Redland, Stoke Bishop and other Bristol suburbs, also from the Bath and Clevedon areas.

Spotted Flycatcher *Muscicapa striata striata* (Pall.)

Summer-resident. Common and widely distributed.

Pied Flycatcher *Muscicapa hypoleuca hypoleuca* (Pall.)

Passage-migrant. Uncommon, but has frequently been reported—usually in spring, when it doubtless occurs regularly in small numbers. Scarce on autumn passage, but has been noted at Tortworth, 1936, and at Stoke Gifford, 1934 and 1944. Recorded as having nested at Henbury, 1885, and close to the City boundary, 1899. A clutch of four eggs, for some time in the City Museum but now destroyed, was taken at Sheperdine, May, 1905.

British Goldcrest *Regulus regulus anglorum* Hart.

Resident, and widely distributed. As a nesting bird found chiefly in coniferous woods and gardens, but in winter occurs fairly commonly in purely deciduous growth.

Firecrest *Regulus ignicapillus ignicapillus* (Temm.)

Rare vagrant. The only records are of a bird seen at Clifton, February, 1913, and of one found dead at the same place, autumn, 1914, and sent to the City Museum.

Chiffchaff *Phylloscopus collybita collybita* (Vieill.)

Summer-resident. Common and widely distributed. Occasionally reported in winter.

Scandinavian Chiffchaff *Phylloscopus collybita abietinus* (Nilss.)

One record—that of a specimen obtained at Lympsham, just beyond the southern limits of the district, early April, 1925, and exhibited at a meeting of the British Ornithologists' Club, February, 1926.

Willow-Warbler *Phylloscopus trochilus trochilus* (L.)

Summer-resident. Common and widely distributed.

Northern Willow-Warbler *Phylloscopus trochilus acredula* (L.)

Two definite examples obtained. A mounted specimen in the City Museum was killed at Cowhill, May, 1913, while the skin of one shot at Lympsham, just beyond the southern limits of the district, April, 1926, was for sometime in the City Museum, but was ultimately destroyed. An unusually pale bird shot near Stoke Gifford, April, 1932, and too damaged for preservation, was examined in the flesh by the late Mr. H. F. Witherby, who considered it to be almost certainly an example of this form.

Wood-Warbler *Phylloscopus sibilatrix* (Bechst.)

Summer-resident locally. Uncommon, but nests more or less regularly in most suitable woodlands.

Grasshopper-Warbler *Locustella naevia naevia* (Bodd.)

Summer-resident. Uncommon and local, though well known in suitable habitats. Occasionally noted on migration in areas where it does not breed.

Reed-Warbler *Acrocephalus scirpaceus scirpaceus* (Herm.)

Summer-resident locally. Nests in most suitable reed-beds.

Marsh-Warbler *Acrocephalus palustris* (Bechst.)

Formerly a regular, though very local, summer-resident, but of late years has been extremely scarce or entirely absent. Mr. H. C. Playne writes (*in litt.*) that nests recorded annually, 1894-1898, from the Bath area were in an osier bed at Saltford; also that breeding was proved at Avonmouth and Portishead, 1898. Dr. L. H. Matthews reports (*in litt.*) that the Saltford site, now deserted, was still occupied in 1919. A clutch of three eggs for sometime in the City Museum, but now destroyed, was obtained in a bean crop at Patchway, June, 1909. The only recent record is of a bird, evidently on passage, seen and heard by the writer at Stoke Gifford, June, 1935. The nearest present day breeding haunts are in the Severn area, slightly beyond the northern limits of the district.

Sedge-Warbler *Acrocephalus schænobæus* (L.)

Summer-resident. Local, but nests fairly commonly on suitable ground—chiefly in lowland areas. Occurs widely on migration.

Garden-Warbler *Sylvia borin* (Bodd.)

Summer-resident. Occurs in similar haunts to Blackcap, but is, perhaps, less abundant and in some years tends to be more local.

Blackcap *Sylvia atricapilla atricapilla* (L.)

Summer-resident. Common and well distributed in woodland areas. Sometimes reported in winter.

Whitethroat *Sylvia communis communis* Lath.

Summer-resident. Common, widely distributed and may be found in almost all types of country.

Lesser Whitethroat *Sylvia curruca curruca* (L.)

Summer-resident. Not so abundant or as widely distributed as common Whitethroat, but fairly plentiful—particularly where thick hedgerows occur.

White's Thrush *Turdus dauma aureus* Hol.

Very rare vagrant. One record—that of a specimen killed at Langford, close to the northern slopes of Mendip, January, 1871.

Fieldfare *Turdus pilaris* L.

Winter-visitor. Common and widely distributed.

Mistle-Thrush *Turdus viscivorus viscivorus* L.

Resident. Common and widely distributed.

British Song-Thrush *Turdus ericetorum ericetorum* Turton

Resident. Common and widely distributed. The continental form, *T. e. philomelus* Brehm, probably occurs in winter, but no specimen has yet been reported.

Redwing *Turdus musicus musicus* L.

Winter-visitor. Common and widely distributed.

Iceland Redwing *Turdus musicus coburni* Sharpe

One record—that of a bird, now in the Liverpool Museum, obtained at Clevedon, November, 1899.

Ring-Ouzel *Turdus torquatus torquatus* L.

Passage-migrant in small numbers. Recorded fairly regularly in both spring and autumn and has once or twice been found breeding. Occurs chiefly on high ground, though not infrequently in lowland areas. Reported as having nested at Almondsbury, 1899, but the record is without any corroborative details. A nest with four eggs, now in the City Museum, was taken by Mr. S. Lewis near Priddy, on the Mendip Hills, April, 1910.

Blackbird *Turdus merula merula* L.

Resident. Common and widely distributed.

Wheatear *Ænanthe ænanthe ænanthe* (L.)

Passage-migrant. Also summer-resident very locally. Has been reported as a nesting bird from several Mendip areas ;

from the hills near Bath; and from Brean Down; but there seems to be no definite evidence of regular breeding. Used to nest, but not for many years past, on Durdham Down, Clifton (Playne, 1898), and recorded long ago as having nested near Alveston (Knapp, 1829). Occurs widely on migration, spring arrivals appearing three or four weeks earlier than those of the larger Greenland form. A wheatear, presumably of this race, was seen at Bedminster, early February, 1899.

Greenland Wheatear *Enanthe enanthe leucorrhoea* (Gm.)

Passage-migrant, occurring regularly in both coastal and inland areas. Birds on spring passage, especially brightly plumaged males, are often not difficult to recognise, but autumn migrants are rarely separable in the field from common Wheatear.

Whinchat *Saxicola rubetra* (L.)

Summer-resident. Local, but nests fairly commonly on rough pastures, along railway embankments and in other suitable habitats. Occurs widely on migration.

British Stonechat *Saxicola torquata hibernans* (Hart.)

Resident. As a breeding bird frequents various types of country, but is decidedly local. Nests regularly in some coastal areas, also on Mendip and other suitable hill ground. Becomes more widespread in winter.

Redstart *Phœnicurus phœnicurus phœnicurus* (L.)

Summer-resident. Local, though fairly common as a nesting bird in suitable woodland habitats or where pollard willows occur. Widespread on migration.

Black Redstart *Phœnicurus ochrurus gibraltariensis* (Gm.)

Winter-visitor in very small numbers. Formerly recorded only at intervals, but observations over the last ten years show that it now occurs annually. Most records from coastal areas, including Severn Beach, Sea Mills, Clevedon and Brean Down. Has also been seen near Bath, and at Blagdon (several occasions), Cheddar, Banwell, Stratton-on-the-Fosse and elsewhere. Not yet reported as remaining to nest, but single males present, and singing, in the heart of the City, June, 1945, and July, 1947.

Nightingale *Luscinia megarhyncha megarhyncha* Brehm

Summer-resident. Not uncommon in suitably wooded habitats. Widely distributed in lowland areas, but scarce on high ground.

British Robin *Erithacus rubecula melophilus* Hart.

Resident. Common and widely distributed.

Alpine Accentor *Prunella collaris collaris* (Scop.)

Very rare vagrant. One old record—that of a bird obtained in the Deanery garden at Wells, 1833.

British Hedge-Sparrow *Prunella modularis occidentalis* (Hart.)

Resident. Common and widely distributed.

Wren *Troglodytes troglodytes troglodytes* (L.)

Resident. Common and widely distributed.

British Dipper *Cinclus cinclus gularis* (Lath.)

Resident locally. Nests on suitable streams, chiefly in Cotswold and Mendip areas. Breeding, or breeding season, records within fairly recent years from various places including Stone, Alderley, Ozleworth, Hambrook, Corston, Pensford, Blagdon, Litton, Mells and Winscombe. Has been seen well within the City boundary—on the R. Frome at Stapleton (frequently) and on the R. Trym, near Henbury (once, 1947).

Swallow *Hirundo rustica rustica* L.

Summer-resident. Common and widely distributed.

House-Martin *Delichon urbica urbica* (L.)

Summer-resident. Common and widely distributed.

Sand-Martin *Riparia riparia riparia* (L.)

Summer-resident locally, but chiefly a passage-migrant, often occurring in considerable numbers at the reservoirs and similar places. In the absence of normal breeding sites, small colonies nest in drainage holes of retaining walls and embankments. Such colonies have for long been known within the City boundary and have been reported from Keynsham, Long Ashton, Backwell, Radstock, Mells and elsewhere.

Alpine Swift *Apus melba melba* (L.)

Very rare vagrant. The only record is of a specimen, now in the Somerset County Museum, Taunton, obtained near Axbridge, 1851 or earlier.

Swift *Apus apus apus* (L.)

Summer-resident. Common and widely distributed.

Nightjar *Caprimulgus europæus europæus* L.

Summer-resident. Local, but not uncommon in suitable areas. Breeds, or has bred, at Long Ashton, Leigh Woods, Backwell, Pensford, Chewton Mendip, Cadbury Camp, Clevedon, Weston-super-Mare and elsewhere.

Bee-eater *Merops apiaster* L.

Very rare vagrant. The only authentic record is of four obtained from a small flock which visited Stapleton, May, 1866. Of these, three are mounted in the City Museum. A detailed account of this highly interesting event was published in the *Proceedings* for January, 1868.

Hoopoe *Upupa epops epops* L.

Occasional visitor, chiefly on spring and autumn passage.

The first dated records appear to be those of birds at Bath, 1850 ; Weston-super-Mare, 1858 and 1860 ; Priddy, 1859 ; Keynsham, 1862 ; Redland, about 1870 ; and Charfield, 1878. Subsequently reported from New Passage, 1889 ; and Bleadon and Flax Bourton, 1895 ; while there are at least ten notices for the years 1907-1944. Latest report is of one at Winford, April, 1947. A pair nested, unsuccessfully, at Badgworth, about a mile beyond the southern limits of the district, 1931 (*Brit. Birds*, XXV, p. 164).

Kingfisher *Alcedo atthis ispida* L.

Resident. Widely distributed and not uncommon on suitable streams. Fairly frequent at the reservoirs and sometimes reported from the coast.

Green Woodpecker *Picus viridis pluvius* Hart.

Resident. Common and widely distributed.

British Great Spotted Woodpecker *Dryobates major anglicus* (Hart.)

Resident. Less abundant than the previous bird but fairly common in well-timbered country.

British Lesser Spotted Woodpecker *Dryobates minor comminutus* (Hart.)

Resident. Widely distributed and not uncommon in most areas. Less frequently reported than Great Spotted Woodpecker but, owing to its small size, is perhaps often overlooked.

Wryneck *Jynx torquilla torquilla* L.

Formerly known as a not uncommon summer-resident, but has greatly decreased since the end of the last century, and now appears to be no more than a scarce visitor on migration. Mr. H. C. Playne reports (*in litt.*) that the bird used often to be seen on the wooded slopes of Cadbury Camp and that he located a nest at Failand in 1889. Mr. H. J. Charbonnier mentions nesting at Keynsham, *c.* 1895, but there seems to be no subsequent authentic breeding record. Wrynecks were noted fairly frequently in the Bath area until 1908 or later, while for more recent years there are spring passage records from various localities, including Backwell, Chewton Mendip, Blagdon and Winscombe. Single examples reported from Dursley, July, 1932, and Whitchurch, August, 1947.

Cuckoo *Cuculus canorus canorus* L.

Summer-resident. Common and widely distributed.

Yellow-billed Cuckoo *Coccyzus americanus americanus* (L.)

No record from within the district, but a female was shot at Pylle, six miles S.E. of Wells, October, 1901, and was later exhibited at a meeting of the British Ornithologists' Club.

Snowy Owl *Nyctea scandiaca* (L.)

Very rare vagrant. The only recorded occurrence is of a bird taken with a damaged wing in Cheddar Gorge, September, 1933.

American Hawk-Owl *Surnia ulula caparoch* (Müll.)

Very rare vagrant. One old record—that of a bird shot in the Yatton area, August, 1847. Although usually referred to as having been obtained near Yatton, it seems from the original account (*Zool.*, 1851, p. 3029) that the bird was actually killed on Backwell Hill, about four miles distant.

Little Owl *Athene noctua vidalii* A. E. Brehm

Formerly known only from single specimens obtained at Bath-easton, 1834, and Clevedon, 1878, but now a common resident and widely distributed. Following the rapid spread from the centres of introduction (Northants. and Kent), colonisation of the district began early in the present century—the bird being first reported, from Tickenham, 1907. Breeding was first proved, at Pensford, 1910. A Little Owl killed at Winscombe, 1859, and now in the Somerset County Museum, Taunton, was until recently regarded in error as a Tengmalm's Owl, *Ægolius f. funereus* (L.) (*Brit. Birds*, XXXV, p. 18).

Long-eared Owl *Asio otus otus* (L.)

Apparently no more than a scarce and very local resident. Perhaps also an occasional winter-visitor or passage-migrant. Has been recorded as a breeding bird from Stratton-on-the-Fosse and has doubtless bred elsewhere, but no information for nearly twenty years. One, preserved at Stoke Gifford, was shot at Stapleton, *c.* 1890, and another was killed in Ashton Park, December, 1895. Two were shot at Frampton Cotterell, 1897, while a specimen in the City Museum was obtained at Bathford sometime prior to 1906. Past records from other localities include those of birds at Portishead, Chewton Mendip, Mells and Radstock.

Short-eared Owl *Asio flammeus flammeus* (Pontopp.)

Winter-visitor. Uncommon, but probably occurs in most years. Recorded from various coastal areas, including Avonmouth, Clevedon and Brean Down. Has also been noted on Mendip and in other inland localities.

British Tawny Owl *Strix aluco sylvatica* Shaw

Resident. Common and widely distributed.

White-breasted Barn-Owl *Tyto alba alba* (Scop.)

Resident. Widely distributed, but less common than Tawny Owl.

Peregrine Falcon *Falco peregrinus peregrinus* Tunst.

Resident. Local and chiefly confined to coastal areas, but fairly frequent inland outside the nesting season. Breeds on Brean Down and Steep Holm, and occasionally on the Cheddar Cliffs. A pair bred annually in the Avon Gorge, 1928-1934 (Glos. side except 1933). Two eggs, for some time in the City Museum but now destroyed, were taken from an eyrie on Denny Isle, April, 1927.

Hobby *Falco subbuteo subbuteo* L.

Summer-resident. Uncommon, though perhaps often overlooked. In recent years has frequently been noted at Stoke Gifford and Blagdon, and has also been recorded from Dyrham, Severn Beach and Cheddar. Reported in former years as being seen or obtained at Tortworth, Burnett, Wrington, Frome, Wells and elsewhere. Probably breeds in several localities, but the only definite record is of a pair nesting, successfully, five miles north of Berkeley, 1946.

Merlin *Falco columbarius asalon* Tunst.

Winter-visitor. Uncommon, but probably occurs in most years. Chiefly met with in coastal areas. Recent records are of one at Stoke Gifford, October, 1945; two (evidently on passage) at Clevedon, late April, 1946; and single birds at the New Grounds, March and November-December, 1947.

Kestrel *Falco tinnunculus tinnunculus* L.

Resident. Common and widely distributed.

Rough-legged Buzzard *Buteo lagopus lagopus* (Pontopp.)

Very scarce visitor. What appear to be the only reliable records are those of a bird seen at Clevedon, November, 1906, and of one found dead at the same place, October, 1910.

Common Buzzard *Buteo buteo buteo* (L.)

Resident. Although uncommon and local, has much increased during the present century. Now occurs over a considerable part of N. Somerset and breeds, perhaps more frequently than is supposed, in the Mendip area. Has recently been reported from various localities in S. Gloucestershire, including Clifton, Henbury, Stoke Gifford, Dyrham, Rangeworthy and Wotton-under-Edge.

Marsh-Harrier *Circus æruginosus æruginosus* (L.)

Evidently no more now than a very scarce visitor. The only records for the present century are of a bird, most probably a Marsh-Harrier, at Combe Down, July-August, 1931, and of an immature specimen seen on various dates at Frampton-on-Severn, about a mile beyond the northern limits of the district, October-November, 1947.

Montagu's Harrier *Circus pygargus* (L.)

Status as for Marsh-Harrier. No recent, authentic record.⁴ What appear to be the only notices for former years are of one trapped on Brean Down, June, 1864, and of one at Tickenham, 1891.

Hen-Harrier *Circus cyaneus cyaneus* (L.)

Very occasional winter-visitor, but perhaps more frequent than is supposed. Reliably reported from the Mendip area twice in recent years—a male at Burrington Combe, December, 1934, and a female at Rowberrow, February, 1945.

Sparrow-Hawk *Accipiter nisus nisus* (L.)

Resident. Common and widely distributed.

Kite *Milvus milvus milvus* (L.)

Long extinct as a resident and now a very rare vagrant. Among various reports during the latter half of the last century are those of one shot at Cleeve Wood, near Yatton, 1888, and another trapped at Chewton Keynsham, August, 1890. Latest record is of one noted on five occasions in N. Somerset (locality not published), December, 1913 (*Brit. Birds*, VII, p. 299). The observer, Mr. A. F. R. Wollaston, in correspondence with the Rev. F. L. Blathwayt, reported that the bird was seen "on the hilly country between Flax Bourton and Wrington."

White-tailed Eagle *Haliaeetus albicilla* (L.)

Very scarce visitor. One was killed on Mendip as long ago as 1811. Has since been obtained at Weston-super-Mare, February, 1861, and Dodington Park, December, 1871. What were probably birds of this species were reported from Steep Holm, March, 1919, and Weston-super-Mare, December, 1927.

Honey-Buzzard *Pernis apivorus apivorus* (L.)

Very scarce visitor in spring or summer. One is stated to have been shot near Wells, April, 1875. Mr. Charles Green reports (*in litt.*) that two killed in the Tortworth area, *c.* 1879 (*cf.* Mellersh, *Birds of Glos.*, 1902, p. 15) were for some time in the Gloucester Museum, but owing, presumably, to their unsatisfactory state of preservation, were ultimately destroyed. A record of one seen at Blagdon reservoir, 1912, lacks essential details. A female in the City Museum was obtained in Ashton Park, June, 1917, or earlier.

Osprey *Pandion haliaetus haliaetus* (L.)

Occasional visitor in spring or autumn. One was shot at Tortworth Court Lake sometime prior to 1860, and another was taken alive in the Channel, 1887. Records in recent years are

⁴ A female harrier, probably Montagu's, was seen on marshy ground near Clevedon, May, 1947.

of birds at Cheddar reservoir, November, 1938, and at Blagdon reservoir, September, 1914 and 1938, and May, 1936 and 1946.

Spoonbill *Platalea leucorodia leucorodia* L.

Very scarce visitor. Single birds twice reported from the Severn—one, now in the City Museum, being shot at Framilode, two miles beyond the northern limits of the district, February, 1920, and another seen off the New Grounds, September, 1945. One was reported from the R. Axe, May, 1946.

Glossy Ibis *Plegadis falcinellus falcinellus* (L.)

Not recorded from within the district, but one was shot near Brent Knoll, about four miles south of the R. Axe, November, 1920.

Common Heron *Ardea cinerea cinerea* L.

Resident. Frequent on the coast and at inland waters, and not uncommon in most lowland areas. Continues to occupy the well known breeding sites at Brockley and Banwell, and since 1935 a few pairs have bred annually at Uphill, Weston-super-Mare. Used to nest in very small numbers at Melcombe Wood, Mells, but not since 1923. Small colony re-established in Warleigh Woods, Claverton, 1944, after lapse of about twenty years. Odd pairs recorded as nesting near Winscombe, 1919; at Uphill, 1923; and at the New Grounds, 1946. Breeding sites still occupied or in fairly recent use, but just outside the district, reported from Marston Bigot, near Frome, and from Parks Farm, near Slimbridge.

Squacco Heron *Ardeola ralloides* (Scop.)

Very rare vagrant. The only notice is of one obtained at the New Grounds, August, 1867, and presented—as a mounted specimen—by Lord Ducie, to the Gloucester Museum, 1911. Details supplied by Mr. Charles Green from the Museum records show, contrary to the statement by Mellersh (*Birds of Glos.*, 1902, p. 104), that the bird was not shot by Lord Ducie himself, but that he was present at a shoot when a keeper or someone killed it and gave it to him.

Little Bittern *Ixobrychus minutus minutus* (L.)

Rare vagrant. One is stated to have been shot near Bath as long ago as 1789, and another was killed at Bleadon, October, 1864. More recent records are of a bird, now in the Exeter Museum, caught near Banwell, May, 1912, and of one seen at Ubley, winter, 1916-17.

Bittern *Botaurus stellaris stellaris* (L.)

Scarce winter-visitor, though not infrequent during severe frosts. Among old records are those of birds at Hambrook, Ashley Down, Portishead, Clevedon and Weston-super-Mare. Reported in recent years from various localities, including

Bleadon, 1925 ; Emborough, 1927-28 and 1929 ; Hallen, 1931 ; Cheddar Moor, several in 1940 ; Nailsea, 1933, 1945 and 1947 ; and Blagdon reservoir, 1947.

Whooper Swan *Cygnus cygnus* (L.)

Very occasional winter-visitor, and evidently less frequent than Bewick's Swan. Recorded as having occurred near Axbridge, a party of four, 1892, and at Avonmouth, 1901. The only subsequent notices are of two at the New Grounds, December, 1946, and of parties of three at Cheddar reservoir, January, 1946, and four at the same place, November-December, 1947.

Bewick's Swan *Cygnus bewickii bewickii* Yarr.

Irregular winter-visitor. The first dated record is of a bird, now in the City Museum, shot from a flock of thirteen on the coast near Clevedon, December, 1879. Reported in recent years from the New Grounds area—a flock of nineteen, February, 1939, and from Blagdon and Cheddar reservoirs, up to six in number, on half a dozen occasions, 1937-1947.

Mute Swan *Cygnus olor* (Gm.)

Resident in a semi-feral state, though many pairs are entirely wild. Frequent at the docks and reservoirs and not uncommon wherever there are suitable waters.

Grey Lag-Goose *Anser anser anser* (L.)

Scarce winter-visitor. Very few authentic records, though, perhaps, more frequent than is supposed. One is stated to have been shot near Brean Down, November, 1920, and one was obtained at Frampton-on-Severn, just beyond the northern limits of the district, December, 1930. Reliable sight records in recent years are of single birds at the New Grounds, October, 1933 and 1939, and December, 1945 and 1946.

White-fronted Goose *Anser albifrons albifrons* (Scop.)

Winter-visitor. Frequently reported from both coastal and inland areas, but is chiefly known from the New Grounds where from 2,000 to 4,000 or more winter annually. A party of nine White-fronts (three adults and six immatures) in unusually dark plumage and with bright yellow bills, seen in close company with a flock of about 160 normal birds at the New Grounds, November, 1945, were most probably of the reputed race from breeding grounds in W. Greenland.

Lesser White-fronted Goose *Anser erythropus* (L.)

Status uncertain, but in view of recent observations may occur not infrequently in very small numbers among common White-fronts wintering on the Severn, and is, perhaps, not so scarce in the British Isles as hitherto supposed. Two adults visited the New Grounds, December, 1945, one (or both) remaining until

the following February. Three adults were identified at the same place in the winter of 1946-47. Should be carefully looked for among any large flock of typical *albifrons*.

Bean-Goose *Anser fabalis fabalis* (Lath.)

Scarce winter-visitor. Most records in former years doubtful owing to confusion with Pink-foot. The following recent observations at the New Grounds suggest that it may occur annually in very small numbers among White-fronted Geese on the Severn—two, February, 1940; single birds, February, 1945, and winter, 1945-46; at least six, winter, 1946-47; and two, December, 1947. Two unusually large specimens (race?) were shot on the Severn between Berkeley and Arlingham, *c.* 1912 (*Ibis*, 1940, p. 136). A bird, reported as a Bean-Goose, was killed at Lymphsham, just beyond the southern limits of the district, November, 1921.

Pink-footed Goose *Anser fabalis brachyrhynchus* Baillon

Winter-visitor. Occurs regularly, second half of September to November or later, at the New Grounds, where from 500 to 1,000 or more not infrequently noted, 1933-1939. Much reduced in subsequent years—numbers usually varying between 70 and 120. Records from other areas are of one shot near Brean Down, January, 1929, and of several obtained from small parties which visited Horfield, and the Severn bank near Avonmouth, during the severe frost of January, 1940.

Snow-Goose *Anser hyperboreus hyperboreus* Pall.

Very rare vagrant. The following, either of this or of the larger form, *A. h. atlanticus* (Kennard), have been reliably reported from the New Grounds—eight, adults and immatures, October, 1901, and three adults, November, 1906. A specimen of *A. h. hyperboreus* was obtained from three adults which visited the same place, winter, 1916-17, and is now preserved at Berkeley Castle.

Red-breasted Goose *Branta ruficollis* (Pall.)

Very rare vagrant. The only records are of an adult, now in the City Museum, shot at Oldbury-on-Severn, November, 1909, and an immature bird seen among White-fronts at the New Grounds, February, 1941.

Barnacle-Goose *Branta leucopsis* (Bechst.)

Winter-visitor. Scarce, but occurs regularly in very small numbers, usually not more than three or four, among grey geese at the New Grounds. What seems to be the only record from elsewhere is that of a party of seven in Ladye Bay, Clevedon, January, 1945.

Dark-breasted Brent Goose *Branta bernicla bernicla* (L.)

Winter-visitor. Recent records suggest that this form occurs regularly in very small numbers. All of a party of thirteen near Avonmouth, February, 1937, were dark-breasted, while odd



WILD GEESE AT THE NEW GROUNDS, SLIMBRIDGE, GLOUCESTERSHIRE



birds, sometimes two or three, at the New Grounds on various occasions, 1934-1947, were, with two exceptions, also of this form (*cf.* below).

Pale-breasted Brent Goose *Branta bernicla hrota* (Müll.)

Scarce winter-visitor, and evidently much less frequent than the dark-breasted bird. The only definite records are of single examples at the New Grounds, February-March, 1941, and September-November, 1946.

Canada Goose *Branta canadensis canadensis* (L.)

Occasional winter-visitor. Eight were shot near Bleadon during severe weather, 1916. A party of nine was reported from Blagdon reservoir, 1935, and a similar number was noted in the Brean Down area, March, 1940. One was present among grey geese at the New Grounds, December, 1939—March, 1940, and February, 1941. A party of ten visited the same place, March, 1947.

Sheld-Duck *Tadorna tadorna* (L.)

Resident. Common and well known as a breeding species on Brean Down; at Woodspring; along the Severn reaches; and elsewhere in coastal areas. Also breeds on Steep Holm, and nesting has been reported from Denny Isle. Very large congregations sometimes noted off Brean Down in autumn. Occasional on inland waters in winter.

Mallard *Anas platyrhynchos platyrhynchos* L.

Resident. Also an abundant winter-visitor. As a breeding bird, is common and widely distributed. Often numerous on the coast, at the reservoirs, and in other suitable haunts.

Gadwall *Anas strepera* L.

Scarce winter-visitor. Little known formerly, but now reported at intervals in very small numbers. Has been noted at the reservoirs on at least eight occasions in the last decade, the latest records being those of three at Blagdon, April, 1942, and a pair, April, 1946; and of single males at Cheddar, January, 1946 and 1947, and December, 1947.

Teal *Anas crecca crecca* L.

Chiefly an abundant winter-visitor to the coast and inland waters, but a few remain in summer. Has bred at Blagdon reservoir; Priddy Mineries; Chantry Pond, near Frome; and probably elsewhere. Together with Mallard was formerly taken in large numbers at the Berkeley decoys.

Garganey *Anas querquedula* L.

Passage-migrant in small numbers, occurring chiefly in spring. Sometimes remains in summer. Breeding recorded from Blagdon reservoir, 1910 and 1947, but the notices lack conclusive details. In the last decade has been reported from Cheddar reservoir

(once); Kenn Moor (twice); Blagdon (various occasions); and from the New Grounds, where a pair was taken in a decoy pipe, April, 1947, and an immature bird caught in the same way, August, 1947. Only two or three autumn records.

Wigeon *Anas penelope* L.

Winter-visitor, occurring commonly on the coast and on suitable inland waters.

American Wigeon *Anas americana* Gm.

Very rare vagrant. The only records refer to 1946, and are of a male among common Wigeon at Blagdon reservoir in late January and early February, and a male, no doubt the same, noted at Cheddar reservoir in the first and third weeks of March and again in late December. What was almost certainly a second bird, also a male, was seen on the Severn, off the New Grounds, early in March. The possibility that these observations relate to a bird, or birds, which had escaped from captivity cannot be entirely ruled out.

Pintail *Anas acuta acuta* L.

Winter-visitor. Regular, in small numbers, on the coast and at suitable inland waters.

Shoveler *Spatula clypeata* (L.)

Winter-visitor to suitable inland waters—usually in moderate, but sometimes in considerable, numbers. Small parties often occur in coastal areas. A few remain in summer, and nesting has been reported on various occasions from Blagdon reservoir. Has probably bred on Kenn Moor and perhaps elsewhere.

Common Pochard *Aythya ferina* (L.)

Winter-visitor. Common and often abundant on suitable inland waters. Occasional in small parties on the coast. A few sometimes remain in summer, and nesting was reported from Blagdon reservoir, 1931 and 1933, but the records lack conclusive details. Breeding at the same reservoir was proved when a nest and eggs, now in the City Museum, were taken, early July, 1936.

Ferruginous Duck *Aythya nyroca nyroca* (Güld.)

Very rare vagrant. The only definite records are of an immature bird obtained at Blagdon reservoir, November, 1922, and of a female shot on the R. Axe, near Lympham, February, 1929. What may have been a Ferruginous Duck was seen at Barrow Gurney reservoirs, November, 1923.

Tufted Duck *Aythya fuligula* (L.)

Known chiefly as a common winter-visitor to inland waters. A few remain in summer, and breeding has been reliably recorded from Blagdon reservoir on various occasions since 1906. A pair nested, unsuccessfully, at Litton reservoir, 1932. A few visited

the docks at Cumberland Basin during the severe frosts of January, 1940, and February, 1947. Exceptional on the coast, though sometimes reported from the New Grounds.

Scaup-Duck *Aythya marila marila* (L.)

Winter-visitor, chiefly to the coast. Used to occur in gatherings of several hundred at Weston-super-Mare, but now much scarcer. No large number reported since that of 150 seen off Brean Down, February, 1930. The only recent records from the Severn reaches above Avonmouth are of single birds off the New Grounds, October, 1937, and off Severn Beach, April, 1938. Fairly frequent at the reservoirs, but usually not more than a bird or two.

Goldeneye *Bucephala clangula clangula* (L.)

Winter-visitor, occurring regularly in small numbers at the reservoirs. Scarce elsewhere, but recently reported from Em-borough Pond (once), and the New Grounds (twice).

Long-tailed Duck *Clangula hyemalis* (L.)

Formerly very scarce and known only from a specimen shot on the coast at Weston-super-Mare, December, 1890. Now a winter-visitor at irregular intervals, and has occurred at the reservoirs at least ten times since 1925. Noted at Blagdon, either singly or in twos, on six occasions, while one was reported from Litton reservoir, November, 1928. From Cheddar there are reports of a party of five, January, 1942, and of single birds, March and May, 1942, and May, 1946.

Common Eider *Somateria mollissima mollissima* (L.)

Rare vagrant. The only recorded occurrences are of a female shot at Barrow Gurney reservoirs, winter, 1888, and a male on the Severn, below Aust Cliff, February, 1902.

Common Scoter *Melanitta nigra nigra* (L.)

Winter-visitor. Uncommon, but has been reported occasionally from Weston-super-Mare and is, perhaps, more frequent in the Channel and Estuary than records suggest. One was seen on the Avon, at Sea Mills, April, 1937, while from the New Grounds there are records of two, October, 1946, and a party of five, October, 1947. Occurs in most years at the reservoirs, usually singly, but party of five at Barrow Gurney, September, 1945. A male was seen off New Passage, July, 1937.

Velvet-Scoter *Melanitta fusca fusca* (L.)

Very occasional winter-visitor. The only authentic records are of single adult males at New Passage, March, 1892, and off Brean Down, January, 1925; of two, male and female, at Barrow Gurney reservoirs, January, 1926; and of single immature birds at Blagdon reservoir, January-March, 1939, and Barrow Gurney, March-April, 1942.

Goosander *Mergus merganser merganser* L.

Winter-visitor. Observations in recent years show that it occurs annually. Recorded in the past from Weston-super-Mare, and single birds were obtained at Wraxall, 1870; Hinton Blewett, 1880; and Bitton, 1891. One was shot at Bleadon, 1928, and a few were reported from the R. Axe, 1929. Has frequently been noted at the reservoirs, usually singly or in twos but up to five or six on several occasions. Party of five reported from the New Grounds, 1942, and single birds seen in the same area and at Avonmouth, 1947.

Red-breasted Merganser *Mergus serrator* L.

Irregular winter-visitor, occurring less frequently than Goosander. Also recorded in former years from Weston-super-Mare. Noted at Blagdon reservoir on various occasions, usually only a bird or two but parties of up to six have been reported. One seen, Barrow Gurney reservoirs, April, 1936. One (perhaps three) noted off Brean Down, March, 1925, and single birds recorded as visiting the lake at Hunstrete, 1929 and 1941. As with the previous bird, adult males seldom met with.

Smew *Mergus albellus* L.

Winter-visitor. Regular at the reservoirs in small numbers. Most records refer to female or immature birds, but adult males not infrequently noted in recent years. An adult male preserved at Dyrham was shot there in 1855. Very few coastal records, but one reported from Clevedon, 1892, and another from the Weston-super-Mare area, 1927.

Cormorant *Phalacrocorax carbo carbo* (L.)

Resident. Breeds only on Steep Holm—a colony of some fifteen to twenty pairs. Nesting first proved, 1934, though the birds were probably breeding there earlier. Not uncommon on the coast, often occurring as far up the Severn as the New Grounds. Frequent at the reservoirs—usually singly but sometimes in small parties.

Shag *Phalacrocorax aristotelis aristotelis* (L.)

Very occasional visitor, usually in autumn or winter. An old notice of one at Shirehampton lacks essential details and the same applies to that of a party of three at Steep Holm, May, 1919. What seem to be the only definite records are of single birds at Blagdon reservoir, *c.* 1913, and September, 1923; Winscombe, November, 1916; on the Avon at Bath, September, 1918; at Chewton Mendip, September, 1923; and of one found dead at Cheddar reservoir, November, 1945.

Gannet *Sula bassana* (L.)

Normally a very occasional visitor to the Channel and Estuary,

but storm driven or washed up birds not infrequently reported from the coast. A party of four or five was seen on Denny Isle, September, 1893, and twelve were noted off Weston-super-Mare, July, 1924. Storm driven examples have been found inland at Wotton-under-Edge, Old Sodbury, and Radstock.

Storm-Petrel *Hydrobates pelagicus* (L.)

Occurs very occasionally as a storm driven visitor. Records in former years are of one found at Alveston following a violent gale, October, 1824, and of one picked up in Small Street, Bristol, November, 1876. Recent notices include those of birds found at Clevedon, 1929, and at Weston-super-Mare, 1929, 1935 and 1946.

Leach's Fork-tailed Petrel *Oceanodroma leucorhoa leucorhoa* (Vieill.)

Status as for previous species. Twice recorded in the past as having been picked up beneath Clifton Suspension Bridge (1883 and 1886). One was found dead at Wells, November, 1931, and single birds are stated to have been seen at Aust, and Cheddar reservoir, October, 1938.

Manx Shearwater *Puffinus puffinus puffinus* (Brünn.)

Normally a very scarce visitor, but may occur in the Channel and Estuary more often than is supposed. Several were seen off Avonmouth, June, 1897, and about thirty between Weston-super-Mare and Steep Holm, July, 1928. Dead birds reported from Brean Down on two or three occasions, and storm driven specimens have been found in various inland localities.

Fulmar Petrel *Fulmarus glacialis glacialis* (L.)

Very scarce visitor. Single birds were obtained at Weston-super-Mare on two occasions prior to 1870, and one is stated to have occurred off Avonmouth, August, 1878. What seems to be the only subsequent record is of one, evidently storm driven, found dead at Cheddar reservoir, November, 1938.

Great Crested Grebe *Podiceps cristatus cristatus* (L.)

Resident. Known as a breeding species chiefly from Blagdon reservoir where several pairs have nested almost annually since 1907 (twelve pairs reported, 1931). Has also bred at Litton (frequently since 1925); at Barrow Gurney, Chew Magna, Mells Pond and Orchardleigh (once or twice); and at Tortworth Court Lake, 1934-1936. Common on the larger reservoirs at all seasons but most plentiful in spring and autumn. Occasional elsewhere. Some birds in summer are evidently non-breeders.

Red-necked Grebe *Podiceps griseigena griseigena* (Bodd.)

Scarce winter-visitor. One was shot at Blagdon reservoir, December, 1914. The only reliable sight records are of single birds at Barrow Gurney reservoirs, February, 1937; Frampton-on-Severn,

just beyond the northern limits of the district, March, 1937 ; Blagdon reservoir and on the R. Avon, Saltford, February, 1947 ; and Cheddar reservoir, December, 1947.

Slavonian Grebe *Podiceps auritus* (L.)

Irregular winter-visitor to the reservoirs, occurring less frequently than Black-necked Grebe. The only notices for former years are of one at Barrow Gurney, 1885, and one at the same place, 1890. Single birds, sometimes two or three, reliably reported on various occasions from Barrow Gurney and Blagdon, 1924-1947, and Cheddar, 1945-1947. One or two spring records of birds in breeding plumage.

Black-necked Grebe *Podiceps nigricollis nigricollis* Brehm

Winter-visitor. Little known formerly, but has occurred regularly at the reservoirs since 1930. Reported chiefly from Barrow Gurney, where first observed, 1924, and where it has appeared in most years since. Also recorded, frequently, from Blagdon, and from Cheddar on various occasions, 1938-1946. Sometimes seen well into spring and has been noted in summer.

Little Grebe *Podiceps ruficollis ruficollis* (Pall.)

Resident. Common, breeding wherever there are suitable waters. Visits the reservoirs in considerable numbers in autumn.

Great Northern Diver *Colymbus immer* Brünn.

Occasional winter-visitor. The first dated records are of one killed at Bath, *c.* 1825, and of one shot at Barrow Gurney, January, 1881. Other notices for past years refer to two obtained in the Floating Harbour, Bristol, and two on the Berkeley Ship Canal, near Purton. Has been seen at intervals, usually singly, on both Barrow Gurney and Blagdon reservoirs since 1916. From Cheddar there are records of two, 1938, and of single birds on three occasions, 1944-1947.

Black-throated Diver *Colymbus arcticus arcticus* L.

Apparently no more than a very scarce visitor. The only authentic record is of one seen at Blagdon reservoir on several dates, early April, 1946.

Red-throated Diver *Colymbus stellatus* Pontopp.

Irregular winter-visitor, but perhaps the most frequent of the divers. Has been noted at the reservoirs, either singly or in pairs, at least a dozen times in recent years. Single birds were caught near Wells, February, 1912, and at Weston-super-Mare, December, 1929. An oiled bird visited the Floating Harbour, Bristol, January, 1938.

Wood-Pigeon *Columba palumbus palumbus* L.

Resident. Common and widely distributed. Sometimes in very large flocks following winter immigration.

Stock-Dove *Columba oenas* L.

Resident. Common and widely distributed, but less abundant than Wood-Pigeon.

Turtle-Dove *Streptopelia turtur turtur* (L.)

Summer-resident. Widely distributed and not uncommon in most parts of the district.

Pallas's Sand-Grouse *Syrhaptes paradoxus* (Pall.)

Very rare vagrant. Occurred, some being obtained, during both the 1863 and 1888 irruptions. In the former year a party of fifteen was seen near Wotton-under-Edge, and one was found dead at Kilcott. In 1888 single birds were shot on Kenn Moor and at Portishead and Yate, and two were killed at Hambrook, while a party of twenty was seen at Norton St. Philip. Others were reported from the Weston-super-Mare area.

Bar-tailed Godwit *Limosa lapponica lapponica* (L.)

Passage-migrant. Visits the coast regularly in spring and autumn and sometimes occurs in winter. Most records are from the Severn Beach area, but has also been reported from Weston-super-Mare, Woodspring, Clevedon, Littleton-on-Severn and the New Grounds. Very occasional at the reservoirs.

Black-tailed Godwit *Limosa limosa limosa* (L.)

Formerly a scarce visitor, but in the last twenty years has been frequently reported from both the coast and reservoirs, and now appears to be a regular passage-migrant, chiefly in autumn. Coastal records include those of single birds or small parties at Weston-super-Mare, Portishead, Aust and Littleton-on-Severn, while at the New Grounds up to thirty were noted, August-September, 1945, and about a dozen at the same season, 1946. Among reservoir records are those of twenty-three at Blagdon, September, 1934, and four, April, 1939; ten at Cheddar, August, 1938; and eighteen at Barrow Gurney, September, 1947.

Common Curlew *Numenius arquata arquata* (L.)

Winter-visitor chiefly, but present in all seasons and has sometimes been found breeding. Common on the coast and not infrequent inland. Nesting reported from the Mendip Hills on several occasions, 1912-1925. May have bred in recent years on the low-lying moors near Clevedon, but evidence not entirely conclusive.

Whimbrel *Numenius phaeopus phaeopus* (L.)

Chiefly known as a spring passage-migrant, though not infrequently reported in autumn. Regular on the coast in small or moderate numbers, and sometimes noted at the reservoirs and elsewhere inland.

Woodcock *Scolopax rusticola* L.

As winter-visitor occurs regularly in suitable areas, but numbers are perhaps fewer than formerly. Scarce in summer and evidently very uncommon as a breeding species. Has nested in present century on Mendip, also near Clevedon and Mells, and probably elsewhere (*Ibis*, 1945, p. 529).

Great Snipe *Capella media* (Lath.)

Very rare vagrant. The Rev. M. A. Mathew, in his Revised List of the Birds of Somerset (1893), mentions it as having occurred in autumn near Weston-super-Mare (*cf.* also D'Urban and Mathew, *Birds of Devon*, 2nd ed., 1895, pp. 323-4). A record of one shot near Cheddar, October, 1920, lacks corroborative details.

Common Snipe *Capella gallinago gallinago* (L.)

Resident, but chiefly a common winter-visitor to suitable ground. Occurs frequently at the reservoirs. Breeds regularly on low-lying moors in the Clevedon, Nailsea and Yatton areas, and perhaps occasionally elsewhere. Found nesting on Black Down, 1912 and 1915.

Jack Snipe *Lymnocyptes minimus* (Brünn.)

Winter-visitor to suitable ground, but much less abundant than Common Snipe. Recent notices are mostly from the reservoirs, but has also been reported from Cheddar Moor, Tickenham, Stoke Gifford, Dyrham, the New Grounds and other localities.

Grey Phalarope *Phalaropus fulicarius* (L.)

Irregular visitor in autumn, usually occurring singly. Reported in former years from Bath, Weston-super-Mare, Barrow Gurney and the Wells and Wotton-under-Edge areas. Also from Avonmouth, where three were obtained, September, 1896. In recent years has been noted at Litton reservoir, 1930; near Barrow Gurney, 1934; and at Blagdon reservoir on half a dozen occasions, 1923-1944.

Red-necked Phalarope *Phalaropus lobatus* (L.)

Rare vagrant. The only definite record is of a bird obtained at Blagdon reservoir, September, 1921. A phalarope reported, without corroborative details, as being of this species was seen at the same reservoir, autumn, 1931.

Turnstone *Arenaria interpres interpres* (L.)

Winter-visitor to the coast. Chiefly August to May, but has been reported in all months. Best known from Severn Beach, where as many as 150 to 200 have sometimes been counted. The only inland records are of one at Barrow Gurney reservoirs, August, 1937, and two at the same place, June, 1939.

Knot *Calidris canutus canutus* (L.)

Chiefly a passage-migrant, occurring most frequently in autumn, but has been noted on the coast in all seasons. Birds in full breeding dress sometimes met with in spring. Numbers usually small, but over 100 twice recorded from Severn Beach, and flock of about 400 reported from the New Grounds, September, 1946. Two inland records—a single bird at Barrow Gurney reservoirs, September, 1935, and two at Cheddar reservoir, August, 1939.

Dunlin *Calidris alpina* (L.)

Winter-visitor and passage-migrant. The most abundant coastal wader, often occurring in very large flocks, and may be met with in all months. Both forms—the southern, *C. a. schinzii* (Brehm), and the northern, *C. a. alpina* (L.)—occur, but practically all wintering birds are, no doubt, typical *alpina*. Odd birds or small parties visit the reservoirs on both passages.

Curlew-Sandpiper *Calidris testacea* (Pall.)

Passage-migrant in small numbers, occurring regularly on the coast in autumn. Very scarce in spring. In recent years has been chiefly reported from Severn Beach, but also from Weston-super-Mare, Portishead and the New Grounds. The only reservoir records are of one at Blagdon, September, 1913, and a party of eight or ten at Barrow Gurney, September, 1923.

Little Stint *Calidris minuta* (Leisl.)

Passage-migrant, occurring more or less regularly in autumn and occasionally in spring. Chiefly reported from the coast, usually in very small numbers but party of fifteen at Severn Beach, September, 1943. Recorded from the reservoirs, either singly or in twos, on half a dozen occasions, 1936-1947. Twice noted in winter on the sands immediately south of Brean Down—single birds, February, 1935, and January, 1940.

Temminck's Stint *Calidris temminckii* (Leisl.)

Very scarce visitor on migration. The only records are of a party of three at Cheddar reservoir, June, 1939, and a single bird at Barrow Gurney reservoirs, September, 1943.

American Pectoral Sandpiper *Calidris melanotos* (Vieill.)

Very rare vagrant. One record—that of a single bird at Barrow Gurney reservoirs in late September and early October, 1935.

Purple Sandpiper *Calidris maritima maritima* (Brünn.)

Winter-visitor, occurring more or less regularly in small numbers. Has occasionally been reported from the Weston-super-Mare area, but records from the N. Somerset coastline are very few. At Severn Beach, however, birds have been noted fairly

frequently in recent years, usually with Turnstone and Dunlin, and in all months, November to May. Several records from New Passage.

Sanderling *Crocethia alba* (Pall.)

Passage-migrant, usually in small numbers. Regular on the coast, and has been reported from the reservoirs in both spring and autumn. Party of fourteen, Cheddar reservoir, May, 1946. Occasional in winter.

Ruff *Philomachus pugnax* (L.)

Passage-migrant, chiefly in autumn. Occurs fairly regularly at the reservoirs and not infrequently on the coast. Has also been recorded from Wrington, 1888; Tetbury, 1909; and Stoke Gifford, 1942. Rarely more than two or three together, but party of seven off the New Grounds, September, 1945. Twice noted on spring passage—one at Blagdon, 1938, and two at Cheddar, 1939. Three winter records—single birds at Weston-super-Mare, January, 1864; Blagdon, December, 1937; and on the R. Avon, near Sea Mills, February, 1942.

Common Sandpiper *Actitis hypoleucos* (L.)

Passage-migrant, occurring in all months, April to October, and sometimes as late as November. Common on the coast, along rivers, at the reservoirs, and a not infrequent visitor to small streams and ponds. Some probably remain through summer, but no definite evidence yet of breeding. One winter record—that of a single bird at the New Grounds, mid-December, 1945.

Wood-Sandpiper *Trin. gaglareola* L.

Very scarce visitor on migration. One was shot near Badgworth, on the south side of the R. Axe, September, 1903, but the only records from within the district are of single birds at Cheddar reservoir, May, 1939, and at a small pool on the Gloucestershire side of St. Catherine, August, 1943.

Green Sandpiper *Tringa ochropus* L.

Passage-migrant, occurring regularly in autumn. Fairly frequent in spring and has been reported in all months. A familiar species at the reservoirs and not uncommon in coastal areas and at inland streams and pools. Usually found singly, but several together by no means exceptional.

British Redshank *Tringa totanus britannica* Math.

Resident, but chiefly a winter-visitor and passage-migrant, occurring commonly on the coast and not infrequently inland. Breeds on suitable ground in the Portishead, Clevedon and Weston-super-Mare areas, and has bred at Blagdon reservoir on various occasions, but not, apparently, since 1939. Some evidence



BLAGDON RESERVOIR, SOMERSET

of nesting in recent years at Cheddar and Oldbury-on-Severn. The Iceland form, *T. t. robusta* (Schiöler), probably occurs in winter and has been obtained on the opposite coast of Monmouthshire (cf. G. C. S. Ingram and H. M. Salmon, *Trans. Cardiff Nat. Soc.*, Vol. LXX, 1937).

Spotted Redshank *Tringa erythropus* (Pall.)

Irregular visitor on autumn passage. Formerly known only from Weston-super-Mare, where two were shot sometime prior to 1893. Reported at intervals in recent years—usually singly and chiefly from the reservoirs (Barrow Gurney, once, 1933, and Blagdon, at least nine times, 1923-1944). Single birds identified at Frampton-on-Severn, just beyond the northern limits of the district, 1938; on the R. Avon, at Hotwells, 1945; and on the R. Axe, 1946. Twice met with in winter on the R. Yeo, at Woodspring—one, January-February, 1935, and two, November, 1935.

Greenshank *Tringa nebularia* (Gunn.)

Passage-migrant. Seldom reported in former years, but now known as a regular visitor in autumn—usually to the reservoirs. Has also been noted at Severn Beach, New Passage and the New Grounds. Several spring records from the reservoirs and one from the R. Axe. Most reports refer to single birds, though two or three together by no means unusual. Winter records (two) lack corroborative details.

Ringed Plover *Charadrius hiaticula hiaticula* L.

Chiefly a passage-migrant, but may be met with on the coast in all months. Most abundant in late summer and autumn, when numbers up to 500 sometimes reported from the Severn Beach area. Small parties not infrequent at the reservoirs on both passages. Used to breed at Severn Beach, where nest and eggs found and young seen, May, 1912, and three nests and eggs located, May, 1913 (Mr. R. P. Gait and Dr. D. Munro Smith *in litt.*). Has also nested on the sands below Brean Down, just outside the district (Dr. L. H. Matthews *in litt.*).

Arctic Ringed Plover *Charadrius hiaticula tundrae* (Lowe)

One record—that of a male, now in the City Museum, obtained at Portishead, August, 1922. Has also been killed (one, May, 1936) on the opposite coast of Monmouthshire (cf. G. C. S. Ingram and H. M. Salmon, *Trans. Cardiff Nat. Soc.*, Vol. LXX, 1937).

Kentish Plover *Leucopoliis alexandrinus alexandrinus* (L.)

Very rare vagrant. The only record is of one among a large gathering of Dunlin and Ringed Plover, at Severn Beach, early May, 1947.

Southern Golden Plover *Pluvialis apricaria apricaria* (L.)

Winter-visitor. Regular inland and fairly frequent in coastal areas, often appearing in considerable numbers at Marksbury, Lansdown, the New Grounds and in other favoured localities. Occasional in small parties at the reservoirs. Sometimes met with well into spring, and has once been found nesting—Mr. S. Lewis reporting (*in litt.*) that a clutch of four eggs, now in the City Museum, was taken on Mendip, May, 1901. Both this and the Northern form, *P. a. altifrons* (Brehm), no doubt occur, but the two races not separable in winter.

Grey Plover *Squatarola squatarola* (L.)

Winter-visitor, occurring regularly in small numbers on the coast. Occasionally met with well into spring, but the only recent record of birds in full breeding plumage is of three, among a party of six or seven, at Severn Beach, May, 1946.

Dotterel *Eudromias morinellus* (L.)

Very scarce visitor on migration, but apparently more frequent in former years. Seven were killed on the Mendip Hills, near Wells, April, 1869, and two were recorded from the same area, August, 1870. One was shot on Steep Holm, early May, 1869, and later in the month a small party visited Weston-super-Mare and a single bird was seen at Sand Point. The only recent records are of a party of six or eight, at Burrington, April, c. 1929, and one on Brean Down, August, 1937.

Lapwing *Vanellus vanellus* (L.)

Resident. Common and widely distributed, but as a breeding bird has decreased considerably in the last few years. Abundant in winter, often occurring in very large flocks.

Black-winged Stilt *Himantopus himantopus himantopus* (L.)

Very rare vagrant. One was shot many years ago near Thornbury (*cf.* Dillwyn, *Fauna and Flora of Swansea*, 1848, p. 8), and another, now in the City Museum, was obtained near Wells, but just beyond the southern limits of the district, July, 1896. The only recent record is of one at Cheddar reservoir, September, 1938.

Avocet *Recurvirostra avosetta* L.

Very rare vagrant. One, now in the Sheffield Museum, was killed at Thornbury sometime prior to 1900. Mr. H. W. Robinson records (*Brit. Birds*, Vol. VII, p. 235) that a party of four was seen on the Severn at (?near) Stonehouse, March, 1913. (N.B.—Stonehouse is five miles inland, but as the New Grounds is the nearest point on the Severn it seems likely that the birds were observed in that area).

British Oyster-catcher *Hematopus ostralegus occidentalis* Neum.

Resident on the coast, most birds in summer being evidently non-breeders. Usually met with in small parties, but flocks of 50 to 100 not infrequently noted in the Brean Down area. Nesting has been reported from Woodspring, also from Steep Holm and Denny Isle. Scarce inland, but odd birds occasionally visit the reservoirs.

Pratincole *Glareola pratincola pratincola* (L.)

Very rare vagrant. The only record is of one shot on the northern slope of Mendip, not far from Weston-super-Mare, sometime prior to 1881.

Stone-Curlew *Burhinus œdicnemus œdicnemus* (L.)

Now very scarce, but formerly regarded as a not infrequent visitor in summer to the Mendip Hills. Recorded in the past as having been seen or obtained at Avonmouth, Cheddar and Buckland Dinham. The only notice for the present century is of a winter occurrence—two being identified in Woodspring Bay, December, 1925.

Common Crane *Grus grus grus* (L.)

No record from within the district, but one was shot near Brent Knoll, May, 1875. From the original account (*Zool.*, 1879, p. 128) it appears that the bird was obtained at Wick Farm, less than a mile south of the R. Axe.

Black Tern *Chlidonias niger niger* (L.)

Passage-migrant. Regular at the reservoirs, usually in both spring and autumn. The highest number noted together is twenty-one at Cheddar, May, 1938. Very few records from the coast, though sometimes reported in former years from Weston-super-Mare and once from Avonmouth. A party of twelve was seen off the New Grounds, September, 1946.

Sandwich Tern *Sterna sandvicensis sandvicensis* Lath.

Scarce visitor on migration. What seem to be the only definite notices are of single birds at Clevedon, April, 1890, and Severn Beach, September, 1936, and the following at Cheddar reservoir—one, September, 1941, and two, April, 1947. One winter record—that of a single bird seen, and later found dead, at Cheddar reservoir, December, 1945.

Roseate Tern *Sterna dougallii dougallii* Mont.

Very rare visitor on migration. One obtained at Clevedon, April, 1897, was subsequently examined by the Rev. F. L. Balthwayt. This is the only authentic record.

Common Tern *Sterna hirundo hirundo* L.

Passage-migrant, usually in small numbers. Occurs chiefly in autumn, but has been noted in all months—April to October.

Sometimes reported from the coast, though most records are from the reservoirs. Twenty-five terns, either this or the following bird, were seen over flooded pastures at Stoke Gifford, September, 1935. Not always separable in the field from Arctic Tern, to which some records may refer (*cf.* below).

Arctic Tern *Sterna macrura* Naumann

Passage-migrant. May occur fairly frequently, but owing to close resemblance in the field to Common Tern is seldom definitely recorded. Great numbers of both this and *S. h. hirundo* appeared in the Channel and Estuary in early May, 1842, many of them visiting the Bristol docks where, due to their tameness, two or three hundred were killed and others taken alive (*cf.* Yarrell, *History of British Birds*, 4th ed., Vol. III, p. 554). A considerable invasion of Common and Arctic Terns (mostly Arctic) was reported from the reservoirs, April-May, 1947—up to 100 or more being seen on several occasions at Blagdon and once at Cheddar. A few were noted at Barrow Gurney and the Duchess' Pond, Stapleton.

Little Tern *Sterna albifrons albifrons* Pall.

An uncommon visitor on migration, though probably more frequent than is supposed. Most records refer to spring passage. An early notice is that of five shot at Weston-super-Mare, May, 1866, while recent reports are of two at Severn Beach, May, 1945, and single birds at Blagdon reservoir, May, 1930; Clevedon, April, 1934; R. Axe, July, 1945; and Cheddar reservoir, October, 1947. Not known as having remained to breed within the district, but nesting proved annually on Steart Island (six miles south of Brean Down), 1924-1926. Nested same place, 1928, and probably, 1930.

Sooty Tern *Sterna fuscata fuscata* L.

Very rare vagrant. One record—that of a bird taken alive near Bath, after stormy weather, early October, 1885.

Sabine's Gull *Xema sabini* (Sabine)

Rare vagrant. The following have been reported from the Weston-super-Mare area—two obtained a few years prior to 1865, and one shot from a party of five at the mouth of the R. Axe, September, 1867. The only subsequent record is of one caught alive at Tickenham, September, 1896.

Little Gull *Larus minutus* Pall.

Occasional visitor, usually on spring or autumn passage. The first recorded occurrence is that of one killed at Weston-super-Mare, January, 1851. Single birds were shot in the same locality, *c.* 1863 and *c.* 1869, and one was obtained at Clevedon, October or November, 1888. Reports in recent years are of single birds at Blagdon reservoir, September, 1940 and 1945, and twelve together at Cheddar reservoir, May, 1938. Two were seen at the latter place, May, 1946.

Black-headed Gull *Larus ridibundus ridibundus* L.

Chiefly an abundant winter-visitor to the coast and inland, but some present in all months. Most plentiful July to March. A familiar bird along the R. Avon and round the City docks, and often numerous at the reservoirs.

Common Gull *Larus canus canus* L.

Winter-visitor, from late July or August, to the coast and inland, and may be seen in all months. Occurs frequently, sometimes abundantly, along the R. Avon and at the docks and reservoirs. Great numbers visit the Cotswolds daily in autumn and winter, returning to the Severn sandbanks to roost.

Herring-Gull *Larus argentatus argentatus* Pont.

Resident. Abundant on the coast at all seasons, also along the R. Avon and at the docks. Common at the reservoirs and a frequent visitor elsewhere inland. Breeds only on Steep Holm, where much increased during last fifty years, and now perhaps 500 pairs nesting. A pair nested, unsuccessfully, at the foot of Aust Cliff, 1942.

Scandinavian Lesser Black-backed Gull *Larus fuscus fuscus* L.

Occasional visitor, perhaps occurring more often than records suggest. Single examples have been identified at Barrow Gurney reservoirs, August, 1937, and on the R. Avon, at Sea Mills, July, 1934; April, 1937 and 1938; and October, 1942.

British Lesser Black-backed Gull *Larus fuscus graellsii* Brehm

Summer-resident: February or March to early November, but records show that a few usually remain in winter. Occurs abundantly along the R. Avon and at the docks; also at the reservoirs and not infrequently elsewhere inland. Much less common on the coast than Herring-Gull. Breeds, in about same numbers as Herring-Gull, only on Steep Holm, where it has also greatly increased in the last fifty years.

Great Black-backed Gull *Larus marinus* L.

Resident in comparatively small numbers. Chiefly on the coast, but odd birds, sometimes several, often occur well up the R. Avon and at the reservoirs. Gatherings up to fifty or more not infrequent at the New Grounds in winter. Breeds regularly on Steep Holm, where nesting (two pairs) first proved, 1923, and where it has since increased to nine or more pairs breeding, 1946.

Glaucous Gull *Larus hyperboreus* Gunn.

Very occasional visitor in winter. An adult shot on the Severn, 1840, is figured in Yarrell's *History of British Birds*. Other records for past years include those of two obtained at Weston-super-Mare

and one on Steep Holm, 1870. The only recent notices are of single immature birds reported from Severn Beach, December, 1938, and Cumberland Basin, December, 1939—January, 1940. (See under Iceland Gull).

Iceland Gull *Larus glaucoides* Meyer

Very occasional visitor in winter. The only records for the previous century refer to single examples killed at Weston-super-Mare sometime prior to 1860 and in December, 1870. An immature specimen was reported from Barrow Gurney reservoirs, March, 1931, while a young bird visited the docks area at Cumberland Basin, January, 1933, and remained almost continuously until February, 1935. Latest records are of single immature birds at Cumberland Basin, January, 1939; Cheddar reservoir, April, 1939; Stoke Gifford, February, 1940; Hotwells, January, 1946; and the New Grounds, January, 1947. (N.B.—In view of the close resemblance in all stages of plumage of Glaucous and Iceland Gulls, and, as shown by recent investigations, the not infrequent near approximation in size and other characters, the probability of confusion between the two cannot in most cases be ruled out).

Kittiwake *Rissa tridactyla tridactyla* (L.)

Apparently no more than an uncommon and irregular visitor to the Channel and Estuary. Storm driven birds sometimes occur at the reservoirs and elsewhere inland. Recorded in past years as appearing in considerable numbers in winter on the coast at Weston-super-Mare, but now seems to be much scarcer. Has been referred to as breeding formerly on Steep Holm, but the statement lacks corroborative details.

Ivory-Gull *Pagophila eburnea* (Phipps)

Very rare vagrant. The only reliable record is of one taken alive at Weston-super-Mare, *c.* 1864.

Great Skua *Stercorarius skua skua* (Brünn.)

Very scarce visitor in autumn or winter. What appear to be the only records are of one at Sharpness, 1896; two at Cheddar reservoir, October, 1938; and one at the New Grounds, November, 1938.

Pomatorhine Skua *Stercorarius pomarinus* (Temm.)

Rare vagrant, and, apparently, not reported for the last sixty years. At least seven were obtained, autumn, 1879, when large numbers occurred off the south-west counties and a few appeared well up the Channel and Estuary—two being killed at Weston-super-Mare, several at Clevedon, one at New Passage and one inland at Chew Magna. A skua, stated to be of this species, was found dead near Hawkesbury Upton, December, 1887.

Arctic Skua *Stercorarius parasiticus* (L.)

Irregular visitor, chiefly on autumn passage. Probably occurs more frequently than records suggest. Single birds, usually dark phase, noted on seven or eight occasions in recent years—the latest reports being from the New Grounds, and Cheddar reservoir, October, 1938; Littleton-on-Severn, June, 1941; and Severn Beach, October, 1942.

Long-tailed Skua *Stercorarius longicaudus* Vieill.

Rare vagrant. One was shot at Clevedon, October, 1891, when numbers were driven by severe gales well up the Channel and Estuary. The only subsequent records are of one obtained at Axbridge, October, 1903, and another seen near Weston-super-Mare, June, 1912.

British Razorbill *Alca torda britannica* Ticehurst

Occasional visitor to the Channel and Estuary. Perhaps more frequent than is supposed. Recorded formerly as occurring in small parties during autumn and winter, but the only notices for recent years are of two and a single bird off Steep Holm, June, 1935, and three together in the same place, June, 1936. Storm driven birds sometimes reported from the coast and inland. (See under Southern Guillemot).

Southern Guillemot *Uria aalge albionis* With.

Status as for Razorbill. Former records from the Channel and Estuary also mention Guillemots as appearing in autumn and winter. Notices in fairly recent years of birds washed up in the Brean Down area show that both this and the Northern form, *U. a. aalge* (Pont.), occur. Nothing authentic seems to be known regarding alleged breeding on Brean Down (1912), while there appears to be no conclusive evidence in support of statements that Razorbills, Guillemots and Puffins bred formerly on Steep Holm.

Black Guillemot *Uria grylle grylle* (L.)

Very rare vagrant. An immature bird was obtained in the Channel, off Weston-super-Mare, December, 1896. The skin of this specimen, for sometime in the Rothschild collection at Tring, is now in the American Museum of Natural History, New York (Dr. R. C. Murphy *in litt.*). A record of one seen at Cheddar reservoir, November, 1938, lacks the necessary details to substantiate the occurrence of so unlikely a bird inland.

Little Auk *Alle alle alle* (L.)

Very occasional storm driven visitor in winter. Specimens have been found in both coastal and inland areas, but there seems to be no record for recent years.

Southern Puffin *Fratercula arctica grabæ* (Brehm)

Occasional visitor to the Channel and Estuary. Perhaps occurs more frequently than is supposed. Most winter notices refer to remains of storm driven birds, either on the coast or inland. Latest records are of one seen off Steep Holm, May, 1935, and single birds found dead at Filton, October, 1935, and on Kenn Moor, October, 1945. (See under Southern Guillemot).

Corn-Crake *Crex crex* (L.)

Formerly a widely known summer-resident, but has greatly decreased since early in the present century and now appears to be scarce over most of the district. No definite breeding information in recent years, though calling has been reported from various localities, including Rangeworthy, Saltford, Failand, Nailsea, Tickenham and Mells. Noted fairly frequently on autumn passage.

Spotted Crake *Porzana porzana* (L.)

Not reported in recent years, but, perhaps, an overlooked summer-resident or passage-migrant. Appears to have been not uncommon formerly in the Weston-super-Mare area, where five were killed during the latter half of December, 1890. Remarks by the Rev. M. A. Mathew (*Zool.*, 1891, p. 93) on young broods in August near the same place suggest that the bird used to occur fairly frequently as a breeding species in that locality (*cf.* D'Urban and Mathew, *Birds of Devon*, 2nd ed., 1895, p. 277). Single examples, probably on passage, were obtained at Bath, October, 1881; Patchway, October, 1891; and Nailsea, September, 1904. One was seen near Frome, February, 1917.

Baillon's Crake *Porzana pusilla intermedia* (Herm.)

Very rare vagrant. One, a female, was killed at Weston-super-Mare, September, 1840, and another is recorded as having been shot at Axbridge, September, 1901.

Water-Rail *Rallus aquaticus aquaticus* L.

Chiefly a winter-visitor, occurring not uncommonly in suitable habitats. Scarce as a breeding bird, though perhaps overlooked. Has been recorded as nesting at Blagdon reservoir, and breeding was reported from Mells and the Mendip area, 1920, but there appears to be no subsequent information.

Moorhen *Gallinula chloropus chloropus* (L.)

Resident. Common and widely distributed.

Coot *Fulica atra atra* L.

Resident. Breeds at most suitable waters. Also an abundant winter-visitor, occurring regularly in large numbers at the reservoirs. Occasional on the coast during hard frosts.

British Black Grouse *Lyrurus tetrix britannicus* With. & Lönn.

Formerly resident on Mendip but now apparently extinct. Perhaps bred until 1920 or later, though no definite evidence since a nest and eggs were found on Black Down, May, 1915. Last reported, 1922, when a male was shot at the foot of Black Down and a female seen on Dolebury Warren (*Rep. Som. Birds.*, 1946, p. 4). A female in Mr. A. R. Robinson's collection at Backwell House was killed on Backwell Hill sometime prior to 1900.

British Red Grouse *Lagopus scoticus scoticus* (Lath.)

Accidental visitor. The only authentic record is of one, perhaps a wanderer from the Welsh hills, shot on Black Down, September, 1884.

Pheasant *Phasianus colchicus* L.

Resident. Common in many parts of the district, and abundant where preserved.

Common Partridge *Perdix perdix perdix* (L.)

Resident. Common and widely distributed.

Red-legged Partridge *Alectoris rufa rufa* (L.)

Resident. Uncommon, but probably more widespread than is supposed. Scattered pairs, perhaps descendants of some introduced near Cheddar, *c.* 1860, have been reported as breeding on Breaun Down (frequently) and in various Mendip localities. Bred Stoke Gifford, 1935 and 1936, and doubtless on other occasions. Is said by sportsmen to have been obtained at Horton, Dyrham, Frampton Cotterell and Queen Charlton.

Quail *Coturnix coturnix coturnix* (L.)

Summer-resident in fluctuating numbers. Uncommon and, though perhaps often overlooked, is evidently scarcer than formerly. Some increase noted since 1942—birds being recorded from various places, including Abbots Leigh, Hutton, Patchway, Doynton and Pucklechurch, and from such Cotswold areas as Marshfield and Cold Ashton. Breeding reported from Cheddar, 1929, and Stoke Gifford, 1944, while there are earlier records of nesting at Chipping Sodbury, Sidcot and South Stoke. Exceptional in winter.

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[Copies of this paper may be purchased at 2/6 each.
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ADDITIONS TO THE BRISTOL INSECT FAUNA (DIPTERA) SINCE 1945

(See *Proceedings*, 27(2), 107-8)

By H. L. F. AUDCENT, M.Sc.

(Received, Jan. 31, 1948. Read in title at General Meeting,
March 4, 1948)

THE Bristol District is lucky in the accession of four Dipterists, three of whom are still with us, since the publication of the last list. These keen workers have made many new records and have added new localities to our old records, as can be seen by the unusual length of this list. I propose to use the following abbreviations for their names. Cw.=Mr. J. Cowley, F.=Mr. E. G. M. d'Assis-Fonseca, J.B.=Mr. J. Bowden, Lw=Dr. E. E. Lowe. Other abbreviations as given in Part I (*Proc.* 7 (1) 1928.)

The nomenclature of Diptera has undergone many changes in the last few years. It would take up too much room to list here all the alterations. These can be found in *A Check-List of British Insects* by Kloet and Hincks, 1945, 327 to 429.

Blaise Castle, Coombe Dingle and Durdham Down are at Bristol.

PSYCHODIDAE

- Pericoma avicularia* Tonn. G. Mangotsfield (J.B.); S. Cole (Eaton) 2/9/04.
- Pericoma calcilega* Feuer. S. Wincanton (Eaton) 10/6/02.
- Pericoma mutua* Eat. G. Mangotsfield (J.B.) no dates.
- Pericoma nubila* Mg. G. Mangotsfield (J.B.).
- Pericoma trivialis* Eat. G. Mangotsfield (J.B.).
- Psychoda alternata* Say. (*sexpunctata* Curt.). G. Mangotsfield (J.B.).
- Psychoda brevicornis* Tonn. G. Mangotsfield (J.B.).
- Psychoda erminea* Eat. G. Mangotsfield (J.B.).
- Psychoda grisescens* Tonn. G. Mangotsfield (J.B.).
- Psychoda phalaenoides* L. S. Edington (Cw.) 30/10/46.
- Psychoda severina* Tonn. var. *thenogenetica* Tonn. G. Mangotsfield (J.B.).
- Psychoda spreta* Tonn. G. Mangotsfield (J.B.).
- Psychoda trinodulosa* Tonn. G. Mangotsfield (J.B.); S. Edington (Cw.) 6/11/46.
- Telmatoscopus consors* Eat. S. Edington (Cw.) 30/10/46.

CULICIDAE

- Theobaldia (Culicella) morsitans* Theob. S. Taunton (A. N. Clements) 25/5/45, Clevedon (A.) 18/6/40.
Anopheles maculipennis Mg. G. Mangotsfield (J.B.) 1/4/44 ; S. Shepton Mallet (C.) 29/12/09.
Anopheles plumbeus Steph. S. Luccombe (A. N. Clements) 24/4/45.

BIBIONIDAE

- Bibio reticulatus* Lw. G. Coombe Dingle (F.) 8/5/47.

SCATOPIRIDAE

- Scatopse flavicollis* Mg. G. Rodborough (T. B. Fletcher) 27/9/43, Blaise Castle (F.) 8/11/47.

TIPULIDAE S.F. LIMONIINAE

- Limonia (Limnobia) nigropunctata* Schum. S. Brockley Combe (A.) 17/5/47.
Limonia (Limnobia) autumnalis Staeg. S. Edington (Cw.) 18/10/46.
Limnophila (s.g. *Elaophila*) *submarmorata* Verr. S. Holford (Cw.) 5/9/47.
Limnophila (s.g. *Pæcilostola*) *pictipennis* Mg. S. Catcott (Cw.) 11/5/44.
Oxydiscus (Adelphomyia) senilis Hal. S. Edington (Cw.) 27/10/46.

S.F. TIPULINAE

- Ctenophora pectinicornis* L. S. Loxley Wood, Shapwick (Cw.) 3/6/46 and Edington (Cw.) 4/6/47.
Tipula pseudovariipennis Cz. S. Brockley Combe (A.) 17/5/47.

STRATIOMYIDAE

- Odontomyia angulata* Panz. S. Pedwell (F.) 21/6/47 and Edington (Cw.) 27/6/47.
Oxycera analis Mg. G. Filton (F.) 6/46, Coombe Dingle (F.) 26/6/47 ; S. Loxley Wood, Shapwick (F.) 21/6/47 and (Cw.) 24/6/47.
Oxycera morrisii Curt. S. Edington (Cw.) 2/7/47.
Beris morrisii Dale. G. Coombe Dingle (F.) 15/6/46.

ASILIDAE

- Leptogaster guttiventris* Zett. S. Oakhill (Cw.) 29/6/47.
Dioctria linearis F. G. Coombe Dingle (F.) 14/7/46.
Laphria marginata L. S. Loxley Wood, Shapwick (A., Cw. and F.) 21/6/47.

EMPIDIDAE

- Tachypeza nubila* Mg. G. and S. common.
Platypalpus (Tachydromia) annulipes Mg. G. Coombe Dingle (F.) 7/6/47.

- Platypalpus* (*Tachydromia*) *cursitans* F. G. Durdham Down (F.) 14/7/46.
- Platypalpus* (*Tachydromia*) *exilis* Mg. G. Coombe Dingle (F.) 7/6/47.
- Platypalpus* (*Tachydromia*) *flavicornis*, Mg. G. Durdham Down (F.) 28/8/46.
- Platypalpus* (*Tachydromia*) *pallipes* Fall. S. Goblin Combe (F.) 28/9/46.
- Hybos grossipes* L. S. West Town (F.) 22/6/47.
- Platycnema pulicaria* Fall. G. Durdham Down (F.) 11/6/47.
- Bicellaria intermedia* Lundb. S. West Town (F.) 22/5/47.
- Trichina flavipes* Mg. G. Blaise Castle (F.) 29/9/46.
- Trichina clavipes* Mg. G. Filton (F.) 22/5/47.
- Leptozeza ruficollis* Mg. (*flavipes* Mg.) G. Durdham Down (F.) 2/6/46.
- Oropezella sphenoptera* Lw. G. Coombe Dingle (F.) 14/6/47.
- Microphorus holosericeus* Mg. G. Coombe Dingle (F.) 3/5/47.
- Hilara aeronotha* Mik. S. Ham Green (F.) 23/6/46.
- Hilara brevistyla* Coll. G. Kings Weston, Bristol (F.) 9/6/46.
- Hilara cornicula* Lw. G. Filton (F.) 6/6/47.
- Hilara griseifrons* Coll. G. Durdham Down (F.) 4/7/46
and Coombe Dingle (F.) 26/6/47.
- Hilara intermedia* Fall S. Clevedon (F.) 28/5/47.
- Hilara interstincta* Fall. S. Ham Green (F.) 23/6/46.
- Hilara lundbecki* Frey. S. Portishead (F.) 24/5/47.
- Hilara manicata* Mg. G. Coombe Dingle (F.) 18/7/47.
- Empis* (s.g. *Pachymeria*) *aetiva* Lw. G. Coombe Dingle (F.) 29/6/47.
- Rhamphomyia* (s.g. *Holoclera*) *nigripennis* F. G. Coombe Dingle (F.) 28/5/46.
- Rhamphomyia* (s.g. *Pararhamphomyia*) *simplex* Zett. G. Coombe Dingle (F.) 3/5/47.
- Rhamphomyia* (s.g. *Pararhamphomyia*) *tibiella* Zett. G. Coombe Dingle (F.) 3/5/47; S. Cadbury Camp (F.) 11/5/47.
- Clinocera* (s.g. *Hydrodromia*) *stagnalis* Hal. G. Coombe Dingle (F.) 3/5/47; S. Ham Green (F.) 12/4/47.

DOLICHOPODIDAE

- Dolichopus* (s.g. *Leucodolichopus*) *signifer* Hal. G. Filton (F.) 4/6/47, Coombe Dingle (F.) 29/6/47; S. West Town (F.) 22/6/37, Clevedon (F.) 23/6/47.
- Dolichopus* (s.g. *Melanodolichopus*) *planitarsis* Fall. S. Catcott (Cw.) 24/5/47, Edington (Cw.) 17/5/47.
- Dolichopus* (s.g. *Eudolichopus*) *arbustorum* Stann. G. Coombe Dingle (F.) 15/6/47.
- Dolichopus* (s.g. *Eudolichopus*) *nigricornis* Mg. S. Wells (F.) 1/6/46 Holford (Cw.) 5/9/47.

- Dolichopus* (s.g. *Eudolichopus*) *plumipes* Scop. **G.** Coombe Dingle (F.) 15/6/47.
- Dolichopus* (s.g. *Dolichopus* s.s.) *longitarsis* Stann. **S.** Norton Fitzwarren (F.) 16/8/47.
- Hercostomus cretifer* Walk. **G.** Durdham Down (F.) 2/7/47, Coombe Dingle (F.) 19/7/47.
- Hercostomus parvilamellatus* Macq. **S.** Edington (Cw.) 21/5/47.
- Gymnopternus brevicornis* Staeg. **S.** Ham Green (F.) 23/6/46, Leigh Woods, Bristol (F.) 20/7/47.
- Gymnopternus metallicus* Stann. **G.** Coombe Dingle (F.) 8/6/47.
- Hydrophorus bipunctatus* Lehm. **S.** Portbury (F.) 7/4/47.
- Medetera jugalis* Coll. **S.** Edington (Cw.) 7/6/47.
- Medetera muralis* Mg. **S.** Edington (Cw.) 15/6/47.
- Medetera nitida* Macq. **S.** Edington (Cw.) 8/8/46.
- Medetera pallipes* Zett. **S.** Edington (Cw.) 30/7/46.
- Porphyrops communis* Mg. **S.** West Town (F.) 25/5/47.
- Xiphandrium appendiculatum* Zett. (*macrocerum* Mg. *sp.* Par.) **G.** Combe Dingle (F.) 10/6/46 and 3/5/47; **S.** Edington (Cw.) 22/5/47.
- Xiphandrium caliginosum* Zett. (*zetterstedti* Par.) **G.** Coombe Dingle (F.) 24/7/46; **S.** Edington (Cw.) 7/8/47.
- Syntormon denticulatus* Zett. **G.** Coombe Dingle (F.) 25/9/46.
- Syntormon pallipes* F. var. *pseudospicatus* Strobl. **G.** Coombe Dingle (F.) 6/7/47.
- Neurogona quadrifasciata* F. **G.** Combe Dingle (F.) 15/6/47; **S.** West Town (F. and Cw.) 28/6/47.
- Chrysotus cupreus* Macq. **G.** Filton (F.) 6/6/47.
- Chrysotus neglectus* Wied. **G.** Coombe Dingle (F.) 8/6/47.
- Argyra argentella* Zett. (*discedens* Par. *nec* Beck.) **G.** Morton (F.) 8/7/47; **S.** Edington (Cw.) 4/7/47.
- Argyra argentina* Mg. **G.** Filton (F.) 6/6/47, Coombe Dingle (F.) 7/6/47; **S.** Loxley Wood, Shapwick (Cw.) 9/8/47.
- Argyra atriceps* Lw. **G.** Coombe Dingle, Bristol (F.) 8/6/47.
- Argyra confinis* Zett. **G.** Coombe Dingle (F.) 6/7/47; **S.** West Town (F.) 28/6/47, Leigh Woods, Bristol (F.) 20/7/47, Oakhill (Cw.) 29/6/47.
- Campsicnemus scambus* Fall. **G.** Durdham Down (F.) 26/9/46.
- Symphycnus desoutteri* Par. (*annulipes* Mg. of my list.) **G.** Coombe Dingle (F.) 19/5/47; **S.** Portishead (F.) 24/5/47, Loxley Wood, Shapwick (Cw.) 26/5/47.
- Xanthochlorus ornatus* Hal. **G.** Durdham Down (F.) 19/7/46, Coombe Dingle (F.) 15/6/47.

PHORIDAE

- Beckerina umbrimargo* Beck. S. Brockley Combe (A.)
17/5/47.
Conicera tarsalis Schmitz. S. Castle Neroche (F. W. Edwards)
12/5/36.

CLYTHIIDAE

- Microsania pallipes* Mg. S. Clevedon (H. Bird) 30/8/47.
Microsania pectimipennis Mg. G. Filton (F.) 29/8/47,
Durdham Down (F.) 1/9/47; S. Clevedon (H. Bird)
25/8/47.
Callomyia amena Mg. G. Coombe Dingle (F.) 9/6/46.
Agathomyia viduella Zett. S. West Town (A. and F.)
17/5/47.
Clythia atra Mg. G. Durdham Down (F.) 1/7/46.
Clythia consobrina Zett. S. Clevedon (A.) 25/10/47.
Clythia dorsalis Mg. G. Durdham Down (F.) 22/8/46.
Clythia hirticeps Verr. S. Leigh Woods, Bristol (A.)
10/9/34.
Clythia modesta Zett. G. Blaise Castle (F.) 12/10/47;
S. Clevedon (A.) 25/10/47.
Clythia picta Mg. G. Tewkesbury (A.) 1/11/35.
Clythia rufa Mg. G. Blaise Castle (F.) 12/10/47; S.
Clevedon (A.) 25/10/47.
N.B.—The three Clevedon species were caught on *Armillaria
mellea*, Honey Fungus.

DORILAIIDAE

- Dorilas flavipes* Mg. S. Loxley Wood, Shapwick (Cw.)
19/6/44.
Dorilas furcatus Egg. S. Loxley Wood, Shapwick (Cw.)
26/5/47.
Dorilas fuscipes Zett. S. Catcott (Cw.) 24/5/47.
Dorilas hæmorrhoidalis Zett. S. Catcott (Cw.) 24/5/47,
Wedmore (Cw.) 23/7/47.
Dorilas imparatus Coll. S. Loxley Wood, Shapwick (Cw.)
19/5/47.
Dorilas montium Beck. G. Filton (F.) 22/5/40.
Dorilas nigritulus Zett. S. Wells. (L.) no date.
Dorilas pulchripes Thom. G. Coombe Dingle (F.) 26/10/47.
Dorilas thomsoni Beck. (*pratorum* Verr. *nec* Fall.) S. Loxley
Wood, (Cw.) 2/7/47.
Dorilas ultimus Beck. G. Durdham Down (F.) 4/9/47.
Dorilas vittipes Zett. G. Coombe Dingle (F.) 20/5/47;
S. West Town (F.) 25/5/47.
Dorilas zonatus Zett. S. Loxley Wood, Shapwick (Cw.
and F.) 21/6/47.

SYRPHIDAE

- Paragopsis (Eumerus) tuberculatus* Rond. S. Edington (Cw.)
31/5/42.
- Brachypalpus bimaculatus* Macq. G. Coombe Dingle (Lw.)
7 to 24/6/47.
- Zelima (Xylota) semulatra* Harr. (*abiens* Wied.) S. Loxley
Wood, Shapwick (Cw.) 8/7/45.
- Zelima (Xylota) tarda* Mg. S. Loxley Wood, Shapwick
(Cw.) 3/7/45.
- Zelima (Xylota) xanthocnema* Coll. G. Olveston (C.) 7/17,
Blaise Castle (A.) 6/21; S. Edington (A. and Cw.)
5/7/47.
- Brachyopa insensilis* Coll. S. Edington (Cw.) 2/6/47.
- Chrysogaster macquarti* Lw. S. Edington (Cw.) 6/42-46.
- Chrysogaster virescens* Lw. S. Keynsham (A.) 1/6/29.
- Cheilisia (Pyrophæna) rosarum* F. G. Coombe Dingle (F.)
14/8/44.
- Xanthandrus comtus* Harr. G. Durdham Down (F.) 20/9/47;
S. Long Ashton (J.B.) 28/7/44.
- Platycheirus tarsalis* Schum. G. Mangotsfield (J.B.) 14/8/43.
- Ischyrosyrphus laterarius* Müll. S. Tickenham (A.) 26/1/24,
West Town (Wm.) 10/7/27, Street (Cw) 11/7/45,
Loxley Wood, Shapwick (A.) 5/7/47.
- Chrysotoxum latilimbatum* Coll. S. Clevedon (A.) 1/8/40
and 12/6/47, Loxley Wood, Shapwick (Cw.) 4/7/45.
- Syrphidis (Syrphus) annulipes* Zett. G. Coombe Dingle (Lw.)
19/5/47; S. West Town (F.) 21/4/46.
- Sphærophoria menthrasti* L. var. *taeniata* Mg. S. Edington
(Cw.) 20/7/45.

CONOPIIDAE

- Thecophora (Occemyia) atra* F. S. Cadbury Camp (F.)
12/7/47.
- Myopa polystigma* Rond. S. Edington (Cw.) 25/4/44.

LARVAEVIDAE

- Zenillia (Exorista, s.g. Eumea) spernenda* Zett. (*westermanni* Zett.)
G. Kings Weston, Bristol (F.) 9/6/46, Filton (F.)
17/9/46.
- Zenillia (Exorista, s.g. Eumea) hortulana* Mg. G. Bristol. (F.)
21/5/46.
- Cyzenis albicans* Fall. G. Coombe Dingle (F.) 9/6/46.
- Epicampocera succincta* Mg. G. Filton (F.) 10/5/45, Coombe
Dingle (F.) 11/5/45, Durdham Down (F.) 27/9/47.
- Lydella grisescens*, R.D. S. Walton Moor, Clevedon (F.)
24/8/47.
- Carcelia grava* Mg. G. Coombe Dingle (F.) 2/5/46.

- Winthemya* (s.g. *Chetoliga*) *amæna* Mg. **G.** Coombe Dingle (F.) 22/4/45.
- Winthemya quadripustulata* F. **G.** Filton (F.) 23/8/46.
- Winthemya variegata* Mg. **G.** Coombe Dingle (F.) 10/6/47.
- Phorocera assimilis* Fall. **G.** Coombe Dingle (F.) 22/4/46.
- Exorista* (*Tachina*, *Larvævora*) *larvarum* L. **S.** Walton Moor, Clevedon (F.) 24/8/47.
- Meigenia bisignata* Mg. **G.** Filton (F.) 24/8/46.
- Anachætopsis ocypterina* Zett. **G.** Filton (F.) 4/6/46 and 15/7/46.
- Voria* (s.g. *Athrycia*) *trepida* Mg. var. *curvinervis* Zett. **G.** Filton (F.) 18/6/46.
- Wagneria lentis* Mg. **G.** Coombe Dingle (F.) 15/5/46 ; **S.** Cadbury Camp (F.) 12/5/46.
- Neaera albicollis* Mg. **G.** Filton (F.) 26/8/46.
- Ernestia* (s.g. *Varichæta*) *connivens* Zett. **G.** Coombe Dingle (F.) 7/9/46 ; **S.** Saltford (F.) 1/9/46.
- Ernestia vagans* Mg. **G.** Coombe Dingle (F.) 22/4/46.
- Bithia spreta* Mg. **S.** Edington (F.) 5/7/47.
- Larvævora* (s.g. *Fabriciella*) *ferox* Panz. **G.** Westbury-on-Trym (F.) 27/8/44.
- Servillia lurida* F. **G.** Coombe Dingle (F.) 4/6/45.
- Macquartia* (s.g. *Cleonice*) *grisea* Fall. **S.** Cadbury Camp (F.) 12/5/46.
- Macquartia nubilis* Rond. **G.** Coombe Dingle (F.) 3/7/45.
- Alophora* (*Allophora*) *hemiptera* F. **S.** Shapwick (Cw.) 4/7/45.
- Hyalomyia obesa* F. **G.** Durdham Down (F.) 21/9/47.
- Lophosia* (*Lophrosia*) *fasciata* Mg. **G.** Coombe Dingle (F.) 25/6/45 and (Lw.) 18/7/47.
- Protachaeta discrepans* Pand. **G.** Durdham Down (F.) 7/9/46.
- Blaesoxipha rossica* Villen. **S.** Edington (A.) 5/7/47.
- Metopia argyrocephala* Mg. (*leucocephala* Rossi,) **S.** Ham Green (F.) 7/7/46.
- Pachyophthalmus signatus* Mg. **G.** Coombe Dingle (F.) 7/6/47.
- Macronichia ungulans* Pand. **G.** Bristol (F.) 12/6/46 ; **S.** Leigh Woods, Bristol (F.) 20/7/47, Edington (F.) 21/6/47.
- Stomorhina* (*Stomatorhina*) *lunata* F. **G.** Westbury-on-Trym (31 specimens on Golden Rod in garden) (F.) 21—26/9/47, Coombe Dingle (Lw.) 2/10/47.

MUSCIDAE

- Pyrellia serena* Mg. **S.** Sharpam (F.) 6/9/47.
- Muscina assimilis* Fall. **S.** Nailsea (G. S. Maunder) bred 7/45 from the Field Mushroom (*Psaliota campestris*).

- Muscina pabulorum* Fall. G. Downend (J.B.) 29/7/45.
Gasterophilus intestinalis Deg. S. Hanham (J.B.) 11/9/43.
Alleostylus simplex Wied. G. Coombe Dingle (F.) 9/11/47.
Dialyta atriceps Lw. G. Coombe Dingle (F.) 9/6/46 and
 19/5/47.
Dialyta halterata Stein. G. Coombe Dingle (F.) 11/6/46.
Lophosceles cristatus Zett. G. Blaise Castle (F.) 29/9/46.
Phaonia errans Mg. S. Ham Green (F.) 19/4/47, Walton
 Moor, Clevedon (F.) 23/8/47.
Phaonia erratica Fall. G. Moorend (J.B.) 17/8/43 and
 4/8/45.
Phaonia erronea Schnb. G. Coombe Dingle (F.) 5/10/47,
 Blaise Castle (F.) 9/11/47.
Phaonia goberti Mik. G. Bristol (F.) 24/4/46, Coombe
 Dingle (F.) 26/10/47.
Phaonia laeta Fall. G. Filton (F.) 1/5/46.
Phaonia magnicornis Zett. S. Sharpsham (F.) 6/9/47.
Phaonia scutellaris Fall. G. Mangotsfield (J.B.) 9/9/45.
Phaonia serva Mg. G. Filton (F.) 10/5/45, Coombe Dingle
 (F.) 7/6/47.
Phaonia signata Mg. G. Mangotsfield (J.B.) 9/9/45.
Phaonia trimaculata Bché. G. Filton (F.) 22/5/46, Coombe
 Dingle (F.) 22/5/46.
Phaonia vittifera Zett. G. Coombe Dingle (F.) 9/5/46 ;
 S. West Town (F.) 25/5/47.
Hydrotæa albipuncta Zett. S. Cadbury Camp (F.) 12/5/46
 and 11/5/47, Coxley Moor, Wells (F.) 1/6/46.
Hydrotæa armipes Fall. S. West Town (F.) 17/5/47.
Hydrotæa militaris Mg. G. Filton (F.) 16/5/45, Coombe
 Dingle (F.) 19/7/47.
Hydrotæa pilipes Stein. G. Chalford (F.) 15/7/47.
Hydrotæa similis Mde. G. Mangotsfield (J.B.) 11/4/45.
Hydrotæa velutina R.D. G. Bristol (F.) 22/5/46, Coombe
 Dingle (F.) 20/5/47.
Fannia atra Stein. S. Clevedon (F.) 12/7/47.
Fannia difficilis Stein. G. Bristol (F.) 1/5/46.
Fannia genualis Stein. S. Cadbury Camp (F.) 11/5/47.
Fannia hirticeps Stein. G. Coombe Dingle (F.) 19/5/47.
Fannia lineata Stein. G. Bristol (F.) 20/5/46, Filton (F.)
 3/6/46, Coombe Dingle (F.) 30/6/46. S. Coxley
 Moor, Wells (F.) 1/6/46.
Fannia monilis Hal. G. Filton (F.) 10/5/46 and 19/9/46.
Fannia parva Stein. G. Coombe Dingle (F.) 9/5/46,
 Durdham Down (F.) 18/6/46, Blaise Castle (F.) 8/11/47.
Fannia postica Stein. G. Coombe Dingle (F.) 11/5/46 and
 15/6/46.

- Fannia pretiosa* Schin. S. Saltford (F.) 1/9/46.
Fannia pubescens Stein. G. Filton (F.) 20/9/46; S. Clevedon (F.) 12/7/47.
Fannia similis Stein. G. Durdham Down (F.) 30/5/47.
Fannia speciosa Villen. G. Filton (F.) 24/5/46.
Fannia vesparia Mde. S. Saltford (F.) 1/9/46.
Piezura pardalina Rond. G. Coombe Dingle (F.) 2/8/44, Blaise Castle (F.) 29/9/46; S. Ham Green (F.) 23/6/46, Leigh Woods, Bristol (F.) 20/7/47.
Lispe litorea Fall. G. New Passage (F.) 11/8/45.
Lispe uliginosa Fall. G. Bristol (F.) 8/8/35.
Limnophora (s.g. *Spilogona*) *surda* Zett. G. Coombe Dingle (F.) 7/6/47.
Limnophora (s.g. *Gymnodia*) *humilis* Zett. G. Filton (F.) 26/6/47.
Limnophora (s.g. *Pseudolimnophora*) *nigripes* R.D. G. Coombe Dingle (F.) 21/9/46.
Limnophora (s.g. *Pseudolimnophora*) *triangula* Fall. G. Coombe Dingle (F.) 20/5/47, Hallen (F.) 18/9/37.
Hebecnema affinis Mall. G. Coombe Dingle (F.) 3/5/47.
Hebecnema fumosa Mg. G. Westbury-on-Trym (F.) 14/10/44, Bristol (F.) 15/4/46.
Mydæa ancilla Mg. G. Bristol (F.) 9/5/46.
Mydæa nebulosa Stein. G. Coombe Dingle (F.) 2/5/46 and 26/6/47.
Enoplopteryx ciliatocostata Zett. G. Filton (F.) 23/8/46.
Enoplopteryx obtusipennis Fall. S. West Town (F.) 17/5/47, Failand (F.) 31/5/47.
Helina denudata Zett. G. Durdham Down (F.) 22/5/46.
Helina obscurata Mg. G. Morton (F.) 14/7/47.
Helina quadrimaculata Fall. S. West Town (F.) 25/5/47, Loxley Wood, Shapwick (F.) 5/7/47.
Helina uliginosa Fall. G. Filton (F.) 30/5/46.
Hydrophoria linogrisea Mg. G. Mangotsfield (J.B.) 28/4/45; S. Leigh Woods (F.) 20/7/47.
Hydrophoria ruralis Mg. G. Coombe Dingle (F.) 18/7/47, Filton (F.) 26/8/47.
Acroptena divisa Mg. G. Coombe Dingle (F.) 13/7/47.
Acroptena villosa Ringdh. S. Clevedon (F.) 28/5/47.
Pegomyza intermedia Mg. G. Coombe Dingle (F.) 8/5/45, Chalford (F.) 15/7/47.
Pegomyza praepotens Wied. G. Durdham Down (F.) 23/7/46.
Pegomyza virginea Mg. G. Coombe Dingle (F.) 7/6/47.
Pegomya (*Pegomyia*) *caesia* Stein. G. Durdham Down (F.) 11/6/47.

- Pegomya esuriens* Mg. **G.** Coombe Dingle (F.) 28/5/46 and 19/5/47, Filton (F.) 23/5/46.
- Pegomya geniculata* Bché. **G.** Durdham Down (F.) 2/6/47; **S.** West Town (F.) 1/6/47.
- Pegomya genupunctata* Stein. **G.** Coombe Dingle (F.) 25/5/46; **S.** West Town (F.) 25/5/47.
- Pegomya hamorrhoea* Zett. **G.** Filton (F.) 4/7/46; **S.** Failand (F.) 31/3/46.
- Pegomya interruptella* Zett. **G.** Durdham Down (F.) 2/6/47.
- Pegomya squamifera* Stein. **G.** Blaise Castle (F.) 8/11/47.
- Pegomya univittata* v. Ros. **G.** Coombe Dingle (F.) 10/6/47 and 19/7/47.
- Pegomya vittigera* Zett. **S.** Clevedon (A.) 22/9/47.
- Chortophila* (s.g. *Delia*) *carduiformis* Schnb. **G.** Bristol (F.) 15/4/46, Filton (F.) 27/8/46.
- Chortophila* (s.g. *Delia*) *cepetorum* Mde. **S.** Clevedon (F.) 11/5/47.
- Chortophila* (s.g. *Delia*) *tristriata* Stein. **G.** Coombe Dingle (F.) 7/4/46.
- Chortophila* (s.g. *Erioischa*) *floralis* Fall. **G.** Durdham Down (F.) 23/7/46; **S.** West Town (F.) 21/4/46.
- Chortophila* (s.g. *Nupedia*) *debilis* Stein. **S.** Cadbury Camp (F.) 13/4/47.
- Melinia canabina* Stein. **S.** Cadbury Camp (F.) 11/5/47.
- Phorbia curvicauda* Zett. **G.** Coombe Dingle (F.) 8/5/47.
- Egle aestiva* Mg. **G.** Coombe Dingle, 19/8/46; **S.** Ham Green (F.) 26/4/47.
- Egle parva* R.D. **G.** Bristol (F.) 21/5/46, Filton 19/7/46 and 23/9/46.
- Egle radicum* L. **G.** Filton (F.) 25/4/47, Durdham Down (F.) 25/9/47.
- Opsolasia ræderi* Kow. **S.** Ham Green (F.) 19/4/47.
- Leucophora* (*Hammomyia*) *grisea* Fall. **G.** Coombe Dingle (F.) 11/5/45.
- Hylephila personata* Coll. **G.** Coombe Dingle (F.) 16/4/47 and 19/5/47.
- Paraprosalpia* (*Prosalpia*) *bilbergi* Zett. **G.** Bristol (F.) 15/4/46; **S.** West Town (F.) 26/4/47.
- Paraprosalpia* (*Prosalpia*) *sepiella* Zett. **S.** West Town (F.) 26/4/47 and 17/5/47.
- Paraprosalpia* (*Prosalpia*) *silvestris* Fall. **S.** West Town (F.) 21/4/46.
- Lispocephala alma* Mg. **G.** Morton (F.) 17/2/46.
- Lispocephala brachialis* Rond. **G.** Coombe Dingle (F.) 7/4/47.
- Lispocephala erythroceræ* R.D. **G.** Coombe Dingle (F.) 22/4/46.

- Chelisia monilis* Mg. **S.** West Town (F.) 17/5/47, Portishead (F.) 24/5/47.
Limnospila albifrons Zett. **G.** Filton (F.) 24/6/46.
Spanochæta dorsalis Stein. **G.** Coombe Dingle (F.) 19/8/46 and 15/6/47.
Schænomyza litorella Fall. **G.** Filton (F.) 18/9/46.
Cænosiæ bilineella Zett. **G.** Durdham Down (F.) 21/8/47.
Cænosiæ perpustakaan Mg. **G.** Durdham Down (F.) 19/7/46.
Cænosiæ trilineella Zett. **G.** Durdham Down (F.) 19/7/46.

SCATOPHAGIDAE (CORDILURIDAE)

- Amaurosoma fasciatum* Mg. **G.** Coombe Dingle (F.) 8/5/47.
Cnemopogon apicalis Wied. **S.** Catcott (Cw.) 24/8/47, Edington (Cw.) 17/5/47.
Leptopeza filiformis Zett. **G.** Coombe Dingle (F.) 14/7/46.
Trichopalpus fraternus Mg. **S.** Ham Green (F.) 19/4/47, Walton Moor, Clevedon (F.) 28/8/47.

PALLOPTERIDAE

- Pallopæta ambusta* Mg. **G.** Coombe Dingle (F.) 10/6/47 and 6/7/47.
Pallopæta trimacula Mg. **G.** Coombe Dingle (F.) 7/9/46.

TRYPETIDAE

- Urophora solstitialis* L. **S.** Cheddar (F.) 6/8/35.
Spilographa (Euribia) immaculata Macq. **S.** Leigh Woods, Bristol (F.) 20/7/47.
Gonioglossum (Orellia) wiedmanni Mg. **S.** Wraxall (F.) 28/6/36.
Phagocarpus permundus Harr. **G.** Durdham Downs (F.) 4/9/47.
Prionimera (Acidial) cognata Wied. **G.** Coombe Dingle (F.) 26/6/47, Filton (F.) 7/7/47.
Trypeta falcata Scop. **G.** Filton (F.) 28/6/46.
Trypeta (Orellia) ruficauda F. **G.** Filton (F.) 10/7/46.

LONCHAEIDAE

- Lonchæa deutschii* Zett. **G.** Shepperdine (A.) 5/8/24; **S.** Sharpham (A.) 31/7/35.
Lonchæa scutellaris Rond. **S.** Clevedon (A.) 13/7/40, Shepton Mallet (A.) 7/8/42.
Lonchæa tarsata Fall. **S.** Sharpham (A.) 31/7/25.

LAUXANIIDAE

- Calliopum (Halidayella) similimum* Coll. **G.** Coombe Dingle (F.) 7/6/47.
Cnemacantha (Sapromyza) illota Lw. **G.** Kings Weston, Bristol (F.) 9/6/46.
Cnemacantha (Sapromyza) leta Zett. **G.** Coombe Dingle (F.) 6/7/47; **S.** West Town (F.) 1/6/47.
Sapromyza hyalinata, Mg. **G.** Coombe Dingle (F.) 12/5/47.

PSILIDAE

Psila (s.g. *Camptopsila*) *lefebvrei* Zett. G. Coombe Dingle (F.) 29/5/46.

Psila (s.g. *Tetrapsila*) *obscuritarsis* Lw. G. Filton (F.) 6/6/47.

TETANOCERIDAE (SCIOMYZIDAE)

Phaomyia fuscipennis Mg. G. Coombe Dingle (F.) 8/6/47.

Sciomyza nana Fall. S. West Town (F.) 28/6/47.

Sciomyza scutellaris v. Ros. G. Durdham Down (F.) 15/9/46.

Pteromicra glabricula Fall. G. Coombe Dingle (F.) 20/5/47;

S. Sharpham (F.) 6/9/47.

Ilione (Elgiva) lineata Fall. S. Brockley Combe (F.) 27/6/36.

Hydromya dorsalis F. G. Damery (F.) 23/3/36, Filton (F.) 1/7/47.

Limnia fenestrata Macq. G. Coombe Dingle (F.) 16/6/45, Filton (F.) 11/9/46.

Salpicella (Lucina) fasciata Mg. G. Coombe Dingle (F.) 8/6/47.

Tetanura pallidiventris Fall. G. Coombe Dingle (F.) 19/6/47.

COELOPIDAE

Caelopa eximia Stenh. S. Clevedon (F.) 12/7/47.

HELOMYZIDAE

Helomyza dumicola Coll. G. Coombe Dingle (F.) 28/7/47.

Allophyla atricornis Mg. G. Coombe Dingle (F.) 15/6/47, Blaise Castle (F.) 14/10/47.

Heteromyza (Theleida) rotundicornis Zett. G. Durdham Down (F.) 17/1/47.

Heteromyza (Theleida) commixta Coll. G. Filton (F.) 9/1/47.

Heteromyza (Theleida) oculata Fall. G. Blaise Castle (F.) 5/10/47.

Tephrochlamys tarsalis Zett. G. Brentry (F.) 6/10/47.

Neolieria inscripta Mg. S. West Town (F.) 17/4/47.

Neolieria ruficauda Zett. S. teste J. E. Collin.

Neolieria ruficeps Zett. G. Filton (F.) 26/3/46.

Chetomus confusus Wahlg. G. Coombe Dingle (F.) 15/6/47.

Leria modesta var. *czernyi* Collart. G. Filton (F.) 17/3/47.

CLUSIIDAE

Acartophthalmus bicolor Old. G. Durdham Down (F.) 30/5/47 and 11/6/47.

Clusiodes gentilis Coll. G. Coombe Dingle (F.) 29/9/46.

DIASTATIDAE

Campichaeta obscuripennis Mg. G. Durdham Down (F.) 12/10/46.

DROSOPHILIDAE

- Stegana coleoprata* Scop. G. Chalford (F.) 15/7/47.
Drosophila busckii Coq. G. Durdham Down, 12/8/46 and
 12/10/46; S. Clevedon (F.) 1/11/47.
Drosophila obscura Fall. var. *tristis* Fall. G. Durdham Down
 (F.) 28/8/46.
Cacoxenus indagator Lw. S. Clevedon (A.) 21/5/47.

EPHYDRIDAE

- Dichaeta caudata* Fall. S. Sharpham (F.) 6/9/47.
Notiphila dorsata Stenh. S. Clevedon (F.) 27/5/47.
Notiphila nigricornis Stenh. S. Clevedon (F.) 27/5/47.
Discomyza incurva Fall. G. Durdham Down (F.) 24/9/47.
Pelina aenescens Stenh. S. Clevedon (F.) 27/5/47.
Pelina nitens Lw. S. Ham Green (F.) 19/4/47.
Hydropota (Hydrellia) albiceps Mg. S. Ham Green (F.)
 19/4/47.
Hydropota (Hydrellia) albilabris Mg. G. Hallen (F.) 18/9/47,
 Filton (F.) 1/10/47.
Hydropota (Hydrellia) nasturtii Coll. G. Coombe Dingle (F.)
 15/9/46, Filton (F.) 8/10/46.
Hydropota (Hydrellia) nigripes Zett. var. *cochleariae* Hal. G.
 Coombe Dingle (F.) 21/9/46.
Cenia fumosa Stenh. S. Sharpham (F.) 6/9/47.
Cenia palustris Fall. G. Hallen (F.) 18/9/47.
Lamproscatella dichæta Lw. G. Filton (F.) 17/3/47; S.
 Wick (F.) 11/4/47, West Town (F.) 26/4/47.
Scatella lutosa Hal. S. Ham Green (F.) 26/4/47.
Scatella subguttata Mg. (*aestuans* Hal). G. Coombe Dingle
 (F.) 15/9/46, Filton (F.) 19/9/46; S. Portishead (F.)
 25/5/47.
Limnellia fallax Cz. G. Brentry (F.) 5/10/47.
Parydra (Napæa) nigritarsis Strobl. G. Brentry (F.) 5/10/47;
 S. Clevedon (F.) 27/5/47, Ham Green (F.) 19/4/47.
Parydra (Napæa) littoralis Mg. G. Coombe Dingle (F.) 29/9/46.

SPHAEROCERIDAE (CYPSELIDAE, BORBORIDAE)

- Stratioborborus (Cypselæ) fimetarius* Mg. (*suillorum* Hal) G.
 Coombe Dingle (F.) 7/4/47.
Stratioborborus (Cypselæ) roseri Rond. G. Blaise Castle (F.)
 18/10/47.
Borborillus (Cypselæ) costalis Zett. G. Filton (F.) 9/10/44.
Trichiaspis (Cypselæ) stercoraria Mg. G. Damery (F.)
 23/3/46.
Collinellula (Leptocera) lutosa Stenh. G. Filton (F.) 1/7/47,
 Hallen (F.) 18/9/47; S. Clevedon (F.) 27/5/47,
 Walton Moor, Clevedon (F.) 23/8/47.

- Paracollinella* (*Leptocera*) *oldenbergi* Duda. G. Coombe Dingle (F.) 15/9/46 and 22/4/47.
- Stanhammaria* (*Leptocera*) *fenestralis* Fall. S. Portbury (F.) 22/3/47.
- Spinotarsella* (*Leptocera*) *humida* Hal. G. Coombe Dingle (F.) 4/4/47 and 8/6/47.
- Thoracochæta* (*Leptocera*) *brachystoma* Stenh. G. Filton (F.) 25/3/47; S. Ham Green (F.) 26/4/47.
- Limosina bifrons* Stenh. S. Ham Green (F.) 26/4/47.
- Limosina collini* Rich. S. Portbury (F.) 22/3/47.
- Limosina clunipes* Mg. (*crassimana* Hal.) G. Filton (F.) 17/3/47.
- Limosina luteilabris* Rond. (*simplicimana* Rond.) G. Filton (F.) 17/3/47.
- Limosina mirabilis* Coll. S. Ham Green (F.) 26/4/47.
- Limosina penetralis* Coll. G. Filton (F.) 25/3/47.
- Limosina rufilabris* Stenh. G. Coombe Dingle (F.) 29/3/47.
- Limosina talparum* Rich. S. West Town (F.) 17/5/47.
- Coprophila acutangula* Zett. (*pusilla* Mg.) G. Coombe Dingle (F.) 16/4/47.
- Coprophila ferruginata* Stenh. G. Coombe Dingle (F.) 16/4/47; S. Ham Green (F.) 26/4/47.

AGROMYZIDAE

- Agromyza spirææ* Kalt. G. Coombe Dingle (F.) 10/5/47.
- Melanagromyza schineri* Giraud. S. Portishead (F.) 24/5/47.
- Phytomyza ranunculi* Schrk. var. *præcox* Mg. G. Coombe Dingle (F.) 7/4/46 and 25/9/46.
- Phytomyza albipennis* Fall. G. Bristol (F.) 16/2/46 and 25/5/46.

ODINIIDAE

- Odinia maculata* Mg. G. Coombe Dingle (F.) 26/6/47, Durdham Down (F.) 22/8/47.

PUPIPARA HIPPOBOSCIDAE

- Ornithomya fringillina* Curt. S. Wellow (H. R. F. Magrath) 14/7/06.

CORRECTIONS

STRATIOMYIDAE. 7, (3), 198, 1930: For *Eulalia hydroleon* L. substitute *E. angulata* Panz.

PSYCHODIDAE. 7 (2), 120, 1929. For *Pericoma advena* Est. substitute *P. diversa* Tonn.

For *Psychoda sexpunctata* Curt. substitute *P. alternata* Say.

RECENT LITERATURE

COLLIN, J. E., 1947. The British Genera of Trypetidae. *Ent. Rec.* 59, Suppl. 1-14.

THE AGE OF THE CLIFTON GORGE, BRISTOL

By EDWARD GREENLY, D.Sc., F.G.S.

(Received, Aug. 6, 1947. Read in title at General Meeting,
March 4, 1948)

TO find the age of this, we have to find the age of the Downs, through which it has been cut.

Not very far to the east of Bristol, we enter a country of long escarpments composed of Mesozoic rocks. But an escarpment is not a fixture: it is all the time in slow recession. At their initiation, these escarpments must have ranged all across the Bristol country from which they have since receded. When they still were there, the Downs cannot have been at or even near the surface. The eastern of the said escarpments is the escarpment of the Chalk, whence it follows that our Downs cannot be of Cretaceous age.

Can they then be of Eocene age? Hardly, for during the Eocene period, most of what now is southern England was under an extensive sea, so no escarpments could be formed. To the succeeding Oligocene much the same remark applies.

We need a long terrestrial period for our escarpments to develop. And this we find in the Miocene, during which period (with the doubtful exception of its close) the whole of the British area does appear to have been land. Development and recession, however, go on with excessive slowness: we can hardly expect our Downs to emerge until the dawn of the Pliocene period. So they would see the light of day somewhere about that time, when there had been some recession.

Some of this evidence, however, may be said to be negative, so confirmation is desirable, and confirmation is to be had. Along and adjacent to the coast, from the Lizard to Anglesey, there are several similar platforms, the latest and lowest of which is at about the same height as our Downs. Now the age of these platforms is known to be Pliocene. But when two lines of reasoning, of such totally different kinds, both converge to the same conclusion, there can be little doubt of the soundness of that conclusion. So we can feel tolerable confidence that our Downs are of Pliocene age.

But the Gorge is a trenchment through them. Accordingly, it too must be Pliocene, of a somewhat later stage.

Does this date appear too recent for so gigantic an operation? But *is* the Pliocene so recent? In eastern England it does so seem.

If, on the other hand, we go to the Mediterranean, the great volcanic cone of Etna, more than 10,000 feet in height, has been built-up by successive eruptions since a late stage of the Pliocene period. Moreover, while the East-Anglian Pliocene adds up to 290 feet, the Pliocene of Northern India is of the order of 14,000. In view of measurements such as these, a Pliocene age seems not too recent even for the Clifton Gorge.

STUDIES ON THE BIOLOGY OF THE BRISTOL CHANNEL

XVII

THE LITTORAL AND SUBLITTORAL FAUNA OF THE NORTHERN SHORES, NEAR CARDIFF

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(Received, Feb. 19, 1948. Read in title at General Meeting,
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CONTENTS

- | | |
|------------------------|-----------------------|
| 1. Introduction | 6. Sublittoral Survey |
| 2. Peterstone Wentloog | 7. Biological Notes |
| 3. Sully Island | 8. Discussion |
| 4. Barry Harbour | 9. Summary |
| 5. Breaksea Point | 10. Reference List. |

I. INTRODUCTION

DURING the last ten years the southern shores of the Estuary of the Severn and the Bristol Channel from Gloucester to Porlock have been subjected to a biological survey by members of the Department of Zoology of Bristol University. On the other hand, the northern shores, the coasts of South Wales and Monmouthshire, have not been systematically explored, and of recent years the only papers dealing with this area are those of C. B. Rees (1939; 1940).

An effort is now being made to bridge this gap in our knowledge, and in 1947 the writer has examined three shores in the vicinity of Cardiff, each easily accessible by road or rail.

By means of a special grant of money from University College, Cardiff, and using apparatus kindly lent by the Department of Zoology, University of Bristol, a survey of the sublittoral fauna was attempted off the same length of coast and around the principal local features in the Bristol Channel, namely the sandbank known as Cardiff Grounds, the Monkstone, Flat Holm and Steep Holm. In all, 8 days were spent in boat work, and the writer wishes to express his gratitude to Mr. F. J. Boyce, owner of "Progress I", whose willing co-operation at all times did much to increase

the scope of the survey, and also to acknowledge kind assistance in the boat work from his colleagues, Mr. G. T. Jefferson and Mr. W. A. L. Evans. A number of students of this College were also very helpful in boat work.

The position of the shore stations and of the trawl and dredge hauls are shown in the map. The sublittoral stations have been divided arbitrarily into three groups as is indicated by the broken lines on the map, and from the sublittoral records for each of these areas additions have been made in a separate column (b) to the fauna list of the appropriate shore station.

In the descriptions of stations, the following abbreviations have been used :—

H.W.N.T.	High-water mark of neap tides.
M.S.L.	Mean sea level.
L.W.N.T.	Low-water mark of neap tides.
L.W.O.S.T.	Low-water mark of ordinary spring tides.

No exact measurements of these tidal levels were made, and their use is intended merely to give an approximate impression of the zonation of the fauna on the shore.

I am indebted to Dr. A. B. Hastings for the identification and correction of nomenclature of all the Polyzoa, and to Dr. E. M. Sheppard for examination of all the Isopoda. I also wish to thank Dr. H. O. Bull who checked the identity of *Diadumene lucia*, and Major G. I. Crawford who identified specimens of *Corophium volutator* and all specimens of *Gammarus* and *Marinogammarus*.

Thanks are due to Professor J. E. Harris for the use of an Agassiz trawl, a naturalist's dredge and a considerable quantity of rope, without which I should have been unable to undertake any boat work in 1947.

I also wish to thank Professor James Brough for his help in the development of this survey and for his critical assistance in the preparation of this paper.

II. PETERSTONE WENTLLOOG

The region of shore examined lay a little to the west of Peterstone Wentlloog, not far from the point where a sewer crosses the beach and opens on the shore a little above L.W.O.S.T. It was, in fact, the same area as that studied by C. B. Rees (1940) in 1937. The mouth of the sewer is marked by a buoy which at low water lies on the shore in a shallow pool. By the side of the sewer there is a series of wooden piles, the lowermost of which were examined in 1947.

The salt marsh consists of two zones only. There is an upper

sward terminating to seaward in a vertical earth cliff some 6 feet high. This zone was not examined in the present survey. At a comparatively recent date, it appears, the middle zone, which is typical of salt marshes, has been entirely removed by erosion. In consequence, at the foot of the above mentioned cliff there is open mud, fairly firm to the foot as it lies above H.W.N.T., colonised sparsely by *Salicornia* sp. and *Spartina townsendi*. Surface drainage has led to the formation of shallow pools between the clumps of *Spartina*.

In the following description of the distribution of the fauna, mention will be made of the most abundant species encountered. In the fauna list for this beach the species recorded by C. B. Rees (1940) are included with acknowledgments. From the visits to the beach in 1947, certain broad impressions of the distribution of the fauna were gained which did not entirely agree with the findings of the exhaustive survey by Rees. For example, in 1947 *Macoma balthica* was especially abundant only in the region of and below L.W.N.T. *Hydrobia ulvae*, which Rees found in greatest abundance on the firm but rough-surfaced mud below M.S.L., in 1947 was most abundant on the softer, smoother mud higher up on the beach near M.S.L. More accurate comparisons are not possible as no population counts and no measurements of vertical level were made in 1947.

In 1937, Rees found *Corophium volutator* in abundance only near L.W.O.S.T. and suggested that its appearance there was only temporary. In 1947 the distribution of this species was unchanged.

In shallow pools on the mud above H.W.N.T. *Crangon vulgaris* and *Gobius* spp. were abundant, and a large specimen of *Anguilla vulgaris* was obtained.

At the seaward end of the *Spartina* zone there was a small pile of boulders and stones bearing a small growth of *Pelvetia canaliculata* and here *Lineus gesserensis*, *Melita palmata* and *Mercierella enigmatica* were obtained.

Below this level and extending some distance below M.S.L. the mud is fairly firm except on the banks of shallow, meandering water courses. The dominant species here were *Nereis diversicolor* and *Hydrobia ulvae*. Over quite a wide area of the upper third of this zone the empty shells of *Scrobicularia plana* occurred in abundance, lying wedged vertically in the mud as though exposed by erosion. Undoubtedly *S. plana* has lived here in abundance recently but no traces were found on the surface of the mud suggesting the presence of living specimens, and much searching deep in the mud failed to produce a single specimen. In 1937, Rees obtained one living specimen of *S. plana*. It is conjectured that erosion of the middle zone of this salt marsh, or unusually sharp frosts, may have caused a great local reduction of this species.

A short distance below M.S.L. *Hydrobia ulvae* became rare. In crevices in a fallen tree wedged in the mud at this level, large congregations of *Jera marina* were found, and specimens of *Tealia felina* and *Lepidochiton cinereus* were also found here.

At and below L.W.N.T. the mud became stiffer, and lighter in colour, and its surface was pitted instead of smooth, as described by Rees (1940). The extent of this area may vary from season to season according to temporary variations in the strength of inshore currents and variations in the rate of deposition or erosion of soft, surface mud. In this area of stiff mud the dominant species were *Corophium volutator* and *Macoma balthica*.

Laomedea gelatinosa was quite common on stones lying on the surface of the mud, as also was the anemone *Diadumene luciae* but this species was most abundant on the wooden piles near the mouth of the sewer. Rees recorded the presence of this species in 1937 but did not state whether it was typical in form and colouration or not. Specimens taken in 1947 were unusual and a description is given in Section 7.

One living specimen of *Teredo navalis* was found in one of the piles near the mouth of the sewer.

Fauna List at Peterstone Wentlloog

a. Intertidal

CŒLENERATA

HYDROZOA

- Tubularia indivisa* L.
- Laomedea gelatinosa* (Pallas)
- †*Obelia dichotoma*

ANTHOZOA

- **Diadumene luciae* (Verrill)
- Tealia felina* (L.)

CTENOPHORA

NEMERTINI

- Lineus gesserensis* (O. F. Müller)

ANNELIDA

POLYCHAETA

- **Nereis diversicolor* (O. F. Müller)
- †*N. succinea* (Leuckart)
- †*Nephtys* sp.
- **Polydora ciliata* (Johnston)
- Mercierella enigmatica* Fauvel

OLIGOCHAETA

- Clitellio arenarius*

ARTHROPODA

CRUSTACEA

Ostracoda

- †*Leptocythere castanea* (G. O. Sars)

Copepoda

- †*Stenhelia palustris* (Brady)
- †*Nannopus palustris* Brady
- †*Platychelipus littoralis* Brady
- †*Tachidius discipes*

b. Sublittoral

- ‡*Hydrallmania falcata* (L.)
- Sertularia cupressina* (L.)

- Pleurobrachia pileus* (O. F. Müller)
- Beroë cucumis* Fabricius

- Lagisca extenuata* (Grube)
- Nereis pelagica* L.
- Sabellaria alveolata* (L.)

Cirripedia

- **Balanus improvisus* Darwin
B. balanoides (L.)

Malacostraca

Cumacea

- †*Diastylis rathkei* Kröyer

Isopoda

- Limnoria lignorum* (Rathke)
Spheroma serratum (Fabricius)
 †*S. rugicauda* Leach
Jera marina (Fabricius)
Ligia oceanica (L.)

Amphipoda

- Melita palmata* (Montagu)
 **Corophium volutator* (Pallas)
 Schizopoda

Decapoda

- **Crangon vulgaris* L.
 **Carcinus maenas* Pennant

- Gammarellus homari* (Fabricius)
Gammarus z. salinus Sexton

Praunus flexuosus (Müller)

- Portunus marmoreus* Leach
Eupagurus bernhardus (L.)
Pasiphae sivado Risso
Pandalus montagui Leach

Pycnogonida

- Nymphon?* *rubrum* Hodge
Pycnogonum littorale (Stroem)

MOLLUSCA

PLACOPHORA

- Lepidochiton cinereus* (L.)

GASTROPODA

- **Hydrobia ulvae* (Pennant)

LAMELLIBRANCHIA

- **Macoma balthica* (L.)
 †*Scrobicularia plana* (da Costa)
Teredo navalis L.

POLYZOA

ECTOPROCTA

- Electra hastingsae* Marcus

- Callopora aurita* (Hincks)
Escharella immersa (Flem.)

VERTEBRATA

PISCES

- Anguilla vulgaris* Turton
Gobius flavescens Fabricius

- Clupea sprattus* L.
Ammodytes lanceolatus Lesauvage
Gadus luscus L.
G. minutus L.
Pleuronectes limanda L.
Agonus cataphractus (L.)

III. SULLY ISLAND

The island is connected to the mainland by a causeway of smooth rock which slopes gently westwards and is submerged in the centre at about half tide. This causeway divides the shore

* indicates species obtained both in 1937 by C. B. Rees and in 1947 by the present writer.

† indicates species obtained only by C. B. Rees.

‡ indicates drifting material not necessarily typical of the area in question. Except where otherwise stated, all records were made in the autumn of 1947.

into an eastern and a western bay. The consequent differences in exposure to wave action provide a variety of habitats in close proximity, each supporting a characteristic fauna. Field work has been more intensive here than on other beaches which were more uniform in character.

The western bay consists principally of smooth rocks sloping gently towards the sea, rock pools being rare. Rock ledges some two feet high are present and when these are overhung by a canopy of *Ascophyllum* their fauna is poor. Ledges devoid of algae and fully exposed to wave action carry *Balanus balanoides* principally on overhanging surfaces, and *Chthamalus stellatus* on vertical and upward facing surfaces.

Zonation of the larger algae is very clearly exhibited on this shore, the following species being present in the order given as one passes from H.W.N.T. to L.W.N.T.

Pelvetia canaliculata
Fucus spiralis
Ascophyllum nodosum
Fucus vesiculosus
F. serratus

Enteromorpha occurs on a small area of thin sand on rock, above *Pelvetia*. In a broad area of very shallow standing water in the centre of the causeway, the following weeds are common :—

Chondrus crispus
Corallina officinalis
Ulva lactuca
Cladophora rupestris
Ceramium rubrum

Polysiphonia fastigiata is abundant on *Ascophyllum*, *Chondrus* again occurs under a dense canopy of *F. serratus*, and in a pool near L.W.N.T. *Nemalion multifidum* was obtained.

The distribution of the principal elements of the fauna of the western bay may be summarised as follows :—

In crevices in the cliffs, under large dry stones and in the upper part of the causeway in crevices :—

<i>Petrobius</i> sp.	<i>Orchestia gammarella</i>
<i>Ligia oceanica</i>	<i>Littorina saxatilis</i>
<i>Marinogammarus marinus</i>	

On the rocks, under stones and on the weed in the *Ascophyllum* zone :—

<i>Actinia equina</i>	<i>Littorina saxatilis</i>	<i>Gammarus locusta</i>
<i>Carcinus menas</i>	<i>L. littoralis</i>	
<i>Patella vulgata</i>	<i>L. littorea</i>	

On exposed ledges at and below M.S.L., exposed to considerable wave action :—

Balanus balanoides
Chthamalus stellatus
Hemioniscus balani

On the rocks, under boulders and on the weed in the *Fucus serratus* zone :—

<i>Spirorbis spirillum</i>	<i>Patella vulgata</i>
<i>Pomatoceros triqueter</i>	<i>Lepidochiton cinereus</i>
<i>Idothea viridis</i>	<i>Gammarus locusta</i>

In shallow standing water near M.S.L. in the centre of the causeway :—

<i>Spirorbis spirillum</i>	<i>Lepidochiton cinereus</i>	<i>Gibbula umbilicalis</i>
<i>Pomatoceros triqueter</i>	<i>Patella vulgata</i>	<i>Alcyonidium polyoum</i>
<i>Polydora ciliata</i>	<i>Littorina littorea</i>	<i>Escharella immersa</i>
<i>Jera marina</i>		

In this region *Patella* is larger and more abundant than elsewhere and the shells of the largest specimens are bored by large numbers of *Polydora*.

At L.W.O.S.T. in the centre of the western bay there is a broad zone of boulders and stones. Oyster shells are not uncommon, and several valves have been found firmly attached to large stones and showing no signs of abrasion. It seems probable that oysters have lived here recently but no living specimens were found either on the shore or in dredging offshore. The fauna here is:—

<i>Lepidonotus squamatus</i>	<i>Lepidochiton cinereus</i>	<i>Callopora aurita</i>
<i>Lagisca extenuata</i>	<i>Acanthodoris pilosa</i>	<i>Alcyonidium polyoum</i>
<i>Gammarus locusta</i>	<i>Adalaria proxima</i>	<i>Pyura</i> sp.
<i>Balanus improvisus</i>	<i>Escharella immersa</i>	

Adjacent to this zone of boulders is an area of flat rocks colonised by a weak growth of *Sabellaria alveolata*. This area is kept permanently wet by sea water draining from the causeway. A number of species has been collected from this association, but all were uncommon. A few examples are as follows :—

<i>Tealia felina</i> var. <i>lofotensis</i>	<i>Marinogammarus obtusatus</i>
<i>Cancer pagurus</i>	<i>Cyclopterus lumpus</i>

At L.W.O.S.T. close to the *Sabellaria* association is an area of shale which has at one time been bored by species of *Barnea*. No living specimens have been obtained. A small fauna has been obtained from empty borings and from thin splits in the rock, for example :—

<i>Syllis armillaris</i>	<i>Lepidonotus squamatus</i>
<i>Polydora ciliata</i>	<i>Berenicia patina</i>

At L.W.O.S.T. at the western, most exposed tip of the island the rocks are bare and there are some small pools in crevices. On the rocks there are small specimens of *Patella vulgata*, and *Chthamalus stellatus* is abundant. At the lowest level, *C. stellatus* is replaced by *Balanus improvisus* and some dead specimens of *B. crenatus* were also present. In the small pools quite large skeletons of *Chalina* sp. occurred. *Halichondria panicea* and *Pomatoceros triqueter* were present.

The eastern bay is more complex in character, greater protection from wave action and currents permitting the deposition of sand and mud.

There is a small area of shallow sand, a little below H.W.N.T., in which the mud content increases considerably as one approaches the protection of the causeway which at this point presents a vertical face 4 feet high and facing due east. Here *Arenicola marina* is typical of the cleaner sand whilst *Bathyporeia pilosa* and *Nereis diversicolor* were obtained from the more muddy sand.

The centre of the bay is covered by a shallow layer of soft mud, gravel and stones, in which collecting is difficult. Apart from one small specimen of *Scrobicularia plana* (alive), little more than *Nereis diversicolor* has been obtained in this area.

A spur of shingle projects into the bay and on the eastern side of this fairly clean and deep sand drops down steeply towards L.W.O.S.T. In this sand the only specimens obtained were *Nephtys cirrosa*.

Passing farther east, a rocky promontory encloses a muddy area in which *Arenicola marina* occurs. At L.W.O.S.T. on this promontory there is an area of stones and small boulders on a firm but muddy substrate. The fauna here is much the same as that recorded for a similar area in the centre of the western bay but *Acanthodoris pilosa* and *Adalaria proxima* were more abundant in the eastern bay, due perhaps to greater protection from wave action.

On the opposite side of the eastern bay, on the northern shore of the island, a broad expanse of fairly stiff mud passes from about M.S.L. to L.W.O.S.T. Oligochaets (unidentified) were found in this mud but no traces were seen of *Scrobicularia*, *Macoma*, *Hydrobia* or *Corophium*.

In spite of the great variety of habitats offered at Sully Island, the fauna here—67 species recorded—is considerably less than that recorded for Breaksea Point—89 species. This may be attributed partly to the differences in salinity and turbidity between the two stations, and partly to the lack of rock pools, crevices and overhanging ledges, especially at L.W.O.S.T.

Fauna List at Sully Island

a. Intertidal

b. Sublittoral

PARAZOA

- Halichondria panicea* (Pallas)
Chalina ? *oculata*

CÉLENTERATA

HYDROZOA

- Dynamena pumila* (L.)
Sertularia cupressina (L.)

- Tubularia indivisa* L.
**Hydrallmania falcata* (L.)

* Drifting material.

ANTHOZOA

- Actinia equina* L.
Tealia felina (L.)
T. f. var. *lofotensis* Stephenson
Sagartia troglodytes (Price)

CTENOPHORA

Pleurobrachia pileus (O. F. Müller)

NEMERTINI

- Amphiporus lactiflores* (Johnston) *Nemertopsis flavida* Beaumont

ANNELIDA

POLYCHAETA

- Lepidonotus squamatus* (L.) *Phyllodoce* ? *mucosa*
Harmothoe longisetis (Grube)
Lagisca extenuata (Grube)
Eteone longa (Fabricius)
Syllis armillaris (Müller)
Nereis pelagica L.
N. diversicolor O. F. Müller
N. virens Sars.
Nephtys cirrosa Ehlers
Marphysa sanguinea (Montagu)
Polydora ciliata (Johnston)
Cirratulus cirratus (O. F. Müller)
Arenicola marina L.
Sabellaria alveolata (L.)
Pomatoceros triquetter (L.)
Apomatus similis Marion & Bobretzky
Spirorbis spirillum (L.)
Amphitrite johnstoni Malmgren

ARTHROPODA

CRUSTACEA

Cirripedia

- Chthamalus stellatus* (Poli)
Balanus balanoides (L.)
B. improvisus Darwin
B. crenatus Bruguière

Malacostraca

Isopoda

- Spheroma serratum* (Fabricius) *Anthura gracilis* (Montagu)
Idothea granulosa Rathke *Eurydice pulchra* Leach
Janira maculosa Leach
Jera marina (Fabricius)
Ligia oceanica (L.)
Hemioniscus balani (Spence Bate)

Amphipoda

- Bathyporeia pilosa* Lindström *Gammarus z. salinus* Sexton
Gammarellus homari (Fabricius)
Melita palmata (Montagu)
Marinogammarus marinus (Leach)
Gammarus locusta (L.)
Orchestia gammarella (Pallas)

Decapoda

- Eupagurus bernhardus* (L.) *Pasiphae sivado* Risso
Carcinus maenas (Pennant) *Pandalus montagui* Leach
Cancer pagurus L. *Crangon vulgaris* L.
Portunus marmoreus Leach

INSECTA

- Petrobius* sp.

MOLLUSCA

PLACOPHORA

Lepidochiton cinereus L.

GASTROPODA

Patella vulgata L.*Gibbula umbilicalis* (da Costa)*Littorina littorea* (L.)*L. saxatilis* L.*L. littoralis* (L.)*Acanthodoris pilosa* (Abilgaard)*Adalaria* (*Doris*) *proxima* Alder & Hancock*Ancula cristata* (Alder)*Buccinum undatum* L.

LAMELLIBRANCHIATA

Heteranomia squamula (L.)*Mytilus edulis* L.*Scrobicularia plana* (da Costa)† *Hiatella arctica* (L.)† *Barnea parva* (Pennant)

† In spite of abundant signs of their borings, no living specimens of these two species were obtained.

POLYZOA

ECTOPROCTA

Callopora (*Membranipora*) *aurita* (Hincks)*Electra hastingsae* Marcus*Escharella immersa* (Flem.)= *Mucronella peachi* (Johnston)*Berenicia patina* (Lamk.)*Alcyonidium polyoum* (Hass.)*Bicellariella ciliata* (L.)*Flustra foliacea* (L.)

ENDOPROCTA

Barentsia gracilis (Sars)

TUNICATA

ASCIDIACEA

Pyura sp.

VERTEBRATA

PISCES

Anguilla vulgaris Turton.*Onos mustela* (L.)*Cyclopterus lumpus* L.*Ammodytes tobianus* L.*Gadus luscus* L.*G. minutus* L.*G. merlangus* L.*Pleuronectes limanda* L.*Rhombus maximus* L.*Liparis vulgaris* Fleming

IV. BARRY HARBOUR

During 1947, two students in this Department have carried out a survey of Barry Harbour and the two neighbouring promontories, Cold Knap Point and Friars Point, with special reference to the influence of exposure to wave action and to the degree of immersion upon the distribution of the fauna.

Full acknowledgment must be given to Mr. R. Blacker and Mr. D. Waugh for their extensive field work at this station and for their identification of the species there obtained. It is hoped that they will be able to publish their conclusions in due course but it was thought desirable to include their fauna list here for various reasons. In all cases their identifications have been checked by myself.

The area examined included both east and west sides of each of the promontories, a broad strip of sand extending from within

the mouth of the harbour down to L.W.O.S.T., an extensive area of mud and lesser areas of sand above M.S.L. within the harbour, and all rocky exposures around the harbour.

Special mention must be made of the discovery of a few specimens of the barnacle *Elminius modestus* (29.10.47; 28.1.48) at this station, the first record of the occurrence of this species in the upper reaches of the Bristol Channel. A sparse settlement has been recently recorded at Neyland, Pembrokeshire (Crisp & Chipperfield, 1948). The second record at Barry was only made after repeated searches and it seems probable that *Elminius* is only just beginning to be established at this station.

Variation in the course of surface drainage channels and of the extent of the areas of mud and sand in the harbour indicate considerable mobility of the substrate here. Mud may be deposited extensively during a protracted period of calm weather, only to be removed and deposited elsewhere during rough weather. This will not be without influence on the distribution of the infauna.

The accumulation of sewage on the lower levels of Cold Knap Point must have made field work here rather trying, and probably had some influence on the local fauna. *Actinia equina* was especially abundant at low levels on the eastern side of this point and *Eupagurus bernhardus* was abundant on the western side.

Water samples collected at intervals throughout the winter reached a minimum salinity of about 27 per cent. in March, 1948. At this time *Solaster papposus* was found in abundance at low water mark of equinoctial spring tides.

Fauna List from Barry Harbour, Friars Point and Cold Knap Point.

PARAZOA

- Halichondria panicea* (Pallas)
- Chalina oculata* (Pallas)

COELENTERERATA

HYDROZOA

- Dynamena pumila* (L.)
- Sertularia cupressina* (L.)
- Clytia johnstoni* (Alder)
- Obelia dichotoma* (L.)
- Tubularia indivisa* L.

ANTHOZOA

- Actinia equina* L.
- Tealia felina* (L.)
- Sagartia troglodytes* (Price)
- S. elegans* (Dalyell)

PLATYHELMINTHES

TURBELLARIA

- Leptoplana tremellaris* (O. F. Müller)

NEMERTINI

- Lineus gesserensis* (O. F. Müller)
- Amphiporus lactifloreus* (Johnston)

ANNELIDA

ARCHIANNELIDA

- Dinophilus* sp.

POLYCHAETA

- Lepidonotus squamatus* (L.)
- Lagisca extenuata* (Grube)
- Harmothoe impar* (Johnston)
- Phyllodoce maculata* (L.)
- Eteone longa* (Fabricius)
- Syllis armillaris* (Müller)
- Nereis pelagica* L.
- N. diversicolor* (O. F. Müller)
- Lumbriconereis fragilis* (O. F. Müller)
- Scoloplos armiger* (O. F. Müller)
- Scolecopsis ciliata* (Keferstein)
- Nerine cirratulus* (Della Chiaje)
- Pygospio elegans* Claparède
- Polydora ciliata* (Johnston)
- Cirratulus cirratus* (O. F. Müller)
- Arenicola marina* L.
- Amphitrite johnstoni* Malmgren
- Pomatoceros triquetus* (L.)
- Spirorbis spirillum* (L.)
- Potamilla reniformis* (O. F. Müller)

ARTHROPODA

CRUSTACEA

Copepoda

? *Tigriopus fulvus* (Fischer)

Cirripedia

Chthamalus stellatus (Poli)*Balanus balanoides* (L.)*B. improvisus* Darwin*B. perforatus* Bruguière (spat)*Elminius modestus* (Darwin)*Verruca stræmia* (O. F. Müller)

Malacostraca

Isopoda

Idothea granulosa Rathke*Janira maculosa* Leach*Jera marina* (Fabricius)*Spheroma serratum* (Fabricius)*Ligia oceanica* (L.)*Hemioniscus balani* (Spence
Bate)

Amphipoda

Bathyporeia guilliamsoniana
(Bate)*Gammarellus homari* (Fabricius)*Marinogammarus marinus*
(Leach)*M. obtusatus* (Dahl)*M. finnarchicus* (Dahl)*Apherusa bispinosa* (Bate)

Schizopoda

Praunus flexuosus (Müller)*Neomysis integer* (Leach)

Decapoda

Pandalus montagui Leach*Leander squilla* (L.)*L. serratus* (Pennant)*Crangon vulgaris* L.*Porcellana longicornis* (L.)*Eupagurus bernhardus* (L.)*Carcinus manas* (Pennant)*Cancer pagurus* L.*Spirontocaris cranchi* (Leach)*Galathea squamifera* Leach

INSECTA

Petrobius sp.

MOLLUSCA

PLACOPHORA

Lepidochiton cinereus (L.)

GASTROPODA

Patella vulgata L.*Littorina littorea* (L.)*L. saxatilis* L.*L. littoralis* (L.)*L. neritoides* (L.)*Nucella lapillus* (L.)*Buccinum undatum* L.*Retusa alba* (Kanmacher)*Hydrobia ulvae* (Pennant)

LAMELLIBRANCHIATA

Mytilus edulis L.*Hiatella arctica* (L.)*Cardium edule* L.*Macoma balthica* (L.)

POLYZOA

ECTOPROCTA

Membranipora pilosa (L.)*Flustrella hispida* (Fabr.)*Bugula plumosa* (Pallas)*Scrupocellaria scruposa* (L.)*Berenicia (Diastopora) patina* (Lamk.)*Bicelliarella ciliata* (L.)*Vesicularia spinosa* (L.)

ENDOPROCTA

Pedicellina cernua (Pallas)*Barentsia gracilis* (Sars)

ECHINODERMATA

ASTEROIDEA

Solaster papposus (L.)

TUNICATA

ASCIDIACEA

Small solitary Ascidian, as yet

VERTEBRATA

unidentified

PISCES

Anguilla vulgaris Turton*Mugil ? chelo* Cuvier*Onos mustela* (L.)*Blennius phollis* L.*Gobius pictus* Malm.*G. minutus* Pallas

V. BREAKSEA POINT

The upper margin of this shore is formed by a steep shingle bank below which there is a narrow zone of clean sand. Where water trickles out from the shingle on to the sand, *Gammarus locusta* was found underneath stones. In places the sand was colonised by large specimens of *Arenicola marina*.

Below this sandy zone the beach is a broad expanse composed largely of rock terraces which tend to rise very gently towards the sea (south) and towards the west. The shore level descends towards low-water mark by a regular series of shallow steps, there being two large pools above M.S.L., one at Breaksea Point

and the other in Limpert Bay. Water drains from each of these pools through an area of boulders and stones, the borders of the pools elsewhere being principally of smooth, gently sloping rock. Shallow water stands on the terraces west of the pool in Limpert Bay and also on the terraces between M.S.L. and L.W.N.T., and here the water cascades steadily over the steps and in consequence much of the lower half of the beach is covered by running water during the whole of the ebb tide.

Around the two large pools mentioned, under stones and boulders where the water flows away, quite a large fauna has been observed including the following species:—

<i>Amphiporus lactifloreus</i>	<i>Spirorbis spirillum</i>	<i>Gibbula umbilicalis</i>
<i>Oerstedtia dorsalis</i>	<i>Balanus improvisus</i>	<i>Paphia saxatilis</i>
<i>Actinia equina</i>	<i>B. crenatus</i>	<i>Mytilus edulis</i>
<i>Lagisca extenuata</i>	<i>Littorina saxatilis</i>	<i>Amphipholis squamata</i>
<i>Pomatoceros triqueter</i>	<i>L. littoralis</i>	

On the western side of the pool in Limpert Bay where the terraces retain shallow pools, large specimens of *Patella vulgata* occur both on dry rocks and in the water and those in water carry abundant *Polydora ciliata* in their shells.

Each rise consists of a cap of rock overhanging a layer of greenish clay. The clay is partly covered by standing water and is bored by:—

Polydora ciliata
Corophium vulvulator
Barnea candida

The cap of rock on each rise carries *Chthamalus stellatus* on its vertical face and *Balanus balanoides* principally on its overhanging surface. This last species is parasitised by *Hemioniscus balani*. The rock cap is easily broken, and in dry crevices *Marinogammarus marinus* has been obtained. In rock pools *Blennius pholis* or *Onos mustela* may be found.

On the western side of the pool in Limpert Bay a broad strip of muddy sand extends almost to L.W.N.T. In its upper half in particular it is colonised by

Nephtys cirrosa
Scoloplos armiger
Macoma balthica

Near the upper margin of this zone an area more muddy than elsewhere is covered by small stones and shallow standing water. Here several species may be collected, including:—

<i>Spirorbis spirillum</i>	<i>Melita palmata</i>
<i>Terebella lapidaria</i>	<i>Lepidochiton cinereus</i>

Near L.W.N.T. where drainage water cascades on to the sandy strip, an area of peat is exposed. This peat is colonised by *Barnea candida* and to a lesser extent by *B. parva*. *Phyllodoce mucosa* has been collected from an empty *Barnea* burrow at this point.

Owing to the presence of shingle and sand on the upper part of the beach, *Pelvetia canaliculata* and *Fucus spiralis* are excluded, and owing to the smoothness of the rock terraces lower down and the great exposure to rough weather, there is not much *Ascophyllum nodosum* on this beach.

Over the flat, bare, rocky terraces collecting is poor. Here, on the rocks and under boulders, one may find the following species :—

<i>Fera marina</i>	<i>Patella vulgata</i>
<i>Carcinus mœnas</i>	<i>Littorina littorea</i>
<i>Chthamalus stellatus</i>	<i>Blennius pholis</i>
<i>Balanus balanoides</i>	

Below M.S.L. there are good growths of *Fucus serratus* on which one may obtain *Dynamena pumila* and *Flustrella hispida*.

At low-water mark a number of distinct habitats may be discerned. In places a thin growth of *Sabellaria alveolata* mingles with or replaces the *F. serratus*, and here few species are likely to be collected.

The edges of the rock terraces may be very easily broken in places, revealing an abundance of *Hiatella arctica*. Other species which may be found here are as follows :—

<i>Phascolosoma minutum</i>	<i>B. crenatus</i>
<i>Harmothoe longisetis</i>	<i>Nucella lapillus</i>
<i>Balanus perforatus</i> (spat)	

In some places there are outcrops of a very hard rock with overhanging ledges, beneath which there is a seam of more friable rock bored by *Hiatella*. Here *Nucella lapillus* is seen more frequently than elsewhere and, from the lack of any other food source in abundance, it seems probable that *Nucella* feeds here on *Hiatella*. On the under side of the ledges there are some good growths of sponge, including :—

<i>Halichondria panicea</i>
<i>Grantia compressa</i>
<i>Hymeniacion</i> sp.

At L.W.O.S.T. in places *Fucus serratus* and *Sabellaria alveolata* are replaced by a dense, stunted growth of *Laurencia pinnatifidum*. No fauna was found on the patches of this weed.

The best collecting to be had on this beach is in the boulder zone at L.W.O.S.T. Some of these boulders are extremely hard and their undersurfaces are closely bored by *Hiatella arctica*. The most striking species on the underside of these boulders is *Porcellana platycheles*, dozens of which may be found clinging to a single large boulder. The tube worm *Potamilla reniformis* is found in abundance, boring into the rock or occupying empty *Hiatella* holes. The rock is difficult to split and examine, so other species may also occur within these holes.

Other species collected in this area may be listed as follows :—

<i>Leucosolenia lacunosa</i>	<i>Balanus crenatus</i>	<i>Electra hastingsae</i>
<i>Leptoplana tremellaris</i>	<i>Ocenebra erinacea</i>	<i>Lepralia pallasiiana</i>
<i>Lagisca extenuata</i>	<i>Calliostoma zizyphinum</i>	<i>Barentsia gracilis</i>
<i>Apomatus similis</i>	<i>Gibbula cineraria</i>	<i>Pedicellina cernua</i>
<i>Pomatoceros triqueter</i>	<i>Adalaria proxima</i>	<i>Henricia sanguinolenta</i>
<i>Janira maculosa</i>	<i>Acanthodoris pilosa</i>	<i>Solaster papposus</i>
<i>Eupagurus bernhardus</i>	<i>Heteranomia squamula</i>	<i>Amphipholis squamata</i> (spat)
<i>Porcellana longicornis</i>	<i>Alyonidium polyoum</i>	<i>Onos mustela</i>
<i>Cancer pagurus</i>	<i>Schizoporella linearis</i>	<i>Liparis montagui</i>
<i>Verruca stræmia</i>		<i>Pyura</i> sp.

Fauna List at Breaksea Point

a. Intertidal

b. Sublittoral

PARAZOA

- Leucosolenia lacunosa* (Johnston)
Grantia compressa (Fabricius)
Halichondria panicea (Pallas)
Hymeniacion sp.

CELENTERATA

HYDROZOA

- Dynamena pumila* (L.)
Clytia johnstoni (Alder)

- Halecium* sp.
 **Hydrallmania falcata* (L.)
Sertularia cupressina (L.)
 **S. operculata* L.
Plumularia setacea (Ellis & Solander)

*Drifting material.

ANTHOZOA

- Actinia equina* L.

PLATYHELMINTHES

TURBELLARIA

- Leptoplana tremellaris* (O. F. Müller)

NEMERTINI

- Lineus gesserensis* (O. F. Müller)
Amphiporus lactifloreus (Johnston)
Oerstedtia dorsalis (Abildgaard)

ANNELIDA

POLYCHÆTA

- Harmothoe longisetis* (Grube)
H. impar (Johnston)
Lagisca extenuata (Grube)
Phyllodoce mucosa Oersted
Nereis pelagica L.
Nephtys cirrosa Ehlers
Scoloplos armiger (O. F. Müller)
Polydora ciliata (Johnston)
Arenicola marina L.
Sabellaria alveolata (L.)
Terebella lapidaria L.
Potamilla reniformis (O. M. Müller)
Pomatoceros triqueter (L.)
Apomatus similis Marion & Bobretzky
Spirorbis spirillum (L.)

- Protula tubularia* (Montagu)

GEPHYREA

- Phascolosoma minutum* Keferstein

ARTHROPODA

CRUSTACEA

Cirripedia

- Verruca stræmia* (O. F. Müller)
Chthamalus stellatus (Poli)
Balanus balanoides (L.)
B. improvisus Darwin
B. crenatus Bruguière
B. perforatus Bruguière (spat)

Malacostraca

Isopoda

- Janira maculosa* Leach
Jera marina (Fabricius)
Hemioniscus balani (Spence Bate)

Amphipoda

- Gammarellus homari* (Fabricius)
Melita palmata (Montagu)
Marinogammarus marinus (Leach)
M. obtusatus (Dahl)
Gammarus locusta L.
Amphitothoë rubricata (Montagu)
Corophium volutator (Pallas)

Decapoda

- Pandalus montagui* Leach
Spirontocaris cranchi (Leach)
Leander squilla (L.)
Porcellana platycheles (Pennant)
P. longicornis (L.)
Eupagurus bernhardus (L.)
Carcinus maenas (Pennant)
Cancer pagurus L.

- Pasiphae sivado* Risso
Crangon vulgaris L.
Portunus marmoreus Leach

MOLLUSCA

PLACOPHORA

- Lepidochiton cinereus* (L.)

GASTROPODA

- Patella vulgata* L.
Calliostoma zizyphinum (L.)
Gibbula cineraria (L.)
G. umbilicalis (da Costa)
Tricolia pullus (L.)
Littorina littorea (L.)
L. saxatilis L.
L. littoralis (L.)
Rissoa parva (da Costa)
Nucella lapillus (L.)
Ocenebra erinacea (L.)
Acanthodoris pilosa (Abildgaard)
Adalaria (Doris) proxima Alder & Hancock

- Trophonopsis muricatus* (Montagu)
Idulia coronata (Gmelin)

LAMELLIBRANCHIATA

- Heteranomia squamula* (L.)
Mytilus edulis L.
Paphia saxatilis (Fleurian)
Macoma balthica (L.)
Hiatella arctica (L.)
Barnea candida (L.)
B. parva (Pennant)

POLYZOA

ECTOPROCTA

<i>Cryptosula (Lepralia) pallasiana</i> (Moll)	<i>Bicellariella ciliata</i> (L.)
<i>Schizomavella (Schizoporella) linearis</i> (Hass.)	<i>Callopora (Membranipora) aurita</i> (Hincks)
<i>Berenicia patina</i> (Lamk.)	<i>Escharella (Mucronella) immersa</i> (Flem.)
<i>Lichenopora hispida</i> (Flem.)	
<i>Alcyonidium polyoum</i> (Hass.)	
<i>Flustrella hispida</i> (Fabr.)	<i>Flustra foliacea</i> (L.)
<i>Amathia lendigera</i> (L.)	<i>Bugula plumosa</i> (Pallas)
<i>Electra hastingsae</i> Marcus	<i>Vesicularia spinosa</i> (L.)
	<i>Crisia eburnea</i> (L.)
	<i>Valkeria wa</i> (L.)

ENDOPROCTA

<i>Pedicellina cernua</i> (Pallas)
<i>Barentsia gracilis</i> (Sars)

ECHINODERMATA

ASTEROIDEA

<i>Solaster papposus</i> (L.)
<i>Henricia sanguinolenta</i> (O. F. Müller)

OPHIUROIDEA

<i>Amphipholis squamata</i> (Delle Chiaje)
--

ECHINOIDEA

<i>Psammechinus miliaris</i> (Gmelin)

TUNICATA

ASCIDIACEA

<i>Pyura</i> sp.

VERTEBRATA

PISCES

<i>Onos mustela</i> (L.)	<i>Gadus luscus</i> L.
<i>Blennius pholis</i> L.	
<i>Liparis montagui</i> (Donovan)	

VI. SUBLITTORAL SURVEY

From a base at Penarth a number of trips were made in "Progress I", navigated by Mr. F. J. Boyce. The area worked most thoroughly was that off Penarth and Lavernock Point and around the south-west end of the Cardiff Grounds. A voyage was made upchannel as far as the Newport Deep Buoy, and another out as far as Stout Point (a little to the east of Nash Point). Trawling and dredging were also carried out near the Monkstone, Flat Holm and Steep Holm.

Many water samples were taken for the estimation of salinity, especially on a transect passing from Sully Island due south to the "East One Fathom" Buoy.

From this sublittoral survey a number of additions have been made to the local fauna lists for Peterstone Wentloog, Sully Island and Breaksea Point (column b in each case). Here it is desirable to review the sublittoral records in an effort to identify any associations in the area examined.

In all, 31 trawl and 17 dredge hauls were made. The Agassiz Trawl operated something like a dredge, collecting small stones, pieces of *Sabellaria* reef and, on occasions, large rocks and pieces of cement rubble which rubbed and tore the net considerably. Due to the simple, bag-like structure of the trawl, no large and

active fish were caught in it. A moderately large Turbot (*Rhombus maximus*) was caught by the dredge off Cardiff Grounds, and it appears probable that an Otter Trawl operated here might take some large food fish.

On several occasions the haul produced no catch and no information as to the nature of the bottom (trawls 6, 20, 24; dredges 1, 5, 9, 11, 12). On many occasions several species were taken but no indications of the substrate were gained. When the gear worked extremely smoothly on the bottom, it was tempting to conjecture that it was gliding over smooth rock surfaces. Sometimes a change from such smooth gliding to working over *Sabellaria* and small stones was quite abrupt. The nature of the bottom was unknown but possibly was smooth rock in the following cases:—trawls 4, 12, 13, 14, 15, 16, 17, 27, 28, 29; dredges 1, 5, 11, 12, 13.

Clean sand or sand and piled *Macoma* shells were encountered in the region of Cardiff Grounds, and sand was also found near Newport Deep Buoy (trawls 5, 19, 23, 32; dredges 6, 17).

Thick mud was met off Steep Holm (trawl 9) and off Penarth (trawls 18, 20). The most commonly encountered substrate was a mixture of *Sabellaria* and small stones which characterised all hauls hitherto unmentioned.

In the following table a summary is given of the distribution of the principal species obtained, in relation to the type of substrate. For each species the number of hauls in which specimens were obtained is given.

TABLE—DISTRIBUTION OF THE COMMONEST SUBLITTORAL SPECIES COLLECTED

	Sabellaria	Sand	Mud and rubble	Small stones and mud	Unknown substrate ? smooth rock
Total No. of Hauls	15	9	4	4	11
<i>Crangon vulgaris</i> ...	6	5	3	2	7
<i>Pandalus montagui</i> ...	6	3	2	2	7
<i>Pasiphae sivado</i> ...	3	4	2	3	6
<i>Portunus marmoreus</i> ...	2	3	2	2	5
<i>Eupagurus bernhardus</i>	5	1	2	1	3
<i>Sertularia cupressina</i> ...	3		1	1	4
<i>Gammarus zaddachi</i> ...	1		1	1	4
<i>Pleuronectes limanda</i> ...	2	1	2		1
<i>Balanus improvisus</i> ...	3		2		1
<i>Nereis pelagica</i> ...	4	1	1		
<i>Tealia felina</i> ...	4		1	1	
<i>Electra hastingiae</i> ...	6			1	
<i>Callopora aurita</i> ...	7				
<i>Escharella immersa</i> ...	6			1	
<i>Lagisca extenuata</i> ...	6				
<i>Sabellaria alveolata</i> ...	15				

In addition to those species listed in the Table, a considerable number of species was encountered on rare occasions. *Gadus minutus*, *G. luscus* and *Bicellariella ciliata* were each obtained in five different hauls, and 48 other species were obtained on one occasion at least. Several species of Polyzoa and the two echinoderms *Henricia sanguinolenta* and *Psammechinus miliaris* were taken in hauls between Breaksea Point and Stout Point.

The general impression gained was that the sublittoral fauna was impoverished, due to the combined action of lowered salinity and powerful currents. It seems possible, however, that work with an Otter Trawl would indicate a greater abundance and variety of fish than has so far been discovered.

Very small specimens of *Pleuronectes limanda* were most abundant on the sandy bottom in the region of Cardiff Grounds, and a landing was made on this sandbank to search for *Macoma balthica* or any other species which might be suitable as food for fish. No living specimen was seen nor were there any signs of an infauna, due, it is considered, to the mobility of the sand.

The five decapod crustaceans listed at the top of the Table appear to be distributed indifferently over the various substrates encountered. Their abundance in individual hauls varied considerably and it is possible that further work on a statistical basis might disclose marked preferences for particular types of bottom.

Pleuronectes limanda was most abundant on soft bottoms, while the majority of the other species listed in the Table require a rocky substrate on which to settle.

VII. BIOLOGICAL NOTES

Diadumene luciae Verrill

15.10.47. Specimens were found in abundance at L.W.N.T. at Peterstone Wentlloog. Large specimens draped the sides of the lowermost 15 of a series of wooden piles near the mouth of the sewer, being least abundant on the west sides of the piles. Smaller specimens were also found in moderate abundance on small stones lying here and there on the surface of the mud below L.W.N.T. These specimens were far from typical, and I am grateful to Dr. H. O. Bull who checked their identity. He described them as most unusual variants of the species. For this reason I give a brief description of the appearance of this anemone.

Large specimens about $\frac{1}{2}$ inch in diameter of disc and less than this in height. Scaphus green, showing a large number of pale stripes, but with no signs of the typical 12 orange stripes. Capitulum not easily seen on large specimens. Disc green, usually with a very distinct pattern of radiating and subdividing stripes of opaque white. This pattern was

especially well developed opposite the two siphonoglyphs but was sometimes repeated over the whole surface of the disc. Tentacles buff in colour, the outer ones having a diffuse opaque white ring at the base. Of the inner ring of tentacles, often one, opposite a siphonoglyph, was much paler than the remainder. Sometimes such a pale tentacle was found opposite each siphonoglyph; in such cases these two tentacles were sometimes exactly opposite each other but sometimes they were placed slightly asymmetrically.

The smaller specimens were more nearly colourless and lacked any pattern on the disc. These specimens readily extended to the full length of the column, showing the capitulum clearly. Transverse sections of one of these small specimens were atypical in that only one pair of directive mesenteries could be found, and these were very small in comparison with the other mesenteries. This condition was possibly due to the habit of reproduction by longitudinal fission possessed by this species. Examination of acontia showed the spirulae to be of the dimensions typical of this species.

Large specimens obtained on slivers of wood scraped off the wooden piles sometimes appeared to lie in a row, for their bases were markedly oval in shape and adjacent anemones touched each other by these extensions of their bases.

Tealia felina var. *lofotensis*

22.1.47. Some specimens obtained at L.W.O.S.T. at Sully Island were similar to those described by Bassindale (1940) from Blue Anchor and Kilve.

Phyllodocid egg masses

21.4.47. Greenish egg masses about 1 cm. in diameter were found attached on the surface of rocks and on sand, near L.W.O.S.T. at Sully Island. Brought into the laboratory, these hatched over night.

Syllis armillaris (Müller)

21.4.47. Two specimens in a thin film of mud in a split in the rock at L.W.O.S.T. at Sully Island. Both were ripe females, the posterior half of each being swollen and purplish with ova.

Verruca streimia (O. F. Müller)

5.2.47. Many taken at L.W.O.S.T. at Breaksea Point carried large compact egg masses.

Balanus perforatus Bruguière

31.10.47. Many very small, newly settled specimens amongst large specimens of *B. crenatus* at L.W.O.S.T. at Breaksea Point.

Anthura gracilis (Montagu)

8.9.47. In dredge haul 4, off Sully Island, one female was found in an empty *Sabellaria* hole. The aperture of the hole was closed by her caudal fan which appears to be specialised for this purpose. Deep inside the burrow ten young specimens were found.

Jæra marina (Fabricius)

15.10.47. Very large numbers were found at Peterstone Wentloog, closely packed together in crevices and splits in a fallen tree lying on the mud near L.W.N.T. Many of these were carrying large green egg masses.

Hemioniscus balani (Spence Bate)

Extremely abundant in *Balanus balanoides* at Sully Island. Single specimens, female, have also been obtained from *B. improvisus* at Sully Island (21.4.47) and at Barry (29.10.47).

Bathyporeia pilosa Lindstrom

20.6.47. Specimens carrying ova were obtained in muddy sand near H.W.N.T. at Sully Island.

Eupagurus bernhardus (L.)

8.1.47. A female in a shell of *Nucella lapillus* obtained at L.W.O.S.T. at Sully Island was carrying eggs.

Adalaria proxima Alder & Hancock

The character of the radula distinguishes this species at once from *Onchidoris aspera* (Alder & Hancock) (= *Onchidoris muricata* (Müller)) from which it could not be distinguished for certain on external features. The specimens obtained at Portishead in 1937 (Purchon, 1939) and recorded in the text as *O. muricata* were possibly in fact *A. proxima*. This record was omitted from the fauna lists of Purchon (1939) and Bassindale (1940).

7.1.47. Spawn was found at L.W.O.S.T. at Sully Island on the under side of boulders. This distinguishes the species from *O. muricata* which is said not to spawn before April. Specimens from Kilve (10.3.40) and Weston (22.4.39), kindly lent by Mr. Bassindale for examination, prove to be *Adalaria proxima* and not *Onchidoris muricata*.

Acanthodoris pilosa (Abildgaard)

31.10.47. Several very tiny, newly metamorphosed specimens were found on the underside of a boulder at L.W.O.S.T. at Breaksea Point, on a sheet of *Alcyonidium polyoum*.

Escharella immersa (Flem.)

7.1.47. A young colony found at L.W.O.S.T. at Sully Island was described by Dr. A. B. Hastings as showing the ancestrula as figured by Hincks, Text fig. 16, p. 361. This specimen has been added to the collections of the British Museum (Natural History).

Alcyonidium polyoum (Hass.)

5.5.47. Large sheets were found under boulders at L.W.O.S.T. at Breaksea Point. Mature larvae were present in clusters of 6-8 and these were emitted in the laboratory over night.

Amphipholis squamata (Delle Chiaje)

31.10.47. Several very tiny, newly metamorphosed specimens were found on a sheet of *Hymeniacidon* sp. on the underside of a boulder at L.W.O.S.T. at Breaksea Point.

VIII. DISCUSSION

From the data obtained from the survey of four beaches on the coasts of South Wales and Monmouthshire, it is possible somewhat tentatively to compare the distribution of the fauna on both sides of the Bristol Channel, and to indicate the limits of range of certain species into the Bristol Channel. As yet, too little is known of the physical conditions obtaining in the Channel to attempt to isolate the environmental factors which bring about such limitations in distribution.

It must be remembered, when making comparisons between the faunas of different beaches, that the distribution of a species is dynamic and its penetration into an estuary may vary, and perhaps considerably, from time to time. Bassindale (1940) states, for example, that *Gibbula cineraria* was found by Swanton in 1912 as far up channel as Weston, but no higher than Blue Anchor in 1940. Similarly *Sabellaria alveolata* was recorded in 1923 at Portishead, whereas more recently it was found no higher than Weston. Again *Littorina littorea* has retreated from Portishead (1923) to Weston (1940) (map in Bassindale, 1943a).

Altogether 89 intertidal and 21 sublittoral species were collected at Breaksea Point and offshore in the vicinity. The shore here is very extensive, and doubtless further collecting will add many species to the fauna list. Including 9 sublittoral species, 33 species were collected at Breaksea Point but not at stations higher up on the northern coast of the Bristol Channel. The most important of these records are those species which are not likely to have been missed when collecting at the other beaches, where suitable substrates appeared to be present. These species are listed as follows :-

<i>Leucosolenia lacunosa</i>	<i>Calliostoma zizyphinum</i>	<i>Cryptosula pallasiana</i>
<i>Grantia compressa</i>	<i>Gibbula cineraria</i>	<i>Henricia sanguinolenta</i>
<i>Hymeniacidon</i> sp.	<i>Ocenebra erinacea</i>	<i>Amphipholis squamata</i>
<i>Terebella lapidaria</i>	<i>Paphia saxatilis</i>	<i>Psammechinus miliaris</i>
<i>Phascolosoma minutum</i>	<i>Barnea candida</i>	(sublittoral)
<i>Porcellana platycheles</i>	<i>B. parva</i>	

Many species as yet unrecorded here have been obtained at Barry Harbour. Some of these may be excluded from Breaksea Point by lack of shelter. At Barry Harbour and on the neighbouring promontories, Cold Knap Point and Friars Point, Mr.

Blacker and Mr. Waugh have collected a total of 98 intertidal species. Of these as many as 43 species have not been taken either at Sully Island or at Peterstone Wentlloog. It is probable that quite a number of these species are prevented from penetrating further up the Channel by the lack of suitable substrates and adequate protection from rough seas, rather than by their intolerance of further reductions in salinity. The following list includes those species which have not been found on apparently suitable substrates at Sully Island or at Peterstone Wentlloog, and whose distribution on the southern shores of the Bristol Channel does not suggest an ability to penetrate more deeply into the estuary:—

<i>Sagartia elegans</i>	<i>Potamilla reniformis</i>	<i>Nucella lapillus</i>
<i>Leptoplana tremellaris</i>	<i>Balanus perforatus</i> (spat)	<i>Retusa alba</i>
<i>Lumbriconereis fragilis</i>	<i>Verruca stræmia</i>	<i>Hiatella arctica</i>
<i>Scoloplos armiger</i>	<i>Porcellana longicornis</i>	<i>Flustrella hispida</i>
<i>Scolecopsis ciliata</i>	<i>Spirontocaris cranchi</i>	<i>Pedicellina cernua</i>
<i>Nerine cirratulus</i>	<i>Galathea squamifera</i>	<i>Barentsia gracilis</i>
<i>Pygospio elegans</i>	<i>Littorina neritoides</i>	<i>Solaster papposus</i>

Elminius modestus must be considered separately as a recent addition to this shore. The distribution of *Elminius* in British waters has been treated by Bishop (1947) and by Crisp and Chipperfield (1948).

The presence of echinoderms at Breaksea Point and at Barry Harbour suggests that these two beaches should be compared respectively with Blue Anchor and Kilve on the southern shores of the Bristol Channel.

It is less easy to determine what species reach a natural limit to their potential range into the Bristol Channel at Sully Island, for the shore at Peterstone Wentlloog offers little variety in habitat and many species are probably restricted above Sully Island by the lack of a suitable substrate rather than by an inability to endure the estuarine conditions. At Sully Island 67 intertidal and 22 sublittoral species were collected. Of these, 51 intertidal and 10 sublittoral species were not recorded on the shore at Peterstone Wentlloog or offshore in the vicinity. Many of these species, however, have been recorded at higher stations on the opposite side of the channel, e.g., at Portishead and at Aust.

Excluding such species and a number of uncertain cases, the following list includes those species found at Sully Island and whose deeper penetration into the estuary is thought to be prevented by estuarine conditions other than the absence of a suitable substrate:—

<i>Halichondria panicea</i>	<i>Apomatus similis</i>	<i>Cancer pagurus</i>
<i>Actinia equina</i>	<i>Spiroribs spirillum</i>	<i>Gammarus locusta</i>
<i>Sagartia troglodytes</i>	<i>Cirratulus cirratus</i>	<i>Gibbula umbilicalis</i>
<i>Harmothoe longisetis</i>	<i>Marphysa sanguinea</i>	<i>Buccinum undatum</i>
<i>Lagisca extenuata</i>	<i>Chthamalus stellatus</i>	<i>Littorina littorea</i>
<i>Arenicola marina</i>	<i>Balanus crenatus</i>	<i>Acanthodoris pilosa</i>
<i>Sabellaria alveolata</i>	<i>Janira maculosa</i>	<i>Berenicia (Diastopora)</i>
<i>Pomatoceros triqueter</i>	<i>Hemioniscus balani</i>	<i>patina</i>

When considering those species which appear to reach their limit of penetration along the coast of South Wales at Sully Island, it appears that there are similarities between this beach and Weston-super-Mare. Here Bassindale recorded rather more than 50 species and suggested an "assumed" fauna of about 70 species.

The mouth of the Severn is arbitrarily fixed at Avonmouth, and Bassindale (1943a, 1943b) has shown that 10 miles below this point there may be a slow seasonal change in salinity at any particular station, but that during any one tidal cycle only slight changes in salinity occur. A series of observations taken on April 21st, 1947, at low tide, half tide and high tide at various stations agrees with this in showing little variation in salinity at each beach.

Station	Min. Salinity	Max. Salinity
	‰	‰
Portskewett (Black Rock) ..	12.5	14.5
Peterstone Wentlloog	19.9	21.1
Sully Island	27.4	27.9
Porthcawl	29.5	30.2

Above the point ten miles below Avonmouth the fauna has to endure either a slow change of salinity over a considerable range on each tide or, a more arduous experience, a lower range of salinity but a much greater rate of change of salinity.

It appears certain that the beaches here under consideration are not exposed to such extreme conditions; salinity changes but slightly during one tidal cycle but there will be a slow change in salinity from season to season. Too few records are as yet available to admit further discussion of the environmental conditions characterising the four beaches which have been examined.

IX. SUMMARY

1. During 1947 a survey has been made of the shores at Peterstone Wentlloog, Sully Island, Barry Harbour and Breaksea Point.
2. The four shores are described briefly and a fauna list is given for each shore.
3. During September, 1947, a sublittoral survey was carried out from a base at Penarth. Trawl and dredge hauls were made offshore from Peterstone Wentlloog to Stout Point and around the Monkstone, Flat Holm and Steep Holm. A map has been prepared showing the shore stations, and the trawl and dredge hauls have been plotted.
4. The commonest substrate encountered in the sublittoral survey was *Sabellaria* and stones. Sand, mud and rubble, small stones and mud, and ? smooth rocks were also met. An attempt has been made to identify the typical animal associations for each of these environments.

5. It was concluded that the sublittoral fauna of the area examined was impoverished, due to the combined effects of low salinity, strong currents and other factors. Probably however the use of an Otter Trawl would add considerably to the collection of large fish.

6. Some short notes relating principally to breeding habits have been collected in Section 7, Biological Notes.

7. In all, 184 species have been collected from these four beaches (including the data of Rees, 1940). Of these, 38 are new records for the Bristol Channel.

8. An attempt has been made to determine what species reach their limit of penetration into the Bristol Channel at Breaksea Point, Barry Harbour and Sully Island. Echinoderms have been found at Breaksea Point at a salinity of approximately 30‰ (summer), and at Barry Harbour (*Solaster papposus* in waters 27‰ salinity in spring).

9. Comparisons have been made with the faunas recorded for beaches on the southern shores of the Bristol Channel.

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TEMPORARY EXPOSURES AND BOREHOLE RECORDS IN THE BRISTOL AREA

I. RECORDS OF BOREHOLES SUNK FOR THE NEW SEVERN AND WYE BRIDGES

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THE new Severn Bridge is planned to be a suspension bridge with a span of 3,300 feet, supported on two piers, one to be built on Great Ulverstone Rock and the other on the foreshore at Beachley.

The stratigraphy of the area is not complex, but the strata have been deformed by tectonic disturbances of more than one age, the effects of which do not call for the same degree of detailed investigation as would be demanded if the scheme for a tunnel, and not a bridge, had been approved. The geological problems of a fundamental kind which call for careful examination are, firstly, the selection of sites where the rock is strong enough to carry the vertical loading of the piers and, secondly, the determination of the position for the anchorages where an appreciable horizontal component of the stresses involved would operate within the foundation rock.

The purpose of the present article is not to describe the stratigraphy, structure and palaeontology of the area, because these aspects of the investigation will be considered at a later date, but to provide factual information of the rock successions proved in a series of boreholes. The stratigraphical sequence is given below :—

Alluvial deposits	
Shales and limestones	
Cotham Beds	
Westbury Beds	
	} RHEATIC
	} JURASSIC
	} PLEISTOCENE AND RECENT
UNCONFORMITY	
Tea Green Marls	
Red Marls	
Dolomitic Conglomerate	
	} TRIAS
UNCONFORMITY	
Dolomitic Limestone (C_2 — S_1 zones)	
Lower Dolomites (Z — C_1 zones)	
Lower Limestone Shales (K zone)	
Massive Sandstones	
	} CARBONIFEROUS LIMESTONE
	} OLD RED SANDSTONE

In a region where Triassic rocks rest unconformably on Carboniferous Limestone and where the contact is extremely irregular, it was necessary precisely to explore the ground with the object of determining the most suitable positions for the piers and anchorages. A borehole programme was drawn up by the Consulting Engineers, and, of the thirty-seven sites selected, Nos. 17, 18 and 23 were not drilled. The reports are not presented in numerical sequence but commence with the log of Borehole 1, situated at the south-eastern end of the centre-line of the Severn Bridge, which is followed by the logs of the boreholes next in succession to the north-west, the last group of holes being put down on the western bank of the Wye for the smaller bridge over that river (see fig. 7).

I am happy to acknowledge the facilities for the examination of the cores provided by Messrs. Mott, Hay and Anderson, Consulting Engineers for the Severn Bridge, and to thank Dr. Stanley Smith for his unfailing help in the determination of the fossils.

I also wish to acknowledge the receipt from the University of Bristol Colston Society of a grant towards the cost of publication of this paper.

Borehole 1

Location : on centre-line of bridge 100 feet south-west of spot level 139 Aust Head.
Height above Ordnance Datum : 130 feet.

GEOLOGICAL SUCCESSION

	Thick- ness ft. ins.	Total Depth ft. ins.
Soil	1 0	1 0
JURASSIC : LOWER LIAS		
Yellow clay with rounded pieces of limestone	6 6	7 6
Bluish-grey limestone with oyster shells (<i>Ostrea hisingeri</i> , Nilsson)	0 6	8 0
Thin platy limestones with <i>O. hisingeri</i> and yellow clay ; small percentage only of core recovered	1 4	9 4
RHÆTIC : COTHAM BEDS		
Crazy-Cotham limestone	0 7	9 11
Greyish-white shale with some thin beds of light-grey sandstone	10 6	20 5
RHÆTIC : WESTBURY BEDS		
Black paper-shale with two limestones, one 8 inches thick and the other 6 inches thick (incomplete core)	14 7	35 0

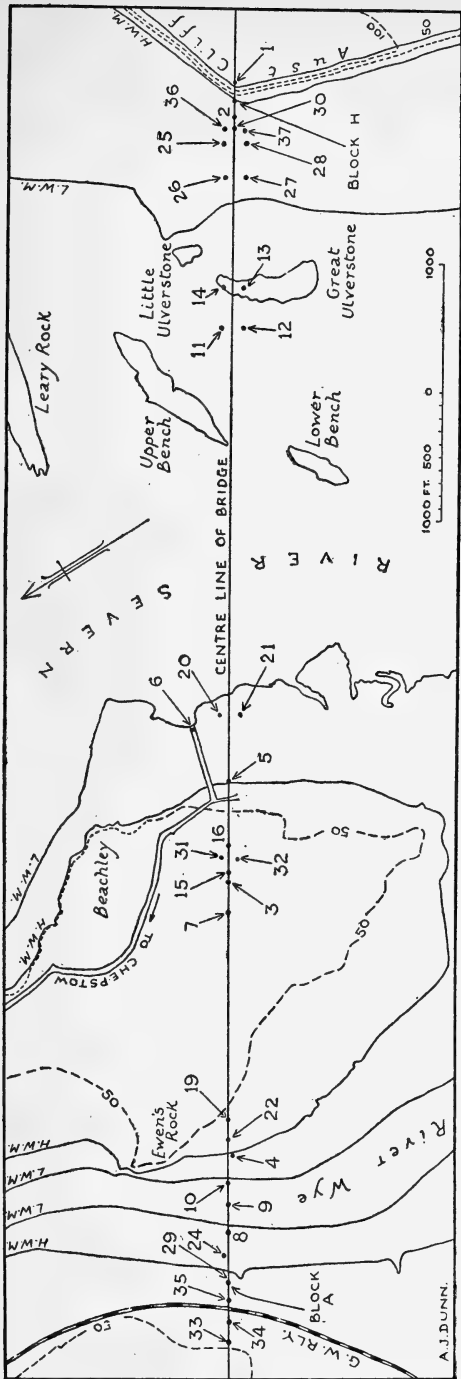


FIG. 7
 SKETCH-MAP SHOWING THE POSITIONS OF THE BOREHOLES FOR THE
 NEW SEVERN AND WYE BRIDGES

	Thick- ness ft. ins.	Total Depth ft. ins.
TRIAS : KEUPER MARL		
Greenish-grey marl with bands of clayey sandstone (= Tea Green Marl)	9 0	44 0
Brick-red marl	122 0	166 0
Closely bedded, colour-banded, green and lavender-grey shale; gypsum occurs at depth 166½ feet	8 0	174 0
Brownish-red marl with occasional green beds; thin layers (¼ inch) of satin-spar	8 0	182 0
Dark maroon shale with some streaks of alabaster	18 0	200 0
Dark maroon marl with rounded masses of alabaster	1 0	201 0
Dark maroon marl with wisps of gypsum arranged subparallel to the bedding	13 0	214 0
Green shale, mottled brown, with nodules and a bed 3 inches thick of grey limestone	3 0	217 0
Light yellowish-grey, dolomitised, sandy marl with occasional small rock fragments up to 1 inch across	3 0	220 0
TRIAS : DOLOMITIC CONGLOMERATE		
Coarse-grained breccia with some pieces of Carboniferous Limestone traversing the diameter of the core	5 3	225 3
CARBONIFEROUS LIMESTONE : LOWER DOLOMITES		
Medium grey, mauve-tinted, dolomitised limestone with crinoid ossicles preserved as casts and showing a characteristic ochreous colour	1 9	227 0

Borehole 2

Location : 260 feet north-west of Borehole 1 on centre-line; Aust foreshore.
Height above Ordnance Datum : at Ordnance Datum.

GEOLOGICAL SUCCESSION

ALLUVIUM

Loose stones and mud	7 0	7 0
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TRIAS : KEUPER MARL

Brick-red, sandy marl, with rare, nodular pieces of alabaster, and some greenish-grey bands of marl	31 0	38 0
Greyish-green marl	2 0	40 0
Brick-red marl	5 0	45 0
Red marl rich in nodules of alabaster	1 0	46 0
Maroon marl	3 0	49 0
Maroon marl with abundant nodules of alabaster	1 0	50 0
Maroon marl with veins of alabaster	10 0	60 0
Dark maroon marl with gypsum arranged subparallel to bedding	7 0	67 0
Green shale, mottled brown	2 0	69 0
Greyish-cream, sandy, dolomitic marl with small pebbles	3 6	72 6

TRIAS : DOLOMITIC CONGLOMERATE

Brick-red, hard marl with angular pieces of red and cream Carboniferous Limestone	1 6	74 0
Angular pieces of red and cream Carboniferous Limestone set in a yellowish, dolomitic, sandy matrix	3 0	77 0

	Thick- ness ft. ins.	Total Depth ft. ins.
CARBONIFEROUS LIMESTONE : LOWER DOLOMITES		
Fine-grained, liver-coloured, grey and maroon, dolomitic limestone which is extensively jointed	15 0	92 0
Incomplete core owing to shattered limestone, but rocks as described above	5 0	97 0

A section drawn through the position of boreholes 1 and 2 shows the existence of an unsuspected, deep valley in the Carboniferous Limestone, now infilled by Trias deposits. The north-western flank of this valley falls through 77 feet in a horizontal distance of 105 feet, or a minimum inclination of 36°. The origin of the steep flank may be attributed to faulting, but a violently fluctuating topography of the ancient Trias land surface is characteristic throughout much of the Bristol district; the Trias valley, the lowest level of which probably attains a minimum depth of 120 feet below Ordnance Datum, could reasonably be explained by the rapid erosion by a fast flowing stream, arising through torrential rainfall, under subarid conditions.

Borehole 30

Location : 260 feet from Block H on centre-line; Aust foreshore.
Height above Ordnance Datum : 2.4 feet.

GEOLOGICAL SUCCESSION

TRIAS : KEUPER MARL

Red, occasionally greyish-green, dolomitic marl	18 6	18 6
Soft, red marl (few cores)	3 0	21 6
Gypsiferous, red marl (incomplete cores) with nodular gypsum in places	10 0	31 6
Gypsiferous, red marl	3 9	35 3

TRIAS : DOLOMITIC CONGLOMERATE

Yellowish-grey, hard, dolomitic marl	3 9	39 0
Ochreous-yellow rock with angular pieces of Carboniferous Limestone up to 2 inches across	3 9	42 9

CARBONIFEROUS LIMESTONE : LOWER DOLOMITES

Medium grey, compact, crystalline, dolomitic, crinoidal limestone, in places extensively jointed	47 3	90 0
Grey and purple, compact, dolomitic, crinoidal limestone	10 0	100 0

Borehole 36

Location : Aust foreshore, 200 feet north-west of block H and 64 feet upstream.
Height above Ordnance Datum : 0.1 foot.

GEOLOGICAL SUCCESSION

TRIAS : KEUPER MARL

Red, dolomitic marl with some greenish-grey bands	17 0	17 0
Cavity	1 0	18 0
Soft, red marl	4 6	22 6
Red marl with gypsum	1 6	24 0
Red marl with abundant specks of gypsum	12 0	36 0
Greyish-green marl	2 0	38 0

TRIAS : DOLOMITIC CONGLOMERATE

Buff-coloured, dolomitic, marly sandstone passing down into a coarse-grained breccia including fragments of Carboniferous Limestone up to 2 inches across	4 0	42 0
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CARBONIFEROUS LIMESTONE : LOWER DOLOMITES

Grey, crystalline, compact, dolomitic, unfossiliferous limestone	10 0	52 0
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Borehole 37

Location : Aust foreshore, 225 feet north-west of block H and 70 feet downstream.

Height above Ordnance Datum : 3.5 feet.

GEOLOGICAL SUCCESSION

	Thick- ness ft. ins.	Total Depth ft. ins.
TRIAS : KEUPER MARL		
Red marl with greenish-grey bands	17 6	17 6
Yellowish-grey marl with rounded masses of gypsum ...	3 6	21 0
TRIAS : DOLOMITIC CONGLOMERATE		
Greyish marl with angular pieces of Carboniferous Limestone	1 6	22 6
Coarse-grained breccia	0 6	23 0
CARBONIFEROUS LIMESTONE : LOWER DOLOMITES		
Grey, crystalline, compact, dolomitic limestone with occasional bands carrying crinoid ossicles	27 0	50 0

Borehole 25

Location : rock platform below Aust Head, the south-easterly corner of the proposed anchorage, 70 feet upstream from centre-line.

Height above Ordnance Datum : 1.5 feet.

GEOLOGICAL SUCCESSION

TRIAS : KEUPER MARL		
Red, dolomitic marl	10 0	10 0
Greenish-grey, dolomitic marl becoming harder and more calcareous towards base	5 0	15 0
TRIAS : DOLOMITIC CONGLOMERATE		
Angular fragments of Carboniferous Limestone set in a reddish-brown, dolomitic matrix	4 9	19 9
CARBONIFEROUS LIMESTONE : LOWER DOLOMITES		
Medium grey, compact, crystalline, dolomitic limestone ...	25 3	45 0
The junction between the Dolomitic Conglomerate and the Carboniferous Limestone was inclined at about 25°.		

Borehole 28

Location : rock platform below Aust Head, the south-westerly corner of the proposed anchorage, 70 feet downstream from centre-line.

Height above Ordnance Datum : 0.5 foot.

GEOLOGICAL SUCCESSION

CARBONIFEROUS LIMESTONE : LOWER DOLOMITES		
Medium grey, compact, crystalline, dolomitic, crinoidal limestone. No fossils were recovered	55 0	55 0

Borehole 26

Location : rock platform below Aust Head, the north-easterly corner of the proposed anchorage, 70 feet upstream from centre-line.

Height above Ordnance Datum : 2 feet.

GEOLOGICAL SUCCESSION

Thick- ness ft. ins.	Total Depth ft. ins.
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CARBONIFEROUS LIMESTONE : LOWER DOLOMITES

Dark, medium and light grey, occasionally purplish, compact, crystalline, dolomitic and sometimes crinoidal limestone, which yielded at a depth of 12 feet a poor specimen of *Zaphrentis* sp. 41 0 41 0

Borehole 27

Location : rock platform below Aust Head, the north-westerly corner of the proposed anchorage, 70 feet downstream from centre-line.

Height above Ordnance Datum : minus 1 foot.

GEOLOGICAL SUCCESSION

CARBONIFEROUS LIMESTONE : LOWER DOLOMITES

Medium grey, fine-grained, compact, crystalline, occasionally crinoidal, dolomitic limestone 50 0 50 0

Borehole 13

Location : Great Ulverstone, 100 feet south-west of centre-line.

Height above Ordnance Datum : minus 8 feet.

GEOLOGICAL SUCCESSION

CARBONIFEROUS LIMESTONE : LOWER DOLOMITES

Light grey, fine-grained, compact, jointed, dolomitic, crinoidal limestone which yielded specimens of *Zaphrentis* cf. *omaliusi* E. & H. 46 0 46 0

The rocks can be correlated with the Z₂ subzone.

Artesian water was met at a depth of 14 feet 6 inches ; at high tide the water rose to the top of the hole and overflowed but at low tide it did not reach the surface. The water was clear and fresh ; there was some connection between the height of the river water and the hydrostatic head of the water from the spring.

Borehole 14

Location : Great Ulverstone, 100 feet north-east of centre-line.

Height above Ordnance Datum : minus 11.5 feet.

GEOLOGICAL SUCCESSION

CARBONIFEROUS LIMESTONE : LOWER DOLOMITES

Light grey, occasionally pink, compact, crystalline, fine-grained, dolomitic, crinoidal limestone which yielded *Zaphrentis* (*Zaphrentoides*) *konincki* E. & H., *Orthotetes crenistria* (Phillips), *Rhipidomella michelini* (l'Eveille), ? *Spiriferina octoplicata* (J. de C. Sow.), *Syringothyris cuspidata* (Martin) and *Spirifer tornacensis* de Koninck 47 0 47 0

The above listed fauna suggests a Z₂ age.

Borehole 12

Location : 250 feet north-west of Great Ulverstone, measured along centre-line, and 100 feet south-west of centre-line.

Height above Ordnance Datum : minus 64.3 feet.

GEOLOGICAL SUCCESSION

	Thick- ness ft. ins.	Total Depth ft. ins.
ALLUVIUM		
Gravel	2 0	2 0
CARBONIFEROUS LIMESTONE : LOWER DOLOMITES		
Medium grey, crystalline, dolomitic, crinoidal limestone ...	0 3	2 3
Pink and grey, crinoidal limestone	1 0	3 3
Medium grey, dolomitic, crinoidal limestone	2 9	6 0
Pink and grey, dolomitic limestone	1 0	7 0
Light to medium grey, occasionally pink, compact, crystal- line, dolomitic, sometimes crinoidal limestone	25 0	32 0

Borehole 11

Location : 250 feet north-west of Great Ulverstone, measured along centre-line,
and 100 feet north-east of centre-line.

Height above Ordnance Datum : minus 59 feet.

GEOLOGICAL SUCCESSION

CARBONIFEROUS LIMESTONE : LOWER DOLOMITES

Grey, dolomitic, sometimes crinoidal, compact, jointed limestone with calcite infilling the joints. The rock is jointed between 33 and 38 feet and has been converted into a breccia, cemented by yellowish-weathering dolomite with some calcite. One specimen of *Syringothyris cuspidata* (Martin) was obtained.

48 0 48 0

Borehole 21

Location : Beachley foreshore on site for a pier of the bridge, 80 feet south-west
of centre-line.

Height above Ordnance Datum : minus 17 feet.

GEOLOGICAL SUCCESSION

No cores available 21 0 21 0

CARBONIFEROUS LIMESTONE : LOWER LIMESTONE SHALES

Brownish, calcareous siltstone with joints infilled with
Trias marl

0 6 21 6

No cores available

12 8 34 2

Brownish, calcareous siltstone, with *Fenestella* and crinoid
ossicles, greyish shale and thin limestone

1 0 35 2

No cores available

1 1 36 3

Purplish-brown, calcareous siltstone

0 5 36 8

No cores available

3 9 40 5

Brown and purplish, calcareous siltstone

0 7 41 0

No cores available

3 0 44 0

Ochreous and purplish, calcareous siltstone with *Fenestella*
sp., *Trepostomatous* bryozoa, ? *Phillipsia* sp., *Orthotetes creni-*
stria (Phillips), *Chonetes* cf. *hardrensis* Phillips

2 0 46 0

Greenish-grey marl

2 0 48 0

Greenish-grey and purplish, crinoidal limestone and silt-
stone which provided *Fenestella* sp.

2 0 50 0

The fauna points to a correlation with the K zone and shows a close similarity
to the succession found in borehole 20.

Many of the cores had been removed for test purposes and the geological
succession given above is incomplete.

Borehole 20

Location : 250 feet south of the eastern end of the Landing Pier, Beachley, and 75 feet north-east of the centre-line.

Height above Ordnance Datum : minus 14.5 feet.

GEOLOGICAL SUCCESSION

	Thick- ness ft. ins.	Total Depth ft. ins.
TRIAS : KEUPER MARL		
Red marl with occasional greenish-grey shale	16 0	16 0
Thin layers of greenish-grey, micaceous flag contained in red marl carrying numerous small pebbles	2 0	18 0
CARBONIFEROUS LIMESTONE : LOWER LIMESTONE SHALES		
Maroon, and pinkish-grey, micaceous flag and shale	4 0	22 0
Reddish-grey, micaceous shale	6 0	28 0
Dull maroon and dark green micaceous shale and siltstone with occasional thin calcareous bands yielding <i>Rhabdomeson</i> sp., <i>Fenestella</i> sp., <i>Syringothyris cuspidata</i> (Martin), and <i>Productus (Pustula) subpustulosus</i> Thomas	11 6	39 6
Purplish-grey and light green siltstone	3 6	43 0
Dark, bluish-grey shale	3 0	46 0
Alternations of bluish-grey shale and more calcareous layers rich in crinoid ossicles	2 0	48 0
Dark, bluish-grey shale passing occasionally into siltstones and also showing thin bands rich in crinoid ossicles	55 0	103 0
Irregularly banded, blue-black and brownish-maroon shale and siltstone, calcareous to varying degrees, sometimes approaching a limestone, rarely crinoidal	5 0	108 0
Greenish-grey, irregularly banded siltstone, in places sufficiently calcareous to grade into a medium grey limestone	5 6	113 6
Greenish-grey and brownish-maroon shale and siltstone yielding <i>Orthotetes</i> cf. <i>crenistris</i> (Phillips), <i>Syringothyris cuspidata</i> and <i>Fenestella</i> sp.	4 0	117 6
Yellowish-purple, calcareous siltstone	6 6	124 0
Dark, greenish-grey, calcareous siltstone which yielded ? <i>Streblopteria</i> , possibly <i>S. ornata</i> Etheridge	10 0	134 0
Brownish-maroon, calcareous siltstone	2 2	136 2
Grey, crystalline, granular, crinoidal limestone with <i>Camarotoechia</i> sp., and <i>Orthotetes</i> sp.	2 10	139 0
Brownish-maroon, calcareous siltstone	0 6	139 6
Grey, crystalline, crinoidal limestone with <i>Spirifer tornacensis</i> de Koninck	1 6	141 0
Brownish-maroon, calcareous siltstone	1 0	142 0
Dark grey, crystalline, crinoidal limestone	3 0	145 0
Irregularly banded, dark medium grey, calcareous siltstone, rarely maroon in colour	5 0	150 0

The dip in the Carboniferous Limestone increased from 20° at a depth of 22 feet to 30° at a depth of 100 feet. The latter angle was maintained except that at one place an inclination of 35° was measured.

The rock succession belongs to the Lower Limestone Shales and is to be classified as within the K zone. The fossils, however, are not exclusively typical of this zone. The lithology compares closely with that found in borehole 5 and here the fauna indicates the K zone.

Borehole 6

Location: at the foot of Beachley Jetty.

Height above Ordnance Datum: minus 13 feet.

GEOLOGICAL SUCCESSION

	Thick- ness ft. ins.	Total Depth ft. ins.
TRIAS: KEUPER MARL		
Maroon and brick-red marl	25 0	25 0
Grey-green and liver-coloured, calcareous and dolomitic marl	1 0	26 0
Liver-coloured and brick-red, banded, calcareous and dolomitic marl	3 0	29 0
Yellowish-red, calcareous and dolomitic marl	5 0	34 0
Brick-red marl	3 0	37 0
Yellowish and pinkish-red, calcareous and dolomitic marl	11 0	48 0

Borehole 5

Location: 400 feet west of the south-east end of Beachley Jetty.

Height above Ordnance Datum: 15 feet.

GEOLOGICAL SUCCESSION

ALLUVIUM		
Yellow sand	2 6	2 6
TRIAS: KEUPER MARL		
Soft, red marl	6 6	9 0
Red marl with occasional bands of yellowish-green, sandy marl	13 6	22 6
CARBONIFEROUS LIMESTONE: LOWER LIMESTONE SHALES		
Dolomitised, crinoidal limestone with fragments of productids	2 6	25 0
Green and occasionally red, micaceous shale	3 0	28 0
Greyish-maroon, fine-grained, dolomitic, argillaceous limestone	2 0	30 0
Dark greyish-maroon shale with green bands	1 6	31 6
Greenish-grey shale	0 9	32 3
Brownish-grey siltstone with <i>Productus vaughani</i> Muir-Wood	0 9	33 0
Greenish-yellow, fine-grained, dolomitic, crinoidal limestone which is ochreous in some bands and also carries blebs of green shale	1 8	34 8
Greyish-yellow siltstone	2 4	37 0
Maroon, green and purple, banded, micaceous shale which becomes more calcareous towards its base	3 0	40 0
Soft, green, micaceous shale	1 6	41 6
Maroon and green shale with bands of thin, decalcified limestone which yielded <i>Productus</i> cf. <i>vaughani</i>	3 0	44 6
Ochreous, dolomitic, fine-grained limestone, in places stained a maroon colour, and yielding <i>Fenestella</i> sp.	2 6	47 0
Maroon, purple and green, slickensided shales sometimes with harder, dolomitic bands approaching fine-grained limestones	7 6	54 6
Yellow and greenish-grey, fine-grained, dolomitic limestone, sometimes crinoidal	5 0	59 6
Purple, calcareous siltstone with bands of yellow, decalcified, dolomitic limestone	3 0	62 6
Maroon and purple, fine-grained limestone	1 6	64 0
Purple, calcareous siltstone	1 6	65 6

	Thick- ness ft. ins.	Total Depth ft. ins.
Maroon and purple, calcareous siltstone with harder courses of dolomitic limestone which yielded <i>Productus</i> sp. The siltstones predominate and provided <i>Productus</i> cf. <i>vaughani</i> , ? <i>Rhabdomeson</i> sp., and innumerable white crinoid ossicles	4 6	70 0
Maroon shale with <i>Rhabdomeson</i> sp. and crinoid ossicles	1 4	71 4
Maroon, calcareous shale and argillaceous, fine-grained limestone with coarser-grained lenticular masses of crinoidal limestone. One sample of <i>Productus</i> (<i>Pustula</i>) <i>pustulosus</i> Thomas was collected	8 2	79 6
Green siltstone, sometimes carrying calcareous, crinoidal masses	6 0	85 6
Purplish-grey micaceous siltstone which yielded <i>Syringothyris cuspidata</i> (Martin) and <i>Rhabdomeson</i> sp.	5 6	91 0
Grey, calcareous, micaceous siltstone containing <i>Productus</i> (<i>Pustula</i>) <i>subpustulosus</i> Thomas, <i>Fenestella</i> sp., and <i>Rhabdomeson</i> sp.	0 6	91 6
Purplish-grey, micaceous siltstone	4 6	96 0
Greenish-yellow, banded siltstone	1 0	97 0
Dark purplish-grey, micaceous siltstone	2 0	99 0
Light brown, fine-grained, crinoidal limestone	2 0	101 0
Purple and bluish-grey, banded, calcareous, crinoidal limestone	1 3	102 3
Bluish-grey, micaceous shale	0 9	103 0
Yellow and greenish-grey, banded, crinoidal, micaceous, calcareous siltstone	0 6	103 6
Banded, purplish-grey, micaceous shale and yellowish siltstone	2 6	106 0
Purple and grey, crinoidal limestone crowded with imperfect and badly preserved brachiopods such as <i>Syringothyris</i> sp., <i>Productus</i> of the <i>vaughani</i> group, <i>Orthotetes</i> sp., and <i>Rhipidomella</i> sp.; one specimen of a <i>Murchisonia</i> was found	1 6	107 6
Bluish-grey siltstone with some calcareous bands	1 6	109 0
Bluish-grey, banded, micaceous siltstone and shale containing poorly preserved and unidentifiable lamellibranchs; a fragment of <i>Orthotetes</i> sp. was also obtained	8 6	117 6
Brown shale, siltstone and fine-grained, calcareous sandstone, the latter containing numerous crinoid ossicles	3 6	121 0
Yellowish-brown, fine-grained sandstone, sometimes calcareous and crinoidal, and siltstone interbedded with shale	7 0	128 0
Reddish-brown shale with some thin beds of crinoidal, fine-grained sandstone...	5 0	133 0
Grey-hearted, ochreous-brown, weathered, crinoidal, calcareous, fine-grained sandstone and ochreous yellow, micaceous siltstone	1 0	134 0

The Triassic deposits were almost horizontally bedded, and, as far as could be determined, the surface of the unconformity was also horizontal. The dip in the Lower Limestone Shales was ascertained at several positions; down to a depth of 91 feet the average angle was 25°, but below that depth to the bottom of the borehole the dip was generally in the neighbourhood of 40°.

The fauna clearly indicates that the Carboniferous rocks belong to the K zone. Those traversed down to a depth of 107 feet 6 inches can be correlated with the K₁ subzone, while from that level to the bottom of the borehole there is presumptive evidence, based on the lamellibranchs and lithology, of a correlation with the K_m beds.

During the sinking of the borehole, water was lost at the unconformity between the Triassic and Carboniferous rocks, and with a feed of 350 gallons per hour the water did not overflow at the surface.

Borehole 16

Location : 220 feet south-east of borehole 15, measured along centre-line.

Height above Ordnance Datum : 57.5 feet.

GEOLOGICAL SUCCESSION

	Thick- ness		Total Depth	
	ft.	ins.	ft.	ins.
Soil	1	0	1	0
PLEISTOCENE				
Sandy clay	7	0	8	0
Sand, stones and boulders	13	0	21	0
TRIAS : KEUPER MARL				
Red clay and marl	15	6	36	6
Greenish-yellow marl	1	6	38	0
Red marl with rare, thin bands of greenish-grey marl	17	0	55	0
Green marl	1	0	56	0
CARBONIFEROUS LIMESTONE : ?LOWER DOLOMITES				
Medium grey, tough, occasionally crinoidal, jointed limestone, shattered and veined with calcite between 63 and 66 feet	15	0	71	0

The junction between the Keuper Marl and the Carboniferous Limestone was almost horizontal.

The details in the above record, down to a depth of 28 feet, were supplied by the borehole foreman.

Borehole 31

Location : midway between boreholes 15 and 16, and 60 feet upstream from centre-line.

Height above Ordnance Datum : 57 feet.

Remarks :

Only two pieces of core were available for examination. One piece (depth 69-71 feet) was definitely Carboniferous Limestone, Lower Dolomites. The other (depth 67-69 feet) appeared to be a coarse-grained Dolomitic Conglomerate with large fragments, but it could also be interpreted as the top of the Carboniferous Limestone which was jointed, the joints having been infilled by sandy marl of Triassic age.

Borehole 32

Location : midway between boreholes 15 and 16, and 60 feet downstream from centre-line.

Height above Ordnance Datum : 57 feet.

Remarks :

Few cores were available for examination. The Keuper Marl rests directly upon the Carboniferous Limestone, without any development of Dolomitic Conglomerate, and the junction between them was found at a depth of 55 feet 6 inches.

The Carboniferous Limestone, which was entered for a distance of 4 feet 6 inches, the borehole being discontinued when a depth of 60 feet was reached, comprises purplish and light-buff, crinoidal, dolomitic limestone; this yielded *Zaphrentis omalusi* E. & H., *Productus (Pustula) subpustulosus* Thomas and *Spirifer tornacensis* de Koninck. The fauna clearly indicates a correlation with the Z zone and the rocks are to be included in the Lower Dolomites.

Borehole 15

Location : 300 feet south-east of borehole 7, measured along centre-line.

Height above Ordnance Datum : 57.5 feet.

GEOLOGICAL SUCCESSION							Thick- ness	Total Depth
							ft. ins.	ft. ins.
Made ground	...	...	...	...	...	...	2 0	2 0
PLEISTOCENE								
Sandy clay	...	...	...	...	...	...	6 0	8 0
Sand, stones and boulders	...	...	...	...	...	...	14 0	22 0
TRIAS : KEUPER MARL								
Red and grey marl (no cores)	...	...	...	...	...	...	15 0	37 0
Greyish-green marl	...	...	...	...	...	...	4 0	41 0
Maroon and red marl	...	...	...	...	...	...	16 6	57 6

CARBONIFEROUS LIMESTONE : LOWER DOLOMITES

Grey, crinoidal, dolomitised limestone from which were collected *Rhipidomella michelini* (l'Eveille), *Athyris* cf. *expansa* (Phillips), *Syringopora* near *S. ramulosa* Goldfuss and *Zaphrentis* (*Zaphrentoides*) *delanouei* E. & H.

The record down to a depth of 37 feet was taken from the borehole foreman. The junction between the Trias and the Carboniferous Limestone was almost horizontal. The fauna from the Carboniferous Limestone indicates a correlation with the Z₁ subzone.

Borehole 3

Location : 250 feet south-east of borehole 7, measured along centre-line.

Height above Ordnance Datum : 55 feet.

GEOLOGICAL SUCCESSION							Thick- ness	Total Depth
							ft. ins.	ft. ins.
Soil	...	...	...	...	...	...	2 0	2 0
PLEISTOCENE								
Loose, sandy gravel with boulders up to 8 inches across	...	...	...	...	...	...	23 0	25 0
TRIAS : KEUPER MARL								
Red marl (no cores)	...	...	...	...	...	...	13 0	38 0
Grey marl	...	...	...	...	...	...	4 0	42 0
Red marl with occasional grey bands	...	...	...	...	...	...	17 0	59 0

CARBONIFEROUS LIMESTONE : LOWER DOLOMITES

Light to medium grey, fine-grained, dolomitic, crinoidal limestone, sometimes coloured a pinkish tinge; fossils are dolomitised, preserved as casts, and ochreous yellow in colour. The fauna comprises *Zaphrentis* (*Zaphrentoides*) *delanouei* E. & H., *Rhipidomella michelini* (l'Eveille), *Productus* (*Avonia*) *bassus* Vaughan, *Productus* (*Pustula*) *subpustulosus* Thomas, *Chonetes hardrensis* Phillips, *Orthotetes* sp., and *Syringothyris cuspidata* (Martin)

The fauna from the Lower Dolomites suggests a correlation with Z₁ subzone. The junction between the Carboniferous Limestone and Triassic rocks was almost horizontal.

Borehole 7

Location : alongside water-tower on camp site.

Height above Ordnance Datum : 58 feet.

GEOLOGICAL SUCCESSION

	Thick- ness ft. ins.	Total Depth ft. ins.
Soil	2 0	2 0
PLEISTOCENE		
Sand, stones and boulders up to 8 inches across	20 0	22 0
TRIAS : KEUPER MARL		
Soft, red marl (no core)	22 0	44 0
Greenish-grey marl streaked with maroon marl	7 0	51 0
Predominantly maroon marl with occasional bands of green marl	18 6	69 6

CARBONIFEROUS LIMESTONE : LOWER DOLOMITES

Greenish-grey, pink, and purplish-grey, heavily crinoidal, dolomitised, fine-grained, compact limestone which yielded <i>Orthotetes cf. crenistria</i> (Phillips), <i>Syringothyris cuspidata</i> (Martin), <i>Spiriferina octoplicata</i> (J. de C. Sow.) and zaphrentoid corals	11 6	81 0
Deep red, crinoidal, dolomitised limestone which provided <i>Syringothyris cuspidata</i> and zaphrentoid corals	3 0	84 0
Greyish and pinkish-white, unfossiliferous limestone plentifully veined with calcite	6 0	90 0

The Keuper Marl rests directly upon an almost level surface of the Carboniferous Limestone, without the intervention of the Dolomitic Conglomerate. The fauna from the Carboniferous Limestone suggests a Z₁ age for the rocks, that is, they are to be correlated with the Lower Dolomites and with the lower part of that subdivision.

Borehole 19

Location : 650 feet south-east of centre of River Wye, measured along centre-line.

Height above Ordnance Datum : 49.4 feet.

GEOLOGICAL SUCCESSION

Made ground	9 0	9 0
Loose limestone blocks : ? made ground	7 0	16 0

CARBONIFEROUS LIMESTONE

Maroon, greenish-grey and grey, fine-grained, compact, dolomitic limestone with bands of crinoid ossicles which show the strata are inclined at 80°, or thereabouts, to the horizontal	14 0	30 0
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The crinoid ossicle bands clearly indicate a high angle of inclination, although the rocks generally show little bedding. The age of the limestone is uncertain as no diagnostic fossils were found.

Borehole 22

Location : 500 feet south-east of centre of River Wye, measured along centre-line.

Height above Ordnance Datum : 25.5 feet.

GEOLOGICAL SUCCESSION							Thick- ness	Total Depth
							ft. ins.	ft. ins.
ALLUVIUM								
Clay and silt	...	...	...	...	...	...	30 0	30 0
Clay and boulders	...	...	...	...	...	...	7 0	37 0
Boulders	...	...	...	...	...	...	3 0	40 0
Grey clay	...	...	...	...	...	...	1 0	41 0

TRIAS : DOLOMITIC CONGLOMERATE

Breccia, becoming coarser-grained towards base and containing angular limestone fragments up to 4 inches across 6 0 47 0

CARBONIFEROUS LIMESTONE : ? LOWER DOLOMITES

Highly crinoidal, richly dolomitic, yellowish-grey limestone	8 0	55 0
Grey and brownish-grey, compact, dolomitic, crinoidal limestone...	7 0	62 0
Light grey, dolomitic, occasionally crinoidal limestone ...	9 0	71 0

No cores were obtained down to a depth of 41 feet. The junction between the Trias and the Carboniferous Limestone was irregular and not clearly defined owing to the jointed character of the limestone and to the chemical weathering which it has undergone. No fossils were collected but the rocks have the same appearance as those occurring in the Lower Dolomites.

Borehole 4

Location : 350 feet S. 32° W. of old limekiln, near Ewen's Rock, Beachley.

Height above Ordnance Datum : approximately 22 feet.

GEOLOGICAL SUCCESSION								
ALLUVIUM								
Soft, grey clay	...	...	...	...	...	...	7 0	7 0
Bed with loose boulders reaching up to 7 inches across	...	...	...	...	...	...	1 0	8 0
Soft, grey clay	...	...	...	...	...	...	27 0	35 0
Beds with loose boulders up to 6 inches across	...	...	...	...	...	...	1 0	36 0
Soft, grey clay with some small, loose, rounded stones	...	...	...	...	...	...	4 0	40 0
Soft, grey clay	...	...	...	...	...	...	14 0	54 0

CARBONIFEROUS LIMESTONE : ? LOWER DOLOMITES

Fine-grained, dark pinkish-grey, dolomitised, unfossiliferous limestone ; incomplete cores were obtained as the rock is broken by fissures	12 0	66 0
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The 54 feet of material resting upon the Carboniferous Limestone is river-deposited and little consolidated. The absence of Triassic deposits is not unexpected, as a bluff of Carboniferous Limestone composed of a similar type of rock to that recovered from the borehole is exposed at the river's side 70 yards to the north-north-east.

Borehole 10

Location : 175 feet south-east of centre of River Wye, measured along centre-line of bridge.

Height above Ordnance Datum : bed of River Wye, minus 10 feet.

GEOLOGICAL SUCCESSION								
ALLUVIUM								
Mud, clay, pebbles and boulders	...	...	...	...	...	...	43 0	43 0
Sand, stones and limestone boulders	...	...	...	...	...	...	13 6	56 6

	Thick- ness ft. ins.	Total Depth ft. ins.
TRIAS : KEUPER MARL		
Red and greenish-grey marl	10 0	66 6
Arenaceous, greenish-grey marl	1 0	67 6
TRIAS : DOLOMITIC CONGLOMERATE		
Light-coloured, yellowish-grey, calcareous, massive, arenaceous marl	4 0	71 6
Light-coloured, pinkish-yellowish-grey, dolomitic, cavernous-weathering, massive, arenaceous marl	4 0	75 6

Borehole 9

Location : centre of River Wye on centre-line of bridge.
Height above Ordnance Datum : bed of river, minus 24 feet.

GEOLOGICAL SUCCESSION

ALLUVIUM

Clay, silt, pebbles and boulders	29 0	29 0
Boulders, pebbles and sand	3 0	32 0

TRIAS : KEUPER MARL

Soft, red marl	10 0	42 0
Grey marl (no cores)	2 0	44 0
Red marl with occasional grey marl	13 0	57 0

TRIAS : DOLOMITIC CONGLOMERATE

Soft, light brownish marl with angular limestone fragments up to 1 inch across	2 0	59 0
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The above details down to a depth of 48 feet were supplied by the borehole foreman.

Borehole 8

Location : 200 feet north-west of borehole 9, measured along centre-line of bridge.

Height above Ordnance Datum : bed of river, minus 15 feet.

GEOLOGICAL SUCCESSION

ALLUVIUM

Silt, and limestone boulders	19 0	19 0
Red clays with boulders and pebbles	11 0	30 0

TRIAS : KEUPER MARL

Red marl	19 0	49 0
Grey marl	2 0	51 0
Soft clayey marl	2 0	53 0

CARBONIFEROUS LIMESTONE

Ochreous, yellow and red, dolomitic, oolitic limestone much fractured, with joints filled with calcite. The rock yielded <i>Seminula (Composita) fcoidea</i> (Vaughan) and <i>Lithostrotion martini</i> E. & H.	7 0	60 0
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The borehole log down to a depth of 53 feet was supplied by the foreman. The fossils from the Carboniferous Limestone clearly indicate the S zone. The surface of the unconformity was nearly horizontal.

An artesian flow of fresh water was tapped at a depth of 53 feet when the junction of the Triassic and Carboniferous rocks was reached. The level to which the water rose was 10 feet above Ordnance Datum, or 25 feet above the bed of the river.

Borehole 24

Location : 166 feet south-east of block A, and 20 feet north-east of centre-line of bridge ; west bank of River Wye.

Height above Ordnance Datum : 13.3 feet.

GEOLOGICAL SUCCESSION

	Thick- ness ft. ins.	Total Depth ft. ins.
ALLUVIUM		
Mud, clay and silt (no cores)	30 6	30 6

CARBONIFEROUS LIMESTONE

Jointed, calcite-veined, ochreous and red, dolomitic limestone with obscure spire-bearing brachiopods	5 6	36 0
Purplish-yellow, fine grained, compact, dolomitic limestone with cast of <i>Lithostrotion martini</i> E. & H.	6 0	42 0

The age of the Carboniferous Limestone is uncertain but it is probably C₂-S₁; the rocks may correlate with the horizons of the Crease and Whitehead Limestones as developed farther north in the Forest of Dean.

Borehole 29

Location : 6 feet, measured along centre-line of bridge, south-east of block A on west bank of River Wye.

Height above Ordnance Datum : 25.3 feet.

GEOLOGICAL SUCCESSION

ALLUVIUM		
Silt and clay with stones (no cores)	34 0	34 0

TRIAS : KEUPER MARL

Red marl	6 6	40 6
Yellowish-grey marl	3 6	44 0

CARBONIFEROUS LIMESTONE

Bright, yellowish-red, dolomitic limestone with a saccharoidal texture. Fossils are poorly preserved and difficult to identify, but <i>Syringothyris</i> is present, and also a spire-bearing brachiopod reminiscent of <i>Composita</i>	3 0	47 0
Yellowish-grey, dull or bright red, fine-grained, dolomitic limestone which frequently shows a saccharoidal texture	7 0	54 0

The rocks of the Carboniferous Limestone compare readily with those found in borehole 24 and probably belong to the same stratigraphical subdivision.

Borehole 35

Location : 154 feet, measured along the centre-line of bridge, north-west of block A on west bank of River Wye.

Height above Ordnance Datum : 24.6 feet.

GEOLOGICAL SUCCESSION

Soil	1 0	1 0
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ALLUVIUM

Red and grey clays with pebbles	29 6	30 6
Grey clay	6 0	36 6

	Thick- ness ft. ins.	Total Depth ft. ins.
TRIAS : DOLOMITIC CONGLOMERATE		
Cavernous weathering, highly mineralised breccia with a calcareous matrix. The fragments of Carboniferous Limestone, which reach a size of 8 inches across, have frequently been dissolved	6 6	43 0

CARBONIFEROUS LIMESTONE

Yellowish-grey, fine-grained, dolomitic limestone exhibiting a typical saccharoidal texture	4 0	47 0
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The borehole record down to a depth of 36 feet 6 inches was taken from the foreman. The Carboniferous Limestone is comparable to that already described from boreholes 24 and 29.

Borehole 34

Location : 314 feet, measured along centre-line of bridge, north-west of Block A on west bank of River Wye.

Height above Ordnance Datum : 27.7 feet.

GEOLOGICAL SUCCESSION

Soil	2 0	2 0
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ALLUVIUM

Reddish clay	20 6	22 6
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TRIAS : DOLOMITIC CONGLOMERATE

Ochreous, sandy marl	4 3	26 9
Richly dolomitic sandstone, with some limestone fragments up to 2 inches across	4 9	31 6
Cavernous weathering, highly dolomitic breccia, which is heavily mineralised and veined with calcite; some of the blocks of Carboniferous Limestone measure 6 inches across	1 3	32 9

CARBONIFEROUS LIMESTONE

Yellowish-red, highly dolomitic, fine-grained limestone passing down into a pale, yellowish-grey limestone. <i>Lithostrotion martini</i> , E. & H. and ? <i>Productus</i> sp. were collected	4 3	37 0
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The record down to a depth of 22 feet 6 inches was provided by the foreman. The Carboniferous Limestone is of the same type as that recorded from boreholes 24, 29 and 35.

Borehole 33

Location : 469 feet, measured along centre-line of bridge, north-west of Block A on west bank of River Wye.

Height above Ordnance Datum : 38 feet.

GEOLOGICAL SUCCESSION

Soil	1 0	1 0
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ALLUVIUM

Reddish, sandy clay (no cores)	16 6	17 6
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TRIAS : DOLOMITIC CONGLOMERATE

Reddish-yellow, dolomitic, fine-grained, sandy limestone with dendritic markings, calcite veins and blebs of galena	11 6	29 0
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TEMPORARY EXPOSURES AND BOREHOLE RECORDS IN THE BRISTOL AREA

II. SOME EXPOSURES IN THE JURASSIC ROCKS AT BATH

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I. INTRODUCTION

THE present account describes the geology of a number of bomb craters in Bath and of a section in the Lower Lias at Weston, near Bath, examined by the writer. A brief description is given of the sequence at Willsbridge Quarry, near Bitton, for comparison with that at Weston. Details of a trench dug in 1925 in the Langridge valley and of a section exposed at Kelston in 1946 are here published for the first time.

I am indebted to Dr. H. M. Muir-Wood and Dr. L. R. Cox for naming some of the brachiopods and lamellibranchs respectively, and to Mr. L. Bairstow for determining the belemnites. To Mr. T. R. Fry I owe my thanks for placing at my disposal specimens from his collection as well as information on sections which he has studied.

Dr. W. J. Arkell has studied the ammonites from Crater 28 and his identifications are given below.

I also wish to acknowledge the receipt from the University of Bristol Colston Society of a grant towards the cost of publication of this paper.

II. DESCRIPTIONS OF LOCALITIES

Exposures 1-30 were in bomb craters. The positions of the first twenty-five are shown on the map (p. 331), and the locations of these are consequently not given in the succeeding records. The heights above Ordnance Datum are only approximate and are obtained by interpolation from the contours and bench marks.

(1) HEIGHT: 170 feet O.D.

LITHOLOGY: 10 feet of yellow, unfossiliferous, clayey soil, probably representing made ground.

(2) HEIGHT: 130 feet O.D.

LITHOLOGY: 6 feet of light brown, unfossiliferous loam with small, brown-stained, subangular flints.

(3) HEIGHT: 120 feet O.D.

LITHOLOGY: fine-grained limestones of White Lias type, associated with irregular limestones of the Blue Lias.

FOSSILS : the Blue Lias limestones yielded *Ctenostreon terquemi* (Tate) and *Gryphæa* aff. *obliquata* J. Sow.

(4) HEIGHT : 120 feet O.D.

LITHOLOGY : hard, grey limestones.

FOSSILS :

Lima (*Plagiostoma*) *valoniensis* Defrance
L. (P.) gigantea (J. Sow.)
Caloceras pironidii (Reynès)

STRATIGRAPHICAL AGE : Lower Lias, zone of *Psiloceras planorbis*, *johnstoni* subzone.

REMARKS : traces of drift similar to that seen in Crater 11 occurred just below the surface of the ground.

(5) HEIGHT : 145 feet O.D.

LITHOLOGY : hard, grey limestones and blue clays.

FOSSILS

Caloceras sp.
Lima (*Plagiostoma*) *gigantea* (J. Sow.)
Ostrea hisingeri Nilsson

STRATIGRAPHICAL AGE : Lower Lias, zone of *Psiloceras planorbis*, *johnstoni* subzone.

(6) HEIGHT : 157 feet O.D.

LITHOLOGY : mainly limestone, with a little blue clay. The latter was full of lamellibranch shell fragments.

FOSSILS :

Lima (*Plagiostoma*) *gigantea* (J. Sow.)
Mactromya sp.
Ostrea hisingeri Nilsson
Pseudolimea hettangiensis (Terquem)
Pleurotomaria sp. (cast)
Zeilleria sarthacensis (Desl.)
 crinoid ossicles

STRATIGRAPHICAL AGE : Lower Lias. In the Bath area *P. hettangiensis* is characteristic of the zone of *Scamnoceras angulatum*, and the remaining fossils also indicate this horizon. The blue clay recalls the "Echinid Clay" which underlies the *angulatum* zone in the district, and if this correlation be correct the limestones represent the *liasicus* subzone, which is confirmed by the absence of *Scamnoceras*, *Gryphæa* and *Calcirhynchia calcaria* S. Buckman, found in the upper part of the zone.

(7) & (8) HEIGHT : 110 feet O.D.

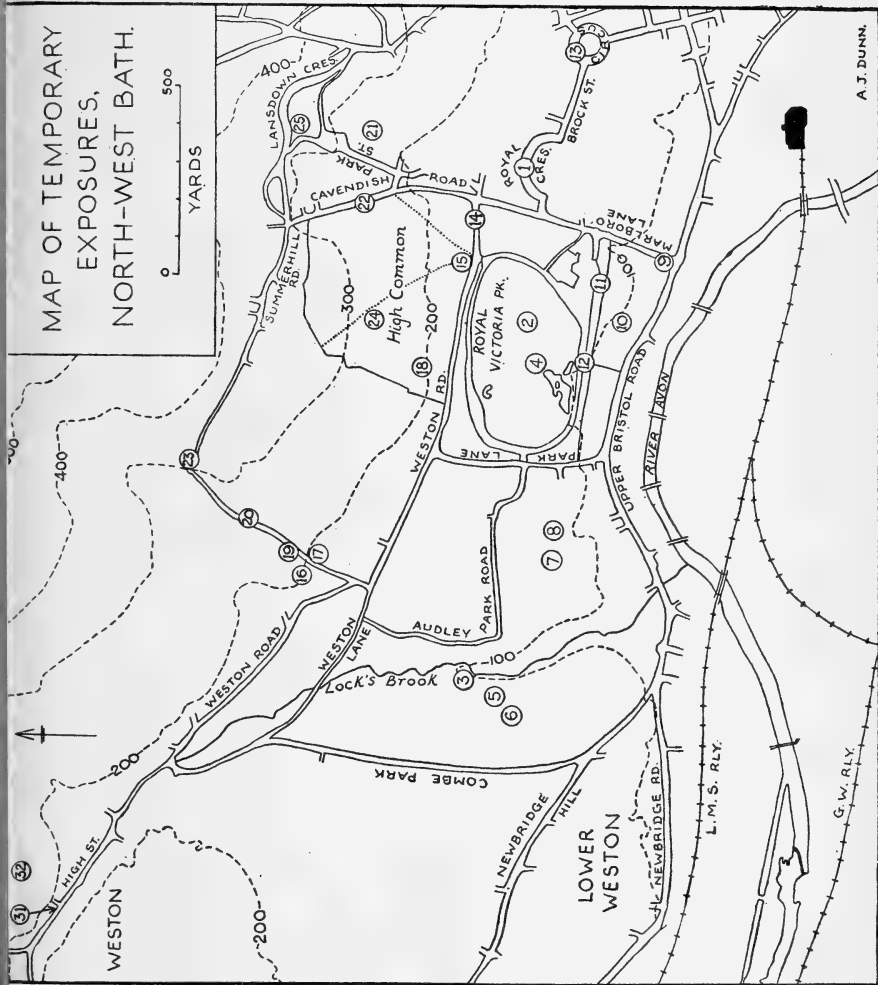
LITHOLOGY : limestones and clays.

FOSSILS :

Ammonites aff. *bisulcatus* Brug. emend. d'Orb.
Arnioceras sp.
Coroniceras cf. *coronaries* (Quenstedt)
Coroniceras sp.
Gryphæa arcuata Lam. [= *G. incurva* J. Sow.]
G. obliquata J. Sow.
Pleuromya sp.
G. arcuata was predominant over *G. obliquata*.

MAP OF TEMPORARY
EXPOSURES,
NORTH-WEST BATH.

0 500
YARDS



A. J. DUNN.

FIG. 8

- STRATIGRAPHICAL AGE : Lower Lias, zone of *Coroniceras bucklandi*, *bucklandi* subzone.
- (9) HEIGHT : 75 feet O.D.
LITHOLOGY : 8 feet of blue clay.
REMARKS : there was no opportunity to collect. The age of the clay is Lower Lias.
- (10) HEIGHT : 95 feet O.D.
LITHOLOGY : 10 feet of blue clay with bands of hard, grey, nodular limestone. 5 feet below the surface was a bed of hard limestone, 7 inches thick, with the upper surface crowded with belemnites.
FOSSILS : rolled *Gryphæa* sp. were found in the clay. Belemnites were abundant and included *Nannobelus* sp.
STRATIGRAPHICAL AGE : the belemnites indicate a horizon in the Sinemurian, probably near the top.
- (11) HEIGHT : 115 feet O.D.
LITHOLOGY : 10 feet of blue, grey-weathering clay.
FOSSILS : belemnites were abundant and included *Caloteuthis* sp., '*Passaloteuthis*' sp. and '*Pseudohastites*' sp. *Gryphæa* sp. was also found.
STRATIGRAPHICAL AGE : Lower Pliensbachian. The belemnites indicate the *taylori* or *brevispina* subzone of the zone of *Uptonia jamesoni*.
REMARKS : above the clay was a thin stratum of drift, consisting of brown, rounded and subangular flints, ranging in size from small fragments up to 4-5 inches. They were accompanied by a yellow-brown loam. The flints were more abundant than in the drift at Crater 2.
- (12) HEIGHT : 100 feet O.D.
LITHOLOGY : blue clay.
- (13) HEIGHT : 160 feet O.D.
LITHOLOGY : 20 feet of blue clay.
- (14) HEIGHT : 170 feet O.D.
LITHOLOGY : unfossiliferous, stiff, blue clay with small crystals of selenite and nodules of hard, blue limestone.
- (15) HEIGHT : 180 feet O.D.
LITHOLOGY : stiff, blue clay with nodules of hard, blue limestone.
- (16) & (17) HEIGHT : 200 feet O.D.
LITHOLOGY : blue clay with impersistent bands of hard, grey, nodular limestone, and small crystals of selenite.
FOSSILS : unidentifiable belemnite and lamellibranch fragments.
- (18) HEIGHT : 210 feet O.D.
LITHOLOGY : unfossiliferous, blue clay.

- (19) HEIGHT : 212 feet O.D.
LITHOLOGY : 8 feet of unfossiliferous, blue clay, with nodules of hard, grey limestone and small crystals of selenite.
- (20) HEIGHT : 250 feet O.D.
LITHOLOGY : blue clay, with bands of limestone, and flat nodules of ironstone up to 5 inches in diameter.
- (21) HEIGHT : 250 feet O.D.
LITHOLOGY : unfossiliferous, blue, micaceous clay, weathering grey and yellow.
STRATIGRAPHICAL AGE : the clays recorded from craters 12-21 are of Lower Lias age, but there is no evidence as to the exact horizons represented.
- (22) HEIGHT : 230 feet O.D.
LITHOLOGY : yellow, clayey sand. A number of blocks of Inferior Oolite, crowded with the usual Upper *Trigonia* Grit fossils, had no doubt descended from a higher level.
FOSSILS : a fragment of body-chamber of *Oistoceras*. The fossil is a cast in ferruginous, micaceous material.
STRATIGRAPHICAL AGE : the ammonite denotes the zone of *Prodactylioceras davæi* in the Lower Pliensbachian. The sand represents the Midford Sand, of Toarcian age, which at Bath rests almost directly on the Lower Lias.
- (23) HEIGHT : 310 feet O.D.
LITHOLOGY : many large masses of blue clay were scattered around, and this rock appeared to be *in situ* at the bottom of the crater. At the top was yellow, micaceous, sandy clay. The junction was not clearly seen.
STRATIGRAPHICAL AGE : the Midford Sand is represented, with probably the Lower Lias clays beneath.
- (24) HEIGHT : 260 feet O.D.
LITHOLOGY : fine-grained, yellow, clayey sand, with indurated bands.
STRATIGRAPHICAL AGE : Midford Sand.
- (25) Four craters close together.
HEIGHT : 355-375 feet O.D.
LITHOLOGY : fine-grained, white limestone was exposed over a vertical range of about 20 feet.
STRATIGRAPHICAL AGE : no fossils were found, but the beds are identified by their lithology as the Doultling Beds of the Upper Inferior Oolite.
- (26) POSITION : 920 yards at a bearing of 156° from the east end of St. Martin's Church, North Stoke, Somerset.
HEIGHT : about 420 feet O.D.
LITHOLOGY : about 10 feet of white, massive, oolitic limestone with some beds of ragstone, and much stalagmite in the joints. Coralline limestone occurred at the bottom of the crater.

FOSSILS :

Parkinsonia sp. juv.
Magnolia aff. *forbesi* Wright
Pedina rotata Wright
Stomechinus intermedius Agassiz
Ataphrus labadyei (d'Archiac)
Chlamys (*Spondylopecten*) *symmetrica* (Morris)
Entolium corneolum (Young & Bird) [= *E. demissum* (Phillips)]
Gresslya abducta (Phillips)
Homomya sp. ind.
Modiolus cuneatus J. Sow.
Ostrea (*Catinula*) *crickleysensis* Cox
Pholadomya aff. *lirata* (J. Sow.) [= *P. murchisoni* J. de C. Sow.]
P. ovalis (J. Sow.)
Pleuromya calceiformis (Phillips)
Pseudotrapezium cordiformis (Deshayes)
Acanthothyris cf. *midfordensis* Richardson & Walker
Rhactorhynchia hampdenensis (S. Buckman) vars.
Stiphrothyris or *Wattonithyris* sp.
Tubithyris subspheroidal (Upton)

STRATIGRAPHICAL AGE : Neo-Bajocian. The beds exposed are the Doulling Stone and the Upper Coral beneath.

(27) POSITION : 50 yards south-west of Coombe Barn, Kelston.
 HEIGHT : 360 feet O.D.

The crater was visited by Mr. T. R. Fry.

LITHOLOGY : brownish, rubbly ragstone predominated.

FOSSILS :

Stomechinus intermedius Agassiz
 ? ' *Terebratula* ' *lentiformis* Upton
Rugitela waltoni (T. Dav.)
Stiphrothyris sp.
Ptyctothyris sp., probably sp. nov.
Lopha marshii (J. Sow.)

STRATIGRAPHICAL AGE : the beds exposed were the top part of the Upper *Trigonia* Grit and part of the Upper Coral Bed above.

(28) POSITION : 250 yards at a bearing of 220° from the Trigonometrical Point on Kelston Round Hill, Kelston, Somerset.

HEIGHT : 600 feet O.D.

LITHOLOGY :

Rubbly and sandy limestone—5' 6" seen
 Massive sandy limestone —2' 3"
 Clay —6' 0" seen

FOSSILS : the limestones were extremely fossiliferous and the following forms have been identified :

Morrisiceras morrisoni (Oppel)
M. morrisoni (Oppel), compressed variety
M. comma S. Buckman
M. fornicatus S. Buckman
M. sphaera S. Buckman
Oppelia sp.
Siemiradzka cf. *matisonensis* (Lissajous)
Tulites subcontractus (Morris & Lycett)
T. (Madarites) aff. calvus (S. Buckman)

- Collyrites ovalis* Leske
Holectypus depressus Leske
 ? *Anisocardia* sp.
Astarte (Cælastarte) compressiuscula Morris & Lycett
A. (Neocrassina) rotunda J. de C. Sow.
Ceratomya striata (J. Sow.) [= *C. plicata* Ag.]
Ctenostreon pectiniforme (Schlotheim)
Goniomya sp.
Lopha sp. (? abnormal specimen of *L. gregarea* J. Sow.)
Meleagrinnella echinata (W. Smith)
 * *Ostrea acuminata* J. Sow.
Pholadomya lirata J. Sow. [= *P. murchisoni* J. de C. Sow.]
Pleuromya alduini (Brongniart)
P. calceiformis (Phillips)
P. marginata (Agassiz)
P. subelongata (d'Orb.)
Protocardia buckmani (Morris & Lycett)
Protocardia sp. nov.
Pseudolimea duplicata (J. de C. Sow.)
Pseudotrapezium cordiforme (Deshayes) [= "*Cypricardia bathonica*
 d'Orb." of Morris & Lycett.]
Thracia amygdaloidea Lycett
T. depressa (J. de C. Sow.)
Ornithella bathonica (Rollier) emend. Muir-Wood
O. cinctiformis Muir-Wood
O. cordiformis Muir-Wood
O. pupa Muir-Wood
Rhactorhynchia sp., probably sp. nov.
Rhynchonelloidella alhamensis Muir-Wood
R. mesoloba Muir-Wood
R. smithi (T. Dav.)
R. smithi (T. Dav.) aff. var. *crassa* Muir-Wood
 * *R. tutcheri* Muir-Wood
R. wattonensis Muir-Wood, and intermediate forms
Rugitella cadomensis (E. E.-Desl.) globose var.
 ' *Terebratula richardsoni* Muir-Wood
Wattonithyris fullonica Muir-Wood
 * *W. midfordensis* Muir-Wood
W. nunmeyensis (S. Buckman)
 * *W. parva* Muir-Wood
 * *W. tutcheri* Muir-Wood
W. wattonensis Muir-Wood
Monilivalvia depressa Edwards & Haime
 ? *Strophodus* sp. (abraded tooth)

STRATIGRAPHICAL AGE : this crater exposed the base of the Fuller's Earth Rock, with the Lower Fuller's Earth Clay beneath. The fossils were not collected *in situ*, but forms belonging to both these formations occur in the above list. Patches of clay crowded with *Ostrea acuminata* suggested that the *acuminata* band was present as usual. Fossils found in a clayey matrix are marked with * in the above list. The remainder appear to have come from the limestone.

(29) POSITION : 595 yards at a bearing of 279° from Beckford's Tower in Lansdown Cemetery, Lansdown Hill, Bath.

HEIGHT : about 660 feet O.D.

LITHOLOGY : blue clay with beef, and crystals of selenite up to 1.5 cm. in length.

FOSSILS :

Anisocardia cf. *bathensis* Cox
Nucula (*Paleonucula*) *waltoni* Morris & Lycett
Ostrea (*Liostraea*) *hebridica* Forbes
Rhynchonelloidella aff. *mesoloba* Muir-Wood
R. waittonensis Muir-Wood
Eryma cf. *bedelta* (Quenstedt)

STRATIGRAPHICAL AGE : the Upper Fuller's Earth Clay.

(30) POSITION : 15 yards south-east of Prospect Stile, Lansdown Hill, Bath.

HEIGHT : 740 feet O.D.

LITHOLOGY : the following section was observed by Mr. T. R. Fry :

Great Oolite Hard, sandy oolite, thin-bedded with patches of yellowish clay —6 feet seen
 Upper Fuller's Earth Clay Dark blue, shaly clay, full of minute crystals of selenite—2 feet seen
 No fossils were found.

SECTION AT WESTON, BATH

LOCATION : 31 on map.

HEIGHT : 185 feet O.D. (base of section).

This section was exposed in 1946 in a cutting for the approach road leading off Weston High Street to a new housing estate, and is no longer visible.

Horizon	No.	Description	Thickness	
			ft.	ins.
	1.	Clay seen	1	6
	2.	Limestone		5
	3.	Clay with impersistent limestone bands ...	1	10
	4.	Grey limestone		9
	5.	Sandy clay, with two 1½-inch bands of limestone; <i>Epammonites</i> cf. <i>scunthorpense</i> Spath	1	6
	6.	Grey limestone		9
	7.	Sandy clay		4½
	8.	Grey limestone; <i>Piarorhynchia radstockiensis</i> (T. Dav.), large ammonite seen <i>in situ</i> ...		8
	9.	Clay	1	0
	10.	Banded, silty limestone		3
subzone of <i>Coroniceras bucklandi</i> upper part)	11.	Grey limestone, with borings in the lower half	1	0
	12.	Sandy clay, partly indurated; <i>Ostrea</i> sp.; large ammonite seen		5
	13.	Grey limestone		7
	14.	Sandy clay		2
	15.	Grey limestone	1	0
	16.	Sandy clay; large nautiloid		2½
	17.	Grey limestone	11	
	18.	Sandy clay; <i>Ammonites</i> aff. <i>bisulcatus</i> Brug. emend. d'Orb.		2
	19.	Grey limestone	11	
Remanié bed	20.	Sandy clay; <i>Charmasseiceras charmassei</i> (d'Orb.), <i>Metophioceras</i> sp., <i>Gryphæa arcuata</i> Lam., <i>Modiolus scalprum</i> J. Sow.		0-8

Horizon	No.	Description	Thickness	
			ft.	ins.
subzone of <i>Metophioceras</i> <i>conybeari</i>	21.	Grey limestone, the upper surface very uneven; <i>Gryphæa</i> sp., small rhynchonellids seen. Some fossils pyritised ... to	1	5
	22.	Sandy limestone seen	1	5

Bed 21 is identified with the *Rhynchonella calcaria* bed (the "callicosta bed" of Tutchers papers) at Keynsham and hence falls in the *conybeari* subzone, the only one at Keynsham where the fossils are pyritised.

Bed 20 is a remanié bed, all the ammonites being fragmentary. The fauna is indicative of the *conybeari* and *rotiforme* subzones.

The beds above the remanié horizon are shown to be of the *bucklandi* subzone by the presence of an ammonite resembling *A. bisulcatus* in the character of the periphery and the whorl shape; the ribbing compares more closely with that of *Megarietites gaudryi* (Reynès). Higher subzones are probably present but evidence is lacking; the form recorded as *Epammonites* cf. *scunthorpense* is not well preserved.

In the field to the north of the above exposure (32 on map), blue clay was exposed in trenches and yielded 'Pseudohastites' sp. and 'Passaloteuthis' sp. These belemnites are indicative of the *taylori* or *brevispina* subzone of the zone of *Uptonia jamesoni*.

SECTION AT WILLSBRIDGE

LOCATION: see Vaughan & Tutchers, 1903, map facing p. 3, locality 4.

Horizon	No.	Description	Thickness	
			ft.	ins.
subzone of <i>Coroniceras</i> <i>bucklandi</i>	1.	Soil and rubble with <i>Coroniceras</i> sp. ...	1	6
	2.	Limestone		8
	3.	Clay		3
	4.	Limestone		6
		Clay parting		
	5.	Limestone		9
Remanié bed	6.	Grey clay, with phosphatised, fragmentary fossils: <i>Charmasseiceras</i> sp., <i>Coroniceras schloenbachi</i> (Reynès), <i>Metophioceras</i> cf. <i>deffneri</i> (Oppel), <i>M.</i> aff. <i>rouvillei</i> (Reynès), <i>Coroniceras</i> sp. (early form), <i>Gryphæa obliquata</i> J. Sow., Gastropods (internal casts, indeterminate)		6
	7.	Limestone, the <i>calcaria</i> bed: in the top six inches are a number of large ammonites, including <i>Coroniceras rotiforme</i> (J. de C. Sow.) and <i>Schlotheimia</i> sp., and <i>Calcirhynchia calcaria</i> S. Buckman is abundant	1	4
subzone of <i>Metophioceras</i> <i>conybeari</i>		Clay parting.		
	8.	Limestone with <i>Metophioceras gracile</i> Spath, and <i>Spiriferina tumida</i> (Quen.)		5
subzone of <i>Scammoceras</i> <i>angulatum</i>	9.	Limestone and clay		7
	10.	Limestone with <i>Gryphæa</i> aff. <i>obliquata</i> J. Sow. Clay parting.		3
	11.	Limestone with <i>Zeilleria sarthacensis</i> (Desl.)		3
	12.	Irregular beds of limestone with clay partings: <i>Gryphæa</i> aff. <i>obliquata</i> J. Sow. ...	1	7

The section was described by Vaughan and Tutchter (1903, p. 31, and composite section, p. 24), but they were hampered by an inadequate zonal scheme and did not remark on the remanié character of bed 6. The fossils from this bed include abundant, small coroniceratids and species of *Metophioceras*, of which a few have been compared with forms figured by Reynès. The range of many of these forms is, unfortunately, insufficiently known.

The *Coroniceras* from bed 1 agrees with a form occurring at Keeling's Quarry, Keynsham, in the upper part of the *bucklandi* subzone, to which division beds 1-5 are therefore assigned.

EXPOSURE AT KELSTON, NEAR BATH

LOCATION: the excavation lay 300 yards due north of the "Crown Inn," Kelston, near the 250 ft. contour line.

The exposure was visited in January, 1946, by Mr. T. R. Fry, from whose notes and specimens the following section is compiled:

Horizon	No.	Description	Thickness ft. ins.
Upper Lias	1.	Fine-grained, grey, marly limestone. The following fossils were found:—on the upper surface of the bed: <i>Gramnoceras thouarsense</i> (d'Orb.), " <i>Rhynchonella</i> " <i>moorei</i> T. Dav; within the bed: <i>Hildoceras bifrons</i> (Brug.), <i>Velata velata</i> (Goldf.), <i>Ataphrus</i> sp.	9 (a few feet)
	2.	Bluish-grey clay	
	3.	Tough, greenish, sandy limestone, strongly ferruginous: <i>Oistoceras</i> sp., <i>Chlamys</i> (<i>Æquipecten</i>) <i>acuticosta</i> (Lam.), <i>C. textoria</i> (Schlotheim), <i>Modiolus</i> sp., <i>Plicatula</i> sp., <i>Cryptania nucleus</i> (Terquem), <i>Pentacrinus</i> ossicles, echinoid spines	8
Lower Lias		<i>Androgynoceras</i> sp. occurred at about this level.	
	4.	Shaly, micaceous limestone, in thin fissile beds, shale partings. The limestones are crowded with shells, including: <i>Chlamys</i> (<i>Æquipecten</i>) <i>acuticosta</i> (Lam.), <i>Chlamys calva</i> (Goldf.), <i>Oxytoma inequivalve</i> (J. Sow.)	1 0

Beds 3 and 4 belong to the zone of *Productylioceras davæi*, the topmost zone of the Lower Lias. The Middle Lias and two lower zones of the Upper Lias are absent unless represented by part of 2, and the next zone proved (bed 1) is that of *Hildoceras bifrons*. The fossils on the surface of bed 1 belong to the *Grammoceras striatulum* subzone of the zone of *Lytoceras jurense*.

SECTION AT LANGRIDGE, BATH

In 1925 a trench was dug, by the Bath Waterworks Company, in the neighbourhood of Langridge, Woolley and Charlcombe. The section was visited by Mr. T. R. Fry, whose notes record that "many of the exposures were poor, and the succession was obscured

in most cases by masses of hill-wash and slipped material. One of the best exposures was on the hillside to the south of Langridge Church." The following description of this section is compiled from notes and specimens supplied by Mr. Fry :

Horizon		No.	Description	Thickness	
				ft.	ins.
Upper Inferior Oolite	Mainly U. <i>Trigonia</i> Grit.	1.	Rubbly ragstone and grey freestone with <i>Trigonia costata</i> J. Sow., <i>Tubithyris</i> ? <i>subsphaeroidalis</i> (Upton), <i>Holcetypus hemisphaericus</i> Agassiz, <i>Rugitela waltoni</i> (T. Dav.), <i>Rhactophynchia</i> sp. juv., small nautiloids	12	0
		Non-sequence			
Upper Lias	Midford Sand.	2.	Micaceous, sandy marl, with hard bands at intervals. A hard band in the upper part yielded <i>Pseudogrammoceras subfallaciosum</i> S. Buckman ?	40	0
	Cephalopod Bed.	3.	Pale brown, oolitic limestone with much limonite in pebbly form : <i>Grammoceras thouarsense</i> (d'Orb.) lay on the upper surface of the bed. Within the bed were found : <i>Hildoceras walcottii</i> (J. Sow.), <i>Hildoceras</i> sp. indet. (small specimens, numerous), <i>Harporoceras</i> aff. <i>falcifer</i> (J. Sow.), <i>Dactylioceras</i> sp., small nautiloid		9
	Non-sequence				
Lower Lias		4.	Dark brown, oolitic limestone, with pebbles of limonite : <i>Belemnites</i> common, <i>Chlamys</i> sp.		8
		5.	Greyish-blue clay with <i>Androgynoceras maculatum</i> (Young & Bird) ...	10	0
		6.	Dense, blue, earthy limestone with <i>Chlamys</i> sp.		4
		7.	Clay, with thin, fissile limestones ...	3	0
		8.	Pale blue clay seen	65	0

LIAS

III. DISCUSSION

The basal beds of the Lower Lias (*pre-planorbis*) show their usual lithology (3). The subzone of *Psiloceras planorbis*, very thin elsewhere in the district (Vaughan and Tutcher, 1903, p. 37), was not detected. The subzone of *Caloceras johnstoni* showed grey limestones and blue clays (4, 5), and the lower part of the zone of *Scammoceras angulatum* comprised limestones (6) but the upper part of this zone was not exposed. The *conybeari* subzone is represented by the *calcaria* limestone, as elsewhere in the Bristol district, and has at Weston been partially eroded prior to the accumulation of the remanié deposit, mainly of *rotiforme* and perhaps early *bucklandi* subzones, which represents about 5 feet of beds at Keeling's Quarry, Keynsham (Tutcher, 1923, p. 272). A similar bed is also present at Willsbridge, where, however, the upper surface of the *calcaria* bed is smooth.

The presence of a condensed deposit within the *bucklandi* zone at these localities shows that the "Sinemurian Denudation" demonstrated by Tutchter and Trueman (1925, p. 627) at Radstock was also felt north of the Avon, though to a much less marked degree.

All the remaining exposures in the Lower Lias show blue clays, and, as ammonites have not been found except in one case, little can be said in detail as to their age. Two of the lower craters produced abundant belemnites, which showed them to be in beds of Upper Sinemurian (9) and Lower Pliensbachian (11) age respectively. Limestone nodules and bands occur throughout the clays. The thickness of the Lower Lias is approximately 200 feet.

Two craters (21, 22) lay approximately on the junction of the Lower Lias clays with the Midford Sands, and the topmost zone of the Lower Lias is proved at the former. The junction was exposed in the sections at Langridge and Kelston, where it was found that the beds at the top of the Lower Lias include a thin series of fissile, marly, micaceous limestones, with a lamelli-branch fauna, which appear to be fairly constant throughout the northern part, at least, of the Bath district; similar beds have been seen by the writer in excavations for housing at Batheaston, and recorded from Monkswood by Richardson (1947, p. 81). The latter author places them in the Middle Lias, but since capricorn ammonites occur in the beds above at Langridge and at Kelston, they must belong to the Lower Lias, and the lamelli-branch fauna is consistent with this view. The fissile beds are capped at Langridge by a 4" bed of blue limestone and at Kelston by a ferruginous, sandy limestone, and are followed by about 10 feet of blue clay, proved at Langridge to be of Lower Lias age.

The Middle Lias is probably absent at the localities described in the present paper. Richardson (1947, pp. 80-81) records as of this age about 20 feet of sands and clays between the fissile beds and the local base of the Upper Lias at Monkswood, but there is no fossil evidence in support of this interpretation.

The lower part of the Upper Lias is absent. The Cephalopod Bed contains fossils of the zone of *Hildoceras bifrons* and has been previously recorded from Spurways Farm, Lansdown (Winwood, 1893, p. 337); it is similar to the ones at Midford (Richardson, 1907, table facing p. 408) and Limpley Stoke (Gorham, 1930, p. 292). The subzone of *Grammoceras striatulum*, represented by a thin bed of limestone to the south of Bath, is at Kelston and Langridge restricted to a remanié horizon on the surface of the Cephalopod Bed.

The Midford Sands and Upper Inferior Oolite show no special features in the exposures here described.

FULLER'S EARTH SERIES

The craters, taken in conjunction with other evidence, throw some light on the thickness of the Fuller's Earth Series at Lansdown, which is greater than any so far recorded from Bath. William Smith, in his Table of Strata published in 1815, allows 100 feet for this formation (Sheppard, 1915, table facing p. 127); his thicknesses are generally underestimates. Lonsdale (1832, p. 250) quotes 135-148 feet, south of the Avon, and his figure has been repeated by some later authors (e.g., Richardson, 1928, p. 33). Lycett (1857, p. 85) gives the thickness at Box Tunnel, 6 miles east-north-east from Bath, as 148 feet, and this also has been quoted by others for the Bath area. Woodward (1894, p. 243) quotes Lycett's figure but thinks it an overestimate, as "the wells at Bath do not prove more than 70 feet of the beds." He presumably refers to Bristow's record, mentioned below. Winwood (1897, p. 150) estimated 150-180 feet at Monkwood Reservoir. Richardson (1910, pp. 77-8) repeated the estimates of Lycett, Woodward and Winwood without comment.

At Lansdown Golf Course, a well reached the Fuller's Earth at 728 feet O.D. (Winwood, 1909, pp. 119-20. The surface level is 760 feet O.D. and not 750 feet as stated), and at crater 30 the base of the Great Oolite lies at 730-735 feet O.D. On the western slopes of the hill the Inferior Oolite occurred in crater 26 at 420 feet O.D. This formation is not thick around Bath; at Midford (Richardson, 1907, table facing p. 408) there are $11\frac{1}{2}$ feet of beds above the horizon present in crater 30. The Fuller's Earth, therefore, must account for about 290 feet. In the south-eastern part of the hill, the base of the Great Oolite is given as 704 feet O.D. by a well at Charlcombe Grove Farm (Winwood, 1913, p. 85), and at Lansdown Cemetery, according to Bristow's record (in Woodward, 1876, p. 182), the base is at about 720 feet O.D. The latter well reached "sand", after passing through 70 feet of clay, at about 650 feet O.D. Richardson (1928, p. 50) quotes this as "[Midford] Sand," which is improbable. Presumably a sandy layer within the Fuller's Earth, possibly the top of the Fuller's Earth Rock, was encountered. The base of the Inferior Oolite was recently exposed in a trench in Charlcombe Lane, near Charlcombe Manor, at 450 feet O.D. If a thickness of 40 feet is allowed for the Inferior Oolite (the total at Midford is 36 feet) the Fuller's Earth would be about 230 feet thick on this side of the hill.

If Winwood's (1897) record of 150-180 feet at Monkwood, about 3 miles east-north-east from Lansdown, is correct, then the Fuller's Earth must thin out appreciably in this direction.

DRIFT

Drift material consisted mainly of a thin deposit of flint gravel (2, 4), but comprised at least 6 feet of more loamy material at the uppermost crater (11). The material presumably represents a river terrace and extends from 65-80 feet above the level of the Avon.

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PLESIOSAURS IN THE CITY MUSEUM, BRISTOL

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(by permission of the Trustees of the British Museum)

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PLESIOSAURS were secondarily aquatic reptiles whose remains have been found in many parts of the Old and New Worlds in deposits ranging from the Triassic to the late Cretaceous. They are characterized by the possession of a comparatively long neck, a moderately long body and a comparatively short tail: propulsion was by means of the modified limbs which had short propodials, shortened but broadened lower limb-bones, and lengthened digits to form the basis of a long flipper-like limb.

There are many variations in general form and proportions, some kinds having large heads and comparatively short necks and others having small heads and very long, sometimes fantastically long, necks.

The first plesiosaur remains ever described were discovered at Lyme Regis about 1820 by Mary Anning, the young fossil collector and dealer, who was then only twenty-one years old, and were purchased by Colonel (? John) Birch who lived in Bath. It was upon these that the generic name *Plesiosaurus* was suggested by Conybeare¹

The first satisfactorily preserved specimen was discovered by Miss Anning in 1824, was purchased by the Duke of Buckingham and was described shortly afterwards by Conybeare as the type species. The news of the discovery of this specimen caused a great deal of interest and it is important to note that it was first described informally by Conybeare at a meeting of the Bristol Institution on Friday evening, January 30, 1824, precisely a week before its scientific description at the Geological Society of London. In 1848, this specimen was purchased by the Trustees of the British Museum and it is still exhibited at the Museum (Geological Dept. reg. no. 22656).

Since Conybeare's classic description, many genera and species of plesiosaurs have been described, but most of the descriptions rest upon unsatisfactory or highly fragmentary material. To-day a re-examination of most of this material is urgently necessary for

¹ As no species was nominated this generic name is here invalid.

the classification of the group and for attaining an accurate understanding of the anatomy of the various forms.

In such a study the specimens in the City Museum, Bristol, were of great importance. Historically they were amongst the first of the plesiosaurs to be described, for, so early as 1840, Sir Richard Owen created four specific names on specimens in the Bristol collection. Another remained merely a manuscript name of Owen's, but Samuel Stutchbury described another important species in 1846. The last type to be created was that by Professor W. J. Sollas in 1881. There were thus by that date six certain type-specimens in the Bristol Museum.

On several occasions before the war I had the opportunity of examining and measuring these specimens in detail; and, for this purpose, secured the fine series of photographs specially taken by Mr. J. W. Tutcher and reproduced here as Plates 9-13. It is with pleasure that I record here my appreciation of the ready helpfulness of Dr. F. S. Wallis and Mr. Tutcher.

The value of these recent studies has been unfortunately en-
chanced by the tragic destruction of the specimens by enemy
action in November, 1940. Thus, although some of the material
has been adequately described and figured, the only accurate
memorial to this collection of outstanding importance is in these
plates reproduced here. It has seemed advisable to furnish
a few explanatory notes at the same time so that the loss of the
type-specimens, although still a palæontological tragedy, is not
irreparable. In making these notes the specimens are referred to
as if they were extant having in mind the existence and clarity
of the photographs.

PLESIOSAURUS CONYBEARI Sollas

Sollas, W. J. 1881. *Q. J. G. S.* Vol. XXXVII, pp. 440-481.

Figs. 1-14, Pls. XXIII, XXIV

Lydekker, R. 1889. *Cat. Foss. Rept. Brit. Mus.* Part II, p. 269.

Watson, D. M. S. 1924. *Proc. Zool. Soc. Lond.* Part III, 1924,
pp. 887, 899, 905.

Swinton, W. E. 1931. *Report Brit. Ass.* 1930, p. 340.

Skeleton and skull from the Lower Lias (*obtusum* zone) on the north-west corner of Blackven Water, half a mile west of the River Char, Charmouth, Dorset. This, the type specimen, was found in 1880 by Samuel Clarke of Charmouth. It was fully described by Professor W. J. Sollas in 1881. Registered number in the Museum, Cb 2479.

The skeleton as exposed in the Museum (Plate 9a) was almost exactly as figured in Sollas' paper, Plate XXIII, figs. 1 and 2. That is to say, the complete skull, the neck, the major portions of the shoulder girdle, the left and right forelimbs, the left half,



a



b P. "BRACHYCEPHALUS"

a PLESIOSAURUS CONYBEAREI

b

and portions of the right half, of the pelvic girdle, and both femora were displayed. In the exhibit, as shown in Sollas' figure, a cast of the dorsal side of the body was displayed. A cast of the left side of the head was also exhibited.

The following are the main characters of the specimen :—

- (1) The maximum length of the right half of the mandible is 50 cms. (19.75 ins.).
- (2) According to Sollas there are 38 cervical and 21 dorsal vertebrae, but the number of cervicals is probably only 35.
- (3) The length of the cervical series is 211 cms. (83 ins.) and the skull/neck ratio is therefore approximately 24 : 100.
- (4) The length of the cervico-dorsal series is 345 cms. (136 ins.) so that the ratio of skull to this is 14.7 : 100.
- (5) In the anterior cervicals length of centrum equals height but is greater than breadth. In the posterior cervicals length equals height but is less than breadth.
- (6) There are 2 sacral and 5 caudal vertebrae preserved.
- (7) The neural spines increase in height up to the 44th and are moderately square. The spines are inclined backwards up to the 55th, according to Sollas, but this is not borne out by the diagram and cast of the dorsal region, from which it would appear that they slope backwards to the 49th. The 50th to 54th are upright; 55th to 57th slope forwards slightly; 58th to 60th upright; 61st to 66th slope backwards. This arrangement, though by no means certain, would be more consonant with the muscular requirements of the hind limb.
- (8) The humerus and femur are nearly equal in size but the humerus was slightly larger.
- (9) In the shoulder girdle as reconstructed by Sollas the total length of the girdle to the interglenoidal width is as 135 : 100.

The actual details of the anterior part of the girdle and the connections between the clavicular arch, scapulae and coracoids are still in question. A comparison between these details as they can be seen on the Plate (9a) and as reconstructed by Sollas seems to show that Sollas placed the clavicular arch too far forward. The reconstruction (Sollas; pl. XXIII, fig. 3) makes the outer edges of the clavicles coincident with the lateral edges of the scapulae. This is an unusual condition in plesiosaurs and suggests that the clavicular arch should be moved posteriorly so that the hinder edge of the arch comes just behind the front of the coracoids.

It is also probable that the slit shown in the interclavicle should be much smaller or might even have been a small foramen. This suggestion is borne out by an examination of the shoulder girdle of *P. laticeps* (reg. no. 40140) in the British Museum, a species which is almost certainly a synonym of *P. conybeari*.

The pelvic girdle in Sollas' plate lacks definition and is more clearly seen in the photograph.

Dr. Wallis and I measured the total length of the skeleton as 14 feet 6 inches.

Casts of the Bristol specimen are in the British Museum (R.1338 and R.1339) and in the University Museum, Oxford.

PLESIOSAURUS BRACHYCEPHALUS Owen

Owen, R. 1840. *Report Brit. Ass.* 1839, p. 69.

Sollas, W. J. 1881. *Q.J.G.S.* Vol. XXXVII, Pl. XXIV, fig. 2.

Owen, R. 1884. *British Foss. Rept.* Vol. III, Pl. XV.

Lydekker, R. 1889. *Cat. Foss. Rept. Brit. Mus.* Vol. II, p. 266.

Swinton, W. E. 1931. *Rep. Brit. Ass.*, 1930, p. 340.

P. brachycephalus was specifically differentiated from *P. macrocephalus* Owen solely on account of the lower position of the rib facets in the later cervicals. This difference is probably only due to maturity, and therefore, as a specific character, can hardly be allowed to stand.

The species was founded upon portions of the same skeleton from two slabs (part and counterpart) in the City Museum, Bristol. The specimens were collected in 1830 from the Lower *bucklandi* Zone of the Lias at Bitton, Glos., and presented by J. Parker. The type. Old Catalogue number 45. One slab shows skull and vertebral column, right scapula, right ischium, right femur, tibia and fibula, left femur, ilium and pubis, and part of the left humerus. The second slab has right humerus and left humerus, portions of left radius, ulna and a scapula, right coracoid, portions of right ulna, radius and clavicle, impressions of right and left femora, left tibia and fibula, and smaller bones, right and left pubes, right ischium, left ilium. The material has never been adequately described although it was figured by Sollas in 1881 and by Owen in 1884.

Horizon. Lower Lias. ? Sinemurian. Lower *bucklandi* zone.

Locality. Bitton, Gloucestershire. Registered No. Cb 2336.

Description. The skull was much broken up but, so far as it can be interpreted, it is like that of the *P. macrocephalus* described by Andrews (*Q.J.G.S.*, Vol. LII, Pl. IX). The length of the skull is 36.9 cms. (14.5 in.) while the breadth at the back, calculated from one side, is approximately 26 cms. (10.0 in.). The width of the snout is 5.7 cms. (2.25 in.). The mandibular symphysis extended to the back of the fourth teeth, and its length is 6.4 cms. (2.5 in.).

The neck is fairly well preserved but the splitting of the slab makes it impossible to determine the position and number of the pectoral vertebrae. The neck is 115 cms. (3 ft. 5 ins.) long. The number of cervicals appears to be 30. Up to the crack there are 31 vertebrae. The atlas and axis are hidden by the parietals, but all the other cervicals, except the last one or two, are well displayed from their right sides. The centrum has the two rib facets close together and high up on the side of the centrum. The under surface can be seen only on one centrum, where it is

clear that there is a strong hæmal ridge with a depression on either side which slopes upwards to the rib facet. This makes the ventral part wedge-shaped. Throughout the series the centra are ornamented with short wavy lines. The neuro-central suture is low on the centrum and well marked, being, at its lowest point, nearer the rib facet than is usual. On centrum 25, where it is well seen, the distance between the two features is only 5 mm. The lengths of some of the cervical centra are as follows :—

1st	visible	2.1	cms. (.82 in.)
5th	...	2.5	cms. (.98 in.)
10th	...	2.9	cms. (1.1 in.)
15th	...	3.3	cms. (1.3 in.)
20th	...	3.85	cms. (1.5 in.)
25th	...	3.85	cms. (1.5 in.)

The centra are about as long as high. The breadth is not determinable. The neural spines show a gradual change as they pass backwards in the series. Anteriorly they are short, narrow at the top, and the spine is directed backwards. Posteriorly the spines are longer and thicker and are directly over the centrum. The vertebrae posterior to the fifteenth show the processes well. They are broad, short and truncated. The total height of the 17th is 10.2 cms. (4 ins.), while the 27th is 13 cms. (5.1 ins.). The spine of the latter is 6 cms. (2.3 ins.) high and 3.5 cms. (1.3 in.) long.

The dorsals are exposed only in longitudinal section and it is impossible to make anything of value out of them.

The sacrals are not distinguishable but they were probably three in number, and Sollas has made the sacral length 6.4 cms. (2.5 ins.).

The anterior caudal vertebrae show the characteristic early plesiosaur feature of backwardly directed neural spines, associated with the greater use of the hind limbs in these forms. Another curious but undoubted feature concerns the facets for the rib. In the early part of the tail these are half-way up the centrum, but about the 15th centrum they begin to rise in position and by the 19th they are borne partly by the arch. There are 19 definitely caudal vertebrae. These features are well shown on Plate 10.

Professor Watson considers that there are 29 cervicals, and between these and the true hæmapophyses-bearing caudals there are 31 vertebrae made up as pectorals (4), dorsals (23), sacrals (3), and 1 caudal.

The elements of the shoulder girdle are all represented but are not well displayed. A major portion of the right coracoid is shown on the counterpart and there is little doubt from this that the general shape was closely similar to that described by Watson (*Mem. & Proc. Manchester Lit. Phil. Soc.*, Vol. LV, Pt. II, 1911, p. 2, fig. 1) as belonging to a specimen of *P. macrocephalus* from

the Lower Lias of ?Weston, near Bath, and now preserved in the Manchester Museum. The portion of the clavicular arch tentatively suggests this conclusion also. Both humeri are damaged but the general features are discernible. They are 22.5 cms. (8.8 ins.) long, 6.5 cms. (2.5 ins.) across the head, and 11.5 cms. (4.5 ins.) distally. At its narrowest the shaft is 6 cms. (2.3 ins.) broad. They are noteworthy for the large facet for the articulation of the radius; that for the ulna is quite small. Neither radius nor ulna is complete, though parts of all of them can be seen. Of the pelvic bones, the right ischium, the left ilium and both pubes are preserved. The great width of the pelvis that is indicated is noteworthy. Both the femora are quite well preserved. They are longer and more slender than the humeri and their principal dimensions are as follows:—

Length	...	...	...	25 cms. (9.8 ins.)
Breadth at proximal end	...	...	...	6 cms. (2.3 ins.)
Breadth at distal end	...	...	...	12 cms. (4.7 ins.)
Minimum breadth of shaft	...	...	...	5 cms. (2.0 ins.)

The right tibia and fibula are seen on the main slab and the left tibia and fibula are preserved on the counterpart. The tibiae are slightly longer than the fibulae. Neither they nor the tarsals and phalanges that are shown call for any special comment. The total length of the specimen is given by Sollas as 129 inches but this must be an estimate of the complete length, as careful measurement has consistently given me a total length of 115 ins. (293 cms.).

Plesiosaurus brachycephalus must be regarded as an adult *P. macrocephalus* and accordingly placed in the synonymy of the latter species, since this has priority of establishment as a species.

PLESIOSAURUS "BRACHYCEPHALUS"

Material. Completely disarticulated skeleton artificially arranged in plaster. Bristol registered number Cb 2337.

Horizon and Locality. Lower *bucklandi* zone (*vide* Tutchter), Lower Lias. Bitton, nr. Bristol, Glos.

History. Presented to the City Museum, Bristol, by J. Parker. Labelled as *Plesiosaurus brachycephalus* Owen, but has been referred to *P. rostratus* by Prof. D. M. S. Watson in MS. The specimen at first sight gives the impression of great confusion in its skeletal arrangements but examination soon shows that it had been put in the plaster mount by someone familiar with its original arrangement. Nearly all the vertebrae are preserved, the humeri and femora are in fairly good condition, and enough of the pectoral and pelvic girdles remains to give a good idea of the general anatomical arrangement of the animal. All the parts are disarticulated and out of position so that it is undesirable to give any dimensions for the skeleton as a whole.



PLESIOSAURUS BRACHYCEPHALUS

The description of the main elements is as follows. Seventy-six centra are preserved and all are upside down. They are distributed as 23 cervicals—atlas and axis being missing, 4 pectorals, 24 dorsals, 3 sacrals and 22 caudals. It is probable that at least one caudal is missing. The centra are also somewhat crushed.

The cervical centra are very much of the same type throughout the series. The articular faces are deeply cupped, especially on the posterior side, and the edges are bevelled, also particularly on the posterior face. The ventral surface has a hæmal ridge separating a depression on each side containing a nutritive foramen. This lower surface is bounded by the pairs of small facets for the double-headed ribs. Posteriorly the facets approach one another and eventually fuse, thus forming the single facet for the pectoral ribs. Above the facets the centrum is slightly depressed. The suture of the neural arch can be seen and it does not approach very closely to the rib facets. There are few traces of the arch but it appears to have been broad and low, with massive zygapophyses.

The centra appear square in section. The first cervical seen is 20 mm. long (.8 in.) ; 25 mm. high (1 in.) ; and 30 mm. (1.2 in.) broad. The tenth is 35 mm. (1.4 in.) long and 50 mm. (2 ins.) high, the series thus increasing until the centrum attains a length of 50 mm. (2 ins.) in the dorsals.

The pectoral vertebrae show a gradual transition from the cervical to the dorsal type and the width of the centrum increases although the length is less comparatively. The rib facet in the pectorals rises high and is largely borne by the arch. The last pectoral has a deep pit on the centrum below the rib facet.

The dorsal centra are comparatively short and constricted at the middle. Their length is about 50 mm. (2 ins.). The transverse process, where it can be seen, is low and carried largely on the centrum. The centra decrease in size posteriorly and then increase again slightly in length until the sacrum is reached. There are three sacral vertebrae, each about 40 mm. (1.5 in.) long and 50 mm. (2 ins.) high. Owing to their setting in the plaster it is impossible to gauge the width. The centra bear large, single, rib facets, which are partly carried by the arch. In the two posterior sacrals the facets nearly cover the side of the centrum. Two sacral ribs can be seen as short bones with a strong base and expanding laterally.

The caudals are hexagonal but have an almost rectangular appearance and are deeply cupped on both sides with bevelled faces on the edges of the articular faces. Typical centra are 35 mm. (1.4 in.) long, 50 mm. (2 ins.) high, and 55 mm. (2.2 ins.) broad. The caudal ribs are not fused.

Pectoral region. Parts of both coracoids are on the slab, the right being the more complete and having a length of 29 cms.

(11.5 ins.) and a post-glenoidal breadth of 18 cms. (7 ins.). The glenoidal facet was large and broad and directed slightly outwards, and the pre-glenoidal part of the coracoid must have been broad. The right coracoid also shows on its anterior margin a notch for the posterior end of the interclavicle, as in the case of *Plesiosaurus dolichodeirus* (see Seeley *Q.J.G.S.* p. 445, 1874.). The left coracoid fragment is 28 cms. (11 ins.) long and 15 cms. (6 ins.) broad. The scapulae are also incomplete, the left one being the least unsatisfactory. In a manuscript note, Professor Watson has written "The dorsal process is rather large and slender, expanding somewhat towards the top. So little of the glenoid end is preserved in both cases that possibly it was very short. The anterior end is broken off short but is very slender and remarkably separated from the dorsal ramus by a wide notch. This is quite remarkable in shape and quite unlike that of any other plesiosaur."

No fragment of the clavicular arch can be detected. Both humeri are preserved. Though now somewhat crushed, they must have been originally slender in the shaft and expanded distally. Their length is 30 cms. (11.8 ins.) and the distal breadth is 14 cms. (5.5 ins.).

The radius is longer than the ulna. Its dimensions are: proximal breadth, 6.5 cms. (2.5 ins.); distal breadth, 6.0 cms. (2.3 ins.); breadth at the middle of the shaft, 5 cms. (2 ins.); length 11 cms. (4.3 ins.). The ulna is 8 cms. (3.1 ins.) by 6 cms. (2.4 ins.).

Pelvic region. The elements of the pelvis are all present; although the ischia are somewhat crushed, they give almost a complete idea of their proper state. The pubes are also well seen. The ilia are damaged.

Both the femora are present but are not in good condition. As mounted, they are seen on their under surface but the ends are partly concealed. The upper third of the shaft of one of them shows clearly a marked triangular muscle scar, reminiscent of that on the humerus of the type of *Plesiosaurus megacephalus* Stutchbury (see Plate 11). The femora are slightly shorter and more slender than the humeri. Their length is 29 cms. (11.4 ins.) and the distal breadth is 13 cms. (5.1 ins.).

Portions of ribs are scattered over the slab.

The precise relationship of this specimen is not clear. It is not *P. brachycephalus* but it does not conform exactly to *P. rostratus* either.

PLESIOSAURUS MEGACEPHALUS Stutchbury

- Stutchbury, S. 1846. *Q.J.G.S.*, Vol. II, p. 412-417.
 Sollas, W. J. 1881. *Ibid.*, Vol. XXXVII, p. 472.
 Lydekker, R. 1889. *Cat. Foss. Rept. Brit. Mus.* Part II, p. 166.
 Andrews, C. W. 1922. *Q.J.G.S.* Vol. LXXVIII, pt. 3, pp. 294-5.
 Swinton, W. E. 1931. *Report Brit. Assoc.*, 1930, p. 341.

The skeleton when described originally by Stutchbury was free from matrix and the superior surface was observable. It has, however, since been placed in a plaster mount with only its ventral surface exposed. The original description, though adequate for the establishment of the name, leaves much to be desired, and the figure is no less unsatisfactory. Sollas, in his detailed paper on *Plesiosaurus conybeari*, has added a note on the skull of *P. megacephalus*.

Material. Skeleton in the City Museum, Bristol. The Type. Registered number Cb 2335.

Horizon. Lower Lias. ?*angulatum* zone.

Locality. Street, Somerset.

Description. The skeleton is 496 cms. (16 ft. 3 ins.) long, out of which the skull is 83 cms. ($32\frac{1}{2}$ ins.) long (from snout to the back of the angular), the neck is 137 cms. (54 ins.) and the tail is approximately 130 cms. (51 ins.). These figures differ slightly from those given by Stutchbury and Sollas. The upper part of the skull is now concealed so that one must rely on Stutchbury for the description. He merely states that the "superior portion of the head, posterior to the orbits, is so much crushed as to prevent any examination." He gives, however, some measurements for certain dorsal bones. The skull, as now mounted, shows excellently the features of the palatal surface, though this surface is much damaged by cracks and by the addition of plaster. For this again, Stutchbury only gives a few dimensions and the sentence "The *Pterygoid*, as seen from the inferior surface, remains nearly in place, its posterior extremity being in contact with the articular bone of the lower jaw." Sollas is much more satisfactory and gives a fairly complete description and two figures. I was, however, able to make a few new measurements and observations. Since Sollas' examination of it, the inter-symphysial part seems to have had plaster added, as these features mentioned by him are certainly no longer visible. Taking the under surface of the skull as a whole the following are the principal dimensions:—

Length : tip of premaxilla to angular ...	83 cms. (32.5 ins.)
Length of symphysis	15 cms. (5.9 ins.)
Breadth of skull across angulars ...	34 cms. (13.5 ins.)
Length of pmx. to basisphenoid ...	57 cms. (22.5 ins.)
Length of parasphenoid bar between palatal vacs.	48 mm. (1.9 in.)
Breadth at anterior end of these ...	17 mm. (.6 in.)
Breadth at posterior end of these ...	43 mm. (1.7 in.)
Palatal vacuities (ovoid)	46 mm. long by 25 mm. across (1.9 in. by 1 in.)
Maximum distance between the outer borders of the palatal vacuities ...	68 mm. (2.3 ins.)
Length of preserved basisphenoid ...	36 mm. (1.4 in.)
Breadth of posterior mandibular ramus near angular	60 mm. (2.4 ins.)

Posteriorly to the mandibular symphysis, where the two rami divide, exposing the splenials, there can just be made out the two internal narial openings described fully and accurately by Sollas (*loc. cit.*). Behind this patch of bone comes a heavily plastered portion which is, in turn, followed by a rectangle of bone containing the palatal vacuities, portions of the pterygoids, parasphenoid and basisphenoid. This is a concave area some 15 cms. (5.9 ins.) long by 14 cms. (5.5 ins.) broad. The pterygoids with their posterior rami are stout bones, quite strongly concave to the posterior margin of the post-palatal vacuities. These latter are ovoid, 46 mm. (1.8 in.) long and 25 mm. (1 in.) across. The parasphenoid bone separating them is bluntly triangular and is keeled obtusely palate-wards. It is 48 mm. (1.9 in.) long and has an anterior breadth of 17 mm. (.6 in.) and a posterior width of 43 mm. (1.7 in.) The suture between it and the succeeding basisphenoid can be seen clearly to run from almost the posterior limit of the right post-palatine vacuity to a point slightly in front of the posterior limit of the left, presenting a concave front anteriorly. The sutures between the pterygoid and basisphenoid can also be seen running straight backwards and starting just outside the ends of the previous suture. The width of the basisphenoid between the sutures is 32 mm. (1.25 in.) ; its length is 36 mm. (1.4 in.) along the central line and 42 mm. (1.6 in.) along the outer edge, a disparity caused by the bending of the parasphenoidal-basisphenoid suture already mentioned. The posterior limit of the pterygoids is well defined but the basi-occipital with the condyle has been displaced backwards and forms an unintelligible mass of condyle and, presumably, atlas and axis. The right posterior ramus of the pterygoid is preserved as a narrow bone 16.2 cms. (6.4 ins.) long, 3.4 mm. (.13 in.) broad anteriorly and 2.1 mm. (.8 in.) posteriorly, and seen in transverse section is ω shaped. The breadth of the pterygoids at the posterior limit preserved, calculated from the right side, is 136 mm. (5.3 ins.). A portion of the right hyoid (almost if not actually complete) is preserved and is 14.7 cms. (5.8 ins.) long and 17 mm. (.7 in.) thick ; a portion about 8 cms. (3.1 ins.) long remains of the left hyoid. The region immediately posterior to this is obscured by matrix and the processes of the cervicals.

The length of the neck is 135 cms. (4.4 feet). The atlas and axis are no doubt in the small post-cranial mass but are indeterminate. The first observable cervical vertebra is just at the hinder end of this mass, and its measurements, together with those of its successors, are given below. I consider that the 29th centrum seen belongs to the first dorsal so that, taking the atlas and axis into account, this means that it is actually the 31st, and



PLESIOSAURUS MEGACEPHALUS



that the number of cervicals is therefore 30. Most of the cervical series is quite well shown and the centra are much alike. The centrum is comparatively short and the undersurface bears a low rounded haemal ridge. The facets for the ribs are at first low down and obscurely divided. All through the series the facets themselves are large and prominent. The neurocentral suture descends low on the centrum and approaches the facet. The zygapophyses are large, widely spread, and high above the centrum. The neural spines in the anterior part are low and feeble but later they increase in height and stoutness, and throughout most of the series they are sharply and squarely truncated. There is, however, a tendency for them to become less so in the hinder region. In the anterior half of the neck the cervical ribs are very short and claw-like and are about equal in length with the centrum. So short is the anterior process—usually strongly marked in plesiosaurs—that the larger ribs strongly resemble a lion's claw. In the posterior cervicals the rib facets show an interesting change. The rib facet, as has been noticed, was divided by a low and, at first, obscure ridge. Later this ridge acts as a line of separation between two well marked facets which go apart and round off in a manner reminiscent of two young cells. The upper of the two becomes larger and gradually takes up a more and more dorsal position, finally becoming prominent and situated on the neural arch. The lower facet, on the other hand, does not change its position, and gradually loses size and importance. This would suggest that in the short-necked plesiosaurs the single-headed condition of the dorsal ribs is arrived at by the suppression of the capitulum, as in *P. dolichodeirus*, and not by the fusion of the two facets, tuberculum and capitulum. The height of the truncated inclined top of the neural spine above the neuro-central suture is 12.5 cms. (4.9 ins.) in the twentieth cervical. This is the vertebra which Stutchbury says has the most strongly characterized rib.

CERVICAL VERTEBRAE—DIMENSIONS

Centrum of vertebra	Length	Height
3	3 cms. (1.2 ins.)	6 cms. (2.4 ins.)
4	3 cms. (1.2 ins.)	
5	3 cms. (1.2 ins.)	
6	3.2 cms. (1.25 ins.)	
7	3.2 cms. (1.25 ins.)	
8	3.2 cms. (1.25 ins.)	
9	3.4 cms. (1.35 ins.)	
10	3.7 cms. (1.45 ins.)	
11	3.7 cms. (1.46 ins.)	
12	3.8 cms. (1.47 ins.)	
13	3.8 cms. (1.47 ins.)	

Centrum of vertebra	Length	Height
14	3.85 cms. (1.55 ins.)	
15	3.85 cms. (1.55 ins.)	
16	4.3 cms. (1.7 ins.)	
17	4.3 cms. (1.7 ins.)	
18	4.3 cms. (1.7 ins.)	
19	4.3 cms. (1.7 ins.)	
20	4.8 cms. (1.9 ins.)	7.1 cms. (2.8 ins.)
21	4.8 cms. (1.9 ins.)	
22	4.8 cms. (1.9 ins.)	
23	4.8 cms. (1.9 ins.)	
24	4.9 cms. (1.95 ins.)	7.6 cms. (3.0 ins.)
25	4.95 cms. (1.95 ins.)	
26	4.95 cms. (1.95 ins.)	
27	5.5 cms. (2.1 ins.)	
28	5.5 cms. (2.1 ins.)	
29	6.0 cms. (2.4 ins.)	8.1 cms. (3.2 ins.)
30	5.5 cms. (2.1 ins.)	

The dorsal and pectoral vertebrae are not well seen, on account of the mounting and the overlying portions of the shoulder girdle. Apart from the centrum presumed to be the first dorsal, there are shown nine centra and parts of two more—one part anterior and the other part posterior to the series of nine. The arches are missing. The first dorsal is closely similar in size to the last cervical but the height of the truncated neural spine above the neuro-central suture is 12 cms. (4.7 ins.). The centra visible in the mid-dorsal region are cylindrical and smooth and without any trace of a ventral keel. The average length of the centra is 6 cms. (2.4 ins.) i.e. the same length as the second-last cervical. Although no centrum gives an accurate end-section, the approximate height of the centra above mentioned is 7.3 cms. (2.8 ins.). The vertebrae, although smooth, are a little constricted laterally but they show no ventral concavity.

The caudal vertebrae are so much crushed that little can be made out from them. They appear to be 32 in number and probably one is missing or two may be. The centra are keeled slightly. The tail was apparently slender.

The dimensions of the first visible caudal are as follows:—

Height of centrum	7.5 cms. (3 ins.)
Length of centrum	5.0 cms. (2 ins.)
Rib facets ...	3 cms. (1.2 ins.) long by 2.5 cms. (1 in.) across
Height of notch between zygapophyses	11.5 cms. (4.5 ins.).

The centra gradually diminish in length from 5 cms. (2 ins.) to 2 cms. (.8 in.) at the 32nd. There are two small vertebrae in matrix at the end of the series and they may complete the tail, as the last is only 1.5 cms. (.6 in.) long.

The shoulder girdle, as can be seen in the photograph (Plate 11), is much cracked, but all of the elements are represented and a fairly clear idea of the original shape can be inferred.

The clavicular arch is broad and deep but is covered up by the anterior ends of the coracoids. The sutures between the interclavicle and the clavicles are difficult to trace. The clavicular arch of a specimen referred to this species (British Museum R.1322) and figured by Andrews (*Q.J.G.S.*, Vol. LXXVIII, pt. 3, p. 295) agrees closely with what can be seen of the Bristol specimen though the size is less. The arch may here have been somewhat broadened by crushing.

The scapulae are both preserved, the right being especially well shown. They have been flattened so that the lateral (external) aspect is now in full view. As a consequence the dorsal ramus is pointing outwards. The glenoid part cannot be seen well but it is thin. The posterior ramus is short and gives off a wide dorsal ramus or flange with a ridge running along the upper surface of the anterior ramus. The outer edge of the bone is bounded below by a strong ridge. The lower surface cannot be examined but it is concave, the anterior ramus being at an angle of about 150° to the posterior ramus.

The coracoids are, unfortunately, incomplete but it is clear from that of the left side, which is the better preserved, that they were flat and strong. The portion in front of the glenoid is unusually broad, and yet the post-glenoid part is apparently short. A swelling or broad ridge ran across the coracoids from glenoid to glenoid.

The breadth from glenoid to glenoid is 45.7 cms. (18 ins.) and the greatest length of the coracoids observable is 64 cms. (21 ins.). The scapulae were no doubt originally directed only slightly inwards at their anterior ends.

The pectoral girdle would appear most closely to resemble in general appearance that figured by Andrews (*loc. cit.*) as *Eurycleidus arcuatus*.

The pelvic girdle has all its elements represented much as in the original figure given by Stutchbury, but the portions are actually better shown than the figure suggests. On the exhibited mount the fragments had been joined up by plaster as is clearly shown by the plate.

The pubes would appear to be short and broad and the ischia relatively long. Both ilia are shown but are incomplete.

Stutchbury's measurements of all these bones are correct, but it may be convenient to repeat them here.

Length of pubis along the midline (symphysis)	21.5 cms. (8.5 ins.)
Length of ischium along the midline (symphysis)	28 cms. (11 ins.)
Length of ilium	21.5 cms. (8.5 ins.)
Diameter of proximal end of ilium ...	8.3 cms. (3.25 ins.)
Diameter of distal end of ilium ...	5 cms. (2 ins.)
Diameter of middle of length of ilium	3.4 cms. (1.3 ins.)

All the pelvic bones are thick and strong, and the ischium and pubis are slightly concave.

Limb bones. The humerus is 35 cms. (13.7 ins.) long, is 8.5 cms. (3.4 ins.) across the head, 8.5 cms. (3.4 ins.) across the middle of the shaft, and 18 cms. (7 ins.) wide at the distal end.

The anterior edge is almost straight but the hinder is markedly concave. The ventral surface bears, on its upper third, a large triangular muscle-scar that stops about 3 cms. short of the head.

The radius is 11.3 cms. (4.4 ins.) long; 9.1 cms. (3.5 ins.) across its head; 5.3 cms. (2.1 ins.) across its mid-portion, and 7 cms. (2.75 ins.) at the distal end.

The ulna is 10.5 cms. (4.1 ins.) long and 8.4 cms. (3.3 ins.) across its mid-length. Both bones articulate with the humerus along nearly equal faces but, at the distal end, the ulna has a larger connexion with the intermedium than has the radius.

The intermedium is 5.8 cms. (2.3 ins.) long; the small sub-rectangular radiale is 3.5 cms. (1.4 in.) long; and the ulnare is 5 cms. (2 ins.) long.

The complete right fore limb measures 83 cms. (32.5 ins.) in total length.

The femur is slightly shorter than the humerus.

The principal dimensions are:—

Length	34 cms. (13.4 ins.)
Width across the head	9.5 cms. (3.7 ins.)
Width across the mid-length	8.2 cms. (3.2 ins.)
Width at distal end	16.5 cms. (6.5 ins.)

The tibia and fibula are equal in length, namely 11.8 cms. (4.6 ins.). Otherwise their dimensions are:—

	Tibia	Fibula
Width at proximal end	10 cms. (3.9 ins.)	
Width at the mid-length	7.2 cms. (2.8 ins.)	9 cms. (3.5 ins.)
Width at distal end	8.2 cms. (3.2 ins.)	

The intermedium is 6 cms. (2.3 ins.) long.

There is nothing unusual or worthy of comment in the few phalangeal bones or ribs that are displayed. Some of the abdominal ribs are mounted separately.

A cast of the ventral aspect of the skull and of the right fore limb is in the Geological Department of the British Museum (Regd. No. R.1309).

PLESIOSAURUS COSTATUS Owen

Owen, R. 1840. *Report Brit. Ass.*, 1839, pp. 80-81.

Swinton, W. E. 1931. *Ibid.* 1930, p. 341.

The type specimen is a cervical vertebra from the Rhætic of Aust Cliff. Registered number Cb 2457. The vertebra was considered unique by Owen in that the articular surfaces were



PLESIOSAURUS COSTATUS

more concave in the centre than towards the circumference instead of the reverse condition. The Plate (12) shows the vertebra as it was mounted in the Museum. It has considerable similarities with the cervicals of *P. macrocephalus*.

The vertebra is shown mounted in plaster tilted outwards, so that it was rather difficult to obtain exact measurements. The centrum appears almost as long as high and wider than in either of these directions. Part of the neural spine is preserved but is broken off some 18 mm. above the zygapophyses. The neuro-central suture comes down in a V-shape, with the sides of the V at 60°, to meet the upper rib facet, though this was partly due no doubt to the accidental shifting of the whole neural arch about 2 mm. This upper rib facet is prominent and circular and separated by an unusually deep groove from the lower, which is more oval with the longer axis horizontal. As now seen, this rib-facet is on a level with the base of the centrum. The centrum is cupped in the middle at both ends, the cups being 3.5 mm. (.14 in.) deep. The external surface is quite rugose, being covered with a series of wavy lines more strongly marked than those of *Plesiosaurus brachycephalus*. The ventral surface appears to have a ventral and median ridge on each side of which there is a depression.

Length of centrum	...	...	...	4.0 cms. (1.5 ins.)
Height of centrum	...	...	...	4.7 cms. (1.8 ins.)
Width of centrum (according to Owen and Lydekker)	...	...	...	5.0 cms. (2 ins.)
Height of facet for rib	...	...	...	1.3 cms. (.5 in.)
Height of both, edge to edge	...	...	...	2.38 cms. (.9 ins.)
Diameter of upper facet	...	...	...	1.4 cms. (.5 in.)

Owen also gave a brief description and measurements of a dorsal centrum which conform closely to the vertebra mounted in the centre of the lowest row in the plate.

PLESIOSAURUS RUGOSUS Owen

Owen, R. 1840. *Report Brit. Ass.*, 1839, p. 82.

Swinton, W. E. 1931. *ibid.*, 1930, p. 341.

This species was founded upon a series of vertebrae in the Bristol and York Museums and also in the collection of Viscount Cole (later the 3rd Earl of Enniskillen). Three of these vertebrae, a cervical and two dorsals, were in the Bristol Collection. Although no locality or geological horizon were given with the specimens, it seems clear from the literature that they came from the bone bed at Aust Cliff. Number in the Bristol City Museum register Cb 2458.

The specific characters were that the costal facets for the cervical ribs are low down on the centrum and more widely separated than in *P. hawkinsi* which the vertebrae otherwise resembled.

The neurapophyseal suture has a more open angle than in *P. hawkinsi*. The articular surfaces of the vertebrae are convex at their outer margin, then concave, and finally convex at the centre of the surface. The other surfaces of the vertebrae are rugose, especially towards the ends, and from this character the species takes its name.

At the time of Owen's description the vertebrae were probably free, but they were placed, and partly concealed, in a plaster mount (Plate 13) for exhibition in the Museum.

The cervical (lower vertebra in the upper plate) is unsatisfactory for any diagnostic purpose, since it is incomplete, worn and smooth. Its dimensions are :—

Length of centrum	...	...	...	65 mm. (2.5 ins.)
Height of centrum	...	...	...	70 mm. (2.75 ins.)
Distance between rib facets	...	...	...	4.7 mm. (.18 in.)
Diameter of upper rib facet	...	...	...	17 mm. (.6 in.)
Distance of upper rib facet from neuro-central suture	...	...	...	8 mm. (.3 in.)

The dorsals, represented by two articulated vertebrae, are more satisfactory, but they have been compressed laterally and can be seen to be considerably fractured. The upper parts of the neural spines are broken off but the anterior and posterior zygapophyses can be made out. The articular faces of the centra are not deeply cupped. Seen from the side, the articular end has a smooth rim 1 mm. in thickness, followed laterally by a very rugose band, about 17 mm. in antero-posterior extent, that gradually passes into the smooth surface of the centrum. The squashing of the centra suggests that there is a longitudinal keel developed ventrally.

The dimensions of these dorsal vertebrae are :—

Length of centrum	6.4 cms. (2.5 ins.)	6.0 cms. (2.4 ins.)
Height of centrum	5.6 cms. (2.2 ins.)	5.5 cms. (2.1 ins.)
Length between prezygaphophyses	7 cms. (2.75 ins.)	

PLESIOSAURUS SUBTRIGONUS Owen

Owen, R. 1840. *Report Brit. Ass.*, 1839, p. 77.

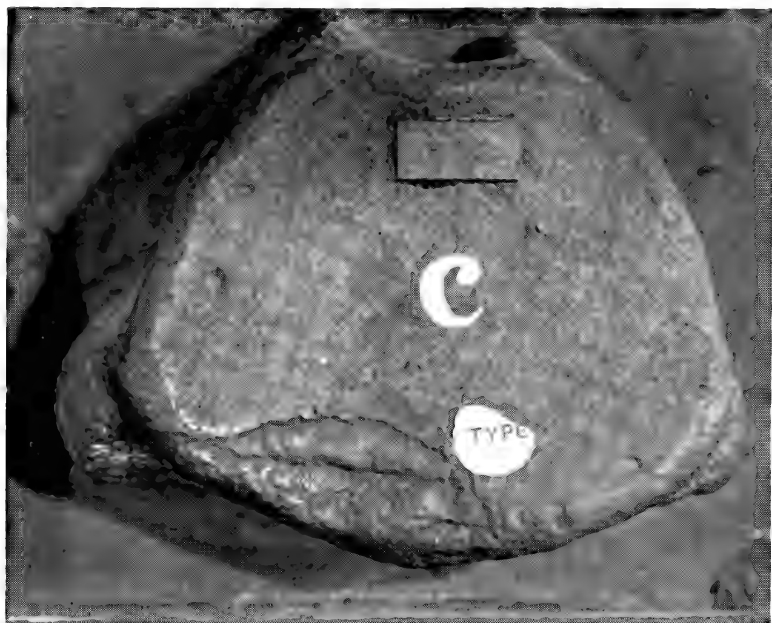
Swinton, W. E. 1931. *ibid.*, 1930, p. 341.

The original report by Owen states that his observations were based upon 'some vertebrae' in the Museum of the Philosophical Institution at Bristol: but only one of these was preserved in the collection as it was known to us. This peculiar cervical centrum, devoid of any remains of the neural arch, well deserved its name. It is clearly (Plate 13, lower) sub-triangular in the shape of its almost flat articular surfaces.

As it was mounted in plaster it was not possible to examine it in detail, but its characters agree closely with those given by Owen,



PLESIOSAURUS RUGOSUS



P. SUBTRIGONUS



although its measurements are not precisely those given by him.

The articular surfaces are flat, with a slight convexity in the centre. The sides of the centrum are smooth and without any features of particular interest, apart from the large and prominent transverse process or facet for the rib. This facet measured about half the antero-posterior length of the centrum.

On the upper part of the side the suture of the neurapophyses was convex—the space between the suture and the rib facet being more than half the height of the centrum.

The ventral surface of the vertebra had a prominent longitudinal median ridge with a depression on each side of it.

Most of these features are not observable on the Plate.

Dimensions :—

Maximum width of the centrum across the facets	... ..	9.5 cms. (3.75 ins.)
Height of centrum from base to neural canal	... ..	7.5 cms. (2.5 ins.)
Width at upper surface of centrum	...	4.0 cms. (1.5 ins.)

This particular vertebra is therefore smaller than those for which Owen gave dimensions in 1840.

The type specimen came from the Lower Lias of Weston, near Bath, and is registered as Cb 2497.

PLESIOSAURUS DEPRESSUS Owen MS.

Swinton, W. E. 1931. *Report Brit. Ass.*, 1930, p. 341.

There was in the Museum a small cervical vertebra labelled as the type of this species. I have not, however, been able to trace any reference in print, manuscript or otherwise to this name, nor can I find any information as to the source of the specimen. It was mounted upside down and obliquely in plaster so that it was not possible to make good measurements of it.

The articular faces were deeply cupped and the lateral edges were rugose, somewhat like those of *P. rugosus*. There was a well marked rib facet on each side at the ventro-lateral aspect of the centrum. No upper rib facet could be seen.

On the ventral surface there was a strongly developed and broad haemal ridge separating two quite considerable depressions which may have suggested the specific name to Owen. The centrum was concave laterally and antero-posteriorly.

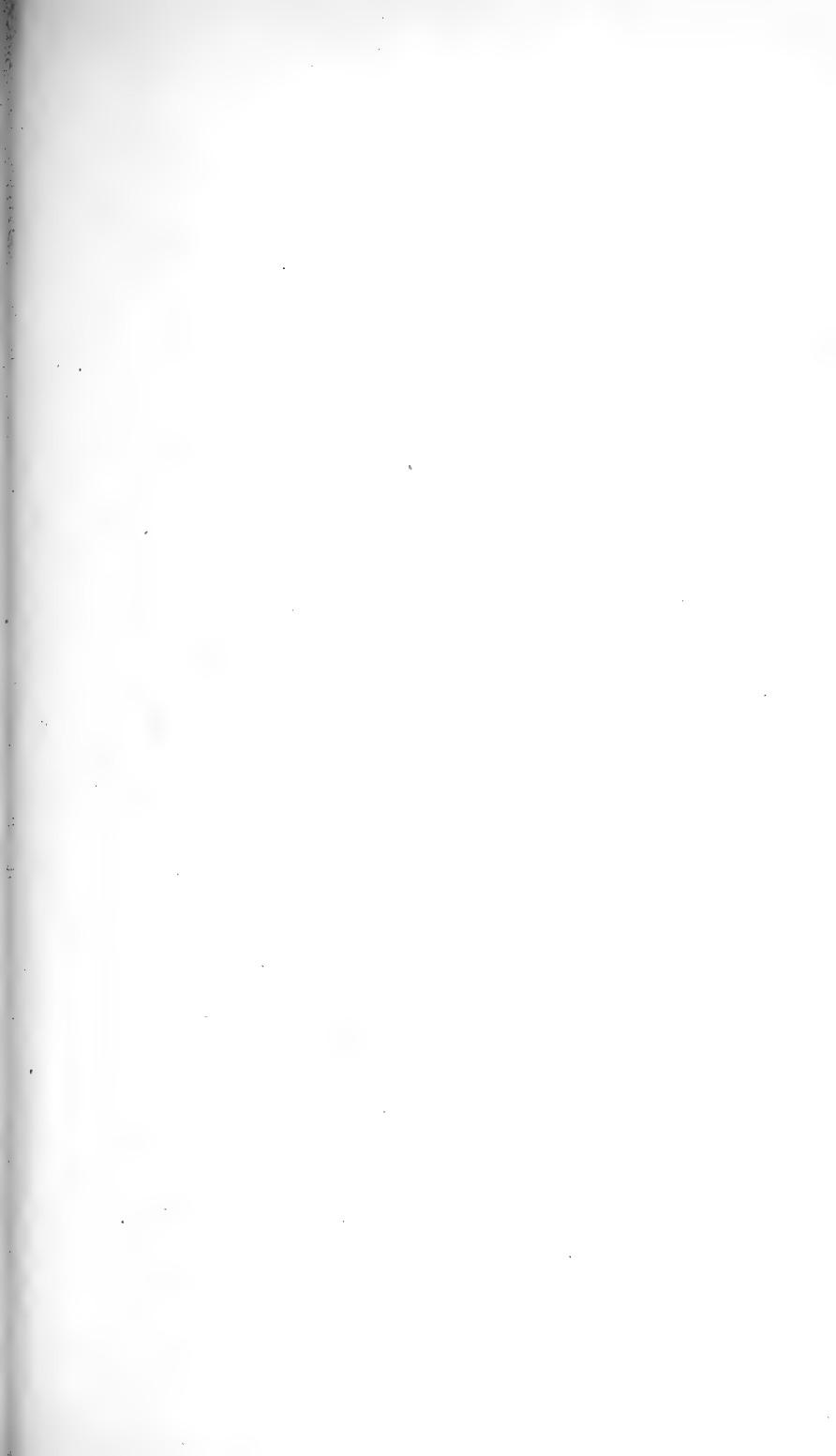
Dimensions :—

Length of centrum	... ..	3.0 cms. (1.2 in.)
Breadth of centrum	... ..	3.3 cms. (1.3 in.)
Height of centrum	... ..	2.5 cms. (1 in.)
Depth of concavity of articular faces	...	7.0 mm. (.27 in.)
Width of haemal ridge	... ..	7.0 mm. (.27 in.)

EXPLANATION OF PLATES

- Plate 9 a. *Plesiosaurus conybeari* Sollas.
The type. Approx. $1/22$ nat. size.
- b. *P.* "*brachycephalus*."
Approx. $1/22$ nat. size.
- „ 10. *P. brachycephalus* Owen.
The type. Counterpart and skeleton. Approx. $1/14$ nat. size.
- „ 11. *P. megacephalus* Stutchbury.
The type. Approx. $1/28$ nat. size.
- „ 12. *P. costatus* Owen.
Type and other vertebrae. Approx. $\frac{1}{2}$ nat. size.
- „ 13. upper. *P. rugosus* Owen.
The type vertebrae. Just over $\frac{1}{4}$ nat. size.
- lower. *P. subtrigonus* Owen.
The type. Approx. nat. size.

All the original photographs were by J. W. Tutchter, Esq., M.Sc.





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CONTENTS

	PAGE
Council	362
Members at March 4, 1949	363
Report of Council	373
Hon. Librarian's Report	373
Hon. Treasurer's Statement of Accounts	374
Report of Botanical Section	375
Report of Entomological Section	376
Report of Geological Section	377
Report of Ornithological Section	379
Account of the General Meetings	380
Bristol Botany in 1948, by Cecil I. and N. Y. Sandwith	383
Ornithological Notes, Bristol District, 1948, by H. H. Davis, M.B.O.U.	393
Lepidoptera Notes, Bristol District, 1948, by C. S. H. Blathwayt, M.A.	405
Bristol Insect Fauna—Diptera (Orthorrhapha), by H. L. F. Audcent, M.Sc.	409
Temporary Exposures and Borehole Records in the Bristol Area :—	
III. Records of boreholes sunk for the tunnel under the Bristol-Gloucester road, by W. F. Whittard, D.Sc., Ph.D.	471
IV. Boreholes on Mendip, by W. F. Whittard, D.Sc., Ph.D.	479
The Terrestrial Isopoda of Steep Holm, by Hugh Boyd	483
The Occurrence of Leisler's Bat at Bristol, by L. Harrison Matthews, M.A., Sc.D., and W. E. Mayes	486

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- H. Prideaux, R. M., F.R.E.S. ... Brastead Chart, nr. Sevenoaks, Kent
- Prowse, D. C., M.B., Ch.B. ... Wigmore House, Thornbury, nr. Bristol
- Prowse, Mrs. D. E., M.B., Ch.B. Do.
- Pruce, Miss M. M. St. George Grammar School, Bristol, 5
- Pugh, T. 40 Old Sneed Avenue, Stoke Bishop, Bristol 9
- Pugsley, Prof. A. G., O.B.E., D.Sc. Sycamore Cottage, East Harptree, Som.
- Pugsley, Mrs. K. M. Do.
- *C. Purchon, R. D., B.Sc., Ph.D. Zoology Dept., University College, Newport Road, Cardiff
- A. Raab, Miss A. M. 44 Reedley Road, Westbury-on-Trym, Bristol
- Race, Miss E. M. 16 Upper Belgrave Road, Clifton, Bristol, 8
- Reynolds, C. J. 50 Alma Vale Road, Clifton, Bristol, 8
- A. Reynolds, Miss F. M. Do.
- * Reynolds, Prof. S. H., M.A., Sc.D., F.G.S. 13 All Saints' Road, Clifton, Bristol, 8
- C. Richards, G. 5 St. Aubyn's Avenue, Uphill, Som.
- A. Roden, Rev. H. C. B., M.A. 7 Henleaze Avenue, Westbury-on-Trym, Bristol
- Rogers, Miss M. H., M.A. ... 36 Cotham Park, Bristol, 6
- Ross, F. Stenhouse. 25 Tugela Road, Uplands Estate, Bristol, 3
- A. Rudge, Miss D. M. 6 Elgin Park, Redland, Bristol, 6
- Russell, R. H. 64 Monks Park Avenue, Bristol, 7
- A. Salmond, P. W. 22 Tyndall's Park Road, Clifton, Bristol, 8
- C. Salter, Miss J. E. R., B.A. 74 Reading Road, Wokingham, Berks.
- Sampson, Miss A. M. 142 Coronation Road, Bristol, 3
- *H. Sandwith, Mrs. C. I., F.L.S. ... 26 Canynge Square, Clifton, Bristol, 8
- Saunders, Miss C. E. 25 Robertson Road, Eastville, Bristol, 5
- Savory, J. H. Windyridge, Abbots Leigh, nr. Bristol
- Savory, Mrs. J. H. Do.
- L. Scase, R. P. Lower Northend Farm, Batheaston, Som.
- Scotland, Miss J. 2 Greenway Park, Southmead, Bristol
- Scott, Lt.-Cmdr. P., M.B.E., D.S.C., M.A. New Grounds, Slimbridge, Glos.
- Selbie, Mrs. W. P. Faragarh, Limpley Stoke, Bath
- Shaw, A., A.S.A.A. 34 Whitecross Avenue, Wells Road, Bristol, 4
- Shaw, Mrs. A. Do.
- Shaw, Miss D. 38 Logan Road, Bishopston, Bristol, 7
- * Shaw, Miss T. 12c Kingsdown Parade, Bristol, 6
- Shinner, H. S. The Chase, Kingswood, Bristol
- Shinner, Mrs. H. S. Do.
- * Skene, Prof. M., D.Sc., F.L.S. Dept. of Botany, Bristol University
- Skene, Mrs. M. 36 Lawrence Grove, Westbury-on-Trym, Bristol

- Skinner, R. A. 39 Apsley Road, Clifton, Bristol, 8
 Sloane, J. F., B.Sc. Burwalls, Bristol, 8
 Smith, D. Munro, M.R.C.S.,
 L.R.C.P. Lodge Cottage, Lodge Road, Kingswood,
 Bristol
 Smith, P. G. Munro. Do.
 Smith, E. L. 18 Carnarvon Road, Bristol, 6
 Smith, J., M.I.M.E. Chelwood House, Pensford, nr. Bristol
 C. Smith, J. O. 23 Sandlea Park, West Kirby, Cheshire
 * Smith, Stanley, M.A., D.Sc.,
 F.G.S. Dept. of Geology, Bristol University
 C. Smith, S. G., F.R.E.S. Estyn, Boughton, Chester
 A. Standing, A. J., B.Sc. 44 Pembroke Road, Clifton, Bristol, 8
 Stanhope, Rev. A. J. 182 Bishop Road, Bishopston, Bristol, 7
 A. Stanley, Miss R. P. 21 West Park, Clifton, Bristol, 8
 Stinchcombe, F. A. 36 Filton Grove, Horfield, Bristol, 7
 Storr, Miss D. M. High School for Girls, Clifton, Bristol, 8
 C. Stubbs, R. L. "Hill View", Haw Lane, Olveston, nr.
 Bristol
 C. Studer, J. P., B.Sc. Shell D'Arcy Exploration Party, Owerri,
 S. Nigeria, Africa
 A. Sutcliffe, A. J. c/o Mrs. Roberts, 14 Tyndall Avenue,
 Bristol, 2
 Sutton, M. 14 Woodcroft Avenue, Whitehall, Bristol, 5
 Swaine, Miss A. K., F.R.A.S. Pisang Cottage, Nailsea, Som.
- Tasker, L. 4 Whiteladies Road, Bristol, 8
 Taylor, Miss A. E. 16 Cotham Road, Bristol, 6
 Taylor, G. H. 107 Sylvan Way, Sea Mill, Bristol
 Taylor, Miss M., D.Sc. Bristol University
 Taylor, S. M., B.Sc.,
 S.I.Mech.E. 23 St. Alban's Road, Bristol,
 Taylor, W. R., M.A. 5 Pembroke Vale, Clifton, Bristol, 8
 A. Taylor, Miss S. K. Do.
 Tetley, Mrs. H. 4 The Avenue, Sneyd Park, Brist, 9
 Thomas, Miss M. 93 Alma Road, Clifton, Bristol, 8
 Thompson, J. 7 Lilymead Avenue, Knowle, Bristol, 4
 Trapnell, D. 19 Sion Hill, Clifton, Bristol, 8
 *C. Trueman, A. E., F.R.S., D.Sc.,
 F.G.S. 21 Audley Road, Ealing, W.5
 C. Tucker, B. W., M.A.,
 M.B.O.U. 9 Marston Ferry Road, Oxford
 Tucker, Mrs. K. M. 6 The Avenue, Clifton, Bristol, 8
 A. Tucker, M. 24 West Park Road, Downend, Bristol
 Tucker, Miss R. Barrow Court, Barrow Gurney, nr. Bristol
 Turner, H. W., M.A., F.G.S. The University, Bristol, 8
 Turner, Mrs. H. W. The Cottage, Kensington Place, Clifton,
 Bristol, 8
 *H. Tutchet, J. W., M.Sc. Eventide, 141 Chesterfield Road, Bristol
- Van der Merwe, Mrs. 26 Hurle Crescent, Clifton, Bristol, 8
 A. Vincent, H. 5 Cotham Road, Bristol, 6
 A. Vincent, Mrs. H. Do.
 Vine, Miss D. J. 64 The Crescent, Henleaze, Bristol
 Vinnicombe, Miss E. J., M.A. Denver, Ridgeway, Long Ashton, Bristol
- A. Wade, Miss P. E. 37 Royal York Crescent, Clifton, Bristol, 8
 Wakefield, Mrs. G. S. "Vanda", 2 Southwood Avenue, Coombe
 Dingle, Bristol, 9

- Wallington, W. A..... "Penwarden", Station Road, West Town,
nr. Bristol
- Wallington, Mrs. H. E..... Do.
- Wallington, Miss J. Do.
- * Wallis, F. S., Ph.D., D.Sc.,
F.G.S. City Museum, Bristol, 8
- Wallis, Rev. G. C. W., M.C.,
B.A..... c/o The Rectory, Stapleton, Bristol
- Wareham, Miss C. A. L..... 252 Charlton Road, Kingswood, Bristol
- Wareham, Miss, F..... Do.
- *C. Warne, L. G. G., M.Sc., Ph.D. Dept. of Botany, The University,
Manchester, 13
- Watkins, Miss M..... 22 Knowle Road, Bristol, 4
- Watkins, N. A., M.A.,
F.R.E.S. 9 Druid Road, Stoke Bishop, Bristol, 9
- Watters, Miss E. D., M.A. ... The Little House, Frenchay, Bristol
- Watters, Miss M. M., M.A.... Do.
- C. Webb, H. F. Elmside, Old Town, Wotton-under-Edge,
Glos.
- Webb, H. M., B.Sc. Camp House, Clifton Down, Bristol, 8
- Webb, H. Vicars 58 Belmont Road, St. Andrew's Park,
Bristol, 6
- Weeks, C. H..... Camerton Hill, Camerton, nr. Bath, Som.
- Weir, G. M. Hursley Hill, Whitchurch, nr. Bristol
- Weir, Mrs. A. M. Do.
- A. Weir, D. A..... Do.
- A. Weir, Miss M. L. Do.
- *C. Welch, F. B. A., B.Sc., Ph.D.,
F.G.S. H.M. Geological Survey, Exhibition Road,
S.W.7
- Weston, F. J. The Tynings, Chew Stoke, nr. Bristol
- Whistler, L. D. 8 Dundonald Road, Redland, Bristol, 6
- A. White, J. D. Down Farm, Winterbourne, Glos.
- Whitehouse, F. W..... Campbell House, Hallam Road, Clevedon,
Som.
- * Whittard, Prof. W. F., Ph.D.,
D.Sc., F.G.S..... Dept. of Geology, Bristol University
- Williams, Miss G. C., B.Sc.... 11 Percival Road, Clifton, Bristol, 8
- Williams, Mrs. G. E..... Strathmore, Passage Road, Westbury-on-
Trym, Bristol
- Williams, Mrs. I. E..... 1 Christchurch Road, Clifton, Bristol, 8
- C. Willis, Miss M. P., B.Sc. "Vancott", Smallways, Congresbury, Som.
- Wills, R. F. 40 Claremont Road, Bishopston, Bristol, 7
- Wills, Mrs. R. F. Do.
- Willson, Miss A. W. The Mount, Long Ashton, Bristol
- Wiltshire, Miss M. O. P., D.Sc. Clifton Hill House, Bristol, 8
- Winnall, T. J. 22 Grosvenor Place, Bath, Som.
- *H. Womersley, H., F.R.E.S.,
A.L.S. Museum, North Terrace, Adelaide, S.
Australia
- C. Woodland, P., M.A..... Redwick, Dursley, Glos.
- A. Woods, H. E. J..... 14 Russell Grove, Westbury Park, Bristol, 6
- A. Wotton, M. J. 16 Abbot Way, Westbury-on-Trym, Bristol
- Wright, A. J. M., M.B., Ch.B. Harley Cottage, Clifton Down, Bristol, 8
- A. Wright, M. A. "Rockleaze", Claremont Avenue, Bishop-
ston, Bristol, 7
- A. Wyman, Miss M. D..... 42 Royal Park, Clifton, Bristol, 8
- *C. Yonge, Prof. C. M., F.R.S.,
D.Sc. The University, Glasgow
- Young, D. Clifton College, Bristol, 8
- Young, Miss P. B., B.Sc. 154 Cranbrook Road, Bristol, 6

AFFILIATED SOCIETIES

- Natural History Society, Diocesan Training College, Fishponds, Bristol
Natural History Society, Grammar School, Dursley, Glos.
Botanical and Zoological Societies, The University, Bristol, 8
Geological Society, Do. Do.
Natural History Society, City of Bath Training Collège, 101 Sydney Place, Bath
Natural History Society, Nursery Nurses' Training School, Brandon Steep,
Bristol, 1.
Scientific Society, Red Maids' School, Westbury-on-Trym, Bristol

REPORT OF COUNCIL

1948

THE membership strength of the Society has been well maintained, but an effort to prevent a fall in level would, perhaps, now be well timed.

At the Annual General Meeting Mr. F. W. Evens was elected President, and Dr. L. H. Matthews and Mr. H. W. Turner were elected Vice-Presidents. Other Officers and Council were elected as shown in the list on p. 362 of this issue of the *Proceedings*.

The Society has had a year of well attended and successful meetings and has been very well favoured by the services of lecturers of high quality and by carefully planned and well guided excursions. The Society is well served by its own members as leaders of summer excursions, and the response of outside lecturers to invitations from the Society is gratifying in the extreme.

Miss A. Dunn, Assistant Hon. Secretary, left Bristol during the year, and Mr. R. Bassindale resigned at the end of the year as he also was leaving Bristol for 2½ years. The thanks of Council were extended to these Officers who had done so much for the Society.

The deaths of Dr. D. A. Alexander, a member of long-standing, and a young member, Mr. B. H. Williams, were recorded with regret during the year.

HON. LIBRARIAN'S REPORT

1948

THE arranging, collating and cataloguing of journals have been continued during the year and are now nearing completion. Further lacunae in our sets of periodicals have been filled by the courtesy and generosity of institutions with which we exchange publications, no less than 118 volumes or parts of volumes having been received. For these we are indebted to the following bodies to whom we express our thanks and appreciation :—

Linnæan Society of Lyons; Zoological Museum, Warsaw; Royal Canadian Institute; University of California, Berkeley; University of Colorado; Connecticut Academy of Arts and Sciences; Michigan Academy of Science; Missouri Botanic Garden; Philadelphia Academy of Natural Sciences; Smithsonian Institution, Washington; Vanderbilt Marine Museum, New York; Wisconsin Academy of Sciences, Arts and Letters; National Museum of the Argentine, Buenos Ayres.

Two hundred and eighty parts or volumes of periodicals have been received in exchange for the Society's *Proceedings* during the year. Twenty-six volumes and five pamphlets have been presented to the library, and thanks for these are due to Mr. H. H. Davis and Mr. R. C. Griffin, and, especially, to Professor S. H. Reynolds for his gift of twenty-two volumes. Thirteen volumes have been purchased, and subscription volumes have been received from the Ray Society and the *Zoological Record* Committee. Eighty-eight volumes have been returned from the binders, with whom there is now no work outstanding.

The library continues to be increasingly used by members; 314 volumes have been borrowed by 45 members during the year.

L. HARRISON MATTHEWS, *Hon. Librarian*

REPORT OF BOTANICAL SECTION

1948

OUR congratulations are due to two of our members: Mr. F. W. Evens on being elected President of the Parent Society, and Mrs. Sandwith on being made an Honorary Member.

Indoor meetings have been held each month in the Wiglesworth Library by kind permission of Prof. Harris. On January 19 Mr. Ivor Evans opened the talks with an account of an Agricultural Camp at Hatt, near Saltash. He found the botany good, securing two typically Cornish plants, *Danaa cornubiensis*, Burnat. and *Sibthorpia europaea*. L., a rare naturalized alien, *Linaria supina*, and a new record for a New Zealand willow herb, *Epilobium nummularifolium*.

On February 16 Prof. Skene gave an outline of fossil botany to a record attendance of interested members. On March 15 Mr. Lawrence Ogilvie, of the National Agricultural Advisory Service, lectured on the Black Rust on Wheat, with its alternate generation on the Barberry, and the havoc it is causing.

From April to September walks led by members were taken in the district: Mr. Ivor Evans—Whitchurch to Brislington and Hanham; Mr. F. W. Evens—Leigh Woods and Nightingale Valley, Iron Acton District, and Yatton, Congresbury and Wrington; Mr. Hedley Williams—Failand; Mrs. Bell took the members round the Bath Botanical Gardens, and Dr. L. E. Hawker took us again on a Fungus Foray in Leigh Woods.

On October 18 talks were resumed, Mr. T. H. Payne relating many nature stories of Chew Stoke. On November 15, Mr. S. Crowdy came from the Long Ashton Research Station with the latest news about cocoa. He had been to Trinidad and the Gold Coast studying the trees in sickness and in health. On December 13, Mr. F. W. Evens gave us a description of the English Lakes, with some notes on the flora of the district. In his description he quoted William and Dorothy Wordsworth, who shared with him an interest in this part of the country. He showed sheets of plants he had collected, and many views in the epidiascope.

Visits were paid to the University gardens and greenhouses, by kind permission of Prof. Skene.

Exhibition Meeting: Mr. Bassindale's suggestion to show exhibits with economic value was a great success, and the following were shown:—Mr. F. W. Evens—wheat; Mrs. Bell—weeds of the wheatfield and a collection from the Middle East; Mrs. G. S. Wakefield—sugar beet and blackberry; Mrs. Sandwith—cotton, flax and hemp; Dr. Catherine Corbett—oats; Miss S. Mount—fungi, with yeast at work; Lady Fermor and Miss M. Mount—dyeing, with the plants used, spinning and weaving; Miss Addison and Miss Taylor—apples; Miss D. Shaw—oak; Mrs. Milburn—tobacco; Mr. Day—a collection of woods; Miss V. V. Cook—foxglove. Mr. Ivor Evans also showed plants from North Wales.

The *Floras* of Gloucestershire and Devon have been placed in the Library.

ETHEL M. E. BELL, *Hon. Secretary*

REPORT OF ENTOMOLOGICAL SECTION

1948

AT the 84th Annual General Meeting of the Section held on 6 January, 1948, Mr. J. V. Pearman was re-elected President and Mr. A. H. Peach re-elected Hon. Secretary and Treasurer.

On 10 February five members of the Section spoke on various subjects concerning Lepidoptera, illustrating their remarks with suitable exhibits.

On 9 March Dr. H. G. H. Kearns of the Long Ashton Research Station gave a paper on "Some recent developments of pest control". He specially gave some useful information to insect collectors on the use of suitable preservative from mite, etc.

On 15 May the Section sponsored a Field Meeting which was attended by about 30 members. The coach proceeded to Vallis Vale where we were met by Mr. Cruttwell of Frome, under whose leadership we visited the spots known by him to yield the best results. Owing to the quite exceptionally early heat wave, insects we should have expected to be emerging were practically over. However, an enjoyable afternoon was spent, if it could not be called profitable from the collector's point of view. It may be mentioned that this was the first coach trip to be arranged by the Section.

On 12 October a letter was read from Mr. R. M. Prideaux (for many years a member of the Section and now an Honorary Member of the Society), being reminiscences of the activities of the Section from the Early Eighties and following years. This was followed by talks and exhibits by members:—Mr. Blathwayt on insects collected on ivy bloom; Mr. Bell, butterflies observed in the Eastbourne district, 1948; Mr. Norgrove, experiences while collecting at Folkestone; Mr. Peach, on breeding *Parage egeria* from captured and then bred females.

On 9 November the meeting was devoted to exhibits of insects taken during the year. Eight members contributed, and in spite of a poor summer and dearth of insects, some very interesting variations were shown—many taken locally.

On 6 December a lecture was given by Dr. E. T. Burtt on the life history of the rose aphid—*macrosiphum rosae*. The mechanism of honey-dew was discussed and Dr. Burtt illustrated his lecture by drawings and exhibits.

A. H. PEACH, *Hon. Secretary*

REPORT OF GEOLOGICAL SECTION

1948

THIRTEEN General Meetings were held during the year, namely the Annual General and Exhibition Meeting, 5 Lecture Meetings and 7 Field Meetings; in addition, there were 5 Discussion Meetings. The average attendance for indoor meetings was 56; for outdoor meetings, 17.

At the Annual General Meeting, held on January 29, the following Officers were elected: Mr. H. W. Turner, President; Dr. F. S. Wallis, Vice-President; Mr. I. S. Loupekine, Hon. Secretary; Mrs. A. Marsden, Hon. Treasurer; Mr. D. T. Donovan, Recorder; and Mr. G. E. J. McMurtrie, Hon. Auditor. Sir Lewis Fermor, Mr. H. Homeshaw, Dr. A. Marsden, Mr. G. S. Maunder, Mr. H. S. Shinner, Dr. Stanley Smith, and Professor W. F. Whittard were appointed Committee Members. The formal business was followed by an Exhibition of Members' Collections, which, comprising 30 individual exhibits, easily surpassed previous efforts.

On February 19 Dr. B. N. Temperley, B.Sc., Ph.D., gave a lecture on "Geological Map-Making in Tanganyika". Dr. Temperley, who had had the benefit of some 15 years' experience of geological map-making in Tanganyika and Northern Rhodesia, outlined the principles of mapping and demonstrated the instruments and kit used on such surveys. Many lantern slides were shown, together with maps that were actually made in East Africa.

On March 18 Mr. D. T. Donovan, B.Sc., F.G.S., spoke on "A Geological Expedition to East Greenland, 1947". Mr. Donovan, who joined Lauge Koch's Danish expedition in the previous summer, gave a general account of the expedition which reached East Greenland on the *Gustav Holm* and a detailed account of the part that he and his assistant, Mr. I. H. Ford, played in the task of examining the Mesozoic rocks on Geographical Society Island. The lecture was illustrated by lantern slides and by specimens collected in Greenland.

Of the seven Field Meetings held during the summer, one was a whole-day excursion, three were afternoon excursions, and three were evening excursions. On May 1 Mr. T. R. Fry led a party to Dundry to examine the Jurassic, notwithstanding a rainy afternoon. On May 29 Mr. I. S. Loupekine led a party to Yate and Chipping Sodbury, primarily to collect minerals, but the torrential conditions were found to be a great handicap. On June 16, under the guidance of Professor W. F. Whittard, the Section paid an evening visit to Blaise Castle Woods where tectonics and other features of interest were examined. On July 17 the President led a coach-party to Westbury, Bratton and Seend, Wiltshire, where exposures of Upper Jurassic and Cretaceous rocks were seen, but not, once again, in dry weather. On August 9, under the leadership of Dr. F. S. Wallis, the Section visited Portishead in the evening, where the Old Red Sandstone and the Carboniferous Limestone were studied. On August 26, owing to the unavoidable absence of Mr. D. T. Donovan, Messrs. J. B. Rivington and M. E. White led an evening visit to the Somerset side of the Avon Gorge, where practice was given in the use of field instruments. Finally, on September 18 Dr. Stanley Smith led the Section to the Cattybrook Brick Company's pit to examine disturbed Carboniferous rocks.

On October 21 the Section welcomed the return to Bristol of Dr. L. R. Moore, D.Sc., Ph.D., F.G.S., who gave a lantern-illustrated lecture on "Coal and Oil-Shales". Dr. Moore reviewed the characters of coal and oil-shales and, as he had had the opportunity to carry out research on the Scottish oil-shales, he dealt with the latter, particularly with the interesting micro-flora that these contain, in concise detail.

On November 18 a large audience listened to a much appreciated philosophical lecture from Professor H. L. Hawkins, D.Sc., F.R.S., F.G.S. (University of Reading), on "Ourselves and the Universe". Professor Hawkins gave his impressions of the world and the universe through what he called "a palæontological eye". He described the development of an individual and compared the stages with those of a developing race.

On December 16 Mr. W. H. Dearden, M.Sc., F.I.M., F.R.I.C., gave a lucid talk on "The Bent Wire and the Metallurgist", in which he gave a simple explanation of the behaviour of metals. By means of lantern slides and specimens, Mr. Dearden demonstrated the structure of pure metals and alloys and dealt with their properties of elastic and plastic deformations and with the importance of annealing. After the lecture, members of the audience had the opportunity to inspect polished sections of metals set out under reflecting microscopes.

I. S. LOUPEKINE, *Hon. Secretary*

REPORT OF ORNITHOLOGICAL SECTION

1948



SEVEN meetings were held during the year, and members have been fortunate in hearing a variety of extremely interesting and attractive lectures. The attendance averaged 75 and reached a maximum of 148 for the final fixture in December.

The 25th Annual General Meeting took place in *January* when Mr. W. R. Taylor was elected President in succession to Mr. J. H. Savory. On behalf of the Section the new President extended a hearty vote of thanks to Mr. Savory for the ardent support he had given throughout his term of office. At the *February* meeting an unusually large audience gathered to see

three colour films, depicting "Bird-life in the West Highlands", taken by Professor R. Milnes Walker. In the unavoidable absence of the lecturer, Mrs. Milnes Walker gave an excellent running commentary on the films, which were remarkable for the great variety of scenery and bird-life shown. In *March* Mr. C. A. Norris spoke on "Bird-life in South-West Sweden"—the result of a visit to that area in 1947. Illustrating his lecture with a comprehensive series of slides, Mr. Norris gave a detailed account of Black Woodpeckers, Rollers, Broad-billed Sandpipers and other highly interesting species met with in Gottland, and went on to describe the unique methods adopted at the bird-ringing observatory on the island of Oland.

As usual the *September* meeting was devoted to exhibits and communications. Books, photographs and other exhibits were shown, and short accounts given by various members. At the *October* meeting the Section heard a most entertaining talk on "Bird-life in Iceland" by Mr. Michael Bratby, who afterwards showed colour-films of captive waterfowl in Mr. Peter Scott's pre-war collection in Lincolnshire and in the Severn Wildfowl Trust collection at the New Grounds. The *November* meeting was the occasion for an excellent lecture by Mr. H. J. Boyd on "The Breeding Behaviour of the Coot"—the outcome of intensive observations which he and Mr. R. E. Alley had undertaken at Blagdon reservoir. The speaker dealt especially with display, the territorial cycle and nest-building, and finally gave a very full account of the hatching and rearing of the young. In *December* a record attendance gathered to hear Mr. James Fisher's fascinating lecture on "St. Kilda". This was illustrated by a beautiful series of slides—many in full colour—to show the magnificent scenery and bird-life of this island group. Mention was made of the great numbers of nesting Fulmars and graphic details were given of the enormous Gannet colonies on Boreray, Stack an Armin and Stack Lee. In conclusion Mr. Fisher gave a reassuring account of the present status of the St. Kilda Wren, and referred to some interesting changes in the bird and mammal faunas since the departure of the human population in 1930.

A summer field-work programme arranged in early April included plans for a preliminary survey of the breeding distribution of Lapwings in the Bristol district. Members were also asked to co-operate with the British Trust for Ornithology by completing Nest Record cards whenever possible. It is a matter of considerable disappointment that the programme received very little active support, and it is hoped that greater efforts will be forthcoming in 1949.

Evening field-walks took place to Savage's Wood, Stoke Gifford, on May 19, and Blaise Castle Woods, Henbury, on the 26th. Both excursions were well attended.

H. H. DAVIS *Hon. Secreter*

ACCOUNT OF THE GENERAL MEETINGS

1948

THE Eighty-fifth Annual General Meeting was held on January 15, the Annual Dinner on January 22, and the Exhibition Meeting on September 30. Lecture meetings, on February 5, November 4 and December 2, were addressed by Mr. L. A. Harvey, Mr. G. A. Steven and Dr. W. E. Swinton respectively. A film show was arranged for March 5. Attendances ranged from 64 to 124 with an average of 87. There were also General Field Meetings.

At the Annual General Meeting the election of the new Council was rapidly completed and Mrs. C. Sandwith was elected an Honorary Member in recognition of her long membership and continued work on the local flora.

The retiring President, Sir Lewis Fermor, then gave his Presidential Address. First of all Sir Lewis referred briefly to the activities of the Society during his term of office and to his pleasure in the satisfactory resurgence of activity after the war years. He then passed on to an account of his visit to Southern Rhodesia and the problems involved in the development of part of this country. Southern Rhodesia was inhabited by the Matabele and Mashonas and was invaded by white people in 1890 when Salisbury, the capital, was founded, 18° south of the equator. In 1895 the country was named after Cecil Rhodes and in 1923 was divided into Northern and Southern Rhodesia, the southern half in 1924 being given responsible government. Southern Rhodesia, roughly circular in outline, lies south of the Zambesi and is divided into two areas of low-lying country by high land running from south-west to north-east. To the south-east of the high land (which is between 3,500 and 5,500 feet above sea-level) the low land drains into the Sabi River and it is this low-lying area that Sir Lewis visited as the mineral specialist of a team of workers appointed to investigate the economic possibilities of the Sabi Valley. These lowlands, falling to less than 1,000 feet above sea-level where the river enters Portuguese East Africa, are sparsely populated, especially by Europeans who are largely restricted to the high country. The high country consists mainly of granite with narrow belts of older schists carrying auriferous veins; but in the lower southern parts of the valley there are belts of gneisses, of Karroo beds with coal, and of younger basalts. To the east of the valley is an area of pre-Cambrian beds rising high above the Sabi River, which here runs from north to south along a major fault line.

Winter, from May to August, is dry with hardly any rain. The summer, however, has much rain from November to February and the swollen torrents rush to the sea through Portuguese territory. The Sabi River, from being almost completely dried up, reaches a width of nearly a mile. Uncontrolled drainage results in soil erosion, and an alluvial plain, 40 by 8 miles in area, has been formed; this gives promise of rich crops if irrigation is introduced on a large scale, after measures for the conservation of flood water have been undertaken. The coal is of second and third grade, but prospecting may show the presence of coal of good quality. In addition to gold in the schists, and the coal in the Karroo belt and under the basalts, there are iron-ores, limestone, and apatite (for phosphatic fertilisers); ores of tungsten and tantalum are already being worked.

In the matter of health, the region has three important endemic diseases—malaria, bilharzia and trypanosomiasis. The methods of control of malaria are well known. Bilharzia makes all bathing in natural waters inadvisable, but preventive measures can be worked out, while attempts are already being made to eradicate the tsetse flies which transmit trypanosoma. This involves the large-scale slaughter of all large game, and it is hoped, from the naturalists' point of view, that some other technique will be evolved. At the moment Europeans are mainly involved on the high land in the mining of gold, asbestos

and chrome, or the farming (with farms of 3,000 acres) of cattle, tobacco and maize. Immigration, however, would involve the splitting up of these farms or the settlement, by the newcomers, of the lowlands. Sir Lewis and Lady Fermor found the heat not so severe as in India, but they found a lack, in Rhodesia, of the appropriate amenities for the hot climate—such as electric fans. It is probable that with properly constructed homes the lowland of the Sabi valley would be easily habitable by white men, who could quite easily send their wives and children to the high land for, at any rate, the hot season. The value of the survey has already been realised and other governments are asking for similar surveys to be undertaken.

At the close of his address Sir Lewis Fermor handed over his badge of office to the newly-elected President, Mr. F. W. Evens, who, in accepting the Chair, thanked Sir Lewis for his address and closed the meeting.

At the Annual Dinner, held at the Grand Hotel, the Guest of Honour was the Right Reverend the Lord Bishop of Bristol. After the toast of "The Society", proposed by the Bishop, two films were shown by Dr. J. A. Kitching, O.B.E., entitled "Zoological Research at the Lough Ine Rapids", and "Through the seasons in Canada". These were much enjoyed.

At the February meeting Mr. L. A. Harvey described the Island of Lundy and the work which was in progress and that which was projected now that a Field Station had been established there. The slides used to illustrate the talk were extremely fine, one slide of a Fulmar Petrel in flight deserving special mention.

Five natural history films were hired for showing at the March meeting, and a large audience fully enjoyed the show despite the fact that the sound apparatus went silent half way through.

Attendance at the Exhibition Meeting on September 30 was an improvement on previous years and the exhibition was extremely good. One laboratory was filled with exhibits of materials useful to man and the other with exhibits of general interest. Thirty-one members exhibited, and the evening was rounded off by the showing of a film of the life of the honey bee.

In November Mr. G. A. Steven, of Plymouth, visited the Society and talked on the work of the Marine Biological Association. Although restricting himself to economic investigations, Mr. Steven showed how wide and important these problems were and gave a very clear picture of the Association's contribution to human affairs.

The December meeting was addressed by Dr. W. E. Swinton. This notable expert on the Dinosaurs proved not only knowledgeable—as was expected of him—but also proved to be a very interesting lecturer, and his account of the structure and habits of the Dinosaurs showed how intimate a knowledge of these animals had been obtained from a study of their fossil remains.

FIELD MEETINGS

The opening meeting of the Session was held on 17 April at Portbury and Wraxall with Messrs. A. C. K. Fear and G. S. Maunder as leaders. A small portion of the Wansdyke was seen near Portbury station, and on the journey to Clapton an exposure of Dolomitic Conglomerate was passed, near which boring operations for water were taking place; the process of boring was demonstrated. Near Clapton Church a good exposure of hæmatite and the overthrust of Carboniferous Limestone on the Pennant were pointed out. Cadbury Camp was traversed and then Tickenham Church visited. Crossing the moor to Nailsea, the party found many interesting plants, including Hairy Bittercress, Golden Saxifrage, Water Violet, Water Crowfoot, Starwort, Duckweed and Great Hairy Wood Rush.

On 8 May Mr. F. W. Evens and Dr. F. S. Wallis were the leaders on a visit to Western Mendip for the purpose of studying a typical traverse of the varying flora, fauna and rocks of these hills. Members climbed the steep, limestone slopes of Fry's Hill and continued over the flat top of Mendip to Callow Drove. By descending a small combe, Winscombe Drove was reached and the relationships of the contour to the underlying rocks of Old Red Sandstone, Lower Carboniferous Shales and Carboniferous Limestone were observed. Here it was clearly

demonstrated that changes in flora are closely associated with the same three types of rocks. Many exposures of Dolomitic Conglomerate were passed en route to Winscombe. Later Mr. E. Gardner explained the chief features of Winscombe Church. Some ecological notes supplied by Professor Lily Newton were much appreciated. Members of the Bath Natural History Club were present and collaborated with the Society.

The meeting on 12 June was a whole-day one and the Quantock Hills were visited and Messrs. F. W. Evens and A. C. K. Fear were the leaders. The route taken by the two coaches was via Wedmore, Bridgwater, Cannington, Nether Stowey, and Holford, where members from Bridgwater joined the party. The walking route was through Hodder's Combe, Sheppards Combe, under Lady's Edge to the Bicknoller Post. The descent on the south side was down Weacombe through the woods to West Quantoxhead and St. Audries. The geologists had opportunities to inspect the exposures at Holford and St. Audries Bay and Mr. Fear gave a short talk on the various rock formations to be seen from the shore. Botanists found an interesting plant association in a quarry at Holford, water plants and a bog flora in the stream running down the combe and also *Sphagnum* Moss, Sundew, Bog Pimpernel, etc. The sessile oakwood association in Sheppards Combe, without a shrubby undergrowth but with Whortleberry, Cow-wheat and numerous mosses, was noted en route. At the Bicknoller Post the prehistoric trackways, round barrows and Iron Age camp were pointed out. Biologists found several nests of the red and large wood ants, and the pools yielded various insect larvæ. On the shore of St. Audries Bay the rock pools yielded a fairly extensive fauna of sea anemones, barnacles, limpets, crabs and sandworms. Several seaweeds were collected.

Messrs. A. C. K. Fear and G. H. Beacham were the leaders on 10 July to Old Sodbury. Proceeding to Sodbury Common, the headwaters of the River Frome were seen and the leader described its course from its source at Dodington and Old Sodbury to Yate, Frampton Cottrell, and so to the centre of Bristol. From Sodbury Common the party proceeded to Little Sodbury where a talk was given on the history of the Manor House and its associations with Tyndale. At the Roman camp many Upper Lias and Inferior Oolite ammonites and other fossils were collected from the small exposures. Later the party walked to the railway cutting west of Chipping Sodbury Station where the Rhætic was seen lying unconformably on the Carboniferous Limestone. At Chipping Sodbury church, evidence of the Clothworkers' Guild was found in connexion with the foundation of the church.

On 14 August Messrs. G. H. Beacham and H. F. Barke led a party to the Burrington Combe district. Leaving the coach at Churchill, where the limestone rocks were observed, members walked to Dolebury Camp, where the prehistoric camps and earthworks of Somerset were noted; the limestone flora of Dolebury Warren was examined and specimens were collected. At Read's Cavern Mr. H. F. Barke gave a lucid explanation of the line of swallets which occur at the junction of the shale and limestones, the surface streams disappearing underground. After tea at Burrington the church was visited; the geologists ascended the western twin stream to Goatchurch Cavern. Specimens of the flora of the Combe were obtained and the Kestrel and Sparrow Hawk were observed.

On 11 September Mr. T. Payne led a party in the Pensford, Stanton Drew and Chew Magna district. The church was visited at Publow and then the party continued by the River Chew and field path to Lords Wood. At Pensford the Broad Oak district and the colliery tip were visited.

R. BASSINDALE, *Hon. Secretary*

M. D. HILEY, *Hon. Secretary, Field Committee*

BRISTOL BOTANY IN 1948

BY CECIL I. and N. Y. SANDWITH

(Received, and read in title at General Meeting, March 3, 1949)

THE weather of 1948 presented a complete contrast to 1947. A mild spring was followed by a wet summer, with one brief but remarkable heat wave at the end of July. There were periods of fine weather in the autumn, but October (generally a fine month) was wet and cold. On Christmas Day leafless bushes of Dogwood were in full flower on Durdham Down, at the edge of the Avon Gorge.

Anemone ranunculoides L. Blaise Castle Woods, G., Miss Sheila Mount, comm. Mrs. Bell. This is a first record for our area of a most attractive plant which must be a garden escape unless it was deliberately planted. When the finder conducted us to the spot in April, 1949, the ground had been disturbed and the plant could not be found. A voucher specimen is in Mrs. Bell's herbarium.

Fumaria Boraei Jord. Appeared spontaneously in Mr. D. Coombe's garden at Bath, S.

Nasturtium microphyllum Boenn. ex Reichb. (*N. uniseriatum* Howard et Manton). Stream near Severn Beach, G., C. C. Townsend, see *Fl. Glos.*, pp. 609-610, where there is a valuable account of the two water-cresses.

Diplotaxis tenuifolia (L.) DC. var. *integrifolia* Koch. Waste ground, Shirehampton, G., D. Coombe.

Lepidium latifolium L. Mr. I. W. Evans reports a colony 20 yards long between Arno's Vale and St. Philip's Marsh, G.

Silene maritima (Hornem.) With. Sand Point, S., 1919, C.I.S. and N.Y.S.

Agrostemma Githago L. In a wheat field, Stockwood Lane, Whitchurch, S., I. W. Evans.

Stellaria Holostea L. var. *apetala* Rostr. ex Asch. et Gr. A patch on the bank of a lane at Failand tan-pits, S., C.I.S. and N.Y.S.

Cerastium pumilum Curt. In plenty along a railway siding at Ashley Hill, G., C.I.S. and N.Y.S.

Linum bienne Mill. In rough pasture near Woodlands, Almondsbury, G.; and with *Siegingia* in a dry pasture on moorland below Axbridge, S., C.I.S. and N.Y.S.

Erodium cicutarium (L.) Ait. var. *pimpinellifolium* (Sibth.) DC. One large plant appeared as a weed in our garden at Tickenham, S.

Impatiens parviflora DC. In deep shade near the old Brass Mill, Keynsham, S., I. W. Evans.

- Lathyrus Nissolia* L. In the grounds of Filton Aerodrome, G.,
E. A. Fonseca.
- Crataegus monogyna* Jacq. var. *xanthocarpa* Lange. This is the correct name for the yellow-fruited Hawthorn found near Midford, S. (see "Bristol Botany in 1946"), see a full discussion by Mr. J. P. M. Brenan in *B.E.C.* 1946-1947 Rep. pp. 260-262 (1948).
- C. monogyna* Jacq. var. *laciniata* Stev. Hedge of field near Yate Court, G., C.I.S. and N.Y.S.
- Epilobium Lamyi* F. Schultz. This little-known species, which must often be overlooked, has appeared as a weed in our garden at Tickenham, S.
- E. montanum* L. \times *roseum* Schreb. Side of platform, Frome Station, S., J. P. M. Brenan, confirmed by G. M. Ash.
- E. palustre* L. With *Stellaria palustris* in a wet pasture on Nailsea Moor, S., C.I.S.
- Lonicera Xylosteum* L. "Wood, Little Sodbury," *Fl. Glos.*, p. 249, and seen by members of the Bristol Naturalists' Society on July 10 in Old Sodbury Wood, G.
- Sambucus nigra* L., forma. A small bush, with pink, single flowers in small, dense corymbs, by the side of a rhine near Oldbury-on-Severn, G., May, Dr. David Prowse. Dr. Prowse conducted the senior writer to the bush, and specimens were collected. On examination the petals proved to be irregularly but conspicuously flushed with mauve-pink in the upper half; otherwise the flowers were normal. In September the finder sent us a consignment of fruit, which does not appear to differ from the typical form either in colour, shape or size. The inflorescence was pinkish-purple, but this colouring is also characteristic of the typical Elder. Reference to the Kew Herbarium shows that a similar pink-flowered Elder, with single flowers with "pink-tinged petals and pink sepals," was collected near the Thames opposite Bray, Bucks., on June 24, 1926, by the Rev. H. J. Riddelsdell. This specimen also had a small dense-flowered corymb, but such corymbs can be found on Elder bushes with cream-coloured flowers, and that character may or may not be correlated with the size of the bush and its leaves, and with the colour of the petals. Then, in H. C. Watson's Herbarium at Kew, there are two specimens collected in Worcestershire by Edwin Lees, with the note, "Var. with outside of petals mulberry colour before the flower expands. Hedge at Hallow, 3 miles N. of Worcester." The flowers on these specimens are all in bud and have dried a consistently dark colour, but so have the leaves. No mention is made of this gathering in Amphlett and Rea's *Botany of Worcestershire*. The interest of Dr. Prowse's Elder lies in the

fact that no pink single-flowered *S. nigra* was known to Fritz Graf von Schwerin when he wrote his monograph of the genus *Sambucus* in *Mitteilungen der Deutschen Dendrologischen Gesellschaft*, 1909, see p. 30. He mentions var. *roseo-plena* Zabel, with semi-double flowers, the petals faintly tinted with rose, which is known in gardens (see Bean, *Trees and Shrubs hardy in the British Isles*, vol. ii, p. 496), adding (translated): "a single-flowered rose form, such as occurs in *S. racemosa* [var. *purpurea* Sweet], strangely enough has been neither described nor observed in *S. nigra*." This may still be true in so far as a name is concerned, since no such form is described in Rehder's *Manual of Cultivated Trees and Shrubs*, ed. 2 (1940), or in Bailey's *Standard Cyclopedia of Horticulture* (1939), and we have been unable to trace any name for it in British or Continental European literature. Wisely, we think, we refrain from giving one ourselves, on the evidence of three bushes which may not be uniform and of which we have studied only one, in a single season.

S. nigra L. var. *viridis* Weston. South slope of Mendip, above Cheddar, S., Oct., 1944, Stanley Lewis in *Herb. Kew*.

S. Ebulus L. Mr. I. W. Evans reports that the station for this species at Keynsham, S., has been destroyed by building.

Galium Mollugo L. \times *verum* L. Lansdown, Bath, S., Miss F. M. Barton, see *B.E.C.* 1946-47 *Rep.*, p. 296.

Valeriana officinalis L. *Fl. Glos.*, pp. 256-7, refers to the recent field investigations of Dr. Maria Skalińska and Dr. T. A. Sprague which have shown that only one species can be recognized in Britain by external characters, although there are two genotypes, a tetraploid and an octoploid, which correspond roughly to the *officinalis* (*Mikanii*) and *sambucifolia* respectively of British authors. Dr. Skalińska's paper on polyploidy in *V. officinalis* in relation to its ecology and distribution has now appeared in *Journ. Linn. Soc., Bot.*, liii. 159-186 (1947). In June, 1945, she visited Bristol and studied the *Valeriana* populations in the Avon and Cheddar Gorges, in company with the junior writer. The complex nature of this problem is revealed by her discovery that the dry ground, narrow-leaflet forms of the Avon Gorge under Leigh Woods, S., were tetraploids, whereas similar forms from dry exposed slopes of Cheddar Gorge, S., proved to be all octoploids, although a herbarium specimen from Cheddar had been identified by her as a tetraploid. Dr. Skalińska's paper raises a number of points of great interest to cytologists, ecologists and plant geographers alike.

Lactuca Serriola L., as expected, is on the increase in and around the City. Blitzed site, Victoria St., G.; and, as the var. *dubia* (Jord.) Rouy, with entire leaves, the midrib beneath

- “prickly,” very common on waste ground by Portway under Sneyd Park, G., *C.I.S.* and *J. P. M. Brenan*.
- Sonchus arvensis* L. var. *glabrescens* G., G. et W. Bombed site, Victoria St., Bristol, G., *J. P. M. Brenan* and *C.I.S.*
- Andromeda polifolia* L. and *Oxycoccus quadripetalus* Gilib. In view of the late W. D. Miller's remarks about the disappearance of these species from the peat moors (see *B.E.C.* 1932 Rep., pp. 273-4), it should be recorded that we last saw *Andromeda* on the moors S. of the railway between Shapwick and Ashcott Stations in August, 1920, while we have a sprig of *Oxycoccus* gathered in the same area in August, 1915, and a manuscript note that we saw it there again in June, 1919. *Andromeda* was still on Mendip in 1928. Has it been seen there since the War?
- Menyanthes trifoliata* L. Crossways, Thornbury, G., in very small quantity, *Dr. R. W. G. Dennis*.
- Cynoglossum officinale* L. Stockwood Lane near Keynsham, S., *I. W. Evans*.
- Symphytum tuberosum* L. Has appeared in the quarry by Portway at the bottom of the Gully, G., *I. W. Evans*.
- S. peregrinum* Ledeb. Vallis Vale, S., several patches, *Mrs. Bell*.
- Atropa Bella-donna* L. Lane off main Brislington-Keynsham road, side of Dr. Fox's, S., *I. W. Evans*.
- Hyoscyamus niger* L. Bishopsworth, S., in a cultivated field with *Chenopodium polyspermum*, *I. W. Evans*.
- Mimulus guttatus* DC. Two large patches in a stream at the Water Works at Compton Martin, S., *I. W. Evans* and *T. H. Payne*.
- Parentucellia viscosa* (L.) Caruel (*Bartsia viscosa* L.). Has appeared in quantity on Durdham Down, G., over a wide area which had been resown after military occupation during the late War. Discovered on June 29 by *C.I.S.*, and independently by *Mr. H. O. Edmonds*. This is an evident introduction, and there have been similar instances of its sudden appearance in other counties, but it is not clear why this particular species should arrive with the sowing of new grass. The seed, we are told, came from the firm of Clarke, at Swindon. This species is new to the district, and to v.c. 34.
- Mentha rubra* Huds. Quarry opposite Anchor Inn, Bleadon, S., *Mrs. B. Welch*.
- Rumex conglomeratus* Murr. × *Hydrolapathum* Huds. Bank of rhine, Walton Heath, near Glastonbury, S., Sept., 1942, *C.I.S.* and *N.Y.S.* The specimens have been seen by *Dr. K. H. Rechinger*, who confirms the identification of this very rare hybrid.
- Euphorbia stricta* L. Footpath connecting Bathampton and Warminster roads, S., 1947, *A. L.* and *J. D. Miller*, comm. *A. F. Wilmott*, see *Watsonia*, i. p. 53. New to the district and to v.c. 6,

but surely an introduction, perhaps from gardens, where this species can spread with great rapidity.

Populus canescens Sm. *Fl. Glos.*, p. 440, quotes only one locality for the female tree, but Mr. White listed several stations in District 5, and specimens were collected from a young tree near Northwoods, Winterbourne, in 1933, by *C.I.S.* It is strange that Mr. White (*Flora*, p. 540) should have remarked that he had never met with the fertile tree of *P. alba*, and quoted Boswell Syme to the same effect. Actually, it is the male tree of *P. alba* which is so scarce, and many botanists have only succeeded in obtaining specimens for their herbaria by visiting a small tree in Kew Gardens. Most of the White Poplars which are so conspicuous on account of their summer foliage will be seen to bear pistillate catkins if examined in spring.

Salix triandra L. var. *Hoffmanniana* Sm. In lowlands of the Cheddar Valley below Axbridge, **S.**, *C.I.S.* and *N.Y.S.*

Orchis mascula (L.) L. A white-flowered form found near Thornbury, **G.**, is reported by *Dr. David Prowse*.

Epipactis leptochila (Godfery) Godfery. Stinchcombe Hill, and woods near Dursley, **G.**, see *Fl. Glos.*, p. 447. These are the only records for our area which can be regarded as authentic. The record from Cheddar Gorge, **S.** (see White, "The Botany of Bristol," 1930) is likely to be an error; at any rate, it must be confirmed. Mr. White assumed too hastily that the plants named *E. media* in the *Bristol Flora* must be automatically referred to *E. leptochila* (see "Bristol Botany in 1926," introductory comment).

E. cleistogama C. Thomas in *Fl. Glos.*, p. 612. The type locality of this new species, of which a fuller account will presumably be published, is the steep western slope of the Cotswolds near Wotton-under-Edge, **G.**, where the plant is said to be not rare, under shelter of Beech.

Iris Pseudacorus L. Growing with willows in silt and rubbish under a roadway near the Tramways' Centre, Bristol, **G.**, *I. W. Evans*.

Ruscus aculeatus L. Hedge in Kewstoke Bay, **S.**, 1919, *C.I.S.* and *N.Y.S.*, and still there in 1948, *I. W. Evans*.

Polygonatum officinale All. Mr. White (*Bristol Flora*, p. 580) remarked that "it fruits but seldom." Good fruiting specimens were seen in September in Cheddar Gorge, **S.**, by *Mr. D. Coombe*.

Wolffia arrhiza (L.) Wimm. Rhines W. and N.W. of Kingston Seymour; and in a pond near Bleadon Station, **S.**, *Mrs. B. Welch*.

Scirpus Tabernaemontani Gmel. Rhine near the golf links at Uphill, **S.**, *I. W. Evans*; and in another below Brean Down, **S.**, 1923, *C.I.S.* and *N.Y.S.*

S. caespitosus L. A curious sport of this was found by Mr. A. E. Ellis in 1938 at Beacon Batch, Blackdown, S., see *B.E.C.* 1946-47 Rep., p. 313. Each inflorescence was converted into a cluster of spikes consisting entirely of glumes. Specimens are preserved in the Kew Herbarium.

Carex Hudsonii Ar. Benn. When Mr. E. Nelmes was incorporating W. B. Waterfall's sheets of *Carex* in the Kew Herbarium he detected specimens of this species labelled "side of moor ditch ('rhine') in large tussocks, Axbridge, Somerset, June 27, 1877." The specimens were named *C. paludosa* Good., and a single culm of that species was found on the sheet. Once again, in the summer, we made two journeys to the moorland below Axbridge and rediscovered tussocks of *C. Hudsonii* surviving in at least four rhines.

C. acuta L. On the first of these visits to the Axbridge lowlands, on May 11, we were surprised to meet with a quantity of this species along one of the rhines, in an entirely new locality. Further patches of *C. vesicaria* were also noted. It is evident that this small area of the Cheddar Valley is a survival ground for interesting sedges.

Bromus lepidus Holmb. Durdham Down, G., *C.I.S.* and *J. P. M. Brenan*.

Lolium multiflorum × *perenne* L. In an area on Durdham Down, G., which had been resown after military occupation, *J. P. M. Brenan* and *C.I.S.* Confirmed by Mr. C. E. Hubbard.

Botrychium Lunaria (L.) Sw. N. side, top of Cheddar Gorge, S., R. B. Abell, see *Watsonia*, i. p. 60.

ALIENS. *Delphinium* at Bristol: in the *Adventive Flora* we gave records for two very distinct plants, under the names *D. Ajacis* L. and *D. Consolida* L. To our surprise, the editors of the *Flora of Gloucestershire*, presumably on nomenclatural grounds, and without examining the relevant specimens, have placed all Bristol records of this genus under a single species, *D. Gayanum* Wilmott. Re-examination of Bristol material shows that no less than three distinct species of *Delphinium* have occurred at Bristol, viz.:

D. Ajacis L. *sensu* Gay (*D. Gayanum* Wilmott). Colliery workings at Kingswood, G., 1893, *White*. This is the plant which formerly occurred in British cornfields, but is now rare.

D. orientale Gay (*D. Ajacis* L. *sensu* Wilmott). Waste ground, Kingswood, G., 1933, *C.I.S.* Bedminster, S., 1922, *C.I.S.* and *N.Y.S.* This is a garden outcast, with smaller, denser, more purple flowers with a shorter spur than *D. Ajacis*.

D. Consolida L., *auct.* Shirehampton, G., 1912; Avonmouth Docks, G., 1926 and 1939; Bedminster, S., 1932; all records by *C.I.S.* and *N.Y.S.* A Mediterranean alien, completely distinct

from the two former on account of its spreading inflorescence branches, entire bracts and glabrous carpels.

Brassica Tournefortii Gouan. Fowl-run, Siston Common, **G.**, 1925, *H. J. Gibbons*.

Camelina Alyssum (Mill.) Thell. (*C. foetida* Fr.). Ashton Gate tip, **S.**, 1937, *C.I.S.* New to the adventive flora of the city.

Lobularia maritima (L.) Desv. St. Philip's Marsh, **G.**, *I. W. Evans*.

Coriandrum sativum L. Portway tip, and on the river-bank, **G.**, *I. W. Evans*.

Heliotropium europaeum L. Portway tip, **G.**, *I. W. Evans*.

Cyperus esculentus L. Waste ground, St. Philip's Marsh, **G.**, *I. W. Evans*. The tubers on the underground stolons of this species provide the "Tiger Nuts" of commerce, beloved of children. The species is very widely distributed all over the world, but has not previously been recorded as an adventive in Britain, and is an excellent addition to the Bristol list.

Apera intermedia Hack. St. Philip's, **G.**, 1916, *Herb. Druce*, see *Fl. Glos.*, p. 580, det. *C. E. Hubbard*. New to the Bristol alien list.

Poa palustris L. Blitzed site, Victoria Street, Bristol, **G.**, *J. P. M. Brenan*.

Bromus squarrosus L. Avonmouth Docks, **G.**, 1931, *H. J. Gibbons*, confirmed by *C. E. Hubbard*. This is a very satisfactory record, since the Avonmouth specimen (coll. *Evans*) cited in the *Adventive Flora* proved to be *B. japonicus* when it was examined in *Herb. Druce*.

MOSESSES. *Physcomitrella patens* B. & S. On sides of cattle hoof-marks in mud by a rhine in a wet pasture below Knightswood Cottages, Tickenham, **S.**, 1948, *J. P. M. Brenan*. New to v.c. 6.

Thuidium delicatulum Mitt. Locally plentiful on rocks covered with a deep, dense moss-layer, in a deep, damp, wooded valley, Asham Woods, near Frome, **S.**, 1946, *J. P. M. Brenan*. New to v.c. 6. See *Trans. Brit. Bryol. Soc.* 1. 123 (1948).

Pylaisia polyantha B. & S. On a willow trunk overhanging a rhine on Nailsea Moor, **S.**, 1948, *J. P. M. Brenan*. New to v.c. 6.

THE SOMERSET PEAT MOORS. Lovers of the peat moors must on no account miss the series of fascinating papers by Prof. A. R. Clapham and Dr. H. Godwin which have appeared in the *New Phytologist* and, especially, in the *Phil. Trans. Royal Soc.* vol. 233 (1948), reviewed in *Nature* of Dec. 25, 1948. These papers disclose the history and complex stratification of the peat bogs up to the end of Romano-British times, and their periodic flooding with calcareous water from the surrounding hills owing to the increased rainfall which accompanied changes of climate. Elaborate pollen analyses at different levels have revealed the character of the vegetation in relation to both the raising and the flooding of the bogs.

We are shown a remarkable world of raised bogs and rising swamps crossed by prehistoric trackways of timber or brushwood (some of the stakes being cut from native British Beech) which were used by the escaping lake-dwellers. *Scheuchzeria palustris* was a dominant plant up to Roman times, while both species of *Rhynchospora*, *Eriophorum vaginatum*, *Andromeda*, *Oxycoccus* and *Cladium* were all very abundant at different stages of succession, though now surviving only on or near those few undisturbed patches of primitive bog which had long ceased to develop. This story should now be completed by a thorough ecological survey of the existing vegetation of the moors. The area is one of the proposed new nature reserves, and this might well be one of the chief duties of the biologist who is appointed to watch and protect the vegetation.

THE "FLORA OF GLOUCESTERSHIRE," which was published on September 3, is a splendid book packed with interest, the fruit of the unwearied labours of three successive editors and many specialists. It is being fully reviewed elsewhere, and it remains for us, first, to congratulate Mr. Price on the successful conclusion of his task, and to call attention to such special features as his own essay on the vegetation, the many beautiful photographs of flowers, trees and landscape, the admirable nomenclature, and the keys to some of the larger and more critical groups. The Gloucestershire division of the Bristol area is covered by District 5 of the *Flora*: the plant localities given in Mr. White's book are repeated in an extremely condensed form, with the addition of new ones derived from the annual "Bristol Botany" notes since 1912 and other sources. Bristol botanists are advised, when using this work for local purposes, to return again and again to the *Flora of Bristol*, not merely to verify the details of a locality and the date of a record, but also to breathe once more the living enchantment of that remarkable book, which was indeed a "contribution to literature."

The present writers have one small bone to pick with the final editor and his assistants: it is stated on p. xcvi that "The enlargement of the City (County) of Bristol, by the transfer of the Bedminster, Knowle and Brislington districts from Somerset, includes these in District 5"; and, on p. xcvi, "The district [5] is in v.-c. 34, apart from the portions of the City of Bristol south of the River Avon, which are in v.-c. 6, N. Somerset." Accordingly, on the map showing the Watsonian vice-counties and the botanical districts, the Bedminster, Knowle and Brislington districts, reaching as far south as Bishopsworth and the neighbourhood of Whitchurch, are given the red colouring of District 5, but they are also given to Gloucestershire itself, with the Gloucestershire county boundary running along their southern edge. But the County of Bristol is not the County of Gloucester, and areas transferred from the

County of Somerset to the County of Bristol surely do not thereby automatically become part of the County of Gloucester. In Bartholomew's *Survey Gazetteer of the British Isles*, ed. 9 (1943), Bedminster and Brislington are given to Somerset, while Knowle appears as "2 eccl. dists. in co. bor. of Bristol." Bristol itself is described as a parliamentary and county borough, city, parish and seaport . . . "in Glos. and Somersetsh., but also a separate county in itself." Moreover, the contributors to the *Flora* are themselves inconsistent over this point: on p. xx, Bishopsword, and on p. xxvii, Bitton, are taken as the southern points of the maximum length of Gloucestershire; while on pp. xxiii-xxiv one writer states that the Bristol Frome and the Boyd "flow southwards into the Bristol Avon, which flows to the Severn at Avonmouth as the county boundary." In any case, and perhaps mercifully, there seems to have been no attempt to abstract records from these Somerset districts in White's *Flora*; but if the author of a new *Flora* of Somerset acts likewise, they will be left as a botanical no-man's-land! And what is to happen when Bristol extends her boundary southwards, in the direction of Dundry and Clevedon? The present writers, who are concerned with the two geographical divisions used by Mr. White, will continue to treat these districts as parts of N. Somerset, retaining the "S" of the *Flora of Bristol* for plant localities lying within them.

Errors and omissions are inevitable in every county flora, and it is our duty, in the interests of Bristol botany, to indicate some of those which are found in this book. The writer of the section on "Botanical Statistics" has evidently relied on that most untrustworthy work, Druce's *Comital Flora*, for his comparisons of the Gloucestershire flora with those of other counties, and Bristol botanists will read with amazement on p. ci that *Spergularia salina* and *Asparagus maritimus* var. *atilis* do not occur in v.-c. 6, while no Somerset man will swallow the astonishing result achieved in the statistical table on p. ciii, where Somerset (of all counties, one of the richest in Britain) is shown to have a smaller flora than inland Worcestershire and Berkshire! On p. clxx, in the list of herbaria consulted, those of C. Bucknall and H. P. Reader are, as stated earlier in the book, at Bristol University and not at "Bristol Museum." More serious, perhaps, is the question of omissions (on the part of the first editor) from the annual "Bristol Botany" notes, and even from White's *Flora*. Thus, the two recent records of *Lathyrus latifolius* given by White have been missed, and the well-known spot on the edge of Durdham Down is reported as "Clifton Downs" on the authority of Mr. Haines; while, in "Bristol Botany in 1919," no less than five records (including two important ones of *Carex acuta*) have been missed or ignored and thus have failed to appear in this book. Again, on p. 580, the Stapleton Road

record of *Apera interrupta* is repeated, although it had been carefully corrected in the *Adventive Flora of the Port of Bristol*, since the specimen proved to be *Polypogon monspeliensis*. We confess that these discoveries have given us some concern as to the thoroughness of the work as a compilation of our previous knowledge. The dates of far too many records have been omitted, a serious matter when there is no reference to publication elsewhere. Finally, although the progressive nomenclature sets a new standard for all British botanists, the treatment of *Delphinium* shows what can happen when experts get their teeth into a list of names without verifying the relevant specimens (see above, in the present paper).

Many people must be asking when there is to be a new Flora of Somerset, or a "new edition" of the *Flora of Bristol*. We know of no plans for Somerset but, as to Bristol, we are quite sure of one thing: there must on no account be any attempt to "bring Mr. White's book up to date" by a re-issue incorporating additions. This would be desecration of a work which is perfect as it stands, and might well be reprinted since it has become so scarce. For later material, what is wanted is surely a new supplementary volume composed of additions, corrections, records of extinctions, revised nomenclature and later biographical notices. A card index of records, with references to publication, has been started by the junior writer, and would eventually be available to any competent botanist who might wish to take in hand the preparation of such a supplementary volume.

ORNITHOLOGICAL NOTES, BRISTOL DISTRICT, 1948

COMPILED FROM THE REPORTS OF MEMBERS OF THE
B.N.S. ORNITHOLOGICAL SECTION

BY H. H. DAVIS, M.B.O.U.

(Received, and read in title at General Meeting, March 3, 1949)

OWING chiefly to the efforts of a small but energetic band of observers, records for 1948 compare favourably with those of previous years. Among the more important events, particular mention may be made of the renewed breeding, following a lapse of eight years, of Ravens in the Avon Gorge, young being successfully reared from an old site on the Gloucestershire side. Other noteworthy reports are of Black Redstarts at Berkeley, Warmley, Failand, Clifton, and, on several occasions, in the City, and of Hoopoes on Brean Down in May, and in the Wotton-under-Edge, North Nibley, Wrington and Ubley areas in late summer and autumn. Mendip records include those of a probable Rough-legged Buzzard; a Hen-Harrier; and a Tern (Common or Arctic) as late as the third week of November; while from the New Grounds there are reports of Bewick's Swan, Gadwall, Garganey and Long-tailed Duck; a Lesser White-fronted Goose, once again an adult, in December; and a Ruff in the first week of March.

The North Somerset reservoirs have again been carefully watched, and among the many interesting reports are those of a Brent Goose at Barrow Gurney and Cheddar in March, and a Turnstone, a Little Tern and a party of forty-one Black Terns at Cheddar in May. A Scandinavian Lesser Black-backed Gull was identified at Cheddar late in March, and what was perhaps the same bird was twice seen in May. A Red-necked Grebe, first noticed at Cheddar in the previous December, remained there until mid-April and had then assumed the attractive breeding plumage, while a grebe of this species, in similar plumage, at Blagdon on April 25 was doubtless the Cheddar bird. Duck records from the reservoirs include those of the continuous presence of Garganey, up to nine in number, from March to mid-May, but breeding has still to be conclusively proved. Scaup and Goosander were frequently noted, but owing presumably to the absence of any prolonged spell of cold, Smew were unusually scarce. Duck census work, on behalf of the International Wild-fowl Preservation Committee (British Section), has been regularly undertaken by Mr. B. King, with valuable help from Messrs. H. J. Boyd and G. E. Clothier, and of special interest among the valuable results obtained

are records to show the great preponderance of Common Pochard from October to the close of the year. Of slightly under 1,200 duck at Blagdon on December 28, Pochard numbered 950, while a count of this species at Blagdon and Cheddar on the same date showed a combined total of 1,400 birds.

Unless otherwise stated the systematic notes below are the result of observations by the following members—A. E. Billett, Rev. F. L. Blathwayt, H. J. Boyd, L. F. Burroughs, Miss G. G. Clements, G. E. Clothier, H. H. Davis, R. P. Gait, B. King, A. C. Leach, Major J. G. MacGeorge, Dr. L. H. Matthews, H. W. Neal, Miss E. D. Overend, T. H. Payne, R. H. Poulding, J. H. Savory, Peter Scott, A. Shaw, R. A. Skinner, Miss S. K. Taylor, W. R. Taylor, H. F. Webb, D. A. Weir and M. J. Wotton. Non-members who have contributed are W. B. Alexander, M. Bratby, J. Buxton, H. Cox, J. H. Harford, J. B. Henderson, G. A. K. Hutton, R. D. Jackson, J. C. Leach, C. A. Norris, M. J. Rogers, K. Shackleton and D. Taylor. The appropriate initials are given with all records.

G = South Gloucestershire. **S** = North Somerset.

RAVEN (*Corvus c. corax*). **G**. A pair nested in the Avon Gorge (Glos. side) for the first occasion since 1940, three or four young being reared (R.H.P., H.W.N., A.C.L., W.R.T. and others). Two flying low over roof-tops near Bristol Royal Infirmary, Dec. 14 (R.H.P.). **S**. Bred successfully, Brean Down, where adults and three young seen, May 8 (J.G.M.). Pair with three or four young just on the wing, Steep Holm, May 2, one juvenile being caught and ringed by R.H.P. Single birds or pairs noted, Abbots Leigh, Jan. 24 (J.H.S.); Clevedon, August 28 (R.H.P.) and Oct. 30 (A.C.L.); Cheddar, Sept. 17 (M.J.W.), Nov. 19 and 21 (B.K. and H.H.D.) and Dec. 27 (A.C.L.); Long Ashton, Sept. 23 (G.E.C.); Blagdon, Nov. 14 and Dec. 19 (H.J.B. and B.K.); and Failand, Dec. 18 (B.K.).

HOODED CROW (*Corvus c. cornix*). **S**. One visited Bath Sewage Farm, near Saltford, late in Feb. and remained until April 19 or longer (B.K.).

CARRION-CROW (*Corvus c. corone*). **G**. More than fifty counted on the Avon mud below Sea Walls, Clifton, May 25 (A.C.L.). **S**. Winter counts at Bath Sewage Farm, near Saltford, averaged between eighty and one hundred birds (B.K.).

STARLING (*Sturnus v. vulgaris*). **G**. The roost at Old Wood, Rangeworthy, first established in the winter of 1943-44 (cf. *Proc., B.N.S.*, 1945), gradually broke up in late Feb. and March, and did not, as in the previous four years, re-form in the autumn (J.H.H.). From Oct. onwards very large numbers roosted in a

small plantation half a mile S.E. of North Woods, Winterbourne. Observations by H.H.D. shortly after the close of the year showed that the roost had assumed immense proportions. It appears from local information that both this and the Rangeworthy site were in use during the winter of 1947-48.

HAWFINCH (*Coccothraustes c. coccothraustes*). **G.** Single bird, New Grounds, Jan. 19 and 20 (P.S.). At least two pairs reported as nesting on Clifton Down (R.P.G.).

SISKIN (*Carduelis spinus*). **G.** Pair, Wotton-under-Edge, Jan. 18 (H.F.W.). Party of nine or ten in decoy wood, New Grounds, Oct. 31 (H.H.D.). **S.** Three, Blagdon reservoir, Oct. 16 (G.G.C.). Up to twenty-five or more noted on various dates in Alders at Barrow Gurney reservoirs, Nov. and Dec. (G.E.C., A.C.L., W.R.T. and others). Ten in Alders, Failand, Dec. 12 (R.H.P.).

LINNET (*Carduelis c. cannabina*). **G.** A pale buff-coloured bird seen among a flock at Dodington Ash, Jan. 3 (A.C.L.).

CIRL BUNTING (*Emberiza c. cirrus*). **G.** Noted on various occasions in the Clifton area, where at least three pairs nested successfully (R.P.G., A.C.L. and R.H.P.). **S.** Seen or heard, Portishead, April 17 (R.P.G.), and Cheddar in March, May and July (H.H.D., B.K. and R.P.G.).

SNOW-BUNTING (*Plectrophenax n. nivalis*). **S.** Two seen just inside the Somerset boundary, Lansdown, Dec. 23 (F.L.B.).

TREE-SPARROW (*Passer m. montanus*). **G.** Reported in small numbers from Severn Beach, Feb. 1 (R.H.P.); New Grounds, Feb. 6 and May 1 (M.J.W.); Dyrham, April 5 (F.L.B.); and on various occasions in winter from Stoke Gifford (H.H.D.).

WOOD-LARK (*Lullula a. arborea*). **G.** Noted on tree-felled site, Westridge Wood, near North Nibley—two, Jan 18 and March 28, and single birds, April 15 and 23. Two on Nibley Hill, Feb. 5 and March 14 (H.F.W.). **S.** Observed in most months at Long Ashton, where parties of up to six seen on various dates in autumn, and singing at night noted in June. One trapped and ringed, same place, in March (G.E.C.). Heard, Churchill, June 5, and Hutton, Nov. 21 (R.H.P.).

WHITE WAGTAIL (*Motacilla a. alba*). **S.** One, Cheddar reservoir, on the unusually early date of March 3 (H.J.B.). At least ten, same place, April 18 (B.K.).

LONG-TAILED TIT (*Ægithalos caudatus rosaceus*). **G.** Small party in the gardens of Bristol Royal Infirmary, Oct. 23 (R.H.P.).

RED-BACKED SHRIKE (*Lanius c. collurio*). **S.** Breeding pair reported from Shipham (R.P.G.). Pair observed feeding fledged young, Clevedon, July 9 (M.J.W.).

PIED FLYCATCHER (*Muscicapa h. hypoleuca*). **G.** Female seen near Horfield, April 20 (M.J.W.). **S.** A male was seen in a Clevedon garden, April 18 and 21 (L. H. Barnard, per F.L.B.).

GRASSHOPPER-WARBLER (*Locustella n. naevia*). **G.** Heard, Bournstream, Wotton-under-Edge, April 20, and again late in July, but no definite evidence of a pair breeding (H.F.W.). **S.** Heard, Long Ashton, April 18 (G.E.C.), and Leigh Woods on several occasions in second half of April (R.H.P.).

BLACKCAP (*Sylvia a. atricapilla*). **G.** A wintering male seen with a party of tits, Clifton Down, Jan. 12 and 28 (R.H.P.).

BLACK REDSTART (*Phoenicurus ochrurus gibraltariensis*). **G.** An immature bird paid a prolonged visit to gardens at S.E. corner of the College Close, Clifton. It was first noticed, Jan. 16, and was still present on March 4 (S.K.T. and W.R.T.). What was probably this bird was observed in the same area, April 3 (M.J.W.). Single males reported from the heart of the City on several occasions, mid-April to third week of June, but no evidence of a pair breeding (A.E.B. and R.H.P.). Song heard in Castle Street as late as Oct. 5 (R.H.P.). Female or immature bird, Berkeley Castle, Jan. 21 (Hon. Mrs. Leo Russell and Miss P. Lumsden, per J.B.), and an adult male reported from Warmley, March 14 (J. E. Brice per M.J.W.). **S.** Female or immature seen in a timber yard at Failand, March 26 (A.C.L. and J.C.L.).

SWALLOW (*Hirundo r. rustica*). **G.** Single bird, New Grounds, as late as Oct. 30 (W.B.A.).

HOUSE-MARTIN (*Delichon u. urbica*). **S.** Fifteen seen at Loxton as late as Nov. 1 (A.C.L.).

NIGHTJAR (*Caprimulgus e. europæus*). **S.** One seen, Long Rock, Black Down, June 22 (T.H.P.). Three pairs located by R.H.P., Leigh Woods area, in June. "Churring" heard, Long Ashton, on several occasions (G.E.C.). A nestling ringed in Leigh Woods, July 16, 1947, was found dead at Casteljaloux, Lot et Garonne, Southern France, Oct. 3, 1948. This is the first recovery abroad of a Nightjar ringed in the British Isles (A.E.B.).

HOOPOE (*Upupa e. epops*). Records from various localities, all well substantiated, show that Hoopoes occurred on autumn passage over a wide area of the district. **G.** A single bird was seen almost daily in the garden at Manor House, Wotton-under-Edge, from July 29 to Aug. 8 (G.A.K.H.), and one, possibly the same, paid a short visit to a garden between North Nibley and Stinchcombe on Aug. 13 (E.D.O.). One was seen a mile or so N.E. of Wotton-under-Edge, Sept. 6, and what was perhaps this bird was picked up in an exhausted condition about a mile and a half E. of North Nibley on the same date and died soon afterwards (H.F.W.). **S.** As recorded in *The Field* (Aug. 28), one visited the lawns at Barley Wood, Wrington, on July 23 and was seen there on and off for the following ten days (R.D.J.). Brief but good views were obtained of one on a roadside at Ubley, July 28 (A.S.). Twice seen on Brean Down in Spring—a single bird, May 18, and two on the 19th (H.C.).

WRYNECK (*Jynx t. torquilla*). **S.** Two heard and seen at Compton Bishop on various occasions throughout the summer, but no conclusive evidence of breeding (D. B. Grubb, per F.L.B.).

SHORT-EARED OWL (*Asio f. flammeus*). **S.** Three put up in the Brean Down area, Nov. 6 (R.H.P.).

PEREGRINE FALCON (*Falco p. peregrinus*). **G.** Single birds, sometimes two, New Grounds, on various occasions (W.B.A., P.S., H.H.D. and others). One, Avon Gorge, Feb. 20 (M. Heard, per D.A.W.). Two, Aust Cliff, Nov. 21 (H.W.N.). **S.** Nested as usual, Brean Down, but no certain evidence that young were reared (H.C.). Eyrie located, and sitting bird put off, on north side cliffs, Steep Holm, May 2 (R.H.P., H.H.D. and others). Single birds, Cheddar reservoir, Feb. 1 and Nov. 14 (B.K.); Cheddar Gorge, Oct. 19 (G.G.C.); and Saltford, Dec. 22 (D.T.).

HOBBY (*Falco s. subbuteo*). **G.** One, New Grounds, July 4 (P.S.) and Aug. 22 (M.B. and H.H.D.). Two, same place, Aug. 14 (R.H.P.).

MERLIN (*Falco columbarius esalon*). **G.** Single birds, Aust, Nov. 23 (H.W.N.), and at the New Grounds, Dec. 18 (P.S. and J.B.H.).

[ROUGH-LEGGED BUZZARD (*Buteo l. lagopus*). **S.** Short views were obtained of a buzzard at the head of Cheddar Gorge, Mendip, on Nov. 16, by H.J.B., and on the 20th by M.J.W., which was identified by both observers as being most probably of this species. Details supplied show that identification rests largely on such characters as the white tail, with broad and conspicuous dark, terminal band, and the bird's tendency to fly only a few feet above the ground and occasionally to hover. As neither observer was able to record such important characters as pale head and feathered tarsi, and as the usual dark patch at the carpal joint of the underwing was not apparently a noticeable feature, the possibility of confusion with a variety of the Common Buzzard cannot be entirely ruled out.]

COMMON BUZZARD (*Buteo b. Buteo*). **G.** One, New Grounds, March 28 (P.S.), and one, Dyrham Wood, on several dates in Sept. (F.L.B.). **S.** The following reported—single birds, Long Ashton, Feb. 11 and Aug. 26 (G.E.C.); Barrow Gurney, March 13 and Oct. 3 (G.E.C.); Wrington, April 4, and Leigh Woods, April 7 (R.H.P.); Burrington, April 9 (J.B.H.); Cleeve, April 15 and 25 (R.A.S. and J.B.H.); Brockley Combe, May 9 (R.A.S.); Crook Peak, Nov. 21 (R.H.P.); and Failand, Dec. 14 (R.H.P.). Two were seen over Ashton Court Estate, May 13 (J.B.H.); near Axbridge, Nov. 16 (H.J.B.); and at Charterhouse, Dec. 27 (A.C.L.). From the Cheddar area there are reports of single birds, May 4 (R.A.S.) and Nov. 19 and 20 (H.J.B. B.K. and M.J.W.). Five, perhaps a family party, were seen together at the top of Burrington Combe, Oct. 19 (G.G.C.).

HEN-HARRIER (*Circus c. cyaneus*). **G.** Extremely good views were obtained of a female or immature bird on Mendip, between Cheddar Gorge and Charterhouse, Nov. 19 and 21 (H.J.B., H.H.D. and B.K.).

SPARROW-HAWK (*Accipiter n. nisus*). **G.** Twice seen in the heart of the City—one over the Centre, Oct. 1 (R.H.P.) and one over Temple Meads on the 14th (H.H.D.).

COMMON HERON (*Ardea c. cinerea*). **S.** A count at the Brockley Combe Heronry on May 9 showed a total of seventeen occupied nests—sixteen in Ash and one in an Oak. In one tree a mixed company of five pairs of Herons, eight pairs of Rooks and a pair of Jackdaws was found to be nesting (B.K., R.P.G. and S.K.T.). Ten occupied nests reported from the Uphill Heronry, Weston-super-Mare (Mrs. J. M. Whitting, per F.L.B.).

WHOOPEE SWAN (*Cygnus cygnus*). **S.** Of four adults which visited Cheddar reservoir in the previous Dec., two remained until Jan. 11 or later (B.K. and M.J.W.).

BEWICK'S SWAN (*Cygnus b. bewickii*). **G.** A party of seven wild swans, described as four adults and three immatures, visited the New Grounds in the first week of Nov., and for a short while on the 3rd actually joined up with captive water-fowl in the Severn Wildfowl Trust's enclosures. Although considered by several observers to be Whoopers, their identity was not then established, nor was it on the following day when the birds appeared at Frampton-on-Severn and two of the immatures were unfortunately shot. Four adults returned to the New Grounds on the 4th and were seen on the Saltings, but on the 5th only one remained. What was presumably this bird was subsequently found in the Trust's enclosures and proved to be an almost fully adult Bewick's Swan. It remained in the pens and became sufficiently tame to be caught and added to the captive water-fowl collection (P.S. and E.D.O.).

WHITE-FRONTED GOOSE (*Anser a. albifrons*). **G.** Well over 2,000 at the New Grounds in Jan. and Feb.; 1,600 still present in early March, but by the 12th only sixty remained. About twenty, March 17, were the last seen. First autumn arrivals noted were two, with Pink-footed Geese, Oct. 15, but fifteen were counted the following day. Numbers subsequently showed a steady increase and had reached 200 by mid-Nov.; 1,000 by mid-Dec.; and at least 2,000 by the close of the year (P.S.).

LESSER WHITE-FRONTED GOOSE (*Anser erythropus*). **G.** One identified among common White-fronts at the New Grounds, Dec. 20, and on subsequent dates to the close of the year (P.S., H.H.D. and others). The bird, the sixth to be recorded from the New Grounds, was clearly an adult male and was paired with an unusually dark breasted female *albifrons*, with which it was seen to be in close company on all occasions.

PINK-FOOTED GOOSE (*Anser fabalis brachyrhynchus*). **G.** The following noted at the New Grounds early in the year—three, Jan 25, and two, Feb. 29 to March 15 or later (P.S.). The first autumn arrivals seen at the New Grounds were eight, Sept. 21 (B.K. and others). Numbers reached a maximum of ninety-six on or about Nov. 6, but by the 26th these had apparently all departed. The only subsequent report is that of one among White-fronts throughout the greater part of Dec. (P.S.).

DARK-BREASTED BRENT GOOSE (*Branta b. bernicla*). **S.** One seen on No. 2 reservoir, Barrow Gurney, March 6 by G.E.C., L.F.B. and M.J.W. It finally left in a south-westerly direction, and what was doubtless the same bird was under observation by H.J.B. and B.K. on the water at Cheddar reservoir about an hour later.

SHELD-DUCK (*Tadorna tadorna*). **G.** 207 counted by B.K. off the New Grounds, June 21. **S.** Single birds, Blagdon reservoir, April 11, and Cheddar reservoir, Oct. 17 (B.K.).

MALLARD (*Anas p. platyrhyncha*). **S.** Maximum totals reported from the reservoirs are 210 Cheddar, Jan. 11, and 275 Blagdon, Oct. 17 (B.K.).

GADWALL (*Anas strepera*). **G.** Two females visited the New Grounds decoy pool on Oct. 27, remained for some days and were seen by E.D.O., M.B., H.H.D. and others. Both were subsequently found in the Severn Wildfowl Trust's water-fowl enclosures and were still there at the close of the year (P.S.). **S.** Single bird, Cheddar reservoir, Jan. 6 (M.J.W.).

TEAL (*Anas c. crecca*). **S.** 450, Cheddar, March 6, and 300, same place, Dec. 28, are the highest totals recorded from the reservoirs (B.K.).

GARGANEY (*Anas querquedula*). **G.** One taken at the New Grounds decoy, Aug. 22. At the same decoy two pairs were seen in the last week of March and two females on April 5. Pair reported from Frampton-on-Severn gravel pits, just outside the district, also in last week of March (E.D.O. and P.S.). **S.** Continuously present at Cheddar reservoir, up to nine in number, from March 18 to May 17 or later (H.J.B., R.H.P., H.H.D., S.K.T., W.R.T. and others). Single males, Blagdon reservoir, April 25 (B.K.) and May 18 (M.J.W.). This is the third consecutive summer that Garganey have made prolonged stays at the reservoirs, but breeding has yet to be proved.

WIGEON (*Anas penelope*). **G.** Very large numbers at the New Grounds, Nov. and Dec. (H.H.D.). At least 700 reported there by B.K. in last week of Dec. **S.** Highest counts recorded from the reservoirs are 320, Cheddar, Jan. 25; 500, same place, Nov. 14, and 450, Blagdon, on the 19th (B.K.).

PINTAIL (*Anas a. acuta*). **G.** Noted in greater numbers off the New Grounds in Jan. than on any previous occasion. At least

100 present on the 31st (P.S.). Party of seven, same place, Nov. 7 (B.K.). **S.** Twelve reported from Cheddar reservoir, Jan. 6 (M.J.W.), while up to half a dozen seen, same reservoir, on various occasions, Jan. to early March (R.H.P., B.K., S.K.T., W.R.T. and others). Three, Blagdon reservoir, Oct. 31 (H.J.B.), and two Nov. 13 (M.J.W.). Six, Barrow Gurney, Dec. 29 (M.J.W.).

SHOVELER (*Spatula clypeata*). **G.** Party of twelve, New Grounds, Dec. 5 (B.K.). **S.** Considerably fewer at the reservoirs than in the past few years. Largest count—120, Feb. 8 (B.K.).

COMMON POCHARD (*Aythya ferina*). **G.** Seven visited the New Grounds decoy pool, Dec. 27 (P.S.). **S.** Unusually plentiful at Blagdon and Cheddar reservoirs in Nov. and Dec. A total of 350 at Blagdon on Nov. 28 had increased to 800 by Dec. 12 (H.H.D.), and to 950 by the 28th (R.H.P. and B.K.). From Cheddar there are reports of 500, Nov. 14, and 680 on the 21st, while a count of 450 on Dec. 28, together with the Blagdon count for the same date, made up a total of 1,400. No comparable figures have been recorded from the reservoirs since 1931 (B.K.).

TUFTED DUCK (*Aythya fuligula*). **G.** Eight or ten off the New Grounds, Nov. 21 (E.D.O.). Adult male with Wigeon off Severn Beach, Dec. 19 (H.H.D.). **S.** Maximum counts from the reservoirs are 115, Barrow Gurney, Dec. 12 (G.E.C.), and 100, Blagdon, Nov. 14 (B.K.).

SCAUP (*Aythya m. marila*). **S.** More frequent at the reservoirs than at any time in recent years. From Barrow Gurney there are reports of four (one ad. male), Jan. 4 (B.K.), two on the 5th (M.J.W.), and single adult males, Jan. 15 (R.H.P.) and Nov. 20 (G.E.C. and A.C.L.). Single immature male, Blagdon, Oct. 17 and Nov. 14 (H.J.B. and B.K.), and one, perhaps same, in almost full adult male plumage on Dec. 12 (H.H.D.). One, Cheddar, Jan. 18, and one on the unusually early date of Aug. 15 (B.K.). Frequently seen on same reservoir by H.J.B. and B.K. from Oct. to Dec.—the highest number being four (two ad. males) Oct. 31.

GOLDENEYE (*Bucephala c. clangula*). **G.** One, a female, visited the New Grounds decoy pool, March 5 (P.S.). Female or immature bird off the New Grounds, Nov. 21 (E.D.O.), and off Severn Beach, Dec. 22 (H.H.D.). **S.** A few, up to eight in number, Blagdon reservoir on various dates, Oct. to Dec. (H.J.B. and B.K.). Up to eight or nine frequently noted, Cheddar reservoir, Jan. to March, and Oct. to Dec. Largest total—fifteen (four ad. males), Jan. 25 (B.K.).

LONG-TAILED DUCK (*Clangula hyemalis*). **G.** Two, females or immatures, clearly identified off the New Grounds, Nov. 21, by K.S., who reports that there may have been four birds present. This, apparently, is the first record for the Gloucestershire side of the district.

COMMON SCOTER (*Melanitta n. nigra*). **S.** Twice seen at the reservoirs—a party of six (one ad. male), Barrow Gurney, Oct. 30 (G.E.C. and M.J.W.), and two females, Blagdon, Nov. 13 (M.J.W.).

GOOSANDER (*Mergus m. merganser*). **S.** The only records are from Cheddar reservoir where red-headed birds were noted on various dates, Jan. to March, and once in Nov. (R.H.P., B.K., H.J.B. and M.J.W.). Seven—the highest total yet reported from the reservoirs—were seen together, March 6 (H.J.B. and B.K.).

SMEW (*Mergus albellus*). **S.** Single red-headed birds seen at Blagdon, Feb. 1 (B.K.), and Cheddar, Dec. 28 (R.H.P.). These are the only recorded occurrences for the year.

CORMORANT (*Phalacrocorax c. carbo*). **S.** Eleven counted at Cheddar reservoir, Aug. 15 (B.K.). Immature bird seen on the R. Avon, Saltford, Sept. 18 (D.T.).

FULMAR (*Fulmarus g. glacialis*). **G.** A bird in fresh condition was found dead at Severn Beach, Feb. 1, by R.H.P., who reports that it proved to be a male and that it still had ectoparasites among the feathers.

RED-NECKED GREBE (*Podiceps g. griseigena*). **S.** A bird which visited Cheddar reservoir early in the previous Dec. remained until April 11 or later and by the end of its stay had almost completely assumed breeding plumage (H.J.B., H.H.D., B.K., A.C.L., W.R.T. and M.J.W.). One, in full breeding plumage, doubtless the same, was seen at Blagdon reservoir, April 25 (H.J.B. and B.K.).

SLAVONIAN GREBE (*Podiceps auritus*). **S.** Single bird, Cheddar reservoir, March 6 (H.J.B. and B.K.). One, in partial breeding plumage, Blagdon reservoir, April 7 (M.J.R.). Single bird, same place, Oct. 17 and 31 (H.J.B. and B.K.).

BLACK-NECKED GREBE (*Podiceps n. nigricollis*). **S.** The following reported from Cheddar reservoir—two, assuming breeding plumage, March 28; three, Oct. 17; one, Oct. 31 (H.J.B., B.K. and H.H.D.).

GREAT NORTHERN DIVER (*Colymbus immer*). **S.** Single bird, Cheddar reservoir, Dec. 14 (H.J.B.).

BAR-TAILED GODWIT (*Limosa l. lapponica*). **G.** Party of five off the New Grounds, Sept. 25 (M.B.).

BLACK-TAILED GODWIT (*Limosa l. limosa*). **G.** Twice noted off the New Grounds—three, Aug. 14 (R.H.P.), and three, Sept. 6 (M.J.W.). **S.** Four, Yeo Estuary, Aug. 28 (R.H.P.).

CURLEW (*Numenius a. arquata*). **G.** At least 300, New Grounds, Aug. 14 (R.H.P.). **S.** 250 on river bank opposite Avonmouth, Sept. 4 (R.H.P.).

WHIMBREL (*Numenius ph. phæopus*). **S.** Four paid a brief visit to Barrow Gurney reservoirs, April 18 (G.E.C.). Two, Cheddar reservoir, May 14 (B.K.).

JACK SNIFE (*Lymnocyptes minimus*). **S.** Single birds reported

from Corston, Feb. 15 and March 6 (B.K.). One, Saltford, several occasions, Feb.—March, and on Dec. 26 (D.T.). One, Blagdon reservoir, Nov. 28 (H.J.B.).

TURNSTONE (*Arenaria i. interpres*). **G.** Several at the New Grounds in early Aug. (E.D.O.), and single bird, same place, on the 22nd (R.H.P. and H.H.D.). 105 in one flock, Severn Beach, Dec. 22 (H.H.D.). **S.** One, Cheddar reservoir, May 9 and 15 (B.K.), and party of six, Black Rocks, Clevedon, Aug. 28 (R.H.P.).

KNOT (*Calidris c. canutus*). **G.** Noted in very small numbers off the New Grounds on several dates in Aug. (R.H.P., M.J.W. and H.H.D.). Five, in red plumage, Severn Beach, May 21 (R.H.P.). Forty, same place, Sept. 9 (A.C.L.), and twelve on the 11th (M.J.W.). **S.** Single bird, Weston-super-Mare sands, April 6 (M.J.R.).

DUNLIN (*Calidris alpina*). **G.** Very large numbers at Severn Beach in Dec. Not less than 2,500 on the 19th and 22nd (H.H.D.). **S.** Party of ten, Cheddar reservoir, May 16 (H.H.D.).

CURLEW-SANDPIPER (*Calidris testacea*). **G.** Twice reported from Severn Beach—four, Sept. 11, and one on the 18th (M.J.W.).

LITTLE STINT (*Calidris minuta*). **G.** The only record for the year is of a single bird at the New Grounds, Aug. 22 (M.B. and H.H.D.).

SANDERLING (*Crocethia alba*). **G.** The following reported from Severn Beach—twelve, May 21 (R.H.P.); one, April 27 (A.C.L.); and two, Sept. 5 (G.G.C.). Eleven, New Grounds, August 22 (R.H.P.), and six on the 24th (M.J.W.). **S.** One, Cheddar reservoir, on several dates, May and Aug. (B.K., H.H.D. and M.J.W.). Single bird, Yeo Estuary, Aug. 28 (R.H.P.).

RUFF (*Philomachus pugnax*). **G.** Single bird at the New Grounds on the unusually early date of March 7 (P.S. and E.D.O.). Two, same place, Aug. 22 (H.H.D.), and one, Sept. 6 (M.J.W.). **S.** Two on the Avon mud opposite Sea Mills, March 20 (C.A.N. and H.H.D.), and one still present, same place, on the 23rd (M.J.W.).

GREEN SANDPIPER (*Tringa ochropus*). **G.** One shot, Dyrham, Feb. 23 (F.L.B.), and one seen at the New Grounds, Aug. 22 (R.H.P.). **S.** Two, Cheddar reservoir, Aug. 8 (B.K.).

GREENSHANK (*Tringa nebularia*). **G.** Up to eight at the New Grounds on various occasions, late July to first half of Sept. (M.J.W., H.H.D., R.H.P. and others). **S.** The following reported on spring passage from the reservoirs—three, Barrow Gurney, May 16 (G.E.C.), and one on the 23rd (R.H.P.); two, Cheddar, May 16 (B.K.). Autumn birds, up to three in number, noted at Cheddar on several dates in second half of Aug. (B.K. and H.H.D.). One, Yeo Estuary, Aug. 23 (R.H.P.).

GOLDEN PLOVER (*Pluvialis apricaria*). **G.** Fifty, New Grounds, Feb. 16 (R.H.P.), and forty-three, same place, Dec. 18 (J.B.H.). What were most probably two examples of the northern form

(*P. a. altifrons*) were seen at the New Grounds on May 1 by M.J.W., who reports that in both birds he was at once struck by the intense black of the face, breast and under-parts, and that, viewed head on, they presented an almost completely black appearance. An equally striking character was the broad and conspicuous white band above the eye, which, though less striking over the remainder of its course, extended backwards to form a clear line of demarcation between the black and the upper parts. M.J.W. records that the birds were alone and, by their sudden and rapid departure northwards, were quite evidently on passage. **S.** Two flocks, about forty in each, in flight near Charterhouse, Dec. 27 (A.C.L.).

BLACK TERN (*Chlidonias n. niger*). **S.** The following were seen at the reservoirs during an unusually large spring passage—Blagdon, fourteen, May 16 and 17 (B.K. and R.H.P.); twelve on the 17th and ten on the 18th (R.H.P. and M.J.W.); Cheddar, sixteen, May 16 (H.H.D. and B.K.), and as many as forty-one on the 17th (B.K.); two, Barrow Gurney, May 17 (G.E.C.). At Blagdon single birds noted on return passage, July 25 and Sept. 19 (B.K.), and two, Sept. 5 (A.C.L.).

COMMON TERN (*Sterna h. hirundo*) and **ARCTIC TERN** (*Sterna macrura*). **S.** Terns, Common or Arctic, frequently noted at the reservoirs on spring passage and on several occasions in autumn. Three or four were present at Cheddar, May 16 and 17 (B.K. and H.H.D.), while at Barrow Gurney twelve were seen on the 16th and 23rd (G.E.C. and R.H.P.). An Arctic Tern was clearly identified by B.K., R.H.P. and R.P.G. at Cheddar on the exceptionally early date of April 11 (cf. *British Birds*, XLI, p. 356), and what was evidently an Arctic was seen by M.J.W. at the same reservoir, Sept. 17. A single bird over the R. Avon at Saltford, July 24 and 25, was definitely a Common Tern (B.K. and D.T.), as also was one at Blagdon reservoir, Aug. 27 (M.J.W.). A quite extraordinary record is that of one, Common or Arctic, seen crossing Mendip, near the head of Cheddar Gorge, on the extremely late date of Nov. 19 (H.J.B. and B.K.).

LITTLE TERN (*Sterna a. albifrons*). **S.** Single bird clearly identified by B.K. at Cheddar reservoir, May 16.

HERRING-GULL (*Larus argentatus*). **G.** A Herring-Gull with yellow legs seen by R.H.P. on the Avon, below Bridge Valley Road, on Feb. 20 may have been a variety of *L. a. argentatus* or perhaps an example of one of the yellow-legged races. R.H.P. reports that the bird, viewed at very close range, was among other Herring-Gulls and that, with most of its companions still in winter dress, it could easily be picked out by its perfect adult summer plumage. The colour of the legs was compared with the normal flesh-coloured legs of the surrounding Herring-Gulls and with the greenish legs of a nearby Common Gull, while the mantle was noted as being

a shade darker than in most *L. a. argentatus*, but paler than in *L. canus*. The further possibility of the bird being an *L. argentatus* × *L. fuscus* hybrid cannot be entirely overlooked.

SCANDINAVIAN LESSER BLACK-BACKED GULL (*Larus f. fuscus*). **S.** A bird of the northern race was identified at Cheddar reservoir on March 28 by H.J.B., H.H.D. and B.K. It was viewed in an excellent light, both on the water and in flight, and was in company with Herring-Gulls and Lesser Black-backs of the British race, with which it was carefully compared. What may have been the same bird was clearly identified at Cheddar by B.K., R.P.G. and S.K.T. on May 9, and by B.K. on the 17th.

GREAT BLACK-BACKED GULL (*Larus marinus*). **G.** Continues to increase as a visitor to the Avon. Fifteen counted together on the mud below Bridge Valley Road, Aug. 29 (R.H.P.). **S.** Eight, Cheddar, May 17 (B.K.), and eleven, same place, Oct. 9 (H.J.B.), are the highest counts reported from the reservoirs.

KITTIWAKE (*Rissa t. tridactyla*). **S.** Adult bird found dead at Cheddar reservoir, April 2 (A.C.L. and M.J.W.).

CORN-CRAKE (*Crex crex*). **S.** Dead bird found near Brean Down, May 3 (H.C.). Calling repeatedly heard from two birds in the Saltford area from early June to the first week of July. Efforts to prove breeding were unsuccessful (B.K. and D.T.). Calling heard by T.H.P. at Hinton Blewett and Nempnett in the second half of July. This suggests that birds may have bred in these localities.

WATER-RAIL (*Rallus a. aquaticus*). **S.** One found dead, Congresbury, Oct. 13 (A.E.B.). Five reported from Blagdon reservoir, first week of Dec. (L.H.M.), and single birds flushed, same place, Dec. 15 and 19 (B.K. and R.H.P.).

COOT (*Fulica a. atra*). **S.** In great numbers at Cheddar reservoir during the winter months. Maximum totals reported—1,200, Jan. 25; 1,600, Nov. 21; and 1,350, Nov. 28 (B.K.).

RED-LEGGED PARTRIDGE (*Alectoris r. rufa*). **G.** A pair noted and calling heard, Wotton-under-Edge, March 17, by H.F.W., who records that breeding was subsequently proved when old and young birds were seen.

A REVISED LIST OF THE BIRDS OF THE BRISTOL DISTRICT

(*Proc. B.N.S.*, 1947, pp. 225-268)

ERRATA

pp. 245-6. **Osprey**—delete May, 1936, from records of birds at Blagdon reservoir.

p. 262. **Sandwich Tern**—for record of two, April, 1947, read Blagdon reservoir and *not* Cheddar reservoir as stated.

LEPIDOPTERA NOTES, BRISTOL DISTRICT, 1948

By C. S. H. BLATHWAYT, M.A., Hon. Sec. for 1949 of the
ENTOMOLOGICAL SECTION

COMPILED FROM REPORTS OF MEMBERS OF THE SECTION
(Received, Feb. 11, 1949. Read in title to Entomological Section,
Feb. 7, 1949.)

THE year 1948, in spite of its favourable start, was on the whole a very disappointing one, particularly when one compares its results with those obtained in 1947 during the magnificent weather of the late Summer and Autumn of that year.

After a mild January and early February, followed by a short cold spell at the end of the latter month, Spring seemed to begin on February 29, which was a glorious day. I saw on the wing on that day numbers of hibernated *Gonepteryx rhamni* (mostly males but including two females), *Vanessa io*, *V. urticae*, *Polygonia c-album*, and even one *Macroglossum stellatarum*. Mr. K. H. Poole also saw several of these species on the same date.

March was unusually fine, and hibernated Butterflies were in profusion, particularly on early Sallows which began to flower in the first week of the month. On March 12 a fine specimen of the migrant *Heliothis peltigera* was netted by me as it flew over Sallow at dusk. I have never before seen this uncommon Moth before May.

Brephos parthenias was in great numbers in suitable places in early March, flying in the sunshine in the neighbourhood of Birches. Strangely enough, the Sallows were not very productive at night, in my experience, until March 19, but, from then onwards for about ten days, the usual 'Quakers' swarmed on them, many very striking forms being taken.

April was on the whole fairly fine but there were a number of very wet and stormy days. A fair number of the common Butterflies and Moths were seen, many of them having emerged earlier in the year than usual. Some success was obtained with a lamp late at night towards the end of the month, *Polyplocha ridens* for instance being obtained in excellent condition at about midnight on one Saturday.

May started with beautiful weather, and most of the early summer Butterflies were well out in the first part of the month and were tending to go over by the middle of the month. It was, however, unfortunate that the Section's Field Day at Vallis Vale, Frome, on May 15, which Mr. Cruttwell kindly led, was rather

spoilt by a strong wind. Up till the middle of May the season was unusually early and I have accordingly mentioned in the list below the first dates on which some of the common species were seen, where these are considered of interest. The fine weather did not, however, last long after Whitsun, and the end of the month was wet and cold, as Mr. Peach and the writer found to their cost during a short stay for the purpose of collecting Lepidoptera at Tintern, in the Wye Valley.

June, as has usually been the case in recent years, was cold and wet, though there were some good days. I had some success on Saturday afternoons and a few species were taken at light late at night.

July produced poor weather till about the middle of the month when it became much finer and I had quite an enjoyable week's collecting at Swanage, in Dorset, which, however, does not come within the scope of these Notes. This month concluded with a heat wave of unusual intensity and it was perhaps during this time alone that light and sugar were at all really productive to the moth hunter.

August was a poor month with few really fine days and was a complete contrast to the magnificent August of 1947.

September was generally cold and unproductive from the Lepidopterists' point of view, though the weather improved at the end of the month and during early October, when several migrants were seen. Ivy was far more prolific after dusk in the first half of October 1948 than in 1947, and several interesting Moths were seen. The heavy rain in the middle of the month, however, spoilt much of the bloom, and Moths were much less frequent during the last half of the month and in the first half of November.

The year concluded with the usual quantities of *Pæcilocampa populi*, *Erannis aurantiaria*, *E. defoliaria*, *Cheimatobia brumata*, *C. fagata (boreata)*, *C. dilutata*, etc. *Brachionycha sphinx* was, however, not so common as in 1947.

The records and observations given below are from North Somerset, except where otherwise stated, and are selected from data supplied by the following Members of the Section:—Messrs. C. L. Bell (C.L.B.), J. F. Bird (J.F.B.), H. W. Bird (H.W.B.), C. S. H. Blathwayt (C.S.H.B.) and K. H. Poole (K.H.P.).

RHOPALOCERA (Butterflies).

Pieris rapæ From 25 March (K.H.P.).

Euchloe cardamines From 18 April (C.S.H.B.).

Colias croceus 8 May and 12 June (C.S.H.B.). A few in August (C.S.H.B., H.W.B.). Several at end of September and beginning of October, including one var. *helice* on 9 October (C.S.H.B.).

- Polygonia c-album* Several hibernated specimens on 29 Feb. Common later (C.S.H.B., K.H.P.). Autumn brood in profusion on Ivy at Kingsweston Down (C.L.B.).
- Vanessa cardui* 12 and 13 June and several in Autumn up to 9 Oct. (C.S.H.B.).
- V. atalanta* As above but continuing till 13 Nov. (C.S.H.B.).
- Melanargia galathea* Abundant on Kingsweston Down in July (C.L.B.). Plentiful near Tickenham (J.F.B.).
- Pararge ægeria* First seen 26 March (K.H.P.). Common on 30 March (C.S.H.B.). Two in centre of Bristol in July (C.L.B.). One extreme melanic var. on 2 Oct. (C.S.H.B.).
- Aphantopus hyperanthus* An extreme form of var. *arete* (male), almost immaculate, 9 July (J.F.B.).
- Celastrina argiolus* First seen 27 March (K.H.P.). Spring brood in numbers at Patchway (C.L.B.).
- Cupido minimus* First seen 8 May at Axbridge (K.H.P.).
- Erynnis tages* First seen 24 April, and a female example of a second brood taken on 30 Aug. (J.F.B.).

HETEROCERA (Moths)

- Mimas tilix* Bred specimen emerged under normal conditions on 16 March (C.L.B.).
- Macroglossum stellatarum* First seen 15 Jan. flying round lights indoors (H.W.B.). First seen out in the open on 29 Feb. (C.S.H.B.).
- Clostera curtula* Several bred 9 Feb. to 29 March from larvæ off *Populus nigra* (H.W.B. and J.F.B.) and a female of the second generation taken 1 Aug. (H.W.B.).
- Asphalia diluta* Common at sugar and at light during late Aug. and early Sept. (C.S.H.B.).
- Polyploca ridens* A few at light on 24 April (C.S.H.B.).
- Lymantria monacha* Several at light on 31 July (C.S.H.B.).
- Gastropacha quercifolia* A male at light 18 July (H.W.B.).
- Apatele aceris* A female *ab infuscata* bred 16 June from pupa found at Nailsea in Nov., 1947 (G. Hugh Bird).
- A. psi* A crippled example of the third generation bred on 5 Dec. (H.W.B.).
- Agrotis vestigialis* 26 June at light (C.S.H.B.).
- A. puta*. Common from 24 April (C.S.H.B.).
- A. exclamationis* First seen 10 May (C.S.H.B.).
- Euxoa nigricans* A few at flowers in Aug. (C.S.H.B.).
- Amathes umbrosa* Aug. at sugar and flowers (C.S.H.B.).
- Triphæna interjecta* 5 Aug. (C.S.H.B.).
- Lampra fimbriata* Aug. at sugar (C.S.H.B.).
- Melanchra persicariæ* 26 June and 2 July (C.S.H.B.).
- Hadena cucubali* 23 May (K.H.P.).

- H. carpophaga* 13 May (K.H.P.).
Eumichtis lichenea Fairly common in Sept. (C.S.H.B.).
Apamea basilinea First seen 26 April (C.S.H.B.).
Aporophyla nigra Two at Ivy in Oct. (C.S.H.B.).
Arenostola fluxa A pair taken at light 27 July (H.W.B.).
Meristis trigrammica First taken 30 April (C.S.H.B.).
Orthosia miniosa Common at Sallow in late March (C.S.H.B.).
Zenobia retusa Bred 26 June from larva found on Sallow at Frome (H.W.B.).
Z. subtusa Bred 10 July from *Populus nigra* (H.W.B.).
Anchoscelis helvola 10 Oct. at Ivy (C.S.H.B.).
Tiliacea aurago Several at Ivy in early Oct. (C.S.H.B.).
T. citrigo 9 Oct. at Ivy (C.S.H.B.).
Eupsilia transversa (*satellitica*) Melanic specimen at Ivy 4 Nov. (C.S.H.B.).
Lithophane socia 13 March at Sallow (C.S.H.B.).
L. semibrunnea 13 March at Sallow (H.W.B.). 5 Nov. at Ivy (C.S.H.B.).
Heliothis peltigera 13 March at Sallow (C.S.H.B.).
Catocala nupta Several at sugar in Sept. (C.S.H.B.).
Brephos parthenias Common from 14 March (C.S.H.B.).
Anaitis efformata 15 May at Frome (H.W.B. and C.S.H.B.).
Nothopteryx polycommata 27 March (C.S.H.B.).
Philereme transversata (*rhamnata*) Fairly common in July (C.S.H.B.).
Chloroclysta miata 10 Nov at Ivy (C.S.H.B.).
Lampropteryx suffumata First seen 6 April (C.S.H.B.).
Xanthorhoe galiata First seen 18 April (C.S.H.B.).
Eupithecia lariciata 25 May (C.S.H.B.).
E. abbreviata First seen 20 March (C.S.H.B.). Several melanic specimens taken 27 March (C.S.H.B.).
E. exigua May 22 (C.S.H.B.).
E. subnotata Aug. 6 (C.S.H.B.).
Gymnoscelis pumilata First seen 14 March (C.S.H.B.).
Chloroclystis coronata 1 May and 26 July (C.S.H.B.).
Horisme vitalbata 13 May (C.S.H.B.).
Abraxas sylvata First seen 22 May and common in June (C.S.H.B.).
Bapta bimaculata Common from 24 April (C.S.H.B.).
Selenia tetralunaria A few at light in April (C.S.H.B.).
Ectropis bistortata First seen 14 Feb. (C.S.H.B.), 15 Feb. (K.H.P.).
Crambus latistrius Two taken on 29 Aug. Reported as new to Somerset (H.W.B.).

BRISTOL INSECT FAUNA

DIPTERA

COMPILED BY H. L. F. AUDCENT, M.Sc.

(Received, March 21, 1949. Read in title at General Meeting,
March 3, 1949.)

FOREWORD

IN 1912 the late Mr. H. J. Charbonnier published in the *Proceedings of the Bristol Naturalists' Society* a list of Diptera of the Bristol district. From 1915 to 1919 the same author published "Notes on the Diptera of Somerset" in the *Proceedings of the Somersetshire Archaeological and Natural History Society*. In this same publication additions to the list were made by the late Mr. H. Slater in 1920 and 1921, by the late Col. T. Jermyn in 1922, by the present author in 1927 and again by Mr. H. Slater in 1928. In 1928 the present author published the first instalment of the Bristol Insect Fauna (Diptera) in the *Proceedings of the Bristol Naturalists' Society* and further instalments were published annually until 1934. Since then additions to the list have been published in 1936, 1939, 1942, 1945, 1947, in *Proc. Bristol Nat. Soc.*, and 1949, by J. Cowley, in *Journ. Soc. Brit. Ent.* **3** (2), 101-118.

Owing to many changes in classification and nomenclature the lists are now out-of-date and also are scattered in publications which are unobtainable. This list will follow in the main Kloet and Hincks' *Check List of British Insects*, p. 327-429, 1945. It will have the further advantage of including the modern records of Messrs. J. Cowley and E. A. Fonseca, who have kindly put their card-indices at my disposal. I thank these two entomologists and many others who have helped me in some way or other. My thanks are also due to the Council of the Royal Society for a grant from the Scientific Publications Grant-in-aid.

The district covered comprises the counties of Bristol, Gloucester and Somerset, though most of the records are from Bristol, W. Gloucester (V.C.34) and N. Somerset (V.C.6). The following localities are all in or near Bristol: Clifton, Durdham Down, Kingsweston, Blaise Castle, Coombe Dingle, Stoke Bishop, Henbury, Hallen, Knowle, Fishponds, Oldbury Court, Frenchay, Filton, Leigh Woods, Ashton Park. Street (Cw.)=Sharpham (A.).

The following abbreviations are used throughout the list:—
G.=Gloucestershire, S.=Somerset.

RECORDERS

A.	= Mr. H. Audcent	Hm.	= Mr. A. H. Hamm
Al.	= Mr. C. Alden	Hw.	= Mr. K. Howard
An.	= Mr. H. W. Andrews	J.	= Col. T. Jermyn
B.	= Dr. B. N. Blood	K.	= Mr. J. P. Kryger
Ba.	= Mr. R. Bassindale	L.	= Mr. G. C. Lamb
Bch.	= Dr. J. V. Blachford	La.	= Mr. B. R. Laurence
Bd.	= Mr. H. Bird	Lv.	= Mr. L. Livingstone
Bl.	= Col. L. Blathwayt	Lw.	= Dr. E. E. Lowe
Br.	= Mr. R. C. Bradley	M.	= Mr. J. Merrin
Bt.	= Mr. C. Bartlett	Ma.	= Mr. G. S. Maunder
Bu.	= Dr. E. Burt	Mg.	= Mr. H. R. F. Magrath
Bw.	= Mr. J. Bowden	Ml.	= Mr. F. Milton
By.	= Mr. H. Bury	Mp.	= Mr. H. W. Mapleton
C.	= Mr. H. J. Charbonnier	P.	= Mr. V. R. Perkins
Chm.	= Mr. R. E. Chamberlain	Pa.	= Maj. W. S. Patton
Cl.	= Mr. A. N. Clements	Pch.	= Mr. A. H. Peach
Col.	= Mr. J. E. Collin	Pn.	= Miss B. Punfield
Cr.	= Mr. W. C. Crawley	Pr.	= Mr. J. V. Pearman
Ct.	= Dr. H. B. Cott	R.	= Miss I. M. Roper
Cw.	= Mr. J. Cowley	Rc.	= Miss Ricardo
D.	= Mr. H. Davies	Rch.	= Dr. O. W. Richards
Da.	= Mr. W. B. Davis	Rd.	= Rev. S. O. Ridley
Dl.	= Mr. W. Dale	S.	= Rev. G. M. Smith
E.	= Mr. F. Enoch	Sh.	= Mr. H. K. A. Shaw
Eat.	= Rev. E. A. Eaton	Sl.	= Mr. L. Slater
Edw.	= Dr. F. W. Edwards	Slm.	= Miss M. Selman
Elt.	= Dr. H. Eltringham	St.	= Mr. J. W. Saunt
F.	= Mr. E. C. M. d'Assis-Fonseca	T.	= Rev. A. T. Thornley
Fl.	= Fl. Paym. T. Bainbrigge Fletcher	Tr.	= Capt. R. D. R. Troup
G.	= Mr. G. C. Griffiths	Ty.	= Mr. W. R. Taylor
Gl.	= Mr. E. A. Glennie	W.	= Mr. C. J. Watkins
Go.	= Mr. E. R. Goffe	Wd.	= Dr. O. F. Wild
Gr.	= Rev. Prof. F. W. Grensted	Wh.	= Dr. E. Barton-White
H.	= Mr. A. E. Hudd	Wl.	= Mr. C. J. Walton
Ha.	= Mr. L. B. Hall	Wm.	= Mr. H. Womersley
Hb.	= Dr. B. M. Hobby	Wt.	= Mr. C. J. Wainwright
		Y.	= Col. J. W. Yerbury

The frequency of a species applies only to this district and should undergo modification when there are more workers in the field.

DIPTERA

Insects with only one pair of wings ; the hind pair is replaced by a pair of small dumb-bell shaped organs, called Halteres. Mouth organs are suctorial ; the tarsus (last part of the leg) has five segments. The larvae are usually soft, whitish and legless, and they may feed on faecal matter (coprophagous), decomposing vegetable matter (saprophagous), plants (phytophagous) or smaller animals (zoophagous), or as parasites inside plants or animals.

Sub-Order: ORTHORRHAPHA

The imago emerges from the pupa by splitting it longitudinally.

I. NEMATOCERA

Antenna with more than six segments, no arista.

Family:—Tipulidae

A well marked V-shaped suture on thorax, antennae long, ocelli absent, legs long and fragile; flies known as Daddy-long-legs or Crane Flies.

S. F. TIPULINAE

Usually large flies found in meadows and woods; palpi long and pendulous, wings large with ten veins reaching the edge of the wing; larvae are hard-skinned (Leather Jackets) and live in soil or rotten wood.

TIPULA L. 1758

Brown, ferruginous or grey flies, some species wholly black, antennae with whorls of hairs.

S. G. ACUTIPULA Alex. 1924

fulvipennis Deg. 1776 (*lutescens* F. 1805). **G.** Sheepscombe (St.) 7/7/23, Bristol (F.) 29/6/47. **S.** Charterhouse-on-Mendip (A.) 30/6/23, Sharpham (A.) 8/8/25, St. Audries (A.) 20/8/29, Loxley Wood, Shapwick (A.) 5/7/47. Wings of male grey, of female brown; not uncommon in woods.

maxima Poda 1761 (*gigantea* Schrk. 1776). **G.** Painswick (W.), Kilcot (P.), Blaise Castle (A.) 14/7/29, Coombe Dingle (F.) 26/5/47. **S.** Freshford (C.), Portishead (Bt.), Tickenham (A.) 27/5/22, St. Audries (A.) 19/8/29, Shepton Mallet (A.) 25/6/42. Fairly common in woods.

vittata Mg. 1804. **G.** Blaise Castle (Wm.) 2/4/24, (A.) 11/4/27 and (F.) 11/4/48. **S.** Keynsham (A.) 21/5/29, Leigh Woods (Bw.) 16/5/44. Uncommon in woods.

S. G. ANOMALOPTERA Lioy 1863

nigra L. 1758. **G.** Olveston (C.) 6/7/16. **S.** Tickenham (A.) 19/7/24, Brockley Combe (Wm.) 11/7/25, Shapwick (A.) 10/7/27. Black fly, male has dark wings, female is brachypterous; fairly common in marshes.

S. G. SCHUMMELIA Edw. 1931

variicornis Schum. 1833 (*annulicornis* Mg. 1830 *preoc.*) **G.** Oldbury Court (Wm.) 19/6/23, Fishponds (A.) 7/5/27, Littledean (A.) 5/6/32. **S.** Tickenham (A.) 2/6/25, Cannington (Sl.) 20/5/26, Chew Magna (A.) 30/5/31. Fairly common in woods.

S. G. VESTIPLEX Bezzi 1924

nubeculosa Mg. 1804. **S.** Leigh Woods (H.)? Rare.

scripta Mg. 1830. **G.** Painswick (W.), Tormarton (A.) 20/6/26, Kingsweston (A.) 11/6/27. **S.** Shepton Mallet (C.), Leigh Woods (A.) 22/5/26, Clevedon (A.) 2/7/40. Common in woods and hedges.

S. G. TIPULA *s.str.*

variipennis Mg. 1818. **G.** Fishponds (A.) 7/5/22, Blaise Castle (Wm.) 2/4/24. **S.** Wellington (Ml.), Shapwick (A.) 20/5/23, Moreton (A.) 23/5/25. Leigh Woods (A.) 23/5/26. Rather common in woods.

pseudovariipennis Cziz. 1912. **G.** Blaise Castle (A.) 15/5/26. **S.** Brockley Combe (A.) 11/5/47. Rare in woods.

- hortulana* Mg. 1818. **G.** Painswick (W.), Blaise Castle (Wm.) 13/5/22 and (A.) 15/5/26. **S.** Leigh Woods (A.) 23/5/25, Prior Park, Bath (A.) 8/5/26, Clevedon (A.) 18/5/29. Uncommon in woods.
- rufina* Mg. 1818. **G.** Painswick (W.), Aust (A.) 6/4/23, Bristol (A.) 27/4/25 and (B.) 17/4/27. **S.** Shepton Mallet (C.), Keynsham (A.) 1/6/29, St. Audries (A.) 19/8/29, Leigh Woods (A.) 7/5/32, Clevedon (A.) 24/4/44. Common, often settles on tree-trunks or walls.
- irrorata* Macq. 1826. **G.** Blaise Castle (A.) 10/6/28 and (F.) 24/5/47. **S.** Kewstoke (Wm.) 22/5/27, Brockley Combe (Wm.) 16/5/28. Uncommon in woods, larvae in rotten wood.
- unca* Wied. 1817 (*longicornis* Schum. 1833). **G.** Cirencester (T.) 1/8/23, Oldbury Court (Wm.) 25/6/27, Coombe Dingle (F.) 29/6/47. **S.** Prior Park, Bath (A.) 18/7/25, Charterhouse-on-Mendip (Wm.) 22/6/29, Moreton (A.) 15/6/31, Limpley Stoke (A.) 10/6/34, Clevedon (A.) 18/6/40. Fairly common in marshy localities.
- marmorata* Mg. 1818 (*confusa* v.d. Wulp 1883). **G.** Hallen (A.) 10/10/25, Bristol (A.) 8/9/29. **S.** Wellington (Ml.), Avon Bank (Wm.) 17/9/22, Clevedon (A.) 23/9/41. Common and widespread.
- obsolata* Mg. 1818. **G.** Cirencester (T.) 10/10/23, Hallen (A.) 10/10/25, Cranham (Wm.) 13/9/26, Kingsweston (A.) 27/9/34. **S.** Leigh Woods (A.) 17/10/24. Fairly common and widespread.
- staegeri* Niels. 1922 (*signata* auctt. nec Staeg.). **G.** Fishponds (A.) 10/10/21. **S.** Nailsea (Wm.) 10/10/28, Clevedon (A.) 20/10/39. Uncommon in woods.
- signata* Staeg. 1840 (*anonyma* Berg. 1839). **G.** Bristol (A.) 27/9/27. **S.** Leigh Woods (H.), Clevedon (A.) 11/10/41. Uncommon in woods.
- pabulina* Mg. 1818. **G.** Cranham (Wm.) 27/8/28. **S.** Taunton (C.) 8/5/07. Uncommon in woods.
- oleracea* L. 1758 (*submendosa* Bo Tjeder 1941). **G.** and **S.** only too common in meadows.
- paludosa* Mg. 1830 (*oleracea* L. *apud* Bo Tjeder 1941). **G.** and **S.** Very common in damp meadows.
- vernalis* Mg. 1804. **G.** and **S.** Very common in meadows in spring and autumn.
- solstitialis* Westh. 1882 (*pierreii* Tonn. 1921, *ferruginea* Lack. 1923). **S.** Shapwick (A.) 7/8/25, Tickenham (A.) 10/8/33. Uncommon in marshy localities.
- lateralis* Mg. 1804. **G.** and **S.** Very common in damp meadows.
- montium* Egg. 1863 (*lateralis* Lack. nec Mg.). **S.** Vallis Vale (A.) 31/5/36. Rare.
- pruinosa* Wied. 1817. **S.** Tickenham (A.) 11/7/31. Uncommon, found near water.
- melanoceros* Schum. 1833. **S.** Nailsea (A.) 6/6/22. Uncommon in marshy localities.
- luteipennis* Mg. 1830. **S.** Wellington (Ml.), Tickenham (A.) 22/9/25, Leigh Woods (A.) 27/9/25. Uncommon in marshy localities.
- pagana* Mg. 1818. **G.** Bristol (H.). **S.** Leigh Woods (H.), Nailsea (Wm.) 5/10/27, Banwell (A.) 20/10/28, Clevedon (A.) 19/10/40. The female is brachypterous. Fairly common in hedgebanks. N.B.—There exists a var. (*holoptera* Edw. 1939) in which the female is fully winged.
- flavolineata* Mg. 1804. **G.** Painswick (W.), Olveston (C.) 5/5/16, Blaise Castle (A.) 6/6/26, Littledean (A.) 5/6/32. **S.** Banwell (H.), Leigh Woods (H.), Backwell (A.) 6/6/25, Clevedon (A.) 3/6/40, Brockley Combe (F.) 25/5/47. Uncommon in woods, larvae live in rotten wood.
- luna* Westh. 1879 (*lunata* auctt. nec L.). **G.** Fishponds (A.) 7/5/27, Coombe Dingle (F.) 29/6/47. **S.** Weston-s-Mare (J.), Tickenham (A.) 16/5/25, Limpley Stoke (A.) 19/5/34, Clevedon (A.) 27/5/39. Fairly common in marshy localities.

S. G. LUNATIPULA Edw. 1931

selene Mg. 1830. **G.** Bristol (A.) 6/6/26, Oldbury Court (A.) 7/7/28. **S.** Keynsham (A.) 1/6/29, Brockley Combe (A.) 28/6/47. Uncommon in dry localities.

fascipennis Mg. 1818. **G.** Cirencester (T.), Tormarton (A.) 20/6/26, Coombe Dingle (A.) 25/6/31 and (F.) 29/6/47. **S.** Tickenham (A.) 26/6/24, Nailsea (Wm.) 11/6/27, Moreton (A.) 15/6/31, Shapwick (A.) 5/7/47. Fairly common in damp localities.

brevispina Pierre 1920. **G.** Kingsweston (A.) 31/5/25. Rare in woods.

cava Riedel 1913. **S.** Shapwick (Wm.) 11/7/25, St. Audries (A.) 20/8/29, Clevedon (A.) 16/7/44. Uncommon in woods.

lunata L. 1758 (*ochracea* Mg. 1804). **G.** and **S.** Very common in woods and hedges in early summer.

pelio stigma Schum. 1833. **G.** Bristol (A.) 10/6/25, Dursley (Wm.) 20/6/25. **S.** Tickenham (A.) 21/6/36, Clevedon (A.) 23/7/44. Uncommon in woods.

PALES Mg. 1800 (NEPHROTOMA Mg. 1803, PACHYRHINA Mg. 1834)

Medium-sized, black and yellow flies with shiny black stripes on the thorax ; antennae bear whorls of hairs.

dorsalis F. 1781. **G.** Olveston (A.) 16/5/16. Rare.

flavipalpis Mg. 1830 (*crinicauda* Riedel 1910). **G.** and **S.** Common in woods.

maculata Mg. 1804 (*maculosa* Mg. 1818). **G.** and **S.** Common and widespread.

flavescens L. 1758 (*hustrio* F. 1794, *lineata* Scop. 1763). **G.** and **S.** Common and widespread.

lunulicornis Schum. 1833. **G.** Hallen (A.) 12/7/24, Kingsweston (A.) 31/5/25, Olveston (A.) 28/6/25. **S.** Cannington (Sl.) 20/5/26, Taunton (A.) 9/6/24, Tickenham (A.) 16/5/25, Shapwick (St.) 31/5/36, Clevedon (A.) 19/7/42. Uncommon in marshy localities.

quadrifaria Mg. 1804. **G.** and **S.** Common and widespread.

analis Schum. 1833. **G.** Blaise Castle (A.) 28/5/27, Oldbury Court (Wm.) 25/6/27. **S.** Leigh Woods (A.) 3/9/24, Chewstoke (A.) 8/7/32, Clevedon (A.) 8/8/39. Uncommon in woods.

questfalia Westh. 1880. **G.** Cirencester (T.) 24/5/23, Bristol (A.) 9/7/25, Stone (A.) 17/6/28. **S.** Leigh Woods (H.) 8/6/20, Tickenham (A.) 19/6/25, Brockley Combe (Wm.) 28/5/27, Keynsham (A.) 1/6/29, Chewstoke (A.) 8/7/32. Uncommon in woods.

cornicina L. 1758. **G.** Painswick (W.), Blaise Castle (A.) 28/5/27. **S.** Leigh Woods (H.) 6/7/18, Sharpham (A.) 3/8/25. Uncommon in woods.

PRIONOCERA Lw. 1844

Brownish-grey fly, male has serrated antennae, in both sexes there are no whorls of hairs on the antennae.

turcica F. 1781. **S.** West Town (Wm.) 2/8/26.

pubescens Lw. 1844 (*subserricornis* Zett. 1851). **S.** West Town (Wm.) 1924. Both species live on moors and are very rare.

DOLICHOPEZA Curt. 1825

Delicate greyish-brown flies with conspicuous white tarsi.

albipes Stroem 1768 (*sylvicola* Curt. 1825). **S.** Weston-s-Mare (J.), St. Audries (A.) 20/8/29, Culmhead (A.) 7/5/48. Uncommon in damp woods.

DICTENIDIA Brullé 1833

Medium-sized, black flies with monopectinate antennae in the male, not pectinate in the female ; two dark spots on each wing.

bimaculata L. 1761. **G.** Painswick (W.), Wotton-under-Edge (P.). **S.** Wellington (Ml.), Sharpham (A.) 11/8/23, Burtlescombe (Cw.) 4/6/48. Uncommon in damp woods, larvae live in rotten wood.

TANYPTERA Lat. 1805 (XIPHURA Brullé 1832)

Rather large, black flies with yellow markings; antennae bipectinate in the male, simple in the female, no whorls of hairs.

mgiricornis Mg. 1818. **G.** Painswick (W.). Very rare; larvae live in rotten wood.

FLABELLIFERA Mg. 1800 (CTENOPHORA Mg. 1803)

Like TANYPTERA but each antennal segment in the male bears four processes, two long and two short ones; in the female the antennae are serrated.

pectinicornis L. 1758. **G.** Wotton-under-Edge (P.), Cirencester (T.) 14/7/23, Bristol (A.) 21/5/21, Stroud (Elt.) 6/6/33, Coombe Dingle (F.) 10/6/47. **S.** Wellington (Ml.), Brockley Combe (Wm.) 16/3/28, Freshford (A.) 5/6/37, Clevedon (Bd.) 6/7/41, Leigh Woods (F.) 11/5/43, Cadbury Camp (F.) 29/5/44, Loxley Wood, Shapwick (Cw.) 3/6/46, Edington (Cw.) 4/6/47. Not uncommon in woods and hedges, larvae live in rotten wood.

S. F. CYLINDROTOMINAE

Like the TIPULINAE, but there are only eight or nine veins reaching the edge of the wing and the palpi are short.

CYLINDROTOMA Macq. 1834

A yellowish fly with black stripes on the thorax; nine veins reach edge of wing.

distinctissima Mg. 1818. **G.** Blaise Castle (Wm.) 20/8/22, and (A.) 28/5/27, Daglingworth (Sh.) 19/4/44, Coombe Dingle (F.) 26/5/47. **S.** Shepton Mallet (C.), Wells (A.) 10/8/25, Keynsham (A.) 21/5/29, Leigh Woods (A.) 26/5/29, Loxley Wood, Shapwick (Cw.) 9/8/47. Fairly common in damp woods, the larvae are green, aerial and feed on the leaves of several species of plants (e.g. *Anemone*, *Stellaria*).

DIOGMA Edw. 1938 (LIOGMA O.S. 1869 *p.p.*)

Resembles CYLINDROTOMA, but only eight veins reach the edge of the wing.

glabrata Mg. 1818. **G.** Blaise Castle (A.) 14/7/29. **S.** Leigh Woods (H.), Backwell (A.) 17/7/26. Rare in damp woods, larvae live in clumps of damp moss.

PHALACROCERA Schin. 1863

Blackish fly with nine veins reaching the edge of the wing, including a short one where the first two veins meet.

replicata L. 1758. **S.** Backwell (Wm.) 11/5/27, Shapwick (A.) 1/5/27. Rare near pools, larvae live in clumps of damp moss.

S. F. LIMONIINAE

Like TIPULINAE, but usually smaller and always with short palpi; ten or eleven veins reach the edge of the wing.

Tribe :—LIMONIINI

Ten veins reach edge of wing, no spurs on tibiae, eyes bare.

LIMONIA Mg. 1803 (LIMNOBIA Mg. 1818)

Proboscis short; antennae simple (exc. RHIPIDIA), with fourteen segments; larvae saprophagous or mycetophilous; flies found mainly in woods.

S. G. METALIMNOBIA Mats. 1911

Second long vein (R.) does not go beyond the cross-vein, first long vein (Sc.) long, male forceps horny.

bifasciata Schrk. 1781. **G.** Cranham (Wm.) 18/9/26. **S.** Leigh Woods (A.) 3/9/24. Uncommon.

quadrinotata Mg. 1818. **G.** Birdlip (W.), Wotton-under-Edge (P.), Cranham (Wm.) 13/9/26. **S.** Leigh Woods (H.) 1/8/18, Shapwick (A.) 31/8/24, Leigh Woods (A.) 3/9/24. Fairly common.

S. G. LIMONIA s.str.

Second long-vein (R.) extends beyond the cross-vein, otherwise like METALIMNOBIA.

nubeculosa Mg. 1804. **G.** and **S.** Very common.

flavipes F. 1787. **G.** and **S.** Fairly common.

nigropunctata Schum. 1829. **S.** Brockley Combe (A.) 17/5/47. Rare.

tripunctata F. 1781. **G.** Cirencester (T.) 9/6/23, Kingsweston (A.) 20/5/32, Coombe Dingle (F.) 26/5/47. **S.** Pill (H.), Shapwick (A.) 20/5/23, Leigh Woods (A.) 23/5/26, Keynsham (A.) 24/5/26, Brockley Combe (A.) 17/5/47. Fairly common among long grass in woods.

trivittata Schum. 1829. **G.** Hanham (A.) 19/6/24. **S.** Keynsham (A.) 16/6/24, Clevedon (A.) 10/6/47. Uncommon.

stigma Mg. 1818. **S.** Leigh Woods (H.), Tickenham (A.) 22/6/32. Rare.

macrostigma Schum. 1829. **G.** Painswick (W.), Blaise Castle (A.) 28/5/27, Dursley (A.) 11/10/30. **S.** Tickenham (A.) 16/9/22, Keynsham (A.) 16/6/24, Shapwick (A.) 26/8/25, Limpley Stoke (A.) 10/6/34. Common.

S. G. DICRANOMYIA Steph. 1829

First long vein (Sc.) short, male forceps are fleshy lobes.

decemmaculata Lw. 1873. **G.** Blaise Castle (Wm.) 20/8/22. **S.** Leigh Woods (H.) 30/5/18, 27/9/19 and (A.) 25/5/37, Brockley Combe (Wm.) 28/5/27. Uncommon, mycetophilous.

fusca Mg. 1804 (*pilipennis* Egg. 1863). **S.** Holford (A.) 28/8/29, Prior Park, Bath (A.) 25/6/32. Uncommon.

aquosa Verr. 1886. **S.** Shepton Mallet (C.). Rare.

dumetorum Mg. 1804. **G.** Kingsweston (A.) 6/6/26, Oldbury Court (Wm.) 21/7/27. **S.** Dunster (A.) 16/8/16, Leigh Woods (H.) 27/6/18, St. Audries (A.) 23/8/29, Clevedon (A.) 17/7/41. Fairly common.

ornata Mg. 1818. **S.** Keynsham (A.) 16/6/24, Moreton (A.) 15/6/31. Uncommon, on *Petasites officinalis* Moench.

goritensis Mik 1864. **G.** Aust (Wm.) 3/11/28 and (A.) 19/8/33. Uncommon on wet coastal cliffs.

didyma Mg. 1804. **S.** Leigh Woods (G.), St. Audries (A.) 19/8/29, Tickenham (A.) 11/7/31. Uncommon.

chorea Mg. 1818. **G.** and **S.** Very common. The males dance in swarms under trees in the evening.

mitis Mg. 1830. **S.** Backwell (A.) 3/5/34. Rare.

var. *affinis* Schum. 1829. **G.** Hallen (A.) 4/3/28, Dursley (A.) 4/6/30. **S.** Leigh Woods (H.) 6/5/18, Tickenham (A.) 22/4/25, Prior Park, Bath (A.) 8/5/26, Nailsea (A.) 22/4/27. Fairly common.

var. *lutea* Mg. 1804. **G.** Kingsweston (A.) 25/5/24, Dursley (A.) 9/6/25, Bristol (A.) 25/4/26. **S.** Shapwick (A.) 11/8/25, Leigh Woods (A.) 27/9/25, Brockley Combe (A.) 17/5/47, Clevedon (A.) 8/7/47. Common.

modesta Mg. 1818. **G.** Blaise Castle (A.) 11/9/22, Kingsweston (A.) 3/9/24. **S.** Tickenham (A.) 16/9/22, Sharpham (A.) 1/8/23, Clevedon (A.) 4/9/40, Edington (Cw.) 19/10/46. Fairly common.

ventralis Schum. 1829. **S.** Sharpham (A.) 5/8/25. Very rare.

sera Wlk. 1848. **G.** Shepperdine (A.) 10/8/24. **S.** Berrow (A.) 16/9/41. Uncommon in coastal marshes.

autumnalis Staeg. 1840. **G.** Kingsweston (A.) 25/5/24, Blaise Castle (A.) 11/5/27. **S.** Shapwick (A.) 31/8/24, Edington (Cw.) 18/10/46. Moderately common.

- sericata* Mg. 1830. **G.** Kingsweston (A.) 6/5/28. **S.** Leigh Woods (H.), Cheddar (H.), Nailsea (Wm.) 8/5/27, Clevedon (A.) 14/5/27. Fairly common.
- danica* Kuntze 1919. **S.** Shapwick (A.) 6/8/27, Clevedon (A.) 22/9/41. Very rare.
- morio* F. 1787. **G.** Tockington (A.) 29/4/27, Blaise Castle (A.) 29/4/28, Stone (A.) 28/6/28. **S.** Tickenham (A.) 16/9/22, Sharpham (A.) 2/9/25, Blagdon, Mendip (A.) 20/4/28, Nailsea (Wm.) 29/4/28. Common in marshy localities.

S. G. GERANOMYIA Hal. 1833

Like DICRANOMYIA, but mouth parts elongated, as long as head and thorax together.

- unicolor* Hal. 1833. **S.** Clevedon (Wm.), Portishead (Wm.), Weston-s-Mare (Wm.) 28/7/28. Uncommon on damp coastal cliffs.

S. G. RHIPIDIA Mg. 1818

Like DICRANOMYIA, but antennae pectinate in the male, slightly serrated in the female, wings faintly spotted all over.

- maculata* Mg. 1818. **G.** and **S.** Common; small, dark fly found in damp situations.

TAPHROPHILA Rond. 1856 (ANTOCHA O.S. 1859)

Dark fly with somewhat milky wing and nine veins reaching edge of wing; antenna with sixteen segments.

- vitripennis* Mg. 1830. **G.** No locality (Edw.).

HELIUS St. Farg. 1828

Small, dark flies with clear wings; proboscis longer than the head; found in weedy ponds and bogs.

- longirostris* Mg. 1818. **S.** Sharpham (A.) 18/8/25, Shapwick (A.) 1/5/27, Backwell (Wm.) 22/6/28.
- flavus* Wlk. 1856. **G.** Coombe Dingle (F.) 1/7/47. **S.** Sharpham (A.) 18/8/25, Backwell (Wm.) 22/6/28.
- pallirostris* Edw. 1921. **S.** Shapwick (A.) 16/7/27, Backwell (Wm.) 22/6/28.

TRIBE :—PEDICIINI

Eleven veins reach the edge of the wing, the tibiae are spurred, the eyes pubescent; found in bogs and springs, larvae saprophagous.

PEDICIA Lat. 1809

S. G. PEDICIA *s.str.*

Large fly with two dark, longitudinal bands and one cross band; antenna has fifteen to seventeen segments.

- rivosa* L. 1758. **G.** Kilcot (P.), Dursley (A.) 26/4/30, Nibley (A.) 21/6/30. **S.** Wellington (Bl.), St. Audries (A.) 28/8/29, Priddy (Cw.) 24/7/45, Holford (Cw.) 30/8/47. Uncommon.

S. G. CRUNOBIA Kol. 1860 (AMALOPIS Hal. 1856 *p.p.*, TRICYPHONA Zett. 1837 *p.p.*)

Moderate-sized, brownish-yellow flies with almost clear wings.

- littoralis* Mg. 1804. **G.** Olveston (A.) 4/6/22, Coombe Dingle (F.) 27/6/47. **S.** St. Audries (A.) 20/8/29. Uncommon.
- straminea* Mg. 1838. **S.** Wellington (Ml.)? Rare.

S. G. TRICYPHONA Zett. 1837

Like CRUNOBIA, but smaller, darker flies.

- claripennis* Verr. 1888. **S.** Burrington Combe (Wm.) 14/5/27, St. Audries (A.) 23/8/29. Uncommon.

immaculata Mg. 1804. **G.** Olveston (C.), Blaise Castle (A.) 24/4/25, Dursley (A.) 26/4/30. **S.** Cannington (Sl.), Shapwick (A.) 20/5/23, Tickenham (A.) 2/6/25, Leigh Woods (A.) 5/5/28, Chewstoke (A.) 19/5/33, Edington (Cw.) 6/5/47. Fairly common.

DICRANOTA Zett. 1838

Antenna with thirteen segments; medium-sized flies, found near flowing water.

S. G. DICRANOTA *s.str.*

bimaculata Schum. 1829. **S.** Shepton Mallet (C.) 28/4/09, Rodney Stoke (A.) 18/4/29, St. Audries (A.) 29/8/29. Uncommon.

S. G. PARADICRANOTA Alex. 1934

pavida Hal. 1833. **S.** St. Audries (A.) 20/8/29. Rare.

ULA Hal. 1833

Small, dark fly with hairy wing, found in woods, larvae mycetophilous.

sylvatica Mg. 1818 (*pilosa* Schum. 1829). **G.** Blaise Castle (A.) 2/2/23 ex *Hypholoma fasciculare* (Huds.) Fr., Kingsweston (A.) 6/5/23. **S.** Leigh Woods (A.) 8/2/23 ex *Tricholoma album* (Schaeff.) Fr. Not uncommon.

TRIBE :—HEXATOMINI

The uppermost long vein is forked near its apex; tibiae spurred, eyes bare.

DACTYLOLABIS O.S. 1859

The cross-vein (m-cu) is at the base of the discal cell (in all other genera this cross-vein is beyond the base), wings spotted; blackish, medium-sized fly.

sexmaculata Macq. 1846. **S.** Bank of Avon under the Suspension Bridge (A.) 11/4/30. Rare.

EPIPHRAGMA O.S. 1859

There is an extra cross-vein in the costal cell, wings have ocellate markings; larvae in rotten wood; dark, medium-sized fly.

ocellaris L. 1761 (*picta* F. 1798). **G.** Olveston (C.), Hallen (A.) 18/6/25, Tormarton (A.) 20/6/26, Blaise Castle (A.) 28/5/27, Filton (A.) 29/5/35. **S.** Leigh Woods (A.) 22/5/27, Kewstoke (Wm.) 27/5/27, Keynsham (A.) 24/5/36, Freshford (A.) 5/6/37, Clevedon (A.) 19/7/42, Backwell (F.) 25/5/47, Loxley Wood, Shapwick (Cw.) 26/5/47. Fairly common.

AUSTROLIMNOPHILA Alex. 1920

No extra cross-vein, wing clear; medium-sized, yellow-brown fly; larvae in rotten wood.

ochracea Mg. 1804. **G.** and **S.** Common.

LIMNOPHILA Macq. 1834

S. G. PHYLIDOREA Big. 1854

Antennae with short verticils of hairs; wings clear, no extra veins; medium-sized, black or fulvous flies; larvae saprophagous.

meigeni Verr. 1887. **G.** Littledean (A.) 5/6/32. **S.** Priddy (A.) 6/6/37. Uncommon on heaths and moors, black fly.

dispar Mg. 1818. **G.** and **S.** Common in woods, yellow fly, stigma distinct.

lineola Mg. 1804. **G.** and **S.** Common in woods, brownish fly.

fulvonervosa Schum. 1829 (*lineolella* Verr. 1887). **G.** Littledean (A.) 5/6/32. **S.** Chewstoke (A.) 8/7/32, Priddy (A.) 6/6/37. Common in woods, yellow fly, stigma faint, thorax with black stripe.

aperta Verr. 1887. **S.** St. Audries (A.) 20/8/29. Like *fulvonervosa*, but discal cell open. Rare.

ferruginea Mg. 1818. **G.** and **S.** Common. Like *fulvonervosa*, but thorax unstriped.

S. G. ELAEOPHILA Rond. 1856 (EPHELIA Schin. 1863)

Extra cross-vein in lower basal cell and wing spotted.

trimaculata Zett. 1838. **S.** Culmhead (A.) 7/5/48. Rare.

verralli Berg. 1912. **S.** Winscombe (J.) 9/7/16. Rare.

mundata Lw. 1871. **S.** No locality (Edw.). Rare.

maculata Mg. 1804 (*marmorata* Mg. 1818). **G.** Hanham (A.) 19/6/22, Blaise Castle (A.) 14/7/29. **S.** Abbot's Leigh (H.), Winscombe (J.) 9/7/16, Tickenham (A.) 27/5/22, Prior Park, Bath (A.) 18/7/25, Edington (Cw.) 27/6/47. Fairly common near streams.

submarmorata Verr. 1887. **G.** Hanham (A.) 19/6/22. **S.** Holford (Cw.) 5/9/47. With *maculata* but uncommon.

S. G. LIMNOPHILA s.str. (POECILOSTOLA Schin. 1863)

Wings with many small, dark spots, no extra cross-vein; dark flies.

punctata Schrk. 1781. **G.** Painswick (W.), Fishponds (A.) 7/5/27. **S.** Leigh Woods (H.), Tickenham (A.) 12/5/25, Chew Magna (A.) 18/5/29, Culmhead (Cw.) 19/4/45. Not uncommon.

pictipennis Mg. 1818. **S.** Nailsea (Wm.) 14/8/25, Catcott (Cw.) 11/5/44. Uncommon.

S. G. PSEUDOLIMNOPHILA Alex. 1919

Like LIMNOPHILA, but wings clear.

lucorum Mg. 1818. **G.** Olveston (A.) 4/6/22, Hallen (A.) 10/10/25, Blaise Castle (A.) 28/5/27. **S.** Nailsea (A.) 17/7/26, Clevedon (A.) 14/5/27, Moreton (A.) 25/5/35, Sharpham (A.) 2/6/36. Common in damp woods.

sepium Verr. 1886. **G.** Tormarton (A.) 13/7/29, Coombe Dingle (F.) 27/6/47. **S.** Tickenham (A.) 17/6/27. Uncommon.

S. G. PILARIA Sint. 1889

Antennal verticils long; wings clear; squama bears a bunch of stiff hairs (squama bare in all other sub-genera except EPIPHRAGMA); found near ponds, in marshes and damp woods; small to medium-sized, dark flies.

discicollis Mg. 1818. **G.** Olveston (A.) 4/6/22, Tormarton (A.) 20/6/26. **S.** Ham Lane (J.), Tickenham (A.) 16/9/22, Shapwick (A.) 20/5/23, Prior Park, Bath (A.) 18/7/25, Edington (Cw.) 21/5/47. Fairly common.

fuscipennis Mg. 1818. **S.** St. Audries (A.) 19/8/29. Rare.

scutellata Staeg. 1840 (*subtincta* Zett. 1851). **S.** Bleadon (A.) 20/9/41. Rare.

nemoralis Mg. 1818. **G.** and **S.** Common. There are several vars. of this species.

adjuncta Wlk. 1848 (*nemoralis* var. *noscibilis* Edw. 1921). **G.** and **S.** Equally common.

filata Wlk. 1856. **G.** Olveston (A.) 6/21. **S.** Tickenham (A.) 27/5/22. Rare.

OXYDISCUS Meij. 1913 (ADELPHOMYIA auctt. nec Berg. 1891)

Wings hairy in apical portion; tibiae with a minute spur.

senilis Hal. 1833. **S.** Clevedon (A.) 21/10/40, Edington (Cw.) 27/10/46. Small, black fly, not uncommon in damp woods.

fuscus Lw. 1873. **S.** St. Audries (A.) 21/3/29. Light-brown fly, rare in damp woods.

TRIBE :—ERIOPTERINI

Eleven veins reach edge of wing; no spurs on tibiae.

CRYPTERIA Berg. 1913

Small, dark fly with clear wing. Found in damp woods.

limnophiloides Berg. 1913. **G.** Blaise Castle (A.) 17/9/21. Rare.

LIPSOTHRIX Lw. 1873

Pale-yellow fly with clear wings found in damp woods.

remota Wlk. 1848. **G.** Painswick (W.), Wotton-under-Edge (P.). Rare.

GNOPHOMYIA O.S. 1859

Medium-sized, dark fly found in damp woods ; larvae live in rotten wood.

lugubris Zett. 1838. **G.** No locality (Edw.). Rare.

GONOMYIA Mg. 1818

No cross-vein between the second and third longitudinal veins ; small, dark flies found in woods and hedges.

S. G. ELLIPTEROIDES Beck. 1907

lateralis Macq. 1835. **G.** Nibley (A.) 14/6/30, Coombe Dingle (F.) 27/6/47.
S. Tickenham (A.) 11/7/31, Clevedon (A.) 15/6/40. Uncommon.

S. G. GONOMYIA *s.str.*

tenella Mg. 1818. **G.** Stone (A.) 28/6/28. **S.** Sharpham (A.) 22/8/25, St. Audries (A.) 23/8/29, Limpley Stoke (A.) 10/6/34, Moreton (A.) 23/5/35, Clevedon (A.) 23/8/40. Fairly common.

CHEILOTRICHIA Rossi 1848

There is a cross-vein between the second and third longitudinal veins, veins bare, the lowest longitudinal vein (An.) is straight, wings clear ; small flies found in damp situations.

S. G. GONEMPEDA Alex. 1924 (EMPEDA O.S. 1869 *p.p.*)

flava Schum. 1829. **G.** Olveston (A.) 8/6/22, Blaise Castle (A.) 28/5/27. **S.** Shepton Mallet (C.) 10/10, Tickenham (A.) 17/6/27, Nailsea (Wm.) 2/7/28, Chew Magna (A.) 30/5/31, Clevedon (A.) 15/6/40. Yellow fly, not uncommon.

S. G. CHEILOTRICHIA *s.str.*

imbuta Mg. 1818. **G.** Kingsweston (A.) 26/6/31. **S.** Moreton (A.) 21/5/33. Yellow fly, uncommon.

S. G. PLATYTOMA Lioy 1863 (EMPEDA O.S. 1869)

cinerascens Mg. 1804 (*nubila* Schum. 1829). **G.** Winterbourne (A.) 28/4/23, Kingsweston (A.) 16/4/26. **S.** Leigh Woods (H.), Sharpham (A.) 6/9/25, Nailsea (A.) 21/4/27, Edington (Cw.) 28/10/46. Blackish fly, common.

POLYMEDA Mg. 1800 (ERIOPTERA Mg. 1803)

Like CHEILOTRICHIA, but veins more or less hairy, lowest longitudinal vein undulated.

S. G. POLYMEDA *s.str.*

flavescens L. 1758. **G.** Olveston (A.) 5/9/22. **S.** Leigh Woods (H.) 31/5/18, Tickenham (A.) 23/7/22, Nailsea (Wm.) 2/7/28. Light-yellow fly, fairly common. Palpi yellow.

squalida Lw. 1871. **G.** Daylesford (Hb.) 15/9/42. **S.** Kenn Moor (A.) 27/6/39. Dark-yellow fly, rare.

divisa Wlk. 1848 (*macrophthalma* Lw. 1871). **S.** Shepton Mallet (C.) 11/4/09, Tickenham (A.) 16/5/25, Sharpham (A.) 5/8/25. Light-yellow fly, fairly common. Palpi black.

griseipennis Mg. 1838. **G.** Hanham (A.) 30/5/31. **S.** Tickenham (A.) 16/5/25, Chew Magna (A.) 30/5/31. Yellow-brown fly, palpi black, fairly common.

lutea Mg. 1804. var. *taenionata* Mg. 1818. **G.** and **S.** Very common ; the true *lutea* is not British. Brownish-yellow fly, the only one with a black knob to the haltere.

- fuscipennis* Mg. 1818. **S.** Bicknoller (A.) 3/5/48. Blackish fly, with very hairy wing veins.
- fusculenta* Edw. 1938. **G.** and **S.** Common.
- trivialis* Mg. 1818. **G.** and **S.** Very common. Dark fly, the only species with a closed discal cell, veins not very hairy.
- diuturna* Wlk. 1848. **G.** Shepperdine (A.) 15/8/24. **S.** Kenn Moor (A.) 29/6/41. Like *trivialis*, but discal cell open, uncommon.

S. G. SYMPLECTA Mg. 1830

(HELOBIA St. Farg. 1825 *preoc.*, SYMPLECTOMORPHA Mik 1886)

Wing-veins distinctly hairy, discal cell closed, lowest longitudinal vein strongly undulated; small, greyish-yellow fly found in damp situations.

stictica Mg. 1818. **G.** and **S.** Common.

S. G. ILISIA Rond. 1856

Wings have dark spots with pale centres, veins almost bare, lowest longitudinal vein straight, discal cell closed; small, yellow-brown flies found in damp situations.

maculata Mg. 1804. **G.** and **S.** Common.

areolata Siebke 1872. **S.** Chew Magna (A.) 30/5/31. Rare.

ORMOSIA Rond. 1856

Wing hairy all over, no discal cell; small, dark flies found in damp situations.

S. G. ORMOSIA *s.str.*

Last longitudinal vein short and straight.

lineata Mg. 1818. **G.** Blaise Castle (A.) 24/4/25. **S.** Shepton Mallet (C.), Portishead (Wm.) 21/5/27, Clevedon (A.) 24/4/43. Fairly common.

nodulosa Macq. 1826. **G.** Painswick (W.), Awkley (A.) 8/9/22, Kingsweston (A.) 17/5/24. **S.** Shepton Mallet (C.) 9/9/09, Leigh Woods (H.) and (A.) 23/5/25, Shapwick (A.) 24/5/25, St. Audries (A.) 23/8/29, Nailsea (A.) 28/6/29, Brockley Combe (A.) 17/5/47. Common.

hederae Curt. 1835 (*uncinnata* Meij. 1918). **G.** Fishponds (A.) 7/5/27. **S.** Tickenham (A.) 16/9/22, Sharpham (A.) 10/9/25, Keynsham (A.) 14/5/32. Fairly common.

aeculata Edw. 1921. **S.** Bicknoller (A.) 26/4/48.

albitibia Edw. 1921. **S.** Leigh Woods (Edw.) 6/9/30. Rare.

S. G. RHYPHOLOPHUS Kol. 1860

Like ORMOSIA, but last longitudinal vein long and undulated.

bifurcata Goet. 1920. **G.** Blaise Castle (A.) 13/9/26, Olveston (A.) 15/9/28. **S.** Leigh Woods (A.) 8/9/28, Clevedon (A.) 20/10/39. Fairly common.

haemorrhoidalis Zett. 1838. **G.** Hallen (A.) 10/10/25. **S.** Leigh Woods (H.) and (A.) 27/9/25. Fairly common.

MOLOPHILUS Curt. 1833

Hairs on veins very long but membrane bare, all forks of longitudinal veins long and starting at same level; small, dark flies found in damp situations.

niger Goet. 1920. **G.** Tockington (A.) 29/4/27, Fishponds (A.) 7/5/27. **S.** Chewstoke (A.) 19/5/33. Uncommon.

obscurus Mg. 1818. **G.** Painswick (W.), Wotton-under-Edge (P.), Blaise Castle (Wm.) 30/4/27. **S.** Shapwick (A.) 24/5/25, Tickenham (A.) 24/5/26, Kenn Moor (A.) 29/6/41. Common.

pleuralis Meij. 1920. **S.** Sharpham (A.) 2/9/25. Rare.

propinquus Egg. 1863 (*gladius* Meij. 1920). **G.** Stow-on-the-Wold (Gr.) 16/8/44. Rare.

Trichoceridae**Phryneidae****Liriopidae**

BRISTOL INSECT FAUNA (DIPTERA)

421

- griseus* Mg. 1804 (*biflatus* Verr. 1886). **G.** Blaise Castle (A.) 17/9/21, Olveston (A.) 18/6/22, Hanham (A.) 19/6/22. **S.** Leigh Woods (H.), Backwell (A.) 6/6/25, Sharpham (A.) 9/8/25, St. Audries (A.) 19/8/29. Common.
- cinereifrons* Meij. 1920 (*griseifrons* Meij. 1920). **G.** Hallen (A.) 13/6/25. **S.** Leigh Woods (H.). Not uncommon.
- ochraceus* Mg. 1818 (*appendiculatus* Verr. *nec* Staeg). **S.** Leigh Woods (A.) 22/6/25, Chewstoke (A.) 8/7/32. Not uncommon.
- appendiculatus* Staeg. 1840 (*armatus* Meij. 1918). **G.** Hallen (A.) 14/9/25. **S.** Leigh Woods (H.), Clevedon (A.) 20/5/40. Not uncommon.

TASIOCERA Skuse 1890 (DASYMOLOPHILUS Goet. 1920)

Very small, black fly with very hairy wings and abdomen ; found in damp situations.

- murina* Mg. 1818. **G.** Blaise Castle (A.) 28/5/27. Rare.

Family :—**Trichoceridae**TRICHOCERA Mg. 1803 (PETAURISTA Mg. 1800 *preoc.*)

Antennae very long and slender ; lowest longitudinal vein short and turned down in a curve, veins very slightly hairy ; small gnats seen dancing in swarms in autumn and winter.

- annulata* Mg. 1818. **G.** and **S.** Common.
- regelationis* L. 1758. **G.** and **S.** Very common.
- major* Edw. 1921. **S.** Leigh Woods (A.) 21/9/27. Rare.
- saltator* Harr. 1776 (*fuscata* Edw. *nec* Mg.). **G.** Queenhill, Tewkesbury (A.) 1/11/25, Bristol (A.) 3/12/32. **S.** Shepton Mallet (C.), Leigh Woods (A.) 12/1/22, Edington (Cw.) 1/12/46. Uncommon.
- hiemalis* Deg. 1776. **G.** and **S.** Very common.

Family :—**Phryneidae**

Small gnats without suture on thorax ; antennae short and stout.

PHRYNE Mg. 1800 (ANISOPUS Mg. 1803, RHYPHUS Lat. 1804)

Wing spotted, discal cell present, membrane hairy ; often seen on windows ; larvae saprophagous.

- cincta* F. 1787. **G.** Frenchay (A.) 14/4/35. **S.** Leigh Woods (A.) 27/1/23, Clevedon (A.) 9/9/40. Not very common, more often found out-of-doors, on walls and tree-trunks.
- fenestralis* Scop. 1763. **G.** and **S.** Very common.
- punctata* F. 1787. **G.** and **S.** Fairly common chiefly out-of-doors.

MYCETOBIA Mg. 1818

Wing clear, discal cell absent, membrane bare ; larvae mycetophilous.

- pallipes* Mg. 1818. **S.** Clevedon (A.) 15/7/42. Rare.

Family :—**Liriopidae**

Medium-sized, black flies with suture on thorax ; ten veins reach edge of wing and there are two forks in apical portion ; there are also longitudinal folds ; the lowest longitudinal vein is long and curved downwards ; there are some large, black spots on the wing, no hairs on veins or membrane ; antennae have sixteen segments ; the flies are found among Reeds and Sedges ; the larvae are saprophagous.

LIRIOPE Mg. 1800 (PTYCHOPTERA Mg. 1803)

S. G. LIRIOPE *s.str.*

- contaminata* L. 1758. **G.** and **S.** Common.

albimana F. 1787. **G.** and **S.** Very common.

scutellaris Mg. 1818. **G.** Gloucester (W.), Olveston (A.) 2/9/23. **S.** Tickenham (A.) 24/5/26, Shapwick (A.) 16/7/27, Blagdon, Mendip (A.) 24/4/28. Fairly common.

S. G. PARAPTYCHOPTERA Tonn. 1919

paludosa Mg. 1804. **G.** Olveston (A.) 4/6/22, Tortworth (A.) 27/4/27, Tormarton (A.) 18/7/29. **S.** Shepton Mallet (C.), Leigh Woods (H.), Sharpham (A.) 22/8/22, St. Audries (A.) 23/8/29, Long Ashton (A.) 2/6/34. Fairly common.

lacustris Mg. 1830. **G.** Coombe Dingle (F.) 27/6/47. **S.** Crook Peak (Rd.), Tickenham (A.) 16/9/25, Kewstoke (A.) 19/5/33, Limpley Stoke (A.) 19/5/34, Kenn Moor (A.) 16/6/39. Fairly common.

Family :—Psychodidae

Very small flies with broad wings which are covered with scales ; flies found in damp situations ; larvae saprophagous.

N.B.—Most of the records come from Rev. E. A. Eaton's Papers in *Ent. mon. Mag.* 1893-8. No modern entomologist seems to be studying this family.

The compiler of this list has many specimens awaiting determination.

PERICOMA Hal. 1856

S. G. PERICOMA *s.str.*

trifasciata Mg. 1804. **S.** Stoney Stoke (Eat.).

calcilega Feuer. 1923. **S.** Wincanton (Eat.) 10/6/02.

blandula Eat. 1893. **S.** Blackmore Vale (Eat.).

pulchra Eat. 1893. **S.** Stoney Stoke (Eat.).

exquisita Eat. 1893. **S.** Blackmore Vale (Eat.).

diversa Tonn. 1920. **S.** Cole (Tonn.).

fallax Eat. 1893. **S.** Blackmore Vale (Eat.).

avicularia Tonn. 1940. **G.** Mangotsfield (Bw.). **S.** Cole (Eat.) 2/9/04, Prior Park, Bath (A.) 20/5/29.

nubila Mg. 1818. **G.** Mangotsfield (Bw.). **S.** Shepton Mallet (C.), Minehead (Eat.).

trivialis Eat. 1893. **G.** Mangotsfield (Bw.). **S.** Stoney Stoke (Eat.).

palustris Mg. 1804. **S.** Stoney Stoke (Eat.).

gracilis Eat. 1893. **S.** Stoney Stoke (Eat.).

mutua Eat. 1893. **G.** Mangotsfield (Bw.). **S.** Bruton (Eat.).

cognata Eat. 1893. **S.** Bruton (Eat.).

compta Eat. 1893. **S.** Stoney Stoke (Eat.).

extricata Eat. 1893. **S.** Stoney Stoke (Eat.).

canescens Mg. 1804. **S.** Wincanton (Eat.).

neglecta Eat. 1893. **S.** Minehead (Eat.).

fusca Macq. 1826. **S.** Wincanton (Eat.), Shepton Mallet (Eat.).

S. G. ULOMVA Hal. 1856

fuiiginosa Mg. 1804. **S.** Stoney Stoke (Eat.).

CLYTOCERUS Eat. 1904

ocellaris Mg. 1804. **S.** Wincanton (Eat.).

TELMATOSCOPIUS Eat. 1904

S. G. PANIMERUS Eat. 1913

notabilis Eat. 1893. **S.** Stoney Stoke (Eat.).

S. G. TELMATOSCOPIUS *s.str.*

- astulatus* Wlk. 1856. S. Ashcot (Eat.).
incertus Eat. 1893. S. Wincanton (Eat.).
morulus Eat. 1893. S. Wincanton (Eat.).
fraterculus Eat. 1893. S. Wincanton (Eat.).
consors Eat. 1893. S. Ashcott (Eat.), Edington (Cw.) 30/10/46.
soleatus Wlk. 1856. S. Wincanton (Eat.).

S. G. MORMIA End. 1935

- revisenda* Eat. 1893. S. Stoney Stoke (Eat.).
caliginosa Eat. 1893. S. Minehead (Eat.).

PSYCHODA Lat. 1796

S. G. PSYCHODA *s.str.*

- alternata* Say 1824 (*sexpunctata* Curt. 1839). G. Mangotsfield (Bw.), Bristol (C.), Painswick (W.).
phalaenoides L. 1758. G. Bristol (C.). S. Edington (Cw.) 30/10/46.
severini Tonn. 1922 var. *parthenogenetica* Tonn. 1940. G. Mangotsfield (Bw.).
brevicornis Tonn. 1940. G. Mangotsfield (Bw.).
trinodulosa Tonn. 1922. G. Mangotsfield (Bw.). S. Edington (Cw.) 6/11/46.
grisescens Tonn. 1922. G. Mangotsfield (Bw.).
spretta Tonn. 1940. G. Mangotsfield (Bw.).
erminea Eat. 1893. G. Mangotsfield (Bw.) 28/9/46. S. Cutcombe (Eat.).

S. G. THRETICUS Eat. 1904

- Aucifugus* Wlk. 1856. S. Bruton (Eat.).

Family :—Culicidae

These include the Mosquitoes. Costa extends beyond the apex of the wing. Larvae mainly aquatic, phytophagous (minute algae) or carnivorous.

S. F. DIXINAE

Antennae long, slender, not plumose in either sex; wing bare; proboscis soft.

DIXA Mg. 1818

S. G. DIXA *s.str.*

- nebulosa* Mg. 1830. S. Tickenham (A.) 23/7/22.
nubilipennis Curt. 1832. S. Rodney Stoke (A.) 6/4/29, Prior Park, Bath (A.) 20/5/29, Clevedon (A.) 13/2/41.
puberula Lw. 1849. S. Holford (A.) 28/8/29.
maculata Mg. 1818. S. Cheddar (C.).
submaculata Edw. 1920. S. St. Audries (A.) 24/8/29.

S. G. PARADIXA Tonn. 1924

- aestivalis* Mg. 1818. G. Shepperdine (A.) 10/8/24.
sphibia Deg. 1776. S. Shapwick (Edw.) 7/9/30.

N.B.—The local DIXA need further attention.

S. F. CHAEBORINAE

CHAOBORUS Licht. 1800 (CORETHRA Mg. 1803)

Antennae of male plumose, of female long and slender; veins bearing hairs; proboscis short and soft; larvae transparent.

S. G. CHAOBORUS *s.str.*

crystallinus Deg. 1776 (*plumicornis* F. 1794). G. Frenchay (C.), Henbury (A.) 5/9/26. S. Shepton Mallet (C.), Backwell (A.) 16/4/27, Taunton (A.) 6/6/31.

flavicans Mg. 1818. S. Nailsea (A.) 27/6/39, Clevedon (A.) 17/6/42.

S. G. SOYOMYIA Coq. 1903

pallida F. 1792. S. Sharpham (A.) 5/8/25.

S. F. CULICINAE

Antennae of male long, plumose, of female with short hairs; veins of wing, and often body and legs, bear hairs and scales; proboscis long and hard; the females suck the blood of man and various animals, and in doing so they may inject the germs of disease.

ANOPHELES Mg. 1818

Abdomen without scales; female palpi as long as proboscis; scutellum with rounded edge and an unbroken row of bristles; females attack man.

plumbeus Steph. 1828. G. Westbury-on-Trym (Wm.) 4/6/20. S. St. Audries (A.) 18/8/29, Shepton Mallet (A.) 5/9/44, Luccombe (Cl.) 24/4/45. Arboreal species breeding in cavities in trees; thorax blackish; wings unspotted; not uncommon in woods.

claviger Mg. 1804 (*bifurcatus* Mg. 1818 *nec* L.). G. Tortworth (A.) 7/6/27. S. Shepton Mallet (C.), Freshford (C.), Nailsea (A.) 24/4/27 and (Wm.) 1/5/27. Rural species, thorax brown, wings unspotted, fairly common.

maculipennis Mg. 1818. G. Olveston (C.), Mangotsfield (Bw.) 1/4/44. S. Shepton Mallet (C.) 29/12/09, Sharpham (A.) 22/8/22. Domestic species hibernating in dwellings, thorax brown, wings spotted, legs wholly black.

THEOBALDIA Nev.-Lem. 1902

Abdomen covered with scales; female palpi shorter than proboscis; scutellum three-lobed with three groups of bristles; hind metatarsus shorter than the tibia. Female abdomen with blunt apex.

S. G. THEOBALDIA *s.str.*

annulata Schrk. 1776. G. and S. Common. Domestic species hibernating in dwellings, thorax brown, wings spotted, legs with white rings, females attack man.

S. G. CULICELLA Felt. 1904

fumipennis Steph. 1825. S. Shapwick (A.) 9/8/23. Uncommon rural species, wings clear, female proboscis partly pale, does not attack man.

morsitans Theob. 1901. S. Clevedon (A.) 18/6/40, Taunton (Cl.) 25/5/45. Fairly common rural species, wings clear, female proboscis wholly black, does not attack man.

AEDES Wied. 1818

Like THEOBALDIA, but female abdomen with pointed apex; claws of front legs toothed (not toothed in all the other genera); all species attack man.

S. G. OCHLEROTATUS Arrib. 1891

cantans Mg. 1818 (*maculatus* Mg. 1827). S. Sharpham (A.) 27/8/25. Uncommon; white rings on hind tarsi.

detritus Hal. 1833. S. No locality (J. F. Marshall).

punctor Kirby 1837 (*communis* auctt. *nec* Deg., *nemorosus* Aust. *nec* Mg.). G. Olveston (A.). S. Leigh Woods (C.), Nailsea (C.), St. Audries (A.) 24/8/29. Clevedon (A.) 19/8/44. A common rural species.

rusticus Rossi 1790. G. Kingsweston (A.) 31/5/24, Olveston (A.) 4/6/22, Filton (A.) 29/5/35. S. Wellington (Ml.), Shapwick (A.) 9/8/23, Clevedon (A.) 27/4/45. Fairly common woodland species.

S. G. FINLAYA Theob. 1903

geniculata Oliv. 1791. G. Stroud (W.), Bristol (A.) 14/7/29. S. Brockley Combe (H.), Leigh Woods (H.) 10/7/17, St. Audries (A.) 24/8/29. Fairly common arboreal species, distinguished by its silvery-white knees.

CULEX L. 1758

Like THEOBALDIA, but hind metatarsus longer than the tibia; does not attack man.

pipiens L. 1758. G. and S. Common. Domestic species hibernating in dwellings.

Family:--Tendipedidae (CHIRONOMIDAE)

These flies, known as Gnats or Midges, are moderately large, have long legs, the antennae are plumose in the male, short haired in the female; no ocelli; wing long and narrow, bare or slightly hairy, sometimes spotted, about six longitudinal veins reach the edge of the wing, the costa does not reach beyond the apex of the wing; no cross suture on thorax; males often dance in the air in swarms; some larvae, called Blood-worms on account of their colour, live in the mud of ponds and are carnivorous, some are parasitic on aquatic plants and animals, some form cases like Caddis Flies and some are terrestrial. None of the species are blood-suckers, many do not feed at all in the imago stage. There is much work to be done locally on this family.

S. F. TANYPODINAE

Cross-vein (m-cu) present between fourth and fifth longitudinal veins, second longitudinal vein (R₂ + 3) forked or absent.

PENTANEURA Phil. 1865

Fifth longitudinal vein (Cu) forking at the cross-vein, costa not produced beyond apex of the third longitudinal vein (R₄ + 5).

S. G. ISOPLASTUS Skuse 1889

lentiginosus Fries 1823. G. Stone (A.) 21/5/27.

nubilus Mg. 1830. S. Blagdon, Mendip (A.) 18/4/28.

melanops Mg. 1818. G. Kingsweston (Wm.) 19/5/22, Stone (A.) 27/6/28.

S. G. PENTANEURA s.str.

binotata Wied. 1817. G. Painswick (W.).

ferrugineicollis Mg. 1818 (*brevitibialis* Goet. 1921). S. Shepton Mallet (C.).

ANATOPYNIA Joh. 1905

Like PENTANEURA, but costa produced beyond apex of third longitudinal vein.

S. G. MACROPELOPIA Thien. 1916

nebulosa Mg. 1804. G. Winterbourne (A.) 28/4/23. S. Shepton Mallet (C.), Sharpam (A.) 16/4/29, St. Audries (A.) 20/8/29.

notata Mg. 1818. S. Brockley Combe (Wm.) 23/4/27.

punctata F. 1805. G. Bitton (C.). S. Abbots Leigh (A.) 16/5/26.

nugax Wlk. 1856. G. Fishponds (A.) 7/5/27, Blaise Castle (A.) 28/5/27.

S. G. PSECTROTANYPUS Kieff. 1909

varius F. 1787. G. Painswick (W.) Winterbourne (A.) 28/4/23, Fishponds (A.) 7/5/37. S. Shepton Mallet (C.), Shapwick (A.) 25/3/21, Prior Park, Bath (A.) 8/5/26, Nailsea (A.) 21/4/27, Wedmore (A.) 6/10/39.

trifascipennis Zett. 1838. G. Painswick (W.).

TANYPUS Mg. 1803 (PROTENTHES Joh. 1905)

The fifth longitudinal vein (Cu) forks beyond the cross-vein and the stem of the fork is less than one-third the length of the lower prong.
punctipennis Mg. 1818. G. Painswick (W.). S. Moreton (A.) 15/6/31.

PROCLADIUS Skuse 1889 (TRICHOTANYPUS Kieff. 1906)

Like TANYPUS, but stem of fork half as long as lower prong ; fourth tarsal segment cordiform.

choreus Mg. 1804. G. Clifton Zoological Gardens (Ty.) 15/5/47. S. Shepton Mallet (C.), Prior Park, Bath (A.) 8/5/26.
culiciformis L. 1767. S. Nailsea (A.) 21/4/27.

CLINOTANYPUS Kieff. 1913

Like PROCLADIUS, but fourth tarsal segment cylindrical.

nervosus Mg. 1818. S. Kenn Moor (A.) 27/6/39.

S. F. DIAMESINAE

Like TANYPODINAE, but second longitudinal vein (R2 + 3) always present and unforked.

PRODIAMESA Kieff. 1906

olivacea Mg. 1818. G. Littledean (A.) 25/5/31.

S. F. ORTHOCLADIINAE

Cross-vein (m-cu) between fourth and fifth longitudinal veins absent ; fore-tibiae spurred.

BRILLIA Kieff. 1913

Wing clear ; cross-vein r-m long ; membrane hairy.

modesta Mg. 1830. S. Bicknoller (A.) 24/4/48.

METRIOCNEMUS v.d.Wulp 1874

Wing membrane bears decumbent hairs ; cross-vein r-m short.

S. G. METRIOCNEMUS *s.str.*

fuscipes Mg. 1818. G. Painswick (W.), Bristol (C.), Hallen (A.) 4/3/28, Dursley (A.) 4/6/30. S. Shapwick (A.) 25/3/21, Backwell (A.) 25/4/25, Blagdon, Mendip (A.) 17/4/28.

S. G. PARAPHAENOCLADIUS Thien. 1924

irritus Wlk. 1856. S. Axbridge (Rd.).

CRICOTOPUS v.d.Wulp 1874

Wing membrane bare ; eyes pubescent ; tibiae white-ringed.

pilularis Zett. 1850. S. Sharpham (A.) 22/8/22.

speciosus Goet. 1921. G. Minchinhampton (Rc.).

tremulus L. 1758. S. Axbridge (Rd.).

bicinctus Mg. 1818. S. Shepton Mallet (C.) 9/9/09.

motitator L. 1761. S. Nailsea (A.) 21/4/27.

biformis Edw. 1929. G. No locality (Edw.).

vitripennis Mg. 1818 (*variabilis* Staeg. 1839). G. Olveston (C.) 2/3/13, Fishponds (A.) 24/3/22. S. Shepton Mallet (C.).

HYDROBAENUS Fries 1830

(SPANIOTOMA Phil. 1865, ORTHOCLADIUS v.d.Wulp 1874)

Wing membrane and eyes bare ; tibiae unicolorous.

S. G. TRICHOCLADIUS Kieff. 1906

lucidus Staeg. 1839 (*lucens* Zett. 1842). S. Leigh woods (H.).*foveatus* Edw. 1929. G. Minchinhampton (Rc.).

S. G. BRYOPHAENOCLADIUS Thien. 1934

xanthogyne Edw. 1929. G. Blaise Castle (A.) 29/4/28.*thienemanni* Kieff. 1906. G. No locality. (Edw.).*brevicalcar* Kieff. 1911. G. No locality. (Edw.).

S. G. SMITTIA Holmg. 1869 (CAMPTOCLADIUS v.d.Wulp 1874)

aterrima Mg. 1818. G. Blaise Castle (A.) 18/3/22, Fishponds (A.) 24/3/22.

S. Blagdon, Mendip (A.) 17/4/28.

stercoraria Deg. 1776 (*byssinus* Schrk. 1803). G. Kingsweston (A.) 4/4/27; S. Leigh Woods (H.).*trilobata* Edw. 1929. S. Shapwick Edw.) 7/9/30.*brevifurcata* Edw. 1926. S. No locality (Edw.).

THALASSOMYIA Schin. 1856

Antennae of male not plumose; small, dark-brown, marine species.

frauenfeldi Schin. 1856. S. No locality. (Edw.).

S. F. CHIRONOMINAE

Like ORTHOCLADIINAE, but fore tibiae not spurred.

TENDIPES Mg. 1800 (CHIRONOMUS Mg. 1803)

Wings bare.

S. G. TENDIPES *s.str.**tentans* F. 1805. G. Westbury-on-Trym (A.) 9/20, Bristol (A.) 29/4/35. S. Sharpham (A.) 5/8/25, Nailsea (A.) 21/4/27, Clevedon (A.) 13/7/40, Shapwick (F.) 28/8/48.*pilicornis* F. 1787 (*moerens* Wlk. 1848). S. Blagdon, Mendip (A.) 19/6/28.*plumosus* L. 1758. G. Painswick (W.). S. Tickenham (A.) 26/4/36.var. *ferrugineovittatus* Zett. 1850. G. Stone (A.) 28/6/28. S. Keynsham (A.) 14/7/26.*annularius* Deg. 1776. S. Axbridge (Rd.).*cingulatus* Mg. 1830. G. Hallen (A.) 24/9/27.*aprilinus* Mg. 1830. G. Blaise Castle (A.) 10/4/21. S. Nailsea (A.) 21/4/27, Rodney Stoke (A.) 6/4/29.*riparius* Mg. 1804. G. Olveston (A.) 4/6/22. S. Cheddar (H.), Prior Park, Bath (A.) 20/5/29, Keynsham (A.) 1/6/29.*dorsalis* Mg. 1818. G. Painswick (W.). S. Dunster (A.) 8/16.var. *venustus* Staeg. 1839. G. Kingsweston (A.) 29/4/35.*paganus* Mg. 1838. G. Walham (Fl.) 19/8/43.*notatus* Mg. 1818. S. Shepton Mallet (C.), Tickenham (A.) 24/4/22.

S. G. CRYPTOCHIRONOMUS Kieff 1918

edwardsi Kruse. 1933 (*virescens* Goet. *nec* Mg.). S. Nempnett (C.).

S. G. GLYPTOTENDIPES Kieff. 1913

glaucus Mg. 1818 (*annularius* Verr. *nec* Deg., *pallens* Goet. *nec* Mg.). G. Olveston (A.) 8/4/23, Shepperdine (A.) 2/8/24, Hallen (A.) 12/4/26, Kingsweston (A.) 13/3/26. S. Taunton (C.), Burnham (A.) 28/8/22, Blagdon, Mendip (A.) 12/4/28, Sharpham (A.) 31/5/36.*paripes* Edw. 1929. S. Sharpham (A.) 7/8/25.

S. G. ENDOCHIRONOMUS Kieff. 1918

dispar Mg. 1830. **G.** Blaise Castle (A.) 18/2/22. **[S.]** Axbridge (Rd.), Shapwick (A.) 25/3/21, Tickenham (A.) 16/9/23, Sharpham (A.) 7/8/25, Prior Park, Bath (A.) 20/5/29, Clevedon (Bd.) 25/8/47.

impar Wlk. 1856. **G.** Tortworth (A.) 27/4/27.

tendens F. 1794. **S.** Sharpham (A.) 22/8/25.

rufipes L. 1761. **S.** Hanham (A.) 19/6/22, Taunton (A.) 9/6/24, Keynsham (A.) 24/5/36.

S. G. STENOCHIRONOMUS Kieff. 1919

gibbus F. 1794. **S.** Chewstoke (A.) 19/5/33.

S. G. PARATENDIPES Kieff. 1911

albimanus Mg. 1818. **S.** Shepton Mallet (C.).

S. G. MICROTENDIPES Kieff. 1921

pedellus Deg. 1776. **G.** Painswick (W.). **S.** Leigh Woods (H.), Sharpham (A.) 10/9/25, Prior Park, Bath (A.) 20/5/29, Keynsham (A.) 1/6/29.

chloris Mg. 1818. **S.** Blagdon, Mendip (A.) 18/4/28.

fuscipennis Mg. 1818 (*pedestris* Mg. 1830). **G.** Painswick (W.), Tortworth (A.) 27/4/27, Bristol (Wm.) 21/5/27. **S.** Chewstoke (A.) 19/5/33.

nitidus Mg. 1818. **S.** Leigh Woods (A.) 7/5/32.

S. G. STICTOCHIRONOMUS Kieff. 1919

maculipennis Mg. 1818. **G.** Minchinhampton (Rc.).

PENTAPEDILUM Kieff. 1913

Wing hairy; squamae fringed.

tendipediforme Goet. 1921. **S.** Shapwick (Edw.) 7/9/30.

flavipes Mg. 1818. **S.** Dundry (A.) 13/2/21.

TANYTARSUS v.d.Wulp 1874

Wing hairy; squamae not fringed.

S. G. LUNDSTROEMIA Kieff. 1921

praecox Mg. 1818. **S.** Nailsea (A.) 21/4/27, Rodney Stoke (A.) 6/4/29.

bituberculata Edw. 1929. **G.** Minchinhampton (Rc.).

S. G. TANYTARSUS *s.str.*

tenuis Mg. 1830. **G.** Bristol (A.) 25/9/33.

Family:—Heleidae (CERATOPOGONIDAE)

Small, black midges, some of which are blood suckers and attack man; male has antennae with a brush of long hairs; the wing has two, long-forked veins and short, thick, dark veins close to the costa; larvae saprophagous. Family neglected locally.

FORCIPOMYIA Mg. 1818

Empodium as long as claws; thick vein near costa short, wings densely hairy, eyes bare; females suck juices of other insects, do not attack man.

S. G. FORCIPOMYIA *s.str.*

pallida Winn. 1852. **G.** Stroud (Fl.) 24/8/38.

bipunctata L. 1767. **G.** Stroud (Fl.) 2/7/42. **S.** West Town (Wm.) 26/8/28, Clevedon (A.) 17/9/39.

brevipennis Macq. 1826. **G.** Aust (A.) 6/9/22.

picea Winn. 1852. **S.** Vallis Vale, Frome (Wm.) 6/6/27.

- titillans* Winn. 1852. S. G. EUFORCIPOMYIA Mall. 1915
S. Shapwick (Edw.) 7/9/30.
- palustris* Saund. 1925. S. G. THYRIDOMYIA Saund. 1925
S. Shapwick (Edw.) 7/9/30.

ATRICHOPOGON Kieff. 1906

- Empodium as long as claws, thick veins near costa long, wing sparsely hairy, eyes bare; female attacks Beetles, not man.
- winnertzi* Goet. 1922. G. Painswick (W.) 8/7/02.

TETRAPHORA Phil. 1865 (DASYHELEA Kieff. 1911)

- Empodium short or absent, thick veins near costa short, wing densely hairy, eyes pubescent; female does not attack man.
- holosericea* Mg. 1804 (*aestiva* Winn. 1852). G. Westbury-on-Trym (A.) 4/21.
- flavoscutellata* Zett. 1850 (*egens* Winn. 1852). S. Backwell (Wm.) 29/7/28,
Shapwick (Edw.) 7/9/30.
- versicolor* Winn. 1852. S. Brockley Combe (Wm.) 21/8/28.

CULICOIDES Lat. 1809

- Empodium short; thick veins near costa long, wing hairy and usually spotted; eyes bare; females attack man.
- nubeculosus* Mg. 1830. S. Tickenham (A.) 6/21.
- riethi* Kieff. 1914. S. Burnham (W. H. Thorpe) 27.
- chiopterus* Mg. 1830. G. Bristol (A.) 25/9/33. S. Clevedon (A.) 20/10/39.
- obsoletus* Mg. 1818 (*varius* Winn. 1852). G. Painswick (W.). S. Backwell (Wm.)
2/9/28, Clevedon (A.) 5/10/39.
- pulicaris* L. 1758. G. Painswick (W.), Kingsweston (A.) 20/4/25, Stroud (Fl.)
12/4/43. S. Shepton Mallet (C.), Shapwick (A.) 20/5/23, Blagdon,
Mendip (A.) 17/4/28.

SERROMYIA Mg. 1818

- Empodium absent, thick veins under costa long, hind-femora thick and spiny beneath, eyes bare, wings sparsely hairy, predaceous on other insects, do not attack man.
- femorata* Mg. 1804. S. Nailsea (C.), Holford (A.) 8/19, Shapwick (A.) 20/5/23.

STILOBEZZIA Kieff. 1911

- Like SERROMYIA, but hind-femora not thickened.
- flaviostris* Winn. 1852. S. Nailsea (Wm.) 20/7/29.

JOHANNSENYOMYIA Mall. 1915 (SPHAEROMIAS Curt. 1829 *p.p.*)

- Like STILOBEZZIA, but wing bare.
- nitida* Macq. 1826. G. Painswick (W.) 8/7/91, Olveston (A.) 18/6/22.

PALPOMYIA Mg. 1818

- Like JOHANNSENYOMYIA, but fore-femora spinulose beneath.
- flavipes* Mg. 1804. S. Tickenham (A.) 27/5/22.

BEZZIA Kieff. 1899

- Like PALPOMYIA but thick veins below costa short and fore-femora with no spines or at most three.
- nigritula* Zett. 1838. S. Rodney Stoke (A.) 6/4/29.
- ornata* Mg. 1830. S. Sharpham (A.) 9/8/25.

Family :—**Thaumaleidae** (ORPHNEPHILIDAE)**THAUMALEA** Ruthe 1831 (ORPHNEPHILA Hal. 1832)

Small, rather stout, dark-brown flies with broad wings which have six unforked veins; antenna short with eleven segments; found near streams; larvae aquatic, feed on Diatoms.

verralli Edw. 1929. **S.** Weston-s-Mare (Wm.) 28/7/28, St. Audries (A.) 26/8/29, Clevedon (A.) 2/9/29.

Family :—**Melusinidae** (SIMULIIDAE)

These are small, dark, hump-backed flies with broad, clear wings, the upper veins are dark, the other eight are faint; ocelli absent; antennae short with eleven segments; they are known as Sand or Black Flies; some of the females are blood-suckers and attack man, the males often dance in the air in swarms in the evening; the larvae are aquatic, they live in running water, are attached to stones or plants and waft food particles into the mouth by means of a pair of fringed appendages.

MELUSINA Mg. 1800 (SIMULIUM Lat. 1802)**S. G. MELUSINA** *s.str.*

ornata Mg. 1818. **G.** Cirencester (T.) 28/6/23, Bristol (B.) 22/7/26, Blaise Castle (F.) 29/9/46, Coombe Dingle (F.) 16/4/47. **S.** Taunton (C.), Wells (C.).

reptans L. 1758. **S.** Shepton Mallet (C.).

equina L. 1758. **S.** Taunton (C.).

S. G. EUSIMULIUM Roub. 1906

latipes Mg. 1804. **G.** Olveston (C.) 25/8/13. **S.** Tickenham (A.) 24/4/22, Clevedon (A.) 10/9/41.

aureum Fries 1824 (*angustipes* Edw. 1915). **G.** Stone (A.) 27/6/38. **S.** Wells (C.), Mendip Caves (Gl.) 17/7/47. This family has been neglected locally.

Family :—**Bibionidae**

Large and medium-sized, black, hairy flies; eyes round and hairy; ocelli present; antennae short, thick, with seven to nine segments; tibiae spurred; upper veins of wing usually darker than the other six veins, no discal cell; larvae are saprophagous; all species rather common.

BIBIO Geoff. 1762

There is a strong, beak-like process at the tip of the fore-tibia.

venosus Mg. 1804. **G.** Painswick (W.), Kingsweston (A.) 6/5/28, Blaise Castle (F.) 24/4/48. **S.** Shepton Mallet (C.), Blagdon, Mendip (A.) 21/4/28, West Town (Wm.) 29/4/28, Shapwick (Wm.) 24/5/30, Portbury (F.) 4/8/37, Brockley Combe (A.) 17/5/47.

leucopterus Mg. 1804. **G.** Painswick (W.), Blaise Castle (Wm.) 1922. **S.** Shepton Mallet (C.), Axbridge (Rd.), Shapwick (A.) 20/5/23, Prior Park, Bath (A.) 8/5/26, Leigh Woods (A.) 20/5/26, Keynsham (A.) 1/6/29.

pomonae F. 1775. **G.** Wotton-under-Edge (P.), Oldbury Court (Wm.) 25/6/27. **S.** Shepton Mallet (C.), Shapwick (Sl.) 22/6/27, Flax Bourton (Wm.) 2/7/27.

marci L. 1758. **G.** and **S.** Common in April, known as St. Mark's Fly.

hortulanus L. 1758. **G.** Wotton-under-Edge (P.), Durdham Down (F.) 10/5/47. **S.** Cannington (Sl.), Leigh Woods (H.).

clavipes Mg. 1818. **G.** Painswick (W.), Bristol (C.). **S.** Freshford (Bl.) and (C.) Bleadon (C.).

nigriventris Hal. 1833. **G.** Painswick (W.), Blaise Castle (F.) 10/5/47, Coombe Dingle (F.) 20/5/47, Bristol (F.) 14/4/48. **S.** Leigh Woods (H.) 19/5/19, Longleat (Ch.) 14/6/25, Burrington Combe (Wm.) 14/5/27, Clevedon (A.) 22/5/39.

- ferruginatus* L. 1767. **G.** Wotton-under-Edge (P.).
reticulatus Lw. 1846. **G.** Coombe Dingle (F.) 8/5/47. **S.** Leigh Woods (H.).
johannis L. 1767. **G.** and **S.** Very common in May, known as St. John's Fly.
laniger Mg. 1818. **G.** and **S.** Common, with *johannis* L.
varipes Mg. 1830. **G.** Winterbourne (A.) 28/4/23, Kingsweston (A.) 2/5/26,
 Blaise Castle (A.) 15/5/26, Tortworth (A.) 27/4/27. **S.** Backwell (A.)
 25/4/26, Clevedon (A.) 4/5/27, Leigh Woods (H.) and (A.) 5/5/28,
 Keynsham (A.) 14/5/32.
 var. *hybridus* Hal. 1833. **G.** Blaise Castle (A.) 15/5/26. **S.** Backwell (A.)
 25/4/26, Clevedon (A.) 25/4/41.

DILOPHUS Mg. 1803

There is a crown of thorns at the apex of the fore-tibia.

- febrilis* L. 1758. **G.** and **S.** Very common in Spring, known as Fever Fly.
femoratus Mg. 1804 (*albipennis* Mg. 1830). **G.** Painswick (W.), Kingsweston (A.)
 31/5/25, Filton (A.) 1/6/32 and (F.) 30/5/46. **S.** Shepton Mallet (C.),
 Tickenham (A.) 20/5/21, Leigh Woods (A.) 25/5/25, Priddy (A.) 7/6/36.

Family :—Scatopsidae

Like BIBIONIDAE, but smaller; eyes reniform; body not hairy; no spurs on tibiae; wing veins reduced in number.

PSECTROSCIARA Kieff. 1912

Veins of wing bear fine hairs, upper prong of forked vein interrupted at the base.

S. G. ALDROVANDIELLA End. 1912

- coxendix* Verr. 1912. **S.** Sharpham (A.) 7/9/25.
halterata Mg. 1838. **G.** Olveston (A.) 6/21. **S.** Shapwick (A.) 3/9/22.

S. G. PSECTROSCIARA *s.str.*

- soluta* Lw. 1846 (*palustris* Edw. 1925). **S.** Clevedon (A.) 12/8/40.
tenuicauda Duda 1929 (*soluta* Edw. *nec* Lw.). **S.** Tickenham (A.) 19/7/24.

SWAMMERDAMELLA End. 1912

Costa very short, upper prong of forked vein complete, veins bare.

- brevicornis* Mg. 1830. **G.** Shepperdine (A.) 15/8/24.

SCATOPSE Geoff. 1762

Like SWAMMERDAMELLA, but costa and fork of vein longer.

- notata* L. 1758. **G.** Olveston (A.) 6/21, Bristol (A.) 11/9/29. **S.** Tickenham
 (A.) 16/9/21, Clevedon (A.) 2/9/39. Sometimes found indoors.
flavicollis Mg. 1818. **G.** Rodborough, Stroud (Fl.) 27/9/43, Blaise Castle (F.)
 8/11/47. **S.** Leigh Woods (H.), Clevedon (A.) 1/11/47.
picea Mg. 1818. var. *scutellata* Lw. 1846. **G.** Painswick (W.) **S.** Clevedon (A.)
 26/9/39.
geniculata Zett. 1850. **S.** Clevedon (A.) 12/9/40 and 20/8/47.
fuscipes Mg. 1830 (*recurva* Lw. 1846). **G.** Bristol (Wm.) 28/10/22. **S.** West
 Town (Wm.) 22/7/28.

Family :—Fungivoridae (MYCETOPHILIDAE)

Medium-sized to small flies of various colours, known as Fungus Gnats; ocelli present; no transverse suture on thorax; third and fourth longitudinal veins usually forked; tibiae spurred; many of the larvae live in fungi (the few known hosts are recorded); flies usually found in woods.

S. F. DITOMYIINAE

Lower cross-vein (m-cu) present, first vein below costa (Sc.) is short and does not end in the costa, wing hairy.

SYMMERUS Wlk. 1848

annulatus Mg. 1830. G. Painswick (W.), Wotton-under-Edge (P.). S. West Town (Wm.) 25/6/27. Rare, larvae in rotten wood.

S. F. BOLITOPHILINAE

Like DITOMYIINAE, but Sc. long and ending in costa, wing bare.

BOLITOPHILA Mg. 1818

glabrata Lw. 1869. S. Wells (L.). Larvae in *Clitocybe nebularis* Quel. Rare.

cinerea Mg. 1818. G. Blaise Castle (Wm.) 29/10/22 and (A.) 3/9/30. S. Leigh Woods (A.) 18/10/24, Clevedon (A.) 30/9/46. Larvae in *Hypholoma velutinum* (Pers.) Fr. Not uncommon.

saunderii Curt. 1836. G. Hallen (A.) 10/10/25, Dursley (A.) 12/10/30. S. Leigh Woods (H.) and (A.) 27/10/22, Brockley Combe (Wm.) 23/4/27. Larvae in *Hypholoma fasciculare* (Huds.) Fr. and *Tricholoma personatum* Fr. Fairly common.

spinigera Edw. 1924. G. Blaise Castle (A.) 18/2/22. Rare.

S. F. EUPHROSYNINAE (MACROCERINAE)

Antennae very long and thread-like; only one cross-vein (m-cu), wing finely hairy. Life-history uncertain, larvae may be carnivorous.

EUPHROSYNE Mg. 1800 (MACROCERA Mg. 1803)

anglica Edw. 1924. S. West Town (Wm.) 22/7/28. Rare.

vittata Mg. 1830. G. Painswick (W.), Oldburv Court (Wm.) 23/6/27. S. Leigh Woods (H.), Brockley Combe (F.) 25/5/47. Fairly common.

pusilla Mg. 1830. S. West Town (Wm.) 22/7/28. Rare.

lutea Mg. 1804. G. Painswick (W.). S. Cranmore Woods (C.) 24/8/07. Uncommon.

fasciata Mg. 1804. G. Hallen (A.) 10/10/25, Bristol (A.) 20/10/25, Blaise Castle (A.) 28/5/27. S. Weston-s-Mare (J.), Leigh Woods (A.) 22/5/26, Clevedon (A.) 6/6/40, Brockley Combe (A.) 17/5/47. Common, may be found in caves and dwellings, largest species 6-8 mm.

centralis Mg. 1818. G. Kingsweston (A.) 9/6/23. S. Shepton Mallet (C.), Clevedon (A.) 14/5/27. Fairly common.

angulata Mg. 1818. G. Painswick (W.), Blaise Castle (Wm.) 17/6/22, Hallen (A.) 13/6/26. S. West Town (Wm.) 11/8/28. Fairly common.

maculata Mg. 1818. S. Tickenham (A.) 19/6/43. Rare.

phalerata Mg. 1818. S. Kewstoke (Wm.) 25/7/22, Nailsea (Wm.) 6/29. Not uncommon.

stigma Curt. 1837. G. Painswick (W.), Winterbourne (A.) 13/5/23, Blaise Castle (A.) 11/5/24, Kingsweston (A.) 31/5/24. S. Leigh Woods (H.) 30/5/18 and (Wm.) 13/3/20 and (A.) 22/5/26, Pensford (A.) 24/5/23, Vallis Vale, Frome (A.) 31/5/36. Common.

S. F. CEROPLATINAE

Like EUPHROSYNINAE, but antennae thick and short; larvae carnivorous.

APEMON Joh. 1909

marginatum Mg. 1804. G. Wotton-under-Edge (P.). S. Wells (L.), Brockley Combe (Chm.) 16/5/26, and (F.) 25/5/47, Clevedon (A.) 3/6/40. Fairly common; large (10-12 mm), black, shining fly with yellow femora.

ASINDULUM Lat. 1804

S. G. MACRORRHYNCHA Winn. 1846

flava Winn. 1846 (*rostrata* Edw. nec Zett.). S. Leigh Woods (H.) 6/7/17 and 17/6/18, Flax Bourton (Wm.) 2/8/27, Tickenham (A.) 12/6/40. Fairly common.

URYTALPA Edw. 1929 (ZELMIRA Mg. 1800 *p.p.*)

ochracea Mg. 1818 (*dorsalis* Staeg. 1840). G. Olveston (A.) 6/21.

var. *nigriceps* Wlk. 1856. G. Kingsweston (A.) 31/5/25. Not uncommon.

NEOPLATYURA Mall. 1928 (ZELMIRA Mg. 1800 *p.p.*)

biimbrata Edw. 1913. S. West Town (Wm.) 10/9/28. Rare.

nigricauda Strobl 1893. S. Shepton Mallet (A.) 29/6/42. Rare.

modesta Winn. 1863. S. St. Audries (A.) 19/8/29. Rare.

ANTLEMON Hal. 1871

servulum Wlk. 1837. S. Leigh Woods (H.) 1916. Rare.

ISONEUROMYIA Brun. 1912 (ZELMIRA Mg. 1800 *p.p.*)

baumhaueri Mg. 1818, 235 (*semirufa* Mg. 1818, 237). G. Blaise Castle (A.) 8/21.

S. Wells (L.), West Town (Wm.) 29/7/28. Fairly common.

ZELMIRA Mg. 1800 (PLATYURA Mg. 1803)

memoralis Mg. 1818. G. Kingsweston (A.) 6/6/26. S. Leigh Woods (A.) 22/5/27. Fairly common.

pallida Staeg. 1840. S. Clevedon (A.) 24/6/44. Uncommon.

nigricornis F. 1805. G. Bristol (Wm.) 13/6/25 and (A.) 14/7/37. Rare.

fasciata Mg. 1804. G. Painswick (W.) 28/7/92. S. Culmhead (H.), Leigh Woods (H.), Brockley Combe (Wm.) 25/6/25, Clevedon (Bd.) 29/6/41. Common.

CEROPLATUS Bosc. 1792

vestaceus Dalm. 1818. S. Shepton Mallet (C.). Rare.

CEROTELION Rond. 1856

lineatus F. 1775. G. Olveston (C.). S. Leigh Woods (H.), Long Ashton (H.), Portishead (Bt.), Holford (Sl.) and (Wm.) 25/7/25, West Town (Wm.) 28/6/29, St. Audries (A.) 30/8/29, Clevedon (A.) 31/5/48. Fairly common.

humeralis Zett. 1850. G. Olveston (C.). S. Leigh Woods (H.). Rare.

S. F. SCIOPHILINAE

Lower cross-vein (m-cu) absent; eyes round; lateral ocelli far from edge of eyes; larvae probably carnivorous; some are fungivorous.

TRIBE :—MYCOMYIINI

Two ocelli situated close together; wings with only fine pubescence.

MYCOMYIA Rond. 1856

Larvae in webs under bark.

winnertzi Dz. 1885. G. Wotton-under-Edge (P.), Hallen (A.) 24/9/27. S. Leigh Woods (H.), Brockley Combe (J.), Clevedon (A.) 12/10/45. Fairly common.

hyalinata Mg. 1830. S. Leigh Woods (A.) 18/10/24. Rare.

flavicollis Zett. 1852. G. Dursley (A.) 12/10/30. Rare.

trilineata Zett. 1838. G. Blaise Castle (A.) 28/5/27. S. Sharpham (A.) 9/8/23. Fairly common.

TRIBE :—SCIOPHILINI

Three ocelli, wings with fairly long hairs, second long vein (R₅) long.

LEPTOMORPHUS Curt. 1831

walkeri Curt. 1831. **G.** Olveston (C.), Kingsweston (A.) 29/9/24. 11-12 mm. Rare.

NEURATELIA Rond. 1856

nemoralis Mg. 1818. **G.** Hallen (B.) 29/5/29. **S.** Leigh Woods (H.) 30/5/18 and (A.) 22/5/27, Portishead (Wm.) 21/5/27. Not uncommon.

SCIOPHILA Mg. 1818

varia Winn. 1863. **S.** Leigh Woods (A.) 18/10/24. Rare.

lutea Macq. 1826. **G.** Stone (A.) 27/6/28. Uncommon. Has been bred from *Polyporus giganteus* (Pers.) Fr., *Hydnum repandum* (L.) Fr. and *Stereum hirsutum* (Wild.) Fr.

hirta Mg. 1818. **G.** Bristol (Wm.) 16/9/22. Fairly common. Has been bred from *Daedalea quercina* (L.) Fr., *Poria vaporaria* (Pers.) Fr., *Polystictus versicolor* (L.) Fr., *Auricularia auricula-judae* (L.) Schroet. and *Lactarius volemus* Fr.

ACNEMIA Winn. 1863

nitidicollis Mg. 1818. **G.** Blaise Castle (Wm.) 18/2/22. Not uncommon.

TRIBE :—GNORISTINI

Three ocelli ; wings pubescent or bare, second vein (R₅) long.

PALAEODOCOSIA Meun. 1904 (DZIEDZICKIA Joh. 1909 *p.p.*)

alpicola Strobl 1894. **S.** Ebbor Rocks, Wells (Cw.) 31/8/48. Rare.

APOLIPHTHISA Grz. 1885

subincana Curt. 1837. **S.** Leigh Woods (Edw.) 6/9/30. Uncommon. Has been bred from *Poria vaporaria* (Pers.) Fr.

BOLETINA Staeg. 1840

trivittata Mg. 1818. **G.** Blaise Castle (A.) 28/5/27. **S.** Leigh Woods (H.) and (A.) 22/5/26. Fairly common.

dubia Mg. 1804 (*inermis* Lundst. 1906). **G.** Blaise Castle (A.) 9/6/21. **S.** Wells (L.), Abbots Leigh (Wm.) 8/5/27. Fairly common. Larvae possibly in Liverworts.

dispecta Dz. 1885. **S.** Leigh Woods (Edw.) 6/9/30. Rare.

nitida Grz. 1885. **S.** Leigh Woods (Edw.) 9/36. Uncommon.

basalis Mg. 1818. **S.** Brockley Combe (H.) 26/5/16. Uncommon.

nigricans Dz. 1885. **G.** Blaise Castle (Wm.) 18/2/22. Rare.

gripha Dz. 1885. **G.** Dursley (A.) 30/3/30 and 16/10/30. **S.** Leigh Woods (H.), Clevedon (A.) 11/4/42. Common.

SYNAPHA Mg. 1818

vitripennis Mg. 1818. **G.** Dursley (A.) 12/10/30. Not uncommon.

TRIBE :—LEIINI

Like SCIOPHILINI, but second long vein (R₅) short.

LEIA Mg. 1818

winthemi Lehm. 1822. **S.** Leigh Woods (H.) 1916. Rare.

strobl Land. 1925. **G.** Tormarton (A.) 20/5/36. Rare.

- fascipennis* Mg. 1818. **G.** Cirencester (T.) 7/6/23, Olveston (A.) 8/10/22.
S. Portishead (A.) 24/9/21, Moreton (A.) 15/6/31, Clevedon (A.) 16/9/41.
 Fairly common.
- crucigera* Zett. 1838. **S.** Sharpham (A.) 10/9/25. Rare.
- cylindrica* Winn. 1863. **S.** Sharpham (A.) 10/9/25, Clevedon (A.) 1/9/39.
 Uncommon.
- bimaculata* Mg. 1804, var. *fasciola* Mg. 1818. **S.** Leigh Woods (H.) 9/8/19,
 Clevedon (A.) 20/6/34, 21/8/40 and 11/9/41. Fairly common.

MEGOPHTHALMIDIA Dz. 1889

- crassicornis* Curt. 1837. **S.** Clevedon (A.) 20/8/40. Rare.

DOCOSIA Winn. 1863

- sciarina* Mg. 1830. **G.** Frenchay (A.) 14/4/35. Not uncommon.

S. F. FUNGIVORINAE (MYCETOPHILINAE)

Like SCIOPHILINAE, but ocelli close to or touching edge of eyes, wings finely hairy, mainly fungivorous.

TRIBE :—EXECHIINI

Meso- and ptero-pleura bare, hind coxae with bristle at base, tibial bristles short.

ANATELLA Winn. 1863

Costa produced beyond apex of second long vein.

- stigerana* Edw. 1921. **S.** Rodney Stoke (A.) 6/4/29. Rare.

EXECHIA Winn. 1863

Costa ending at apex of second long vein, base of lower fork beyond that of upper fork.

- spinigera* Winn. 1863. **G.** Clifton Down (Wm.) 1/2/22. Fairly common. Has been bred from *Hygrophorus chlorophanus* Fr.

- fusca* Mg. 1804. **G.** Painswick (W.), Blaise Castle (A.) 18/2/22 and (Wm.) 18/3/22, Olveston (A.) 5/11/22, Dursley (A.) 12/10/30. **S.** Shepton Mallet (C.). Common. Has been bred from *Boletus versicolor* Rostk., *Amanita mappa* Batsch., *Tricholoma nudum* Fr., *Hebeloma crustuliniformis* (Bull.) Fr., *Clitocybe infundibuliformis* (Schaeff.) Fr., *Hygrophorus chlorophanus* Fr. and others.

- dorsalis* Staeg. 1840. **G.** Dursley (A.) 12/10/30. Fairly common. Has been bred from *Cortinarius hinnuleus* Fr. and *Laccaria laccata* (Scop.) Cooke.

- nana* Staeg. 1840. **G.** Hallen (A.) 14/9/25. Fairly common.

- parva* Lundst. 1909. **G.** Blaise Castle (A.) 24/10/22. **S.** Clevedon (A.) 27/10/47. Fairly common. Has been bred from *Armillaria mellea* (Vahl.) Fr.

- festiva* Winn. 1863. **S.** Backwell (A.) 25/4/26. Uncommon.

- contaminata* Winn. 1863. **S.** Clevedon (A.) 23/9/41. Uncommon.

- trivittata* Staeg. 1840. **G.** Olveston (A.) 5/11/22. Fairly common.

- trisinata* Edw. 1913. **G.** Clifton Down (Wm.) 5/2/22, Blaise Castle (A.) 18/2/22. Fairly common.

- unguiculata* Lundst. 1911. **G.** Blaise Castle (Wm.) 18/2/22 and (A.) 4/3/22. **S.** Leigh Woods (A.). Fairly common.

- subulata* Winn. 1863. **G.** Blaise Castle (F.) 16/7/48. Fairly common.

RHYMOSIA Winn. 1863

Like EXECHIA, but base of lower fork situated before that of upper fork, lowest longitudinal vein (An.) long and strong.

- cristata* Staeg. 1840. **G.** Blaise Castle (Wm.) 20/8/22. Rare.

- domestica* Mg. 1830. **G.** Blaise Castle (A.) 15/5/26. **S.** Wells (L.) Rodney Stoke (A.) 9/6/29, Leigh Woods (A.) 12/4/30, West Town (Ma.) 6/10/45. Fairly common. Has been bred from *Tricholoma nudum* Fr., *Clitocybe infundibuliformis* (Schaeff.) Fr., *Clitocybe nebularis* (Batsch.) Fr. and *Marasmius orcadis* (Balt.) Fr.
- excogitata* Dz. 1909 (*macrura* auctt. nec Winn.). **S.** Blagdon, Mendip (A.) 19/4/28. Uncommon.
- fenestralis* Mg. 1818. **G.** Painswick (W.), Olveston (A.) 24/3/23, Dursley (A.) 12/10/30. **S.** Leigh Woods (H.), Mendip cave (Wm.) 25/3/33. Common. Has been bred from *Pholiota aurea* (Mall.) Fr., *Cortinarius fulgens* (A. and S.) Fr., *Pleurotus ostreatus* (Jacq.) Fr., *Eutoloma porphyrophaeum* Fr., *Clitocybe infundibuliformis* (Schaeff.) Fr., and *Armillaria mellea* (Vahl.) Fr.
- fasciata* Mg. 1804. **G.** Painswick (W.), Blaise Castle (Wm.) 22/3/21, Olveston (A.) 24/3/23, Bristol (A.) 2/12/24 and (B.) 11/2/28. **S.** Clevedon (A.) 29/9/41, Mendip cave (D.) 5/4/47. Common. Has been bred from *Tricholoma spp.* and *Clavaria inaequalis* (Mull.) Quel.
- spimpes* Winn. 1863. **G.** Blaise Castle (A.) 4/3/22. **S.** Leigh Woods (A.) 12/10/22. Rare.

ALLODIA Winn. 1863

Like RHYMOSIA, but lowest longitudinal vein short and weak, no fold in wing below the lower fork.

- crassicornis* Stann. 1831. **G.** Blaise Castle (Wm.) 9/7/22 and (A.) 11/4/27. **S.** Shepton Mallet (C.) 1/3/09, Clevedon (A.) 21/8/40 and 1/5/42. Fairly common.
- Jugens* Wied. 1817. **G.** Blaise Castle (A.) 18/3/22. **S.** Leigh Woods (H.), (Wm.) 12/3/22 and (A.) 31/9/27. Common. Has been bred from *Armillaria mellea* (Vahl.) Fr.
- ornaticollis* Mg. 1818. **G.** Olveston (C.) and (A.) 15/9/28. **S.** Portishead (A.) 12/11/22, Leigh Woods (A.) 10/9/34. Common. Has been bred from *Hygrophorus coccineus* (Schaeff.) Fr., *Russula sardonica* Fr., *Paxillus involutus* (Batsch.) Fr., and *Inocybe pyriodora* (Pers.) Fr. var. *incarnata* (Bres.) Maire.
- grata* Mg. 1830 (*nigricollis* Edw. nec Zett.). **G.** Blaise Castle (A.) 11/4/27. **S.** Clevedon (A.) 28/11/48. Common. Has been bred from *Paxillus involutus* (Batsch.) Fr. and *Hebeloma crustuliniformis* (Bull.) Fr.
- fuscipennis* Staeg. 1840. **S.** Clevedon (A.) 25/3/42. Not uncommon.
- griseicollis* Staeg. 1840 (*caudata* Winn. 1863). **G.** Olveston (A.) 5/11/22. Not uncommon.

BRACHYPEZA Winn. 1863

Like ALLODIA, but a well marked fold in the wing below the lower fork.

- helvetica* Wlk. 1856 (*spuria* Edw. 1913). **G.** Blaise Castle (A.) 3/9/30. **S.** Wells (L.). Uncommon.

TRIBE :—FUNGIVORINI

Mesopleura hairy, hind coxae bare.

POLYXENA Mg. 1800 (CORDYLA Mg. 1803)

Pteropleura bare, tibial bristles short, second segment of palpi swollen.

- fusca* Mg. 1804. **G.** Hallen (A.) 14/9/25. **S.** Leigh Woods (A.) 27/9/25. Uncommon. Has been bred from *Russula* spp.

PHRONIA Winn. 1863

Like POLYXENA, but palpi normal as in all other FUNGIVORIDAE. All the following species are fairly common :—

- flavipes* Winn. 1863. **S.** Clevedon (A.) 5/9/41.
- exigua* Zett. 1852. **G.** Hallen (A.) 24/9/29. **S.** Clevedon (A.) 23/9/41.

- forcipula* Winn. 1863. S. Clevedon (A.) 6/5/41.
basalis Winn. 1863. S. Weston-s-Mare (H.)
forcipata Winn. 1863. G. Kingsweston (A.) 20/4/25. S. Leigh Woods (Edw.)
 6/9/30.
cinerascens Winn. 1863. G. Hallen (A.) 24/9/27.
tarsata Stæg 1840. G. Clifton Down (Wm.) 5/2/22.
tenuis Winn. 1863. S. Leigh Woods (A.) 31/9/27 and 12/4/30.
conformis Wlk. 1856. G. Olveston (A.) 2/5/22.
dubia Dz. 1889. S. Clevedon (A.) 23/9/41.
signata Winn. 1863. S. Leigh Woods (A.) 12/10/22.

DYNATOSOMA Winn. 1863

Pteropleura bare ; tibial bristles long ; eight scutellar bristles.

- fuscicorne* Mg. 1818. S. Leigh Woods (H.) 1/7/18, Shapwick (A.) 21/5/23,
 Clevedon (A.) 18/5/40. Fairly common. Has been bred from *Polyporus*
squamosus (Huds.) Fr. *Polyporus betulinus* (Bull.) Fr., *Polystictus versicolor* (L.)
 Fr., *Daedalia quercina* (L.) Fr., *Trametes suaveolens* (L.) Fr. and *Lenzites betulina*
 (L.) Fr.

FUNGIVORA Mg. 1800 (MYCETOPHILA Mg. 1803)

Pteropleura hairy, tibial bristles long, fourth longitudinal vein (Cu.) forked,
 costa not extending beyond apex of second long vein, four scutellar bristles.

- fungorum* Deg. 1776. G. and S. Very common. Has been bred from *Armillaria*
mellea (Vahl.) Fr., *Boletus edulis* (Bull.) Fr., *Boletus calopus* Fr. *Boletus luridus*
 (Schaeff.) Fr., *Boletus submentosus* (Schaeff.) Fr., *Boletus versicolor* Rostk., *Russula*
atropurpurea Krombh., *Russula delicata* Fr., *Russula cyanoxantha* (Schaeff.) Fr.,
Russula fellea Fr., *Russula ochroleuca* Fr., *Clitocybe giganteus* (Sow.) Fr., *Lactarius*
vellerius Fr., *Hypholoma fasciculare* (Huds.) Fr., *Amanita citrina* (Schaeff.) Roques,
Amanitopsis vaginata (Bull.) Roze.
lineola Mg. 1818. G. Clifton Down (Wm.) 1/2/22, Blaise Castle (A.) 29/10/22,
 Olveston (A.) 5/11/22. S. Shepton Mallet (C.), Leigh Woods (A.) 12/10/22,
 West Town (Wm.) 24/1/26. Common. Has been bred from *Sparassis*
laminosa Fr., *Russula fellea* Fr., *Russula nigricans* Fr., *Lactarius vellerius* Fr.,
Lactarius volemus Fr., *Cortinarius hinnuleus* Fr. and *Hebeloma crustuliniformis*
 (Bull.) Fr.
ocellus Wlk. 1848 (*dimidiata* Staeg. 1840 *preoc.*). G. Blaise Castle (Wm.) 29/2/22,
 Olveston (A.) 5/11/22, Bristol (Wm.) 11/11/22, Kingsweston (A.) 26/11/24,
 Dursley (A.) 30/3/30. Common. Has been bred from *Poria vaporaria*
 (Pers.) Fr., *Phlebia merismoides* Fr., *Sparassis crispa* (Wulf.) Fr., and *Pleurotus*
ostreatus (Jacq.) Fr.
formosa Lundst. 1911. S. Bourton Combe (Wm.) 8/4/22. Fairly common.
 Has been bred from *Phlebia merismoides* Fr.
unicolor Stann. 1831. G. Blaise Castle (Wm.). S. Leigh Woods (H.) 6/5/18.
 Rare.
vittipes Zett. 1852. S. Clevedon (A.) 1/5/42. Fairly common.
gibbula Edw. 1924. G. Blaise Castle (Wm.) 29/10/22. Fairly common.
ornata Steph. 1829. G. Blaise Castle (Wm.) 7/8/23. S. West Town (Wm.)
 10/7/27. Common. Has been bred from *Polystictus versicolor* (L.) Fr.,
Polyporus giganteus (Pers.) Fr., *Pleurotus ostreatus* (Jacq.) Fr.
curviseta Lundst. 1911. G. Clifton Down (Wm.) 5/2/24, Blaise Castle (A.)
 16/3/24. S. Leigh Woods (A.) 12/4/30. Rare.
marginata Winn. 1863. G. Clifton Down (Wm.) 27/1/22, Blaise Castle (A.)
 4/3/22, (Wm.) 13/3/22 and (F.) 16/7/48. S. Leigh Woods (H.), Backwell
 (A.) 13/5/34. Common. Has been bred from *Polystictus versicolor* (L.) Fr.,
Poria vaporaria (Pers.) Fr., *Fistulina hepatica* (Huds.) Fr.

- finlandica* Edw. 1913. **S.** St. Audries (A.) 25/8/29. Rare.
luctuosa Mg. 1830. **S.** Clevedon (A.) 10/10/41 and 1/5/42. Not uncommon.
 Has been bred from *Paxillus involutus* (Batsch.) Fr.
signatoides Dz. 1884. **G.** Stone (A.) 27/6/28, **S.** Shapwick (Wm.) 6/8/22,
 Nailsea (Wm.) 8/22, Clevedon (A.) 4/9/41. Common. Has been bred
 from *Boletus spp.*
guttata Dz. 1884. **S.** Leigh Woods (A.) 15/9/30. Common. Has been bred
 from *Russula nigricans* Fr.
tarsata Winn. 1863 (*occultans* Lundst. 1913). **G.** Blaise Castle (A.) 29/10/22.
 Rare.
trinotata Staeg. 1840. **G.** Olveston (A.) 25/4/23. **S.** Clevedon (A.) 17/12/48.
 Common. Has been bred from *Polystictus versicolor* (L.) Fr. and *Polyporus*
adustus (Wild.) Fr.
cingulum Mg. 1830. **S.** Leigh Woods (A.), Nailsea (Wm.) 9/28. Fairly common.
 Has been bred from *Polyporus squamosus* (Huds.) Fr.

ZYGOMYIA Winn. 1863

- Pteropleura hairy; tibial bristles long, mid-tibiae with ventral bristles; fourth longitudinal vein not forked, third and fourth longitudinal veins divergent, lowest longitudinal vein (An.) short.
valida Winn. 1863. **G.** Blaise Castle (A.) 29/10/22. Not uncommon.
notata Stann. 1831. **G.** Ruscombe (W.) 15/10/18. **S.** Pill (H.) 8/9/17. Rare.

SCEPTONIA Winn. 1863

- Like ZYGOMYIA, but third and fourth longitudinal veins parallel, lowest longitudinal vein long and no ventral bristles on mid-tibiae.
nigra Mg. 1804. **G.** Blaise Castle (Wm.) 29/2/22 and (A.) 29/10/22, Fishponds (A.) 7/5/27. **S.** Leigh Woods (A.) 31/9/27, Clevedon (A.) 5/5/41. Fairly common.

PLATUROCYPTA End. 1910 (EPICYPTA Winn. 1863 *p.p.*)

- Like FUNGIVORA, but costa reaching beyond apex of second longitudinal vein.
testata Edw. 1924. **G.** Blaise Castle (Wm.) 26/10/22. Uncommon. Has been bred from the Myxomycete *Reticularia lycoperdon* Bull.

Family :—Lycoriidae (SCIARIDAE)

Eyes united above antennae by a narrow bridge; three ocelli present; antenna long, composed of sixteen segments; flies often apterous; when winged recognised by the two forked veins, of which the upper fork is wide and has a more or less visible stem; tibiae spurred. Flies found in damp, dark places and indoors; larvae saprophagous. There is no complete English work on this family.

LYCORIA Mg. 1800 (SCIARA Mg. 1803)

S. G. LYCORIA *s.str.*

- caudata* Wlk. 1848. **G.** Blaise Castle (Wm.) 12/5/22.
thomae L. 1767. **G.** and **S.** Very common.
ruficauda Mg. 1818. **S.** Leigh Woods (H.).
hyalipennis Mg. 1804 (*autumnalis* Winn. 1867). **S.** Keynsham (A.) 15/5/22.
 Has been bred from leaves of *Ranunculus spp.*

S. G. NEOSCIARA Petzey 1918

- flavicauda* Zett. 1855. **S.** Leigh Woods (A.) 22/5/26.
praecox Mg. 1818. **G.** Wotton-under-Edge (P.), Blaise Castle (A.) 18/3/22,
 Olveston (A.) 6/4/23.
modesta Staeg. 1840. **S.** Leigh Woods (A.) 18/10/24.

nervosa Mg. 1818. G. Painswick (W.).

nitidicollis Mg. 1818. G. Painswick (W.). S. Tickenham (A.) 6/22, Shapwick (A.) 20/5/23.

forcipata Winn. 1867 (*pallipes* Leng. nec F.). S. Leigh Woods (H.), Portishead (A.) 15/10/22.

carbonaria Mg. 1830. G. Bristol (C.). S. Leigh Woods (H.).

bicolor Mg. 1818. G. Kingsweston (A.) 6/6/26.

brunnipes Mg. 1804. S. Shepton Mallet (C.).

morio F. 1794 (*lugubris* Winn. 1867). S. Shepton Mallet (C.).

pulicaria Mg. 1818. G. Painswick (W.), Bristol (C.).

S. G. TRICHOSIA Winn. 1867

absurda Winn. 1867. S. Culmhead (H.).

S. G. PHORODONTA Coq. 1910 (S. G. PSILOMEGALOSPHYS End. 1911).

flavipes Mg. 1804. G. and S. Common.

S. G. ZYGONEURA Mg. 1830

sciarina Mg. 1830. S. Sharpham (A.) 2/8/25, Clevedon (A.) 25/9/29.

EPIDAPUS Hal. 1851

atomarius Deg. 1778. G. Lawrence Weston (Pr.) 17/4/24.

PNYXIA Joh. 1912

Minute flies (1-2 mm.); female apterous, male winged or subapterous; eyes round, three ocelli; antennae long; only one forked vein in wing. Larvae cause 'scab' of potatoes, also found on tomatoes and cucumbers.

scabiei Hopk. 1895. G. Clifton (C.).

Family :—Itonidae (CECIDOMYIIDAE)

Very small midges with long, hairy, antennae and only four to six wing veins. Larvae may cause galls on plants, or feed on Aphidae or be saprophagous. Most of our records apply to galligenous species.

LESTREMIA Macq. 1826

cinerea Macq. 1826. G. Blaise Castle (A.) 18/2/22, Dursley (A.) 12/10/30. S. Tickenham (A.) 16/9/22.

ANARETE Hal. 1833

coracina Zett. 1851. S. Shapwick (A.) 7/9/25. Rare.

LASIOPTERA Mg. 1818

rubi Heeg. 1851. S. Sandford (R.) 22/8/16. Gall on *Rubus caesius* L.

RHABDOPHAGA West. 1847

heterobia Lw., H. 1850. S. Corston (R.) 28/8/15. Gall on *Salix triandria* L.

marginemtorquens Winn. 1853. S. Clapton-in-Gordano (R.) 20/7/07. Gall on *Salix viminalis* L.

rosaria Lw., H. 1850. G. Hanham (R.) 22/3/19. Gall on *Salix caprea* L. S. Keynsham (R.) 12/5/17, Barrow Gurney (R.) 11/6/18 and (R.) 8/9/25, gall on *Salix alba* L., Bath (R.) 11/4/22, gall on *Salix aurita* L., Barrow Gurney (R.) 11/6/18, gall on *Salix cinerea* L.

salicis Schrk. 1803. S. Kenn Moor (R.) 28/9/17, gall on *Salix cinerea* L., Minehead (Ha.) 1922, gall on *Salix purpurea* L., Shapwick (A.) 10/6/23, gall on *Salix* sp.

terminalis Lw., H. 1850. S. Clapton-in-Gordano (R.) 30/8/15, gall on *Salix fragilis* L.

DASYNEURA Rond. 1840

- affinis* Kieff. 1886. **G.** Littleton-on-Severn (R.) 18/10/17, gall on *Viola sylvestris* Lam. **S.** Long Ashton (R.) 12/5/08, gall on *Viola sylvestris* Lam.
- brassicæ* Winn. 1853. **S.** Shepton Mallet (C.).
- bruneliæ* Kieff. 1909. **S.** Barrow Gurney (R.) 24/8/07, gall on *Prunella vulgaris* L.
- cardaminis* Winn. 1853. **S.** Compton Dando (R.) 27/5/11, gall on *Cardamine pratensis* L.
- crataegi* Winn. 1853. **S.** Long Ashton (R.) 18/7/04, Minehead (Ha.) 1922, galls on *Crataegus monogyna* Jacq.
- fraxini* Kieff. 1897. **G.** Frenchay (R.) 15/6/06. **S.** Leigh Woods (R.) 10/10/05, Banwell (R.) 30/5/18, Minehead (Ha.) 1922. All galls on *Fraxinus excelsior* L.
- galiicola* Lw., F. 1880. **S.** Cheddar (R.) 24/10/06, gall on *Galium mollugo* L.
- muricata* Mde. 1886. **S.** Brent Knoll (R.), gall on *Carex muricata* L.
- papaveris* Winn. 1853. **G.** Wotton-under-Edge (P.).
- serotina* Winn. 1853. **G.** Wotton-under-Edge (P.) on *Hypericum* sp.
- sisymbrii* Schrk. 1803. **G.** Mangotsfield (R.) 11/3/22, gall on *Barbarea intermedia* Bor., Iron Acton (R.) 4/6/08, gall on *Barbarea vulgaris* Br. **S.** Stockwood (R.) 19/6/18, gall on *Barbarea vulgaris* Br.
- thomasiana* Kieff. 1888. **S.** Leigh Woods (R.) 27/6/23, gall on *Tilia vulgaris* Hayne.
- tiliamvolvens* Rüb. 1889. **S.** Leigh Woods (R.) 27/6/23, gall on *Tilia vulgaris* Hayne.
- ulmariae* Bremi 1847. **G.** Durdham Down (R.) 15/6/11, gall on *Spiraea filipendula* L. **S.** Pensford (R.) 26/6/03, Compton Martin (R.) 21/6/07, Minehead (Ha.) 1922, all galls on *Spiraea ulmaria* L.
- urticæ* Perris 1840. **G.** Upton Cheyney (R.) 14/7/06, Bank of Avon (R.) 8/6/18, both galls on *Urtica dioica* L.; Frenchay (R.) 24/10/16, Moorend (R.) 21/9/09, both galls on *Urtica urens* L. **S.** Leigh Woods (R.) 29/9/20, Brislington (R.) 6/10/16, Keynsham (R.) 15/7/22, Minehead (Ha.) 1922, all galls on *Urtica dioica* L.; Woodspring Priory (R.) 20/7/27, gall on *Urtica urens* L.
- viciæ* Kieff. 1888. **G.** Shirehampton (R.) 28/6/24, gall on *Vicia angustifolia* L., Shirehampton (R.) 16/6/21, gall on *Vicia tetrasperma* Moench. **S.** Brislington (R.) 7/6/17, gall on *Vicia angustifolia* L., Pensford (R.) 28/8/24, gall on *Vicia cracca* L., Tickenham (R.) 25/10/19, gall on *Vicia sepium* L.

TAXOMYIA Rüb. 1915

- taxi* Inchb. 1861. **G.** Yate Churchyard (R.) 19/3/24, gall on *Taxus fastigiata* Lindl., Winterbourne (R.) 24/2/99, gall on *Taxus baccata* L. **S.** Chelvey Batch (R.) 16/2/16, gall on *Taxus baccata* L.

JAAPIELLA Rüb. 1915

- geneticola* Lw., F. 1877. **G.** Goose Green, Yate (R.) 22/10/20, gall on *Genista tinctoria* L. **S.** Publow (R.) 22/8/03, gall on *Genista tinctoria* L.
- veronicae* Vall. 1827. **G.** Yate (R.) 22/10/20. **S.** Clapton-in-Gordano (R.) 21/6/07, Barrow Gurney (R.) 27/10/21, Minehead (Ha.) 1922, all galls on *Veronica chamaedrys* L.
- volvens* Rüb. 1917. **S.** Leigh Woods (R.) 27/6/23, gall on *Tilia vulgaris* Hayne.

CYSTIPHORA Kieff. 1892

- sonchi* Lw., F. 1874. **G.** Filton (R.) 2/8/09, Almondsbury (R.) 27/5/18, both galls on *Sonchus arvensis* L.
- taraxaci* Kieff. 1888. **G.** Ashley Down, Bristol (R.) 5/6/22, gall on *Taraxacum officinale* Web.

GEOCRYPTA Kieff. 1913

galii Lw., H. 1850. G. Moorend (R.) 27/9/10, gall on *Galium saxatile* L. S. Winscombe (R.) 17/6/04, gall on *Galium verum* L., Nailsea (R.) 18/7/08, gall on *Galium palustre* L., Cheddar (R.) 24/10/06 and Minehead (Ha.) 1922, galls on *Galium mollugo* L.

WACHTLIELLA Rüb. 1915

persicariae L. 1767. S. Shapwick (R.) 14/6/04, gall on *Polygonum amphibium* L., Kenn Moor (R.) 22/6/11, gall on *Polygonum persicaria* L.
rosarum Hardy 1850. S. Minehead (Ha.) 1922, on *Rosa* spp.
stachydis Bremi 1847. S. Charterhouse-on-Mendip (R.) 24/8/15, gall on *Stachys sylvatica* L.

MACROLABIS Kieff. 1892

corrugans Lw., F. 1877. S. Failand (R.) 2/7/17, gall on *Heracleum sphondylium* L.
pilosellae Binnie 1877. S. Keynsham (R.) 19/6/14, gall on *Hieracium pilosella* L.

MAYETIOLA Kieff. 1896

dactylidis Kieff. 1896. S. Yatton (R.) 30/9/20, gall on *Dactylis glomerata* L.
destructor Say 1817. G. Wotton-under-Edge (P.) ; this is the Wheat Midge.

CRANEIOBIA Kieff. 1913

corni Giraud 1863. G. Ashley Down, Bristol (R.) 27/7/08, gall on *Cornus sanguinea* L. S. Asham Wood, Frome (R.) 4/8/19, gall on *Cornus sanguinea* L.

PHEGOBIA Kieff. 1913

tonatella Bremi 1847. G. Wotton-under-Edge (R.) 29/8/03, gall on *Fagus sylvatica* L. S. Abbots Leigh (R.) 10/8/06, Failand (R.) 3/9/11, both on *Fagus sylvatica* L.

MIKIOLA Kieff. 1896

fagi Hart. 1839. S. Leigh Woods (R.) 29/8/13, gall on *Fagus sylvatica* L.

PHLYCTIDOBIA Kieff. 1912

solmsi Kieff. 1906. S. Leigh Woods (R.) 23/9/11, Portishead (R.) 3/5/05, both galls on *Viburnum lantana* L.

DIDYMOMYIA Rüb. 1912

réaumuriana Lw., F. 1878. S. Leigh Woods (R.) 27/6/23, gall on *Tilia vulgaris* Hayne.

HARTIGIOLA Rüb. 1912

annulipes Hart. 1844 (*piliger* Lw. 1888). S. Failand (R.) 3/10/11, Minehead (Ha.) 1922, galls on *Fagus sylvatica* L.

RONDANIOLÁ Rüb. 1938

bursaria Bremi 1847. G. Horfield, Bristol (R.) 16/10/18, gall on *Nepeta glechoma* Benth. S. Tickenham (R.) 16/10/98, gall on *Nepeta glechoma* Benth.

ITEOMYIA Kieff. 1913

capreae Winn. 1853. S. Long Ashton (R.) 15/6/27, gall on *Salix cinerea* L.

RHOPALOMYIA Rüb. 1892

millefolii Lw., H. 1850. S. Keynsham (R.) 6/8/16, gall on *Achilles millefolium* L.
ptarmicae Vallot 1849. G. Milbury Heath (R.) 3/8/14, gall on *Achilles ptarmica* L.
tanaceticola Karsch 1879. G. Hanham (R.) 24/9/20, Durdham Down (R.) 16/8/27. S. Leigh Woods (R.) 27/9/20, all galls on *Tanacetum vulgare* L.

SCHIZOMYIA Kieff. 1889

galiorum Kieff. 1889. **S.** Weston-s-Mare (R.) 5/8/15, Burnham (R.) 22/8/23, both on *Galium verum* L.

KIEFFERIA Mik 1895

pimpinellae Lw., F. 1874. **S.** Yatton (R.) 14/8/16, gall on *Daucus carota* L.

CONTARINIA Rond. 1860

corylina Lw., F. 1878. **S.** Failand (R.) 19/2/20, Cleeve (R.) 7/12/20, both galls on *Corylus avellana* L.

pyrivora Riley 1885. **G.** Olveston (C.) 19/6/11, on *Pyrus communis* L.

steinii Karsch 1881. **G.** Oldbury Court (R.) 17/8/27, gall on *Lychnis dioica* L.

tiliarum Kieff. 1890. **G.** Compton Greenfield (R.) 19/7/17, gall on *Tilia cordata* Mill, Durdham Down (R.) 1/8/07, gall on *Tilia vulgaris* Hayne, Stoke Bishop (R.) 6/7/23, gall on *Tilia platyphylla* Scop. **S.** Axbridge (R.) 18/6/13, gall on *Tilia cordata* Mill, Leigh Woods (R.) 27/6/23, gall on *Tilia vulgaris* Hayne.

AMETRODIPLOSIS Rüb. 1910

thalictricola Rüb. 1895. **S.** Cheddar (R.) 28/7/25, gall on *Thalictrum minus* L.

HARMANDIA Kieff. 1896

tremulae Winn. 1853. **G.** Bishop's Hill Wood, Wickwar (R.) 30/6/25, gall on *Populus tremula* L.

MACRODIPLOSIS Kieff. 1895

dryobia Lw., F. 1877. **S.** Old Cleeve (Ha.) 1922, Minehead (Ha.) 1922, galls on *Quercus robur* L.

volvens Kieff. 1895. **S.** Old Cleeve (Ha.) 1922, Minehead (Ha.) 1922, galls on *Quercus sessiliflora* Salisb.

MONARTHROPALPUS Rüb. 1892

buxi Geoff. 1764. **G.** Tortworth (R.) 4/1/11. **S.** Bourton Combe (R.) 27/3/20, Goblin Combe (R.) 7/12/20, all three galls on *Buxus sempervirens* L.

II. BRACHYCERA

Antenna with three segments, the apical segment may be ringed, or may bear an appendage, called Arista, which appendage may be bare, pubescent or plumose; palpus has only one or two segments.

Family :—Stratiomyidae

Large or medium-sized flies with yellow or green markings on a dark ground, or metallic green or blue; apical antennal segment ringed; costa not reaching beyond the apex of the wing; larvae aquatic or saprophagous.

S. F. BERIDINAE

BERIS Lat. 1802

Eyes hairy, thorax dark; apical antennal segment with eight rings; abdomen dark-brown or yellow; scutellum bears from four to eight spines; two veins start from the discal cell; tibiae not spurred; life-history unknown; flies found in herbage and on bushes near water.

clavipes L. 1757. **G.** Wotton-under-Edge (P.). **S.** Leigh Woods (H.), Sharpham (St.) 4/6/27, Edington (Cw.) 23/5/46, Loxley Wood, Shapwick (Cw.) 1/5/47, Catcott (Cw.) 24/5/47, Clevedon (F.) 27/5/47. Not uncommon.

vallata Forst. 1771. **G.** and **S.** Common.

geniculata Curt. 1830. **G.** Blaise Castle (A.) 8/21, Coombe Dingle (F.) 6/7/47, Filton (F.) 7/7/47. **S.** Shepton Mallet (C.), Banwell (C.), Leigh Woods

(C.) 20/6/16, Flax Bourton (H.) 28/5/18, Prior Park, Bath (A.) 18/7/25, Tickenham (A.) 25/6/26, Backwell (F.) 3/7/37, Clevedon (A.) 25/9/40, Edington (Cw.) 17/6/42, Oakhill (Cw.) 9/7/46. Fairly common.

chalybeata Forst. 1771. **G.** and **S.** Common.

morrisii Dale 1841. **G.** Coombe Dingle (F.) 15/6/46, Durdham Down (F.) 19/7/46, Morton (F.) 11/7/47. **S.** Porlock (Verrall), Prior Park, Bath (A.) 25/6/32. Uncommon.

CHORISOPS Rond. 1856

Like **BERIS**, but eyes bare.

tibialis Mg. 1820. **G.** and **S.** Fairly common.

S. F. CHLOROMYIINAE

Scutellum without spines; colour of body metallic; antenna bears an apical bare arista; larvae saprophagous.

MICROCHRYSA Lw. 1855

Eyes bare, touching in male; abdomen short; small, metallic, green flies; three veins start from the discal cell, but do not reach the edge of the wing; larvae saprophagous.

polita L. 1758. **G.** and **S.** Common.

flavicornis Mg. 1822. **G.** Painswick (W.), Olveston (C.) and (A.) 4/6/22, Hallen (A.) 12/7/24, Shepperdine (A.) 30/7/24, Stone (A.) 21/5/27, Morton (F.) 11/7/47. **S.** Leigh Woods (H.) and (A.) 22/5/25, Tickenham (A.) 20/7/23, Moreton (A.) 25/5/35, Clevedon (A.) 29/5/39, Edington (Cw.) 27/5/42, Loxley Wood, Shapwick (Cw.) 21/6/47 and (F.) 5/7/47. Fairly common.

cyaneiventris Zett. 1842. **G.** Stone (A.) 27/6/28, Morton (F.) 8/7/47, Coombe Dingle (F.) 19/7/47. **S.** Leigh Woods (H.) 8/18, Nailsea (H.) 5/7/16. Uncommon.

GEOSARGUS Bezzi 1907 (SARGUS F. and CHRYSNOTUS Lw. both *preoc.*)

Eyes bare, not touching in the male; abdomen elongated; medium-sized, green, metallic flies; three veins from discal cell reach edge of wing.

S. G. GEOSARGUS *s.str.*

cuprarius L. 1758. **G.** Painswick (W.), Stroud (Wt.), Wotton-under-Edge (P.), Kingsweston (A.) 9/6/29, Blaise Castle (F.) 8/5/48, Coombe Dingle (F.) 9/5/48. **S.** Backwell (A.) 17/7/26, Evercreech (F.) 27/6/36. Uncommon.

iridatus Scop. 1763. **G.** and **S.** Common.

flavipes Mg. 1822 (*splendens* auctt. *nec* Mg.). **G.** Wotton-under-Edge (P.), Clifton (Wm.) 4/8/18. **S.** Shepton Mallet (C.), Batheaston (Bl.), Portishead (A.) 24/9/21, Tickenham (A.) 11/9/22, Shapwick (A.) 7/9/30, Brockley Combe (A.) 31/8/33, Coxley, Wells (F.) 23/9/45, Saltford (F.) 1/9/46, Loxley Wood, Shapwick (Cw.) 21/9/48. Uncommon.

S. G. CHRYSOCHROMA Willist. 1896

bipunctatum Scop. 1763. **G.** Wotton-under-Edge (P.), Olveston (C.) 25/9/14 and (A.) 2/9/23, Bristol (F.) 1/10/44, Filton (F.) 13/10/44, Durdham Down (F.) 9/8/46. **S.** Batheaston (Bl.), Shepton Montague (Verrall), Leigh Woods (H.) St. Audries (A.) 20/8/29, Clevedon (A.) 8/9/29, Coxley, Wells (F.) 23/9/45. Not uncommon.

CHLOROMYIA Duncan 1837

Eyes hairy, touching in the male; abdomen short, colour metallic green; veins coming from discal cell do not reach edge of wing.

formosa Scop. 1763. **G.** and **S.** Very common.

S. F. STRATIOMYINAE

Apical antennal segment annulated, no arista; scutellum bears two spines; veins rising from discal cell do not reach the edge of the wing; larvae live in mud of ponds and are zoophagous.

STRATIOMYS Geoff. 1762 (STRATIOMYIA Agassiz 1846)

First antennal segment three or four times the length of the second segment; large, black and yellow flies.

chameleon L. 1758. **G.** Wotton-under-Edge (P.). **S.** Highbridge (C.), Shepton Mallet (C.). Rare.

furcata F. 1794. **S.** Wellington (Bl.), Shapwick (J.) 22/6/17 and (Sl.) 22/6/27, Berrow (A.) 13/7/30, High Ham (Cw.) 5/7/43, Catcott (Cw.) 24/6/44, Coxley, Wells (F.) 4/8/45, Edington (Cw.) 8/9/45 and (F.) 5/7/47, Loxley Wood, Shapwick (F.) 5/7/47. Not uncommon.

potamida Mg. 1822. **G.** Bristol (C.), Painswick (W.), Shepperdine (A.) 12/7/24, Dursley (A.) 26/6/30, Filton (F.) 17/6/47, Coombe Dingle (Lw.) 26/6/47. **S.** Wellington (Bl.), Tickenham (Wm.) 12/7/24 and (A.) 26/7/24, Clevedon (Bd.) 25/6/43, Edington (Cw.) 31/7/45 and (F.) 5/7/47, Loxley Wood, Shapwick (Cw.) 17/7/45. Uncommon.

EULALIA Mg. 1800 (ODONTOMYIA Mg. 1803)

First antennal segment about as long as the second; medium-sized flies with yellow or green markings.

S. G. EULALIA *s.str.*

angulata Panz. 1798. **S.** Sharpham (A.) 2/8/23, Pedwell (F.) 21/6/47, Edington (Cw.) 27/6/47. Uncommon. Green and black fly.

ornata Mg. 1822. **S.** Taunton (Wm.) 7/6/24, Sharpham (St.) 4/6/27, Catcott (Cw.) 31/5/42, Kenn Moor (Bd.) 9/6/42, Edington (Cw.) 3/6/44, Pedwell (Cw.) 21/6/47, Loxley Wood, Shapwick (Cw.) 26/6/48. Uncommon. Yellow and black fly.

S. G. NEURAPHANISIS End. 1914

Black, medium-sized fly.

tigrina F. 1775. **S.** Nailsea (J.) 29/5/20, Shapwick (Wm.) 10/6/21 and (A.) 17/6/23, Sharpham (A.) 2/6/36, Catcott (Cw.) 5/6/42, Edington (Cw.) 14/5/43 and (F.) 21/6/47, Pedwell (Cw.) 21/6/47. Not uncommon.

S. G. HOPLDONTA Rond. 1863

Black thorax, green abdomen.

viridula F. 1775. **G.** Walmore (Fl.) 19/8/43. **S.** Sedgemoor (Sl.) 21/7/21, Shapwick (J.) 17/7/19 and (A.) 29/6/39, Tickenham (A.) 1/7/33, Berrow (A.) 26/6/39, Kenn Moor (Bd.) 4/6/44, Coxley, Wells (F.) 4/8/45, Pedwell (F.) and (Cw.) 21/6/47, Edington (A.) 5/7/47 and (Cw.) 26/6/47, Street (Cw.) 28/8/48. Fairly common.

S. F. CLITELLARIINAE

Antenna with apical bare arista; abdomen with only five or six visible segments; wing with four veins rising from discal cell; larvae aquatic and zoophagous.

NEMOTELUS Geoff. 1762

Small, wholly black or with white markings; face produced snout-like; scutellum without spines; found on plants in marshy localities.

pantherinus L. 1758. **G.** Chalford (W.). **S.** Tickenham (A.) 23/6/29, Kenn Moor (A.) 27/6/39, Shapwick (A.) 29/6/39 and (Cw.) 3/7/48, Coxley, Wells (F.) 8/7/45, Edington (Cw.) 13/6/47. Not uncommon.

- uliginosus* L. 1767. **G.** Shepperdine (A.) 12/8/24, Hallen (B.) 11/7/29. **S.** Minehead (Bl.), Tickenham (A.) 19/7/24, Sharpam (B.) 17/2/27. Fairly common.
- notatus* Zett. 1842. **G.** Hallen (A.) 12/7/24, Shepperdine (A.) 12/8/24, Kingsweston (Wm.) 16/6/22. **S.** Berrow (A.) 13/7/30 and 26/6/39. Fairly common.
- nigrinus* Fall. 1817. **S.** Shapwick (B.) 22/6/24, (A.) 24/6/26 and (Cw.) 3/7/48, Kenn Moor (A.) 27/6/39, Shepton Mallet (A.) 29/6/42, Edington (Cw.) 21/5/42, Catcott (Cw.) 24/5/47. Fairly common.

HERMIONE Mg. 1800 (OXYCERA Mg. 1803)

Medium-sized, black flies with yellow or green markings; scutellum with two spines; face not produced.

S. G. HERMIONE *s.str.*

- trilineata* F. 1781. **G.** Hallen (B.) 17/7/24, Filton (F.) 30/6/47. **S.** Puddimore Milton (Bl.), Shapwick (Wm.) 10/6/21, Berrow (A.) 13/7/30, Catcott (Cw.) 24/6/44, Edington (Cw.) 19/7/44, Street (Cw.) 11/7/45, Loxley Wood, Shapwick (Cw.) 24/6/47. Fairly common.
- morrisii* Curt. 1833. **S.** Edington (Cw.) 2/7/47 and 15/7/48. Rare.
- tardigrada* Harr. 1776 (*pulchella* Mg. 1822). **G.** Painswick (Wt.) 10/8/92, Cheltenham (Wm.) 5/7/19, Hallen (B.) 17/7/24. **S.** Batheaston (Bl.), Edington (Cw.) 7/7/46, Loxley Wood, Shapwick (F.) 21/6/47 and (A.) and (Cw.) 5/7/47. Fairly common.
- pardalina* Mg. 1822. **G.** Coombe Dingle (F.) 26/6/48. **S.** Wells (L.). Rare.

S. G. PAROXYCERA Pleske 1925

- analisis* Mg. 1822. **G.** Filton (F.) 6/46, Coombe Dingle (F.) 26/6/47. **S.** Loxley Wood, Shapwick (F.) 21/6/47 and (Cw.) 24/6/47. Rare.
- terminata* Mg. 1822. **G.** Blaise Castle (F.) 8/7/48. Rare.
- formosa* Mg. 1822. **G.** Wotton-under-Edge (P.), Coombe Dingle (F.) 14/7/46 and 26/6/48. **S.** Batheaston (Bl.), Nailsea (Wm.) 27/7/22. Rare.

S. F. PACHYGASTRINAE

Antenna with long, slightly pubescent subterminal arista; three veins only arise from discal cell; larvae saprophagous under bark of trees or in rotting wood.

PACHYGASTER Mg. 1803

Small, black flies; apical antennal segment short; abdomen short and broad.

- leachii* Curt. 1824. **G.** Stroud (Wt.), Bristol (C.) 17/8/07, (B.) 22/7/26 and (F.) 9/7/47, Morton (F.) 11/7/47, Durdham Down (F.) 26/8/46, Filton (F.) 6/7/48. **S.** Wincanton (Verrall.), Tickenham (A.) 22/7/23, West Town (Wm.) 27/7/27, Clevedon (A.) 15/7/42, Edington (Cw.) 29/7/46. Fairly common; chiefly on Oak.
- atra* Panz. 1798. **G.** and **S.** Common; on Elm and other trees.
- minutissima* Zett. 1840. **S.** Horrington, Wells (L.). Rare, on Firs.
- tarsalis* Zett. 1842. **S.** Portishead (H.). Rare, on Beech.

Family:—Erinnidae (XYLOPHAGIDAE)

ERINNA Mg. 1800 (XYLOPHAGUS Mg. 1803, ARCHIMYIA End. 1920)

Apical antennal segment annulated; costa reaching beyond apex of wings; tibiae spurred; medium-sized, black fly with long abdomen; larvae in rotten wood, carnivorous.

- atra* Mg. 1804. **S.** Leigh Woods (C.). Rare.

Family :—**Rhagionidae** (LEPTIDAE)

Moderately large to small flies; eyes bare; apical antennal segment not annulated; abdomen long, almost cylindrical; predaceous flies; larvae live in damp soil and are carnivorous.

S. F. RHAGIONINAE

Fore-tibiae not spurred, mid- and hind-tibiae with two spurs.

ATHERIX Mg. 1803

Apical antennal segment reniform, arista dorsal; cheeks and jowls hairy; wings spotted; larvae aquatic.

melancholia Harr. 1776 (*ibis* F. 1798). **G.** Slaughter (Curtis). **S.** Freshford (C.) Moreton (A.) 21/5/33. Rare.
marginata F. 1781. **S.** Tarr Steps (J.) 18/8/22. Rare.

RHAGIO F. 1775 (LEPTIS F. 1805)

Apical antennal segment bulbous or triangular, arista apical; rather large, yellow flies with black markings; wings spotted or clear.

scolopaceus L. 1758. **G.** and **S.** Common.

notatus Mg. 1820. **G.** Sheepscombe (St.) 29/6/24. Uncommon.

tringarius L. 1758. **G.** and **S.** Common. There are several vars. e.g. *nigriventris* Lw. 1869 and *annulata* Deg. 1776, both of these are common.

monachus Harr. 1776 (*lineola* F. 1794). **G.** Stroud (W.), Wotton-under-Edge (P.), Painswick (St.). **S.** Shepton Mallet (C.), Sharpham (A.) 4/8/23, St. Audries (A.) 25/8/29, Street (Cw.) 10/7/45, Oakhill (Cw.) 9/7/46, West Town (Cw.) 22/6/47, Loxley Wood, Shapwick (A.) 5/7/47. Fairly common.

S. F. CHRYSOPILINAE

Fore-tibia without spur, mid-tibia with two spurs, hind-tibia with one spur; body black, clothed with yellow hairs; wings clear.

CHRYSOPILUS Macq. 1826

Apical antennal segment conical, arista apical.

cristatus F. 1775 (*auratus* F. 1805). **G.** and **S.** Common.

aureus Mg. 1804. **G.** High Littleton (B.) 11/7/26, Shepperdine (A.) 30/7/24, Stone (A.) 27/6/28. **S.** Shepton Mallet (C.), Leigh Woods (A.) 22/6/25, Backwell (A.) 27/7/26, Loxley Wood, Shapwick (Cw.) 8/7/45, Clevedon (A.) 5/8/40, Edington (Cw.) 1/8/46, Catcott (Cw.) 19/6/47. Fairly common.

SYMPHOROMYIA Frfld. 1867

Apical antennal segment reniform, arista dorsal.

immaculata Mg. 1804. **S.** Charterhouse-on-Mendip (Wm.) 30/6/23. Rare.

Family :—**Tabanidae**

These flies, known as Clegs, Horse Flies, Gadflies and Breeze Flies, are large or medium-sized, black with grey or fulvous markings; all have coloured stripes or spots across the eyes when alive; the females are blood-suckers and attack man; larvae live in mud or damp moss and are carnivorous.

S. F. SYLVIINAE

Hind-tibiae spurred; ocelli present.

CHRYSOPS Mg. 1803

Apical antennal segment annulated but not toothed; wings with dark patches; eyes golden green with purple stripes.

coecutiens L. 1758. **G.** and **S.** Common.

- coecutiens* form *fulvus* Goffe 1931. S. Edington (Cw.) 17/8/46.
 form *nigrescens* Goffe 1931. S. Clevedon (Bd.) 25/6/43.
 form *obsolescens* Goffe 1931. S. Tickenham (Go.).
quadratus Mg. 1820. S. Catcott (Cw.) 24/6/44, Loxley Wood, Shapwick (Cw.) 2/7/47.
 form *intermedius* Goffe 1931. S. Edington (Cw.) 6/7/42.
 form *pictus* Mg. 1820. S. Ashcott (Rd.), Sharpham (A.) 8/7/25, Shapwick (A.) 27/6/39, Street (Cw.) 11/7/45, Edington (Cw.) 6/7/46.
relictus Mg. 1820. G. Painswick (W.), Wotton-under-Edge (P.), Olveston (C.) 8/16. S. Shepton Mallet (C.), Bridgwater (Sl.), Crook Peak (Rd.), Sharpham (A.) 22/8/22, Tickenham (A.) 31/5/39, Kenn Moor (A.) 17/6/39, Shapwick (A.) 29/6/39, Catcott (Cw.) 24/6/44, Edington (Cw.) 7/6/48.
 Fairly common.

S. F. CHRYSOZONINAE (HAEMATOPOTINAE)

Hind-tibiae not spurred; no ocelli, apical antennal segment conical and slightly annulated; wings dark with clear markings.

CHRYSOZONA Mg. 1800 (HAEMATOPOTA Mg. 1803)

- pluvialis* L. 1758. G. and S. Very common.
crassicornis Wahl. 1848. G. Sheepscombe (St.) 21/6/25. S. Nailsea (Wm.) 27/7/22, Shapwick (Wm.) 10/6/21 and (A.) 29/6/39, Tickenham (A.) 17/6/23, Edington (Cw.) 3/6/44 and 7/7/46. Uncommon.
bigoti Gob. 1881. S. Tickenham (A.) 3/7/22. Rare.

S. F. TABANINAE

Hind-tibiae not spurred; no ocelli; apical antennal segment flattened toothed at the base and slightly annulated; wings clear.

TABANUS L. 1758

Eyes bare or very slightly pubescent; no ocellar triangle; females with frontal calli.

S. G. TABANUS *s.str.*

In the male the eye facets are all the same size.

- bovinus* L. 1758. G. Wotton-under-Edge (P.). S. Wellington (Bl.), Clevedon (Bd.) 22/6/42. Very rare.

S. G. STRABA End. 1923

In the male the upper eye facets are larger than the lower ones.

- sudetica* Zell. 1842. G. Wotton-under-Edge (P.). Rare.
autumnalis L. 1761. G. and S. Fairly common.
bromius L. 1758. G. and S. Very common.
 form *glaucus* Mg. 1820. G. Cirencester (T.) 9/7/24, Hallen (B.) 26/6/29.
maculicornis Zett. 1842. G. Sheepscombe (St.) 21/6/25. Rare.

SCILADYNUS End. 1925 (THERIOPLECTES auctt. nec Zell. 1842)

Eyes hairy; ocellar triangle present; females with frontal calli.

- micans* Mg. 1804. G. Olveston (C.). S. Wellington (Bl.). Very rare, black fly.
luridus Fall. 1817. G. Painswick (St.) 19/6/24. Rare.
bisignatus Jaen. 1866 (*tropicus* auctt. nec L.). G. and S. Common.
distinguentus Verr. 1909. G. and S. Common.
solstitialis Mg. 1820. G. Painswick (W.). Very rare.

DASYSTYPIA End. 1925 (ATYLOTUS O.S. 1876 *p.p.*, OCHROPS Szil. 1915 *p.p.*)

Eyes hairy ; no ocellar triangle ; females without frontal calli.

fulva Mg. 1820. **S.** Wellington (Bl.). Very rare, fly covered with golden-yellow pubescence.

Family :—Ogcodidae (CYRTIDAE, ACROCERIDAE)

Small, sluggish, humpbacked flies with tiny head and swollen abdomen ; antenna has two segments only and an apical arista ; squamae very large ; larvae are parasitic on Spiders.

OGCODES Lat. 1796 (*emend.* ONCODES Blanchard 1840)

Antennae situated close to the mouth ; two ocelli present ; third longitudinal vein not forked.

gibbosus L. 1758. **S.** Ashcott (Bt.), Sharpham (A.) 27/7/23. Rare.

pallipes Lat. 1811. **G.** Winterbourne (K.) 20/7/23, Hallen (A.) 12/7/24. **S.** Wells (L.) 7/03, Leigh Woods (C.) 1/8/07. Uncommon. Parasitic on *Clubiona putris*.

PARACROCERA Mik 1886

Antennae situated on vertex ; three ocelli ; third longitudinal vein forked.

globulus Panz. 1803. **G.** Wotton-under-Edge (P.). **S.** Shepton Montagu (Verrall).

Very rare.

Family :—Bombyliidae

Medium to small flies ; antennae short, with or without an apical arista ; body covered with long hair ; wings often with dark patches ; larvae parasitic on larvae of other insects.

S. F. ANTHRAGINAE

Eyes reniform, separate in both sexes ; proboscis short.

VILLA Lioy 1864 (ANTHRAX Scop. 1763 *p.p.*)

Wings clear ; antenna with short apical arista.

paniscus Rossi 1790. **S.** Dunster (A.) 8/16. Rare.

circumdata Mg. 1820. **S.** Dunster (A.) 8/16. Rare.

S. F. PHTHIRIINAE

Eyes oval, touching in the male ; tibiae bare or only finely hairy ; proboscis long ; first posterior cell open ; anal cell closed, wings clear.

PHTHIRIA Mg. 1803

Small, grey-black flies with short hairs ; found in sandy situations ; life-history unknown.

pulicaria Mikán 1796. **S.** Berrow (Wm.) 6/21, (A.) 22/8/28 and (B.) 5/7/30. Rare.

S. F. BOMBYLIINAE

Like PHTHIRIINAE, but tibiae with three rows of delicate spines ; first posterior cell closed, anal cell open, wings spotted.

BOMBYLIUS L. 1758

Hind-femur with antero-ventral bristles ; antennae long, with short apical arista ; body covered with long brown to golden hair ; larvae parasitic in nests of Solitary Wasps.

discolor Mikán 1796. **G.** and **S.** Fairly common in the spring ; wing with many small, dark spots.

- major* L. 1758. **G.** and **S.** Common in the spring; wing with black patch under costa.
- canescens* Mikan 1796. **G.** Wotton-under-Edge (P.), Hanham (C.), Henbury (Bt.) 1/6/03, Coombe Dingle (F.) 28/5/44. **S.** Brockley Combe (Bt.), Tickenham (A.) 6/20, Clevedon (A.) 3/6/42, Edington (Cw.) 27/5/44. Uncommon, a smaller fly with almost clear wings.

Family :—**Therevidae**

Medium-sized flies covered with silvery hairs; legs bristly; tibiae spurred; the flies are predaceous, and their larvae, which live in the soil, are carnivorous.

THEREVA Lat. 1796

- Basal antennal segment long, cylindrical; face hairy; eyes touching in male; frons with shining black calli (exc. *annulata*) in the female.
- annulata* F. 1805. **S.** Berrow (A.) 27/8/24 and 13/5/34, and (Cw.) 15/6/43 and 25/6/45. Fairly common on sand-dunes.
- bipunctata* Mg. 1820. **G.** Wotton-under-Edge (P.), Blaise Castle (A.) 7/21. **S.** Berrow (A.) 29/9/24. Not uncommon.
- nobilitata* F. 1775. **G.** Painswick (St.) 29/6/24, Moorend (Bw.) 4/8/45. **S.** Freshford (C.), Tickenham (A.) 6/21, Shapwick (B.) 22/6/24 and (Cw.) 25/5/48, Sharpam (A.) 16/8/23 and (St.) 31/5/36, Edington (Cw.) 19/7/44, Catcott (Cw.) 27/5/48. Fairly common.
- fulva* Mg. 1804. **G.** Cranham (C.). Rare.
- plebeja* L. 1758. **G.** Cirencester (T.) 20/6/24. **S.** Freshford (C.), Burnham (Bl.), Berrow (A.) 22/8/28, Edington (Cw.) 19/5/42, Catcott (Cw.) 4/6/44. Uncommon.

TABUDA Wlk. 1853 (**DIALINURA** Rond. 1856)

Basal antennal segment short, globose; face bare.

- anilis* L. 1761. **S.** Berrow (A.) 27/8/24. Rare.

Family :—**Omphralidae** (**SCENOPINIDAE**)

Small, bare, dark, beetle-like flies, no arista, wings clear, third longitudinal vein forked, anal cell closed; larvae saprophagous in dry dust and old birds' nests.

OMPHRALE Mg. 1800 (**SCENOPINUS** Lat. 1802)

- fenestralis* L. 1758. **G.** and **S.** Common, especially indoors on windows.
- nigra* Deg. 1782. **G.** Bristol (Wm.) 30/6/28, Elberton (C.) 21/6/14. Uncommon.
- senilis* F. 1805. **G.** and **S.** Common, with *fenestralis*, of which it may be a var.

Family :—**Asilidae**

Medium-sized to large flies with long bodies and powerful wings; legs very bristly, tibiae spurred, claws long; vertex of head sunk between the eyes; face often protuberant and bearing bristles; proboscis rigid; genitalia conspicuous; flies, known as Robber Flies, are predaceous; larvae are saprophagous.

S. F. LEPTOGASTRINAE

Palpus with only one segment, arista fairly long, second and third longitudinal veins end separately in the costa, body long and very slender.

LEPTOGASTER Mg. 1803

- cylindrica* Deg. 1776. **G.** and **S.** Fairly common in low vegetation.
- guttiventris* Zett. 1842. **G.** Selsley (Wt.), Cleve Hill (St.). **S.** Clevedon (A.) 4/7/41, Oakhill (Cw.) 29/6/47. Uncommon.

S. F. DASYPOGONINAE

Palpus with two segments; second and third longitudinal veins end separately in the costa.

ISOPOGON Lw. 1847

Antenna with a long slender apical arista; fore-tibia with a curved spur; anal cell closed.

brevisrostris Mg. 1804. **G.** Painswick (St.) 7/7/23, Stroud (F.) 6/6/40, Selsley (Wt.), Bristol (C.). **S.** Withycombe (Sl.) Charterhouse-on-Mendip (Wm.), 30/6/23. Uncommon.

DIOCTRIA Mg. 1803

Antenna with short, blunt apical arista; fore-tibia without curved spur; anal cell open.

atricapilla Mg. 1804. **G.** and **S.** Common in low vegetation.

oelandica L. 1758. **G.** Wotton-under-Edge (P.). **S.** Holford (Pn.) and (F.), 12/6/48. Rare.

cothurnata Mg. 1820 (*reinhardi* Mg. 1820). **G.** Bristol (Verrall).

rufipes Deg. 1776. **G.** and **S.** Common in low vegetation.

baumhaueri Mg. 1820. **G.** Kingsweston (A.) 25/6/31. **S.** Weston-s-Mare (J.), Clevedon (F.) 12/7/47. Uncommon.

linearis F. 1787. **G.** Coombe Dingle (F.) 14/7/46. **S.** Weston-s-Mare (J.), Backwell (A.) 17/7/26, Edington (Cw.) 28/6/46 and (F.) 17/6/47, West Town (F.) 22/6/47 and (Cw.) 28/6/47, Loxley Wood, Shapwick (F.) 5/7/47 and (Cw.) 24/6/47. Uncommon.

S. F. LAPHRIINAE

Palpus with two segments; second and third longitudinal veins meet before reaching the costa; antenna without apical arista.

LAPHRIA Mg. 1803

Black flies with dark wings, found in woods.

marginata L. 1758. **S.** Loxley Wood, Shapwick (A., Cw. and F.) 21/6/47, Street (Cw.) 6/7/48. Uncommon.

S. F. ASILINAE

Palpus with only one segment, second and third longitudinal veins meet before reaching the costa, antenna bears an apical arista.

PHILONICUS Lw. 1849

Legs wholly black.

albiceps Mg. 1820. **G.** Bristol (C.) and (Bt.). **S.** Leigh Woods (C.), Dunster (A.) 8/16, Berrow (A.) 17/8/24 and (Cw.) 25/6/45, Brean Down (A.) 14/7/35. Not uncommon.

ASILUS L. 1758

crabroniformis L. 1758. **G.** Painswick (W.), Wotton-under-Edge (P.), Bristol (C.), Olveston (C.) 1/8/13 and (A.) 8/16, Moorend (Bw.) 15/9/45. **S.** Bathaston (Bl.), Tickenham (A.) 8/19, Glastonbury (A.) 12/8/23, Clevedon (Bd.) 7/8/40 and (A.) 16/8/43, Loxley Wood, Shapwick (Cw.) 10/8/45, Edington (Cw.) 6/9/46, Porlock (La.) 21/8/47, Bossington (La.) 21/8/47. A large fly with black and yellow body, wings brown with apices of veins darker, not uncommon.

PAMPONERUS Lw. 1849

germanicus L. 1758. **G.** Bristol (Millard in Curtis). A rare, black fly with outer half of wing darkened.

DYSMACHUS Lw. 1860

trigonus Mg. 1804. **G.** Bitton (C.). **S.** Axbridge (Rd.), Kewstoke (J.), Berrow (A.) 17/6/23 and (Cw.) 15/6/43, Brean Down (A.) 14/7/35, Portbury (A.) 10/6/39. Legs with reddish markings; bristles on thorax very long; rows of white bristles on abdomen; wings clear; not uncommon.

MACHIMUS Lw. 1849

Hairs behind the eyes short and straight.

S. G. MACHIMUS *s.str.*

atricapillus Fall. 1814. **G.** and **S.** Common.

rusticus Mg. 1820. **G.** Bristol (C.), Painswick (St.) 7/7/23, Stroud (Fl.) 25/6/36. Uncommon.

S. G. EPITRIPTUS Lw. 1849

cingulatus F. 1781. **G.** Olveston (A.) 7/16, Moorend (Bw.) 4/8/45. **S.** Taunton (C.). Rare.

NEOITAMUS O.S. 1878

Hairs behind eyes long and bent forwards; abdomen with blue sheen.

cyanurus Lw. 1849. **G.** Painswick (St.) 7/7/23. **S.** Clevedon (A.) 27/7/40, Tickenham (A.) 19/7/42, Ham Green (F.) 7/7/46, Cadbury Camp (F.) 12/7/47, Barrow Gurney (F.) 27/6/48. Not uncommon in woods.

Family :—Empididae

Medium sized to small flies; legs long and may be swollen or bear scales; proboscis long or short but always hard because the flies are predaceous; larvae live in soil and are carnivorous.

S. F. CORYNETINAE (TACHYDROMINAE)

Small, dark flies found on tree-trunks or palings, may be swept from bushes; eyes separate in both sexes above the antennae but almost or quite touching below the antennae; antennae with a long two-segmented apical arista; wings with five unforked longitudinal veins.

DRAPETIS Mg. 1822

Wings clear.

exilis Mg. 1822 (*pusilla* Lw. 1859). **S.** Leigh Woods (A.) 31/9/27, Clevedon (A.) 13/7/40. Uncommon.

TACHYPEZA Mg. 1838

Wing veins dark seamed.

nubila Mg. 1804. **G.** and **S.** Common on tree-trunks.

CORYNETA Mg. 1800 (TACHYDROMIA Mg. 1803, TACHISTA Lw. 1860)

Wings with broad, dark, transverse bands.

arrogans L. 1761. **G.** and **S.** Common on tree-trunks.

annulimana Mg. 1822. **G.** Painswick (W.), Durdham Down (F.) 14/9/46. **S.** Sharpham (A.) 11/8/25, Edington (F.) 19/6/48, Barrow Gurney (F.) 27/6/48. Uncommon.

PLATYPALPUS Macq. 1827 (TACHYDROMIA Lw. *nec* Mg. 1803)

Wings clear; a faint, sixth longitudinal vein present with a well-marked cross-vein from the fifth longitudinal vein.

maculipes Mg. 1822. **S.** Shepton Mallet (C.), Sharpham (A.) 27/8/25. Uncommon.

agilis Mg. 1822. **G.** and **S.** Common.

nigritarsis Fall. 1816. **S.** Weston-s-Mare (J.). Rare.

longicornis Mg. 1822 (*pubicornis* Zett. 1838). **G.** Hallen (A.) 24/9/27, Durdham Down (F.) 14/9/46, Filton (F.) 17/9/46. **S.** Flax Bourton (H.), Sharpham (A.) 23/8/22, Shapwick (A.) 26/8/25.

pallipes Fall. 1815. **G.** Shepperdine (A.) 30/7/24, Kingsweston (A.) 29/8/24. **S.** Clevedon (A.) 4/9/40, Goblin Combe (F.) 28/9/46, Holford (F.) 12/6/48, Barrow Gurney (F.) 27/6/48.

- ciliaris* Fall. 1816. **G.** Bristol (C.).
- albisetia* Panz. 1806. **S.** Shapwick (A.) 17/6/23.
- minutus* Mg. 1804. **G.** Bristol (C.), Kingsweston (A.) 9/6/23, Olveston (A.) 28/6/25, Durdham Down (F.) 15/9/46, Morton (F.) 11/7/47, Filton (F.) 5/5/48. **S.** Tickenham (A.) 20/8/23, Sharpham (A.) 27/8/25, Clevedon (A.) 3/6/39, Shepton Mallet (A.) 7/7/42, Failand (F.) 31/5/47.
- annulatus* Fall. 1815. **G.** Bristol (C.), Olveston (C.) 7/19. **S.** Clevedon (A.) 23/8/40.
- notatus* Mg. 1822 (*fulvipes* Mg. 1822). **S.** Sharpham (A.) 3/9/22, Berrow (A.) 29/9/24, Priddy (A.) 6/6/37.
- coarctatus* Coll. 1926. **S.** Sharpham (A.) 6/8/23.
- candicans* Fall. 1815 (*varia* Wlk. 1851). **S.** Wells (L.), Shapwick (A.) 20/5/23, Abbots Leigh (A.) 16/5/26, Clevedon (A.) 25/6/29.
- cursitans* F. 1775 (*laticinctus* Wlk. 1851). **G.** Durdham Down (F.) 14/7/46. **S.** Kenn Moor (A.) 16/6/39, Tickenham (A.) 19/6/43.
- exilis* Mg. 1822 (*flavipennis* Wlk. 1851, *lutea* Verr. 1901 *nec* Mg.). **G.** Coombe Dingle (F.) 7/6/47. **S.** Holford (Pn.), Clevedon (A.) 5/7/40, West Town (F.) 27/5/47.
- albicornis* Zett. 1842. **S.** Leigh Woods (H.) 20/6/16.
- major* Zett. 1842. **G.** Olveston (C.), Dursley (A.) 9/6/25, Blaise Castle (F.) 3/7/48. **S.** Leigh Woods (H.) 30/5/16, West Town (F.) 22/6/47.
- fasciatus* Mg. 1822. **G.** Westbury-on-Trym (Wm.) 4/7/20. **S.** Clevedon (A.) 3/8/44.
- pallidiventris* Mg. 1822. **G.** and **S.** Common.
- calceatus* Mg. 1822. **G.** Hallen (A.) 22/6/26. **S.** Tickenham (A.) 21/6/23, Portbury (F.) 31/5/47.
- articulatus* Macq. 1827. **G.** Bristol (C.), Durdham Down (F.) 30/5/47, Filton (F.) 6/6/47.
- annulipes* Mg. 1822. **G.** Durdham Down (F.) 30/5/47, Coombe Dingle (F.) 7/6/47. **S.** Kenn Moor (A.) 19/6/39, Clevedon (A.) 20/6/40.

S. F. NOEZINAE (HYBOTINAE)

Medium-sized flies, eyes touching in both sexes; proboscis short; arista apical, long, slender; hind-femora more or less swollen; wings clear with six longitudinal veins, of which the sixth is weak, two cross-veins between fourth and fifth longitudinal veins forming a discal cell; flies found in herbage and bushes.

NOEZA Mg. 1800 (HYBOS Mg. 1803)

- grossipes* L. 1767. **G.** Hallen (A.) 18/7/24. **S.** Clevedon (A.) 2/7/40.
- femorata* Muell. 1776. **G.** Shepperdine (A.) 30/7/24, Coombe Dingle (F.) 10/6/47. **S.** Leigh Woods (H.), Clevedon (W.), Sharpham (A.) 9/8/23, St. Audries (A.) 30/8/29, West Town (F.) 28/6/47, Loxley Wood, Shapwick (F.) 5/7/47.
- culiciformis* F. 1775. **G.** and **S.** Common.

PLATYCNEMA Zett. 1838

Small, black fly which was formerly included in the PLATYPEZIDAE.

- pulicaria* Fall. 1816. **G.** Durdham Down (F.) 11/6/47.

S. F. OCYDROMIINAE

Eyes either touching in both sexes or only in the male; proboscis short, arista long or short; wing clear with six longitudinal veins, discal cell present or absent; found in woods and herbage.

BICELLARIA Macq. 1823 (CYRTOMA Mg. 1824)

No discal cell, fourth vein forked but base of lower prong absent.

- nigra* Mg. 1824. **G.** Cirencester (T.) 3/6/24. **S.** Tickenham (A.) 16/9/22, Leigh Woods (A.) 22/6/25.
intermedia Lundb. 1910. **S.** West Town (F.) 22/5/47.
pilosa Lundb. 1910. **G.** Coombe Dingle (F.) 30/5/48.
spuria Fall. 1816 (*melaena* Hal. 1833). **G.** Cirencester (T.), Stone (A.) 21/5/27, Coombe Dingle (F.) 7/6/47. **S.** Freshford (C.), Sharpham (A.) 22/8/22, Tickenham (A.) 31/5/39.
simplicipes Zett. 1842. **S.** Shepton Mallet (C.), Shapwick (A.) 31/8/24, Clevedon (A.) 3/6/40.

TRICHINA Mg. 1830

Arista short ; fourth longitudinal vein forked ; hind-femora normal.

- flavipes* Mg. 1830. **G.** Blaise Castle (F.) 29/9/46. **S.** Freshford (C.), Shapwick (A.) 22/6/35, Clevedon (A.) 21/9/40 and 13/6/41.
clavipes Mg. 1830. **G.** Filton (F.) 22/5/47. **S.** Sharpham (A.) 9/8/23, Shapwick (A.) 22/6/35, Clevedon (A.) 3/6/39.

OEDALEA Mg. 1820

Like TRICHINA, but hind-femora swollen and spiny.

- zetterstedti* Coll. 1926 (*holmgreni* Lundb. nec Zett.). **G.** Kingsweston (A.) 31/5/25, and (F.) 9/6/46, Coombe Dingle (F.) 26/6/47, Blaise Castle (F.) 5/7/48. **S.** Leigh Woods (A.) 25/5/29, Clevedon (A.) 14/5/40, Portishead (F.) 24/5/47, West Town (F.) 25/5/47.
stigmatella Zett. 1842. **S.** Holford (Pn.), Stourton (J.).
flavipes Zett. 1842. **S.** Cheddar (C.).

OCYDROMIA Mg. 1820

Discal cell present, six longitudinal veins, none forked ; apical antennal segment short, oval.

- glabricula* Fall. 1816. **G.** and **S.** Common.

LEPTOPEZA Macq. 1834

Like OCYDROMIA, but apical antennal segment long, conical.

- ruficollis* Mg. 1820 (*flavipes* Mg. 1820). **G.** Bristol (A.) 22/6/35, Durdham Down (F.) 2/6/46. **S.** West Town (Wm.) 9/26, Leigh Woods (H.) 31/5/17, Shapwick (A.) 22/6/35, Clevedon (A.) 2/8/40.

OROPEZELLA Coll. 1926 (LEPTOPEZA Macq. 1834 *p.p.*)

Like LEPTOPEZA, but wing longer and discal cell elongated.

- sphenoptera* Lw. 1873. **G.** Coombe Dingle (F.) 14/6/47. **S.** Portishead (H.), Leigh Woods (H.) and (A.) 22/6/25, Backwell (A.) 17/8/26, Priddy (A.) 6/6/37, Kenn Moor (A.) 16/6/39, Clevedon (A.) 5/7/40.

S. F. EMPIDINAE

Six to eight veins reach edge of wing, third longitudinal vein may be forked, discal cell present ; proboscis long or short ; eyes of male usually touching, of female separate.

MICROPHORUS Macq. 1834

Small, greyish-black flies ; apical antennal segment conical, arista two-segmented and long ; proboscis short ; only six longitudinal veins ; found in damp woods.

- anomalus* Mg. 1824. **S.** Leigh Woods (C.).

- holosericeus* Mg. 1804 (*velutinus* Macq. 1827). **G.** Coombe Dingle (F.) 3/5/47-
S. Wells (L.), Leigh Woods (A.) 22/5/26, Clevedon (A.) 21/5/41.

GLOMA Mg. 1822

Like MICROPHORUS, but third longitudinal vein forked.

fuscipennis Mg. 1822. S. Brockley Combe (H.), Flax Bourton (H.).

HILARA Mg. 1822

Medium-sized, dark flies; eyes separated in both sexes, apical antennal segment conical, arista two-segmented, short; proboscis as long as head, conical; the male fore-metatarsi more or less swollen; wing as in GLOMA; flies found hovering over water.

fuscipes F. 1794 (*carinthiaca* Strobl 1892). G. Wotton-under-Edge (P.), Olveston (A.) 18/6/22, Coombe Dingle (F.) 18/7/47. S. Prior Park, Bath (A.) 4/6/30, Tickenham (A.) 20/5/31.

beckeri Strobl 1892. G. Painswick (W.) 16/5/24.

intermedia Fall. 1816. S. Clevedon (F.) 28/5/47.

quadrivittata Mg. 1822. G. and S. Common.

albipennis v. Ros. 1840 (*niveipennis* Zett. 1842). G. Cirencester (T.). S. Shepton Mallet (C.).

aeronotha Mik 1892. S. Ham Green (F.) 23/6/46.

lundbecki Frey 1913. S. Portishead (F.) 24/5/47.

flavipes Mg. 1822. S. St. Audries (A.) 30/8/29, Clevedon (A.) 5/9/40. (G. OROGETON Schin. 1860).

thoracica Macq. 1827. G. Stone (A.) 27/6/28, Filton (F.) 6/6/47, Coombe Dingle (F.) 7/6/47, Durdham Down (F.) 11/6/47, Blaise Castle (F.) 17/7/48. S. Leigh Woods (H.).

maura F. 1781. G. and S. Common.

clypeata Mg. 1822. G. Coombe Dingle (F.) 24/4/48, Filton (F.) 28/5/48. S. Leigh Woods (H.).

griseifrons Coll. 1927. G. Durdham Down (F.) 4/7/46, Coombe Dingle (F.) 26/6/47. S. No locality (Collin).

litorea Fall. 1816. G. Tormarton (A.) 20/5/26. S. Wells (L.), St. Audries (A.) 24/8/29.

curtisi Coll. 1927 (*cilipes* auctt. nec Mg.). S. Sharpam (A.) 2/6/36.

interstincta Fall. 1816. S. Ham Green (F.) 23/6/46.

pilosa Zett. 1842. S. Shepton Mallet (C.).

nigrina Fall. 1816. G. Bristol (C.). S. Long Ashton (C.).

subpollinosa Coll. 1927. G. and S. Common.

cornicula Lw. 1873. G. Coombe Dingle (F.) 3/5/47, Filton (F.) 6/6/47. S. Leigh Woods (H.), Tickenham (A.) 31/5/39, Kenn Moor (A.) 29/6/41.

chorica Fall. 1816. G. and S. Common.

longevittata Zett. 1842 (*bivittata* Strobl 1892). G. and S. Common.

brevistyla Coll. 1927. G. Kingsweston (F.) 9/6/46.

lurida Fall. 1816. G. Stone (A.) 30/6/28. S. Leigh Woods (H.), Prior Park, Bath (A.) 25/6/32.

manicata Mg. 1822. G. Coombe Dingle (F.) 18/7/47.

EMPIS L. 1758

Medium-sized to large flies coloured black, brown or yellow; proboscis very long; wing as in GLOMA; fore-metatarsi of male normal; legs of female may bear scales; found in woods and hedges.

S. G. LISSEMPIS Bezzi 1909

nigritarsis Mg. 1804. G. and S. Common.

S. G. XANTHEMIS Bezzi 1909

stercorea L. 1761. **G.** and **S.** Very common.*trigramma* Mg. 1822. **G.** and **S.** Very common.*punctata* Mg. 1804. **G.** and **S.** Common.*lutea* Mg. 1804. **G.** and **S.** Fairly common.

S. G. KRITEMPIS Coll. 1926

divida L. 1758. **G.** and **S.** Very common.

S. G. LEPTEMPIS Coll. 1926

grisea Fall. 1816. **G.** Sheepscombe (St.) 18/6/27. **S.** Tickenham (A.) 26/6/24.

S. G. PACHYMERIA Steph. 1829

femorata F. 1798. **G.** and **S.** Common.*picipes* Mg. 1804 (*brevicornis* Lw. 1869). **G.** Cirencester (T.) 22/5/23.*tessellata* F. 1794. **G.** and **S.** Very common.S. G. EMPIS *s.str.* (PTEREMPIS Bezzi 1909)*decora* Mg. 1822. **S.** Cheddar (C.).*nuntia* Mg. 1838 (*pennaria* auctt. *nec* Fall. 1816). **G.** Filton (F.) 28/5/46, Durdham Down (F.) 30/5/47, Coombe Dingle (F.) 7/6/47. **S.** Flax Bourton (Wm.) 23/4/21, Ham Green (F.) 7/7/46.*pennaria* Fall. 1816 (*vernalis* Mg. 1822). **G.** Olveston (A.) 8/4/23, Blaise Castle (A.) 28/5/27, Coombe Dingle (F.) 24/5/47, Durdham Down (F.) 30/5/47, Filton (F.) 21/4/48. **S.** Cheddar (C.), Wells (L.), Brockley Combe (J.), Backwell (A.) 25/4/25, Moreton (A.) 23/5/35.*limata* Coll. 1927. **G.** Painswick (W.).*pennipes* L. 1758. **G.** Dursley (A.) 4/6/30, Coombe Dingle (F.) 22/5/48. **S.** Cheddar (C.), Clevedon (A.) 4/7/41.*caudatula* Lw. 1867. **G.** Cirencester (T.) 6/23, Kingsweston (A.) 6/5/23, Filton (A.) 20/5/36 and (F.) 6/6/46, Durdham Down (F.) 18/7/46. **S.** Wells (L.), Clevedon (A.) 12/6/42.*aestiva* Lw. 1867. **G.** Coombe Dingle (F.) 29/6/47. **S.** Clevedon (F.) 12/7/47.*chioptera* Mg. 1804. **G.** Olveston (C.) 21/5/13, Kingsweston (A.) 31/5/24, Durdham Down (F.) 13/5/47, Coombe Dingle (F.) 19/5/47. **S.** Shepton Mallet (C.), Nailsea (A.) 21/4/27, Clevedon (A.) 9/5/46, Cadbury Camp (F.) 11/5/47, Failand (F.) 31/5/47.

S. G. COPTOPHLEBIA Bezzi 1909

albinervis Mg. 1822 (*albipennis* Zett. 1842). **G.** Shepperdine (A.) 30/7/24, Coombe Dingle (F.) 18/7/47. **S.** Tickenham (A.) 23/4/25, Clevedon (A.) 5/6/43 and (F.) 23/6/47.*vitripennis* Mg. 1822. **G.** Kingsweston (A.) 6/8/24. **S.** St. Audries (A.) 30/8/29.

RHAMPHOMYIA Mg. 1822

Like EMPIS, but third vein not forked and proboscis not very long; found in damp woods and marshy meadows.

S. G. HOLOCLERA Schin. 1860

nigripennis F. 1794. **G.** Coombe Dingle (F.) 28/5/46.*scarina* Fall. 1816 (*hybrida* Zett. 1838). **S.** Sharpam (A.) 25/8/25 and 4/8/35.*flava* Fall. 1816. **G.** Kingsweston (A.) 31/5/24, Blaise Castle (A.) 28/5/27, Coombe Dingle (F.) 7/6/47. **S.** Leigh Woods (H.), Tickenham (A.) 24/6/24 Winscombe (A.) 5/7/30, Portbury (F.) 31/5/47.*variabilis* Fall. 1816. **G.** Kingsweston (A.) 6/8/24, Durdham Down (F.) 21/9/47. **S.** Long Ashton (H.), Holford (A.) 6/18.

S. G. MEGACYTTARUS Big. 1880

nigripes F. 1794. **G.** Tormarton (A.) 20/5/26, Stone (A.) 21/5/27, Coombe Dingle (F.) 3/5/47, Blaise Castle (F.) 8/5/48. **S.** Tickenham (A.) 27/5/22, Prior Park, Bath (A.) 4/6/30, West Town (F.) 1/6/47.

S. G. PARARHAMPHOMYIA Frey 1922

barbata Macq. 1823 (*pennata* Macq. 1827). **G.** Awkley (A.) 4/6/22.
geniculata Mg. 1830 (*plumipes* auctt. nec Mg.). **G.** Cirencester (T.), Kingsweston (A.) 24/10/36, Blaise Castle (F.) 25/4/48, Coombe Dingle (F.) 2/5/48. **S.** Shapwick (A.) 20/5/23, Tickenham (A.) 12/5/29.
flata Zett. 1842. **S.** Shepton Mallet (C.), Tickenham (A.) 24/5/26.
tibiella Zett. 1842. **G.** Coombe Dingle (F.) 3/5/47. **S.** Cadbury Camp (F.) 11/5/47.
dentipes Zett. 1842. **G.** Blaise Castle (A.) 24/4/25 and (F.) 25/4/48, Kingsweston (A.) 2/5/26, Coombe Dingle (F.) 2/5/48. **S.** Limpley Stoke (A.) 10/6/34.
simplex Zett. 1849. **G.** Coombe Dingle (F.) 3/5/47.
tarsata Mg. 1822. **G.** Dursley (A.) 9/6/25, Durdham Down (F.) 2/6/46, Blaise Castle (F.) 3/7/48. **S.** Brecon Hill (Ch.) 19/6/26, Priddy (A.) 6/6/37, Clevedon (A.) 13/7/40, Cadbury Camp (F.) 11/5/47, Holford (F.) 12/6/48.

S. G. AMYDRONEURA Coll. 1926

erythrothalma Mg. 1830. **S.** Clevedon (A.) 26/9/39.
gibba Fall. 1816. **S.** Clevedon (A.) 7/7/41.

S. G. ACLONEMPIS Coll. 1926

albohirta Coll. 1926. **G.** and **S.** Common.

S. G. RHAMPHOMYIA s.str.

stigmosa Macq. 1827. **G.** Littledean (A.) 5/6/32.
subcinerascens Coll. 1926. **S.** Cleeve Combe (J.).
sulcata Mg. 1804. **G.** and **S.** Common.

S. F. HEMERODROMIINAE

Small flies; proboscis short; front coxae elongated, front legs armed with spines to hold prey; found in damp woods.

CHELIPODA Macq. 1823 (THAMNODROMIA Mik 1892)

Wing has five longitudinal veins, of which the first is short and the fourth forked, discal cell present; apical arista long; fore-femora swollen and armed with two rows of strong bristles; small, yellow flies found in damp woods.

albiseta Zett. 1838. **S.** Sharpham (A.) 18/8/25.

PHYLLODROMIA Zett. 1837 (LEPIDOMYIA Big. 1880, CHELIPODA auctt.)

Like CHELIPODA, but no discal cell.

melanocephala F. 1794. **G.** Hallen (A.) 9/6/16. **S.** Holford (A.) 6/19, Leigh Woods (Wm.) 15/6/21, Sharpham (A.) 5/9/25.

CHELIFERA Macq. 1823

Arista short; fore-femora swollen and armed with strong bristles; tibiae with long apical spur; five longitudinal veins, of which the third and fourth are forked, discal cell present; small, dark flies found near water.

praecatoria Fall. 1815. **G.** Olveston (A.) 6/21, Awkley (A.) 4/6/22. **S.** Portbury (H.), Bruton (A.) 9/6/37.
aperticauda Coll. 1927. **G.** Bibury (Hm.).

HEMERODROMIA Mg. 1822

Like CHELIFERA, but no discal cell.

laudatoria Coll. 1927. G. Bibury (Hm.).

baetica Coll. 1927. G. Bibury (Hm.).

S. F. CLINOCERATINAE

Like CHELIPODA, but fore-coxae not much elongated, third and fourth longitudinal veins forked.

TRICHOPEZA Rond. 1856

Rather small, dark fly, arista very long, bare; fore-femora with bristly hairs.

longicornis Mg. 1822. G. Littledean (A.) 5/6/22. S. Leigh Woods (H.) and (A.) 8/9/29, Clevedon (A.) 14/7/47, Cadbury Camp (F.) 12/7/47, Holford (F.) 12/6/48.

HYDRODROMIA Macq. 1835 (HELEODROMIA Hal. 1833 *p.p.*)

Like TRICHOPEZA, but arista not so long and pubescent, dark spot at base of each fork and on the cross-veins in wing.

stagnalis Hal. 1833. G. Coombe Dingle (F.) 3/5/47. S. Ham Green (F.) 12/4/47.

DOLICHOCEPHALA Macq. 1823

Like HYDRODROMIA, but first longitudinal vein short, an extra cross-vein between second longitudinal vein and the upper prong of the fork of the third vein; wing brownish with clear spots.

irrorata Fall. 1815. G. Hallen (B.) 20/8/24.

guttata Hal. 1833. S. Wells (L.).

Family :—Dolichopodidae

Medium-sized to small flies, mostly metallic green or blue; antenna with three segments; six longitudinal veins, no discal cell, a cross-vein between the fifth and sixth longitudinal veins; the flies are predaceous and are usually found in damp situations; the larvae live in soil or rotten wood and are carnivorous.

S. F. DOLICHOPODINAE

Basal segment of antenna hairy, arista dorsal, male genitalia large and pedunculated.

DOLICHOPUS Lat. 1796

Metallic, green flies, the tarsi of the male may be plumed, the hind-metatarsi bear dorsal bristles.

S. G. LEUCODOLICHOPUS Frey 1915

atripes Mg. 1824. S. Tickenham (A.) 19/7/24, Shapwick (Cw.) 3/7/48, Street (Cw.) 24/7/48.

vitripennis Mg. 1824. S. Priddy (A.) 6/6/37 and (Cw.) 25/6/47.

signifer Hal. 1838. G. Filton (F.) 4/6/47, Coombe Dingle (F.) 29/6/47, Durdham Down (F.) 18/7/48. S. West Town (F.) 22/6/47, Clevedon (F.) 23/6/47.

S. G. MELANODOLICHOPUS Frey 1915

planitarsis Fall. 1823. S. Catcott (Cw.) 24/5/47, Edington (Cw.) 17/5/47, Shapwick (Cw.) 14/5/48, Walton Moor (A.) 30/4/49.

atratus Mg. 1824. S. Holford (Pn.) and (F.) 12/6/48 and (Cw.) 12/6/48, Priddy (A.) 6/6/37, East Harptree (Cw.) 25/6/47.

picipes Mg. 1824. S. Chew Magna (A.) 30/5/31.

campestris Mg. 1824. S. Shepton Mallet (C.), Sharpham (A.) 9/8/23 and (F.) 28/8/48, Edington (Cw.) 10/7/48, Street (Cw.) 28/8/48, Shapwick (Cw.) 3/7/48.

lepidus Staeg. 1842. S. Kenn Moor (A.) 27/6/39, Shapwick (Cw.) 3/7/48.

S. G. EUDOLICHOPUS Frey 1915

- claviger* Stann. 1831. **G.** Cirencester (T.) 13/6/24. **S.** Clevedon (A.) 21/6/40, Tickenham (A.) 19/6/43, Cadbury Camp (F.) 12/5/46, Street (Cw.) 11/6/47, Edington (Cw.) 22/6/47.
- migrans* Zett. 1843 (*confusus* Zett. 1843). **S.** Shepton Mallet (C.), Axbridge (Rd.), Barrow Gurney (F.) 27/6/18.
- discifer* Stann. 1831 (*nigricornis* Par. *nec* Mg.). **G.** Cirencester (T.) 23/6/23, Olveston (A.) 30/7/22. **S.** Shepton Mallet (C.), Chewstoke (A.) 8/7/32, Wells (F.) 1/6/46, Holford (Cw.) 5/9/47 and (F.) 12/6/48, Portbury (F.) 31/5/47.
- plumipes* Scop. 1763. **G.** and **S.** Fairly common.
- wahlbergi* Zett. 1843. **S.** Clevedon (A.) 20/6/40 and (F.) 7/5/47, West Town (Cw.) and (F.) 28/6/47, Loxley Wood, Shapwick (Cw.) 2/7/47 and (A.) 5/7/47 and (F.) 6/9/47.
- penalis* Mg. 1824. **G.** Painswick (W.), Hallen (A.) 1/8/29, Coombe Dingle (F.) 7/6/47, Blaise Castle (F.) 26/6/48. **S.** Tickenham (A.) 11/5/29, Chew Magna (A.) 30/5/31, Freshford (A.) 5/6/37, Kenn Moor (A.) 27/6/39, Catcott (Cw.) 24/5/47, Edington (Cw.) 13/6/47, Shapwick (Cw.) 3/7/48, Walton Moor (F.) 7/6/48.
- popularis* Wied. 1817. **G.** Coombe Dingle (F.) 3/7/45. **S.** Sharpham (A.) 3/8/25, Charterhouse-on-Mendip (Wm.) 22/6/29, Chewstoke (A.) 8/7/32, Oakhill (Cw.) 29/6/47, Walton Moor (F.) 5/6/48, Holford (Cw.) and (F.) 12/6/48.
- urbanus* Mg. 1824. **S.** Tickenham (A.) 14/6/40, Walton Moor (F.) 5/6/48.
- argyrotaresis* Wahl. 1850. **S.** Walton Moor (F.) 5/6/48, Edington (F.) 20/6/48.
- griseipennis* Stann. 1831. **G.** and **S.** Common.
- virgultorum* Wlk. 1854. **S.** Loxley Wood, Shapwick (Cw.) 30/8/48.
- festivus* Hal. 1832. **G.** and **S.** Common.
- pseudocilifemoratus* Stack. 1934 (*cilifemoratus* auctt. *nec* Macq.). **S.** Clevedon (F.) 23/6/47.
- cilifemoratus* Macq. 1827 (*trivialis* Hal. 1832). **G.** and **S.** Common.
- arbutorum* Stann. 1831. **G.** Coombe Dingle (F.) 15/6/47. **S.** Shepton Mallet (C.).
- linearis* Mg. 1824. **G.** Stone (A.) 26/6/28.
- latilimbatus* Macq. 1827. **S.** Sharpham (A.) 3/8/25 and (A.) 10/9/25 and (F.) 6/9/47, Shapwick (Edw.) 7/9/30 and (Cw.) 3/7/48, West Town (F.) 28/6/47, Loxley Wood, Shapwick (F.) 5/7/47, Edington (Cw.) 7/10/48, Street (Cw.) 24/7/48.
- nubilus* Mg. 1824. **G.** Shepperdine (A.) 23/8/24, Blaise Castle (F.) 25/5/46, Coombe Dingle (F.) 30/5/48. **S.** Sharpham (A.) 7/8/23 and (F.) 6/9/47, Clevedon (A.) 18/6/41, Berrow (B.) 18/6/30, Ham Green (F.) 7/7/46, Walton Moor (F.) 23/8/47.
- simplex* Mg. 1824. **G.** Coombe Dingle (F.) 10/6/47, Blaise Castle (F.) 5/7/48, Filton (F.) 9/7/48. **S.** Shapwick (A.) 5/21 and (Cw.) 25/5/48, Tickenham (A.) 20/7/23, Clevedon (A.) 20/6/34, Edington (Cw.) 23/6/47, Street (Cw.) 11/6/47.
- longitarsis* Stann. 1831. **S.** Norton Fitzwarren (F.) 16/8/47, Street (Cw.) 24/7/48.
- brevipennis* Mg. 1824. **S.** Dunster (A.) 8/6/24, Taunton (A.) 9/6/24, Keynsham (A.) 1/6/29, Yeovil (A.) 6/6/37, Kenn Moor (A.) 16/6/29, Shepton Mallet (A.) 24/6/42, Clevedon (A.) 18/6/43, Catcott (Cw.) 19/6/47, Oakhill (Cw.) 29/6/47.
- ungulatus* L. 1758. **G.** and **S.** Very common.

HERCOSTOMUS Lw. 1857

Like *DOLICHOPUS*, but no dorsal bristle on hind metatarsus and male genitalia not long pedunculate.

S. G. HERCOSTOMUS *s.str.*

- chrysozygos* Wied. 1817. **S.** Tickenham (A.) 11/7/31 and (A.) 14/6/40, Shapwick (A.) 29/6/39, Edington (Cw.) 23/6/47.
- fulvicaudis* Wlk. 1851. **G.** Bristol (Verrall).
- bicolor* Macq. 1827 (*gracilis* Stann. 1831). **S.** Berrow (A.) 27/8/24 and (B.) 18/6/30 and (Sl.) 21/7/28.
- chetifer* Wlk. 1849 (*cretifer* Wlk. 1856). **G.** Durdham Down (F.) 2/7/47, Chalford (F.) 15/7/47, Coombe Dingle (F.) 19/7/47, Filton (F.) 22/6/48, Blaise Castle (F.) 5/7/48. **S.** Leigh Woods (H.) 27/8/18, Tickenham (A.) 1/7/33.
- germanus* Wied. 1817. **G.** Olveston (A.) 15/9/28. **S.** Leigh Woods (A.) 8/9/29.
- nanus* Macq. 1827. **G.** Olveston (A.) 4/6/22, Coombe Dingle (F.) 19/6/47. **S.** Clevedon (A.) 20/6/36, Holford (F.) 12/6/48.
- nigriplantis* Stann. 1831 (*subsimplificipes* Verr. 1912). **S.** Tickenham (A.) 20/7/23 and (A.) 14/6/40, Berrow (A.) 26/6/39, Edington (Cw.) 29/7/46.
- nigripennis* Fall. 1823. **S.** Leigh Woods (H.), Berrow (Sl.) 21/7/28, Shapwick (A.) 29/6/29 and (Cw.) 25/5/48, West Town (F.) 28/6/47, Street (Cw.) 6/7/48.
- parvilamellatus* Macq. 1827. **G.** Olveston (A.) 4/6/22. **S.** Shapwick (A.) 22/6/35, Edington (Cw.) 21/5/47.

S. G. GYMNOPTERNUS Lw. 1857

- chalybeus* Wied. 1817. **S.** Meare (Cw.) 24/7/48, Shapwick (Cw.) 3/7/48, Street (Cw.) 24/7/48.
- celer* Mg. 1824. **S.** Leigh Woods (F.) 20/7/47.
- brevicornis* Staeg. 1842. **S.** Ham Green (F.) 23/6/46, Leigh Woods (F.) 20/7/47.
- metallicus* Stann. 1831. **G.** Coombe Dingle (F.) 8/6/47. **S.** Shapwick (A.) 20/5/23, Edington (Cw.) 7/6/48.
- aerosus* Fall. 1823, var. *dahlbomi* Zett. 1843. **S.** Sharpham (A.) 22/6/35 and (Cw.) 3/7/48, Catcott (Cw.) 24/5/47, Edington (Cw.) 7/6/48, Street (Cw.) 24/7/48.
- assimilis* Staeg. 1842. **G.** Blaise Castle (F.) 5/7/48. **S.** Norton Fitzwarren (F.) 24/7/48.
- cupreus* Fall. 1832. **S.** Shapwick (A.) 24/5/25 and (Cw.) 25/5/48, Sharpham (A.) 29/6/39, Ham Green (F.) 23/6/46, Catcott (Cw.) 24/5/47, Walton Moor (F.) 5/6/48, Edington (Cw.) 7/6/48, Holford (Cw.) and (F.) 12/6/48.

HYPOPHYLLUS Lw. 1857

- Like HERCOSTOMUS, but more slender and male genitalia long, pedunculate.
- obscurus* Fall. 1823. **G.** and **S.** Common.
- discipes* Ahr. 1817. **G.** Chalford (F.) 15/7/47, Bristol (A.) 6/7/32. **S.** Clevedon (Bd.) 26/6/43 and (A.) 23/7/48.
- crinipes* Staeg. 1842. **S.** Holford (F.) 12/6/48.

POECILOBOTHRUS Mik 1878

Like HERCOSTOMUS, but arista hairy; male wing darkened leaving a snow-white spot at the apex.

nobilitatus L. 1767. **G.** and **S.** Common.

S. F. HYDROPHORINAE

Medium-sized, green, not very metallic, flies; arista dorsal; palpi large male genitalia not pedunculate.

HYDROPHORUS Fall. 1823

Fore-femora and tibiae spiny; scutellum with two to four bristles.

oceanus Macq. 1838 (*bisetus* Lw. 1857). **G.** Aust (A.) 9/23, Shepperdine (A.)

- 6/8/24. **S.** Kewstoke (H.), Wick St. Lawrence (J.) 8/8/16, Burnham (A.)
28/8/22, Brean Down (A.) 27/9/29.
praecox Lehm. 1822. **S.** Clevedon (A.) 4/7/46.
bipunctatus Lehm. 1822. **S.** Portbury (F.) 7/4/47.

LIANCALUS Lw. 1857

Rather large, green fly with purple stripes on thorax and dark purple bands on abdomen; fore-femora and tibiae without spines; male wing slightly clouded with a small, clear spot at the apex; scutellum with six bristles.
virens Scop. 1763. **G.** and **S.** Fairly common on damp walls and rocks.

S. F. MEDETERINAE

Small, green flies, not very metallic; arista apical; male genitalia comparatively large and pedunculate; flies found on tree-trunks, palings and walls.

MEDETERA Fisch. 1819 (MEDETERUS auctt. nec Fisch.)

- micacea* Lw. 1857. **S.** Shapwick (J.) 5/8/16.
jacula Fall. 1823. **G.** Whitheshill (W.), Wotton-under-Edge (P.), Durdham Down (F.) 19/7/46, Morton (F.) 8/7/47.
petrophila Kow. 1877. **G.** Durdham Down (F.) 10/7/46, Filton (F.) 22/6/48.
S. Shepton Mallet (A.) 25/6/42.
petrophuloides Par. 1925. **S.** Berrow (A.) 28/6/25.
truncorum Mg. 1824. **G.** and **S.** Fairly common.
dendrobaena Kow. 1877. **G.** Cirencester (T.), Filton (F.) 19/7/48. **S.** West Town (Wm.) 20/8/28, Clevedon (A.) 18/6/40, Barrow Gurney (F.) 27/6/48.
saxatilis Coll. 1941. **S.** Cossington (Cw.) 27/8/48.
nitida Macq. 1834. **S.** Edington (Cw.) 3/8/46.
obscura Zett. 1838. **G.** Blaise Castle (F.) 3/7/48. **S.** Barrow Gurney (F.) 27/6/48.
pinicola Kow. 1877. **S.** Barrow Gurney (F.) 27/6/48.
incrassata Frey 1909. **S.** Loxley Wood, Shapwick (Cw.) 29/6/48.
pallipes Zett. 1843. **G.** Filton (F.) 22/6/48. **S.** Edington (Cw.) 30/7/46 and (Cw.) 19/6/48 and (F.) 20/6/48.
tristis Zett. 1838. **G.** Filton (F.) 22/6/48.
apicalis Zett. 1843. **G.** Coombe Dingle (F.) 7/6/47. **S.** Clevedon (A.) 30/7/42, West Town (F.) 1/6/47, Loxley Wood, Shapwick (Cw.) 2/7/47, Barrow Gurney (F.) 27/6/48.
jugalis Coll. 1941. **S.** Edington (Cw.) 7/6/47.
muralis Mg. 1824. **S.** Edington (Cw.) 15/6/47.

S. F. RHAPHIINAE

Medium-sized to large, metallic, green flies; male apical antennal segment very long, arista long and apical; male genitalia small and not pedunculate; flies found in marshy situations.

PORPHYROPS Mg. 1824

Second antennal segment does not overlap the apical segment; no bristles on outer side of hind-coxae.

- communis* Mg. 1824 (*spinicoxa* Lw. 1850). **G.** Stinchcombe (Chm.) 20/6/25, Blaise Castle (F.) 5/7/48. **S.** West Town (F.) 25/5/47.
crassipes Mg. 1824. **G.** Littledean (A.) 5/6/32, Coombe Dingle (F.) 10/6/47. **S.** Leigh Woods (H.) 22/5/17, Newton St. Loe (Chm.) 9/6/25, Chew Magna (A.) 30/5/31, Brockley Combe (A.) 17/5/47, West Town (F.) 25/4/47.
laticornis Fall. 1823 (*nemorum* Mg. 1830). **S.** Wells (L.).
riparia Mg. 1824. **G.** Shepperdine (A.) 6/8/24.

XIPHANDRIUM Lw. 1857

Like PORPHYROPS, but bristle present on outer side of hind-coxae.

- monotrichum* Lw. 1850. **S.** Holford (F.) 12/6/48.
appendiculatum Zett. 1849 (*macrocerum* Par. nec Mg.). **G.** Coombe Dingle (F.) 10/6/46 and 3/5/47. **S.** St. Audries (A.) 27/8/29, Brockley Combe (A.) 17/5/47, Edington (Cw.) 22/5/47, Loxley Wood, Shapwick (Cw.) 26/5/47.
caliginosum Mg. 1824 (*zetterstedti* Par. 1925). **G.** Morton (F.) 11/7/47, Coombe Dingle (F.) 22/5/48. **S.** Leigh Woods (A.) 23/5/25, Keynsham (A.) 14/5/32, Edington (Cw.) 7/8/47, Holford (Cw.) 30/8/47.
lanceolatum Lw. 1850 (*caliginosum* Par. nec Mg.). **G.** Coombe Dingle (F.) 10/5/47.

SYNTORMON Lw. 1857

Second antennal segment with a thumb-like prolongation on the long conical apical segment; male genitalia small and not pedunculate.

- macula* Par. 1928. **G.** Coombe Dingle (F.) (first British record) 7/4/47, Blaise Castle (F.) 14/3/48 to 2/5/48.
pallipes F. 1794, var. *pseudospicatus* Strobl 1899. **G.** Aust (A.) 6/9/22, Coombe Dingle (F.) 7/6/47, Blaise Castle (F.) 24/4/48. **S.** Leigh Woods (H.), Uphill (J.) 9/9/16, Shapwick (A.) 26/8/25, St. Audries (A.) 27/8/29, Clevedon (A.) 14/9/40 and (F.) 28/5/47, West Town (F.) 17/5/47, Edington (Cw.) 23/6/47 and 1/10/48.
denticulatus Zett. 1843 (*pumilus* Par. nec Mg.). **G.** Queenhill, Tewkesbury (A.) 1/11/25, Coombe Dingle (F.) 11/4/48, Filton (F.) 1/10/47, Blaise Castle (F.) 17/7/48. **S.** Leigh Woods (H.), Edington (Cw.) 29/7/46, St. Audries (A.) 26/8/29.
zelleri Lw. 1850. **G.** Filton (F.) 10/9/48.
sulcipes Mg. 1824, var. *obscurior* Par. 1927. **G.** Filton (F.) 1/10/47, Coombe Dingle (F.) 13/3/48, Blaise Castle (F.) 3/7/48.

EUTARSUS Lw. 1857

Like SYNTORMON, but the apical antennal segment short and the arista dorsal.

- aulicus* Mg. 1824. **S.** St. Audries (A.) 25/8/29, Edington (Cw.) 2/10/47.

MACHAERIUM Hal. 1832

Apical antennal segment very long in both sexes and suddenly hollowed ventrally, arista long and apical, second antennal segment not overlapping the apical segment; a coastal species.

- maritimae* Hal. 1832. **G.** Aust (C.) 26/6/14 and (A.) 6/9/22. **S.** Burnham (Rd.).

BATHYCRANIUM Strobl 1892

Small flies with green thorax and yellow abdomen; apical antennal segment short, arista long and subapical, second antennal segment overlapping the apical segment; flies found in damp woods.

- bicolorellum* Zett. 1843. **S.** Sharpham (A.) 10/9/25, Loxley Wood, Shapwick (Cw.) 9/8/47.

NEUROGONA Rond. 1856

Medium-sized, yellow flies; apical antennal segment short, arista long and subapical, second antennal segment not overlapping the apical segment; male genitalia shortly pedunculate; flies found mainly on tree-trunks.

- pallida* Fall. 1823. **G.** Cirencester (T.), Coombe Dingle (F.) 10/6/47, Blaise Castle (F.) 5/7/48. **S.** Portbury (H.), Leigh Woods (A.) 22/5/27, Clevedon (A.) 18/6/44, Ham Green (F.) 23/6/46, West Town (F.) 28/6/47, Loxley Wood, Shapwick (Cw.) 20/6/48.
suturalis Fall. 1823. **G.** Olveston (C.), Cirencester (T.), Dursley (A.) 9/6/25, Kingsweston (F.) 9/6/46, Morton (F.) 11/7/47, Coombe Dingle (F.) 19/7/47. **S.** Wells (L.) 7/03, Clevedon (A.) 4/7/41.

quadrifasciata F. 1781. **G.** Coombe Dingle (F.) 15/6/47. **S.** West Town (F.) and (Cw.) 28/6/47.

S. F. DIAPHORINAE

Medium-sized to small, metallic, green flies, like *NEUROGONA*, but the male genitalia not pedunculate; found in low vegetation and on leaves of bushes.

DIAPHORUS Mg. 1824

The only *DOLICHOPIID* in which the eyes touch in the male; apical antennal segment reniform, arista dorsal.

oculatus Fall. 1823. **S.** Street (Cw.) 6/7/48.

CHRYSOTUS Mg. 1824

Like *DIAPHORUS*, but male eyes separate and arista situated on or below the middle of the somewhat reniform apical antennal segment.

cilipes Mg. 1824. **S.** Tickenham (A.) 19/7/24.

laesus Wied. 1817. **S.** Freshford (C.), Shepton Mallet (C.) and (A.) 6/7/42.

neglectus Wied. 1817. **G.** Coombe Dingle (F.) 8/6/47. **S.** Priddy (A.) 6/6/37.

femoratus Zett. 1843. **S.** Shapwick (A.) 29/6/39.

cupreus Macq. 1827. **G.** Filton (F.) 6/6/47.

blepharosceles Kow. 1874. **G.** and **S.** Common.

microcerus Kow. 1874. **G.** Coombe Dingle (F.) 5/7/48.

gramineus Fall. 1823. **G.** and **S.** Very common.

ARGYRA Macq. 1834

Medium-sized, green flies with silvery sheen, especially in the male; apical antennal segment more or less triangular, arista subapical; four scutellar bristles; flies found near the ground in damp woods.

S. G. ARGYRA *s.str.*

diaphana F. 1775. **G.** and **S.** Common.

perplexa Beck. 1918. **G.** Filton (F.) 28/8/47.

argentina Mg. 1824. **G.** Shepperdine (A.) 18/8/24, Filton (F.) 6/6/47, Coombe Dingle (F.) 7/6/47. **S.** Prior Park, Bath (A.) 18/7/25, Clevedon (A.) 26/6/39, Loxley Wood, Shapwick (Cw.) 9/8/47.

argentea Zett. 1843 (*discedens* Par. *nec* Beck.). **G.** Morton (F.) 8/7/47, Blaise Castle (F.) 5/7/48. **S.** Edington (Cw.) 4/7/47 and (F.) 19/6/48.

argyria Mg. 1824. **G.** Tockington (C.) 17/7/15, Coombe Dingle (F.) 15/6/47, Filton (F.) 17/6/47, Blaise Castle (F.) 5/7/48. **S.** Portbury (H.), Tickenham (A.) 16/5/25, Sharpham (A.) 4/9/25, Shepton Mallet (A.) 7/7/42, Edington (Cw.) 7/8/47 and (F.) 19/6/48.

leucocephala Mg. 1824. **G.** and **S.** Common.

elongata Zett. 1843. **S.** Edington (Cw.) 22/5/48.

atriceps Lw. 1857. **G.** Coombe Dingle (F.) 8/6/47. **S.** Prior Park, Bath (A.) 18/7/25.

confinis Zett. 1849. **G.** Coombe Dingle (F.) 6/7/47. **S.** West Town (F.) 28/6/47, Leigh Woods (F.) 20/7/47, Oakhill (Cw.) 29/6/47.

S. G. LEUCOSTOLA Lw. 1857

Like *ARGYRA*, but only two scutellar bristles.

vestita Wied. 1817. **S.** Berrow (A.) 26/6/39, Edington (Cw.) 6/7/47, Shapwick (Cw.) 3/7/48.

S. F. CAMPSIGNEMINAE

Small flies, not very metallic; in the male some of the legs are more or less peculiar in shape or armed with stiff bristles; male genitalia small and not pedunculate; flies found by sweeping herbage.

CAMPSICNEMUS Wlk. 1851

Abdomen flattened, face widening towards the mouth.

- scambus* Fall. 1823. **G.** Durdham Down (F.) 26/9/46. **S.** Sharpham (A.) 9/8/23 and 6/9/25, Edington (Cw.) 5/10/48.
curvipes Fall. 1823. **G.** and **S.** Common.
loripes Hal. 1832. **G.** Blaise Castle (F.) 20/3/48.
armatus Zett. 1849. **S.** Clevedon (A.) 16/9/41.

SYMPYCNUM Lw. 1857

Abdomen compressed laterally, face not widening towards mouth.

- spiculatus* Gerst. 1864. **S.** West Town (F.) 28/6/47.
desoutteri Par. 1925 (*annulipes* auctt. nec Mg.). **G.** Stone (A.) 30/6/28, Coombe Dingle (F.) 19/5/47. **S.** Sharpham (A.) 22/8/22, Shapwick (J.) 5/8/16, Tickenham (A.) 8/9/28, Bleadon (A.) 20/9/41, Portishead (F.) 24/5/47, Loxley Wood, Shapwick (Cw.) 26/5/47, Edington (Cw.) 7/6/48 and 5/10/48.

MICROMORPHUS Mik 1878

Very small (under 2 mm.), dark, somewhat metallic flies.

- albipes* Zett. 1843. **S.** Clevedon (W.).

CHRYSOTIMUS Lw. 1857

Small flies (2-3 mm.); male metallic-green, female with yellow abdomen.

- molliculus* Fall. 1823. **S.** Sharpham (A.) 27/8/25 and (Edw.) 7/9/30.

XANTHOCHLORUS Lw. 1857

Small flies (3 mm.); both sexes with yellow abdomen and some yellow on thorax.

- tenellus* Wied. 1817. **G.** and **S.** Fairly common.
ornatus Hal. 1832. **G.** Durdham Down (F.) 19/7/46, Coombe Dingle (F.) 15/6/47. **S.** Berrow (A.) 26/6/39, Clevedon (A.) 18/6/40 and 23/7/48.

S. F. CHRYSOMATINAE

The only subfamily with the fourth longitudinal vein forked, the upper prong of this fork is bent upwards, the lower prong is weak.

SCIAPUS Zell. 1842 (PSILOPUS Mg. 1824 *preoc.*)

Medium-sized, metallic, green flies; long dorsal arista; long cylindrical abdomen; male genitalia small and not pedunculate; flies usually found in damp herbage, sometimes on tree-trunks.

- platypterus* F. 1805. **G.** and **S.** Common.
wiedmanni Fall. 1823. **G.** Painswick (W.) 17/7/95. **S.** Shepton Mallet (C.) 6/7/10.
longulus Fall. 1823. **G.** Cirencester (T.) 6/7/23.

Family:—Musidoridae (LONCHOPTERIDAE)

MUSIDORA Mg. 1800 (LONCHOPTERA Mg. 1803)

Small, dark-yellow flies; apical antennal segment almost globular, arista long and subapical; in the wing the first two longitudinal veins are straight, the third one forks twice, the fourth longitudinal vein ends in the edge of the wing in the male but in the female this vein turns up and ends in the lowest prong of the third vein (this is an unusual form of sexual dimorphism); the flies are caught by sweeping herbage, and the males are much rarer than the females; the larvae live in decaying vegetable matter.

- tristis* Mg. 1824. **G.** Olveston (A.) 5/11/22. **S.** Shepton Mallet (C.), Leigh Woods (H.) and (A.) 3/9/24, Clevedon (A.) 1/12/48.

- lutea* Panz. 1809. **G.** Awkley (A.) 8/9/21, Blaise Castle (A.) 6/9/30. **S.** Sharpham (A.) 22/8/22, Leigh Woods (A.) 18/10/22, Tickenham (A.) 16/9/22.
- var. flavicauda** Mg. 1824. **G.** Shepperdine (A.) 30/8/24, Blaise Castle (A.) 15/5/26. **S.** Shepton Mallet (C.), Backwell (A.) 25/4/25, Sharpham (A.) 4/8/25, Clevedon (A.) 17/8/40, Edington (Cw.) 1/10/48, Loxley Wood, Shapwick (Cw.) 4/11/46.
- var. palustris** Mg. 1824. **G.** Olveston (A.) 23/9/22. **S.** Sharpham (A.) 7/9/25, Loxley Wood, Shapwick (Cw.) 4/11/46, Edington (Cw.) 28/2/48.
- var. trilineata** Zett. 1848. **G.** Olveston (A.) 5/11/22. **S.** Sharpham (A.) 22/8/22, Tickenham (Wm.) 22/4/22 and (A.) 23/7/22, Priddy (A.) 6/6/37, Clevedon (A.) 20/4/45, Edington (Cw.) 1/10/48, Loxley Wood, Shapwick (Cw.) 4/11/46.
- var. cinerea** Meij. 1906. **G.** Blaise Castle (A.) 16/3/24. **S.** Shapwick (A.) 1/5/27, Tickenham (A.) 24/4/22, Prior Park, Bath (A.) 19/3/32, Clevedon (A.) 11/4/39, Edington (Cw.) 1/12/46.
- furcata* Fall. 1823. **S.** Clevedon (W.) 29/8/02.
- var. rivalis** Mg. 1824. **S.** Clevedon (W.) 29/8/02 and (A.) 11/9/41, Bleadon (A.) 20/9/41.
- var. lacustris** Mg. 1824. **G.** Fishponds (A.) 24/3/22, Blaise Castle (A.) 18/3/22. **S.** Shepton Mallet (C.), Sharpham (A.) 19/4/24, Berrow (A.) 27/8/24, Tickenham (A.) 23/7/22, Backwell (A.) 21/4/27.
- var. cinerella** Zett. 1838. **S.** Clevedon (A.) 25/9/40 and 16/9/41.

Family :—**Phoridae**

Small, black, hump-backed flies ; frons wide and bearing strong bristles ; eyes large, hairy ; legs short and strong ; the costa is short and thick, two thick veins, of which the lower one may be forked near the apex end in this costa ; there are three or four more, weak, longitudinal veins ; the flies are caught by sweeping herbage, they may also be seen on leaves or windows running about in a jerky manner ; some females are micropterous or apterous ; the larvae are saprophagous, occasionally parasitic.

N.B.—The generic names given in brackets are those used by Lundbeck.

ANEURINA Lioy 1864

- unispinosa* Zett. 1860 (PARASTENOPHORA Mall. 1910). **G.** Olveston (A.) 30/7/22.
- thoracica* Mg. 1804 (CHAETONEUROPHORA Mall. 1912). **G.** Stone (A.) 27/6/28, Stoke Bishop (Ct.), Filton (F.) 24/6/47. **S.** Taunton (Pa.), Shepton Mallet (A.) 7/7/42, Clevedon (A.) 8/8/44.
- urbana* Mg. 1830 (*caliginosa* Wood nec Mg.) (CHAETONEUROPHORA). **G.** Filton (F.) 12/4/46.

CHAETOPLEUROPHORA Schm. 1922

- erythronota* Strobl 1892 (PARASPINIPHORA Mall. 1912). **S.** Backwell (A.) 17/7/26, St. Audries (A.) 25/8/29, Clevedon (A.) 20/6/40.

TRIPHLEBA Rond. 1856 (TRUPHEONEURA Mall. 1909)

- opaca* Mg. 1830. **G.** Filton (F.) 25/3/47.
- intermedia* Mall. 1908. **G.** Filton (F.) 24/3/48.
- lugubris* Mg. 1830. **G.** Coombe Dingle (F.) 7/6/47 and 7/3/48. **S.** Leigh Woods (F.) 12/4/47.
- intempesta* Schm. 1918. **G.** Durdham Down (F.) 16/3/47.
- autumnalis* Beck. 1901. **G.** Coombe Dingle (F.) 15/2/48.

SPINIPHORA Mall. 1909 (PARASPINIPHORA Mall. 1912)

- maculata* Mg. 1830. **G.** Bristol (F.) 6/3/48, Coombe Dingle (F.) 6/3/48. **S.** Shepton Mallet (C.), Brockley Combe (Wm.) 24/8/22.
- immaculata* Strobl 1894 (*dorsalis* Beck. 1901). **G.** Olveston (C.).
- bergenstammi* Mik 1864 (*domestica* Wood 1906). **S.** Taunton (Pa.).

DIPLONEURA Lioy 1864 (DOHRNIPHORA Dahl 1898)

- abbreviata* v. Ros. 1840. **S.** Clevedon (A.) 19/7/44, West Town (F.) 28/6/47.
abdominalis Fall. 1833. **G.** Hallen (A.) 1/8/29. **S.** Langport (C.), Brockley Combe (A.) 31/8/33, Bishopsworth (Ba.) 6/42, Clevedon (A.) 19/7/42.
florea F. 1794 (*abdominalis* Wood *nec* Fall.). **G.** Durdham Down (F.) 11/9/47.
 var. *versicolor* Schm. 1920. **G.** Blaise Castle (F.) 8/5/48. **S.** West Town (F.) 1/6/47.
concinna Mg. 1830. **G.** and **S.** Fairly common.
nitidula Mg. 1830. **G.** Coombe Dingle (F.) 4/5/47.

PHORA Lat. 1796

- aterrima* F. 1794. **G.** Durdham Down (F.) 26/9/47. **S.** Wells (L.), Tickenham (A.) 25/6/26, St. Audries (A.) 19/7/29, Priddy (A.) 6/6/37, Clevedon (A.) 4/5/39 and 13/7/40, Cadbury Camp (F.) 11/5/47.
obscura Zett. 1848. **G.** Filton (F.) 19/9/46.

BOROPHAGA End. 1924 (HYPOCERA Lioy 1864 *p.p.*)

- incrassata* Mg. 1830. **G.** Durdham Down (F.) 3/8/37. **S.** Wells (L.), Kewstoke (C.) 8/19, Sharpham (A.) 7/8/23, Burrington Combe (F.) 4/8/36, Winford Down (F.) 28/8/37, Clevedon (A.) 23/8/40.

CONICERA Mg. 1830

- atra* Mg. 1830 (*dauci* Mg. 1830). **S.** Freshford (C.), Clevedon (A.) 20/4/45.
tarsalis Schm. 1920. **S.** Castle Neroche (Edw.) 12/5/36.
pauvilla Schm. 1920 (*similis* auctt. *nec* Hal.). **S.** Tickenham (A.) 19/7/24.

GYMNOPHORA Macq. 1835

- arcuata* Mg. 1830. **S.** West Town (F.) 28/6/47.
quartomollis Schm. 1920. **S.** Portbury (F.) 4/2/37.

PSEUDODACTEON Coq. 1907

- formicarum* Verr. 1877. **S.** Dundry (A.) 2/21.

MEGASELIA Rond. 1856 (APHIOCHAETA Brues 1904)

- meigeni* Beck. 1901. **S.** Clevedon (W.) 25/8/02.
errata Wood 1912. **S.** Dunster (A.) 8/16.
giraudii Egg. 1862 (*rata* Wood 1908). **G.** Bristol (Pr.). **S.** Clevedon (A.) 24/8/44.
angustifrons Wood 1912. **S.** Clevedon (A.) 20/8/40.
lutea Mg. 1830. **S.** Shepton Mallet (C.).
flava Fall. 1823. **G.** Bristol (Wm.).
crassicosta Strobl 1892. **S.** Brockley Combe (A.) 17/5/47.
rufipes Mg. 1804. **G.** and **S.** Very common, often indoors.
pulicaria Fall. 1823. **G.** Hallen (A.) 11/9/26, Bristol (A.) 20/11/26. **S.** Tickenham (A.) 20/7/23, Shapwick (A.) 26/8/25, St. Audries (A.) 25/8/29.
melanocephala v. Ros. 1840. **G.** Olveston (C.) 8/17, Morton (F.) 27/9/46, Coombe Dingle (F.) 5/7/48. **S.** Taunton (Pa.), Leigh Woods (H.), Backwell (A.) 20/3/26, Clevedon (A.) 29/9/41.
sulphuripes Mg. 1830 (*minutissima* Wood 1910). **S.** Shepton Mallet (C.) 29/9/07.
projecta Beck. 1901. **G.** Blaise Castle (F.) 6/10/46.
ciliata Zett. 1848. **G.** Bristol (A.) 2/10/32.
fungivora Wood 1909. **S.** Taunton (Pa.)
pleuralis Wood 1909. **S.** Taunton (Pa.), Shapwick (A.) 20/8/25.
meconicera Speis. 1925. **G.** Blaise Castle (F.) 6/10/46, Durdham Down (F.) 17/3/47, Coombe Dingle (F.) 22/4/47.
variana Schm. 1929 (*variabilis* Wood *nec* Brues). **G.** Blaise Castle (F.) 10/5/47.

PHALACROTOPHORA End. 1912

- berolinensis* Schm. 1920. **S.** Clevedon (A.) 20/6/36.

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(It is hoped to publish the *Cyclorrhapha* in the *Proceedings* for 1949, i.e., in 1950.)

TEMPORARY EXPOSURES AND BOREHOLE RECORDS IN THE BRISTOL AREA

III. RECORDS OF BOREHOLES SUNK FOR THE TUNNEL UNDER THE BRISTOL—GLOUCESTER ROAD

BY W. F. WHITTARD, D.Sc., Ph.D.

(*Received, Nov. 20, 1948. Read in title at General Meeting,
Feb. 3, 1949.*)

THE completion of the Severn Bridge will involve the construction of trunk roadways. A road approaching from the east will cross the main road from Bristol to Gloucester (A38) a short distance to the north of Almondsbury. The route to Gloucester in this region passes along the crest of a ridge which is sufficiently defined topographically to enable the bridge road to be carried in a tunnel beneath the road to Gloucester. A series of nine shallow boreholes was sunk along the centre-line of the projected tunnel (fig. 9) and the details of the logs are recorded below.

My thanks are due to the Consulting Engineers for the Severn Bridge Scheme, Messrs. Mott, Hay & Anderson, for permission to examine the cores, and to Dr. Stanley Smith and Dr. L. R. Cox for assistance in the identification of fossils.

Borehole 38

Height above Ordnance Datum : 163 feet

GEOLOGICAL SUCCESSION

	Thick- ness ft. ins.	Total Depth ft. ins.
Soil	1 0	1 0
Red clay	4 0	5 0
TRIAS : KEUPER MARL		
Red Marl	6 6	11 6
Greenish-grey marl with alabaster	2 0	13 6
Red Marl	3 6	17 0

The base of the Keuper Marls was not reached.

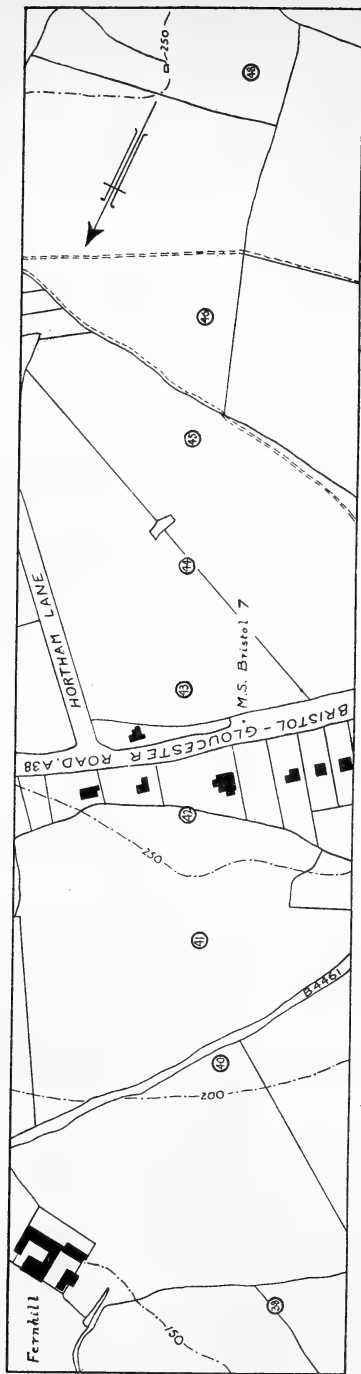


FIG. 9.—LOCALITY MAP OF BOREHOLES FOR TUNNEL UNDER BRISTOL-GLOUCESTER ROAD

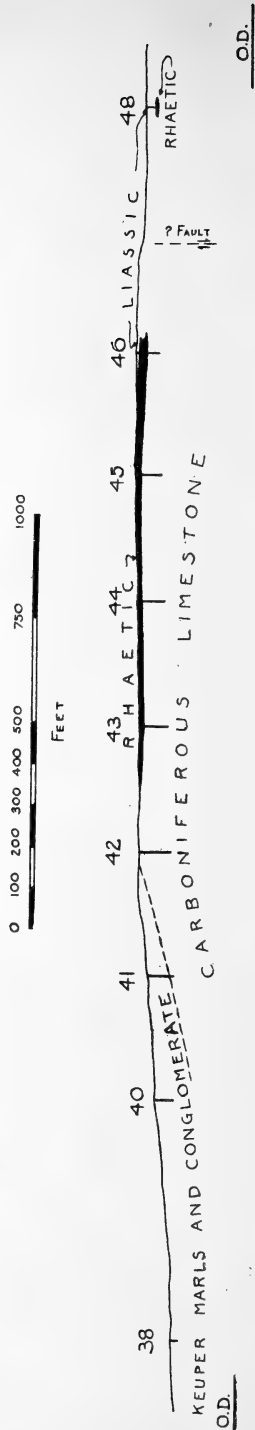


FIG. 10.—GEOLOGICAL SECTION TO SCALE ALONG LINE OF BOREHOLES

Borehole 40

Height above Ordnance Datum : 207 feet

GEOLOGICAL SUCCESSION

	Thick- ness. ft. ins.	Total Depth ft. ins.
Soil	2 0	2 0
Yellow clay	5 0	7 0
TRIAS : KEUPER MARL		
Yellowish-grey, hard, highly calcareous, sandy marl ...	8 0	15 0
Yellowish-grey, sandy marl	2 0	17 0
Red marl with occasional nodular masses of alabaster ...	30 0	47 0

The base of the Keuper Marls was not reached.

Borehole 41

Height above Ordnance Datum : 233 feet

GEOLOGICAL SUCCESSION

Soil	1 0	1 0
TRIAS : KEUPER MARL		
Light, ochreous yellow, calcareous, hard marl with sand grains	15 0	16 0
Red marl with some greyish-yellow bands	20 0	36 0
Greyish-yellow marl becoming coarser-grained towards base and containing angular limestone fragments up to 1 inch across	4 0	40 0
Red marl	1 0	41 0
Yellow, banded with red, hard marl	2 0	43 0
Red marl	1 0	44 0
Grey and greyish-yellow, calcareous marl	3 0	47 0

TRIAS : DOLOMITIC CONGLOMERATE ...

Breccia with angular blocks of limestone larger than 6 inches across	7 0	54 0
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CARBONIFEROUS LIMESTONE

Non-oolitic, fine-grained, compact, grey limestone, occasionally crinoidal, yielding rare specimens of <i>Productus hemisphericus</i> Sowerby	6 0	60 0
Grey and maroon limestone with some red shale (? pseudo-breccia)	2 6	62 6
Grey, fine-grained, compact limestone	1 6	64 0

The fossils obtained from the Carboniferous Limestone give no sure indication of the subzonal age.

Borehole 42

Height above Ordnance Datum : 257 feet

GEOLOGICAL SUCCESSION

Soil	0 3	0 3
CARBONIFEROUS LIMESTONE		
Light grey limestone veined with calcite	18 3	18 6
Grey limestone stained a maroon colour	3 6	22 0

	Thick- ness ft. ins.	Total Depth ft. ins.
Limestone-breccia cemented with calcite	2 0	24 0
Grey, maroon-stained, fine-grained limestone with some bands of compact, grey, porcellanous limestone: <i>Lithostrotion martini</i> E. & H. was collected	7 3	31 3
Red, slickensided shale	0 3	31 6
Grey and maroon, fine-grained limestone, frequently richly oolitic and rarely crinoidal; veined throughout with calcite. <i>Composita</i> sp. was obtained	13 0	44 6
Maroon and grey, oolitic, soft, earthy limestone	1 6	46 0
Grey and maroon limestone	4 0	50 0
Grey limestone, sometimes oolitic, becoming maroon-stained towards the top and yielding <i>Composita</i> sp., and <i>Productus</i> sp. of <i>hemisphericus</i> group	16 3	66 3
Dark grey shale, much slickensided	0 3	66 6
Medium grey, fine-grained limestone, in some cases a porcellanous type ("china-stone"). <i>Composita</i> sp. and <i>Lithostrotion martini</i> were collected	11 6	78 0

The borehole entered the Carboniferous at base of the D₁ subzone or at the top of S₂. The rock from the depth of 31 feet is suggestive of the D zone, but the fossils are more indicative of the S zone. The rocks from the cores below a depth of 31 feet are unmistakably of the S zone but the borehole did not reach the Seminula Oolite.

Borehole 43

Height above Ordnance Datum : 262 feet

GEOLOGICAL SUCCESSION

Soil	2 0	2 0
Yellow clay	4 0	6 0
RHÆTIC : WESTBURY BEDS		
Weathered, black shale	4 0	10 0
CARBONIFEROUS LIMESTONE : S₂ subzone		
Dark grey, compact limestone with <i>Syringopora reticulata</i> Goldfuss	6 0	16 0
Light grey, earthy limestone with wisps of dark grey shale	3 0	19 0
Grey, calcareous shale	4 0	23 0
Medium grey, compact limestone with shaly partings and, near the top of the bed, common <i>Productus hemisphericus</i> Sowerby and <i>Syringopora</i> sp.	8 0	31 0
Grey, calcareous shale	3 6	34 6
Grey, compact limestone with occasional <i>Composita</i> sp. ...	11 6	46 0
Compact, grey limestone with porcellanite ("china-stone")	5 0	51 0
Dark grey limestone with many wisps of dark shale ...	2 0	53 0
Dark grey, compact limestone... ..	3 0	56 0
Grey, concretionary (algal) limestone and red shale: the rock has a nodular appearance	5 0	61 0
Medium grey, compact limestone	9 0	70 0

A high dip of 60° was measured at a depth of 42 feet; the Carboniferous Limestone is correlated with the S₂ subzone mainly because of the presence of the algal concretionary bed between the depths of 56 and 61 feet.

Borehole 44

Height above Ordnance Datum : 267 feet

GEOLOGICAL SUCCESSION

	Thick- ness ft. ins.	Total Depth ft. ins.
Soil	2 0	2 0
Yellow clay	2 0	4 0

RHÆTIC : WESTBURY BEDS

Highly weathered, blue-black shale, associated with yellow clay carrying nodular limestone. Owing to the difficulty of drawing cores the latter deposits may not be "in position" 6 0 10 0

CARBONIFEROUS LIMESTONE : ? D zone

Grey and maroon, crinoidal limestone veined with calcite...	7 0	17 0
White, fine-grained limestone	3 0	20 0
Grey, crinoidal limestone	34 0	54 0
Maroon limestone with numerous ooliths, the majority of which enclose sand grains	1 0	55 0
Maroon and grey, quartzitic sandstone with occasional thin bands of shale	7 0	62 0
One foot of quartzitic sandstone was recovered : apparently a fissure was reached but there was no change in water feed to borehole	6 0	68 0

No fossils were obtained from the Carboniferous Limestone and thus it was not possible to determine the age of the rocks penetrated, but Reynolds and Innes* have recorded the *Dibunophyllum* Zone at Ridge Wood and it is probable that the Carboniferous Limestone proved in the borehole belongs to the same subdivision. They also record the occurrence of a "grit" associated with the limestone in a quarry by the side of the Tockington road at Woodhouse Down, and this "grit" would compare with the quartzitic sandstone recorded from the bottom 14 feet of the borehole.

Borehole 45

Height above Ordnance Datum : 274 feet

GEOLOGICAL SUCCESSION

Soil	2 0	2 0
RHÆTIC : WESTBURY BEDS		
Weathered, black shale	8 6	10 6
CARBONIFEROUS LIMESTONE : D ₁ subzone		
Grey and maroon, crinoidal limestone which yielded <i>Lithostroton martini</i> , <i>Palæosmilium purchisoni</i> E. & H., and <i>Productus hemisphericus</i>	4 6	15 0
Maroon and grey limestone with many wisps and thin partings of shale	3 3	18 3
Maroon, light and medium grey, crinoidal limestone with <i>Lithostroton</i> sp. near <i>L. junceum</i> (Fleming), phaceloid <i>Lithostroton</i> , <i>Dibunophyllum</i> cf. <i>bourtonense</i> Garwood & Goodyear, <i>Palæosmilium purchisoni</i> , <i>Productus hemisphericus</i> and <i>giganteid</i> productids	11 2	29 5

* Proc. Bristol Nat. Soc., Ser. 4, Vol. IV, part i, 1914, p. 100.

	Thick- ness ft. ins.	Total Depth ft. ins.
Red shale	0 4	29 9
Light grey, sometimes maroon-stained, predominantly oolitic, crinoidal limestone in which fossils are uncommon but include <i>Lithostroton</i> sp. near <i>L. junceum</i> and <i>L. cf. pauciradiale</i> (McCoy)	28 3	58 0
Light, maroon-grey limestone with detrital sand grains, becoming richer towards top, and <i>Productus hemisphericus</i> ...	2 6	60 6
Maroon, quartzitic sandstone	3 0	63 6

At a depth of 26 feet the Carboniferous Limestone showed a dip of 25°.

Borehole 46

Height above Ordnance Datum : 276 feet

GEOLOGICAL SUCCESSION

Soil	1 0	1 0
JURASSIC : LIAS (<i>Pleuromya tatei</i> Zone)		
Bedded limestone with yellow clay, the former providing <i>Modiolus laevis</i> Sowerby, <i>Pleuromya tatei</i> Richardson & Tutchter, <i>Protocardia phillipiana</i> (Dunker) and <i>Ostrea hisingeri</i> Nilsson ...	6 0	7 0
RHÆTIC : COTHAM BEDS		
Yellow clay with nodules of fine-grained limestone sometimes carrying iron pyrites ; one of the nodules showed the Cotham Marble structure, and the bed is two inches thick...	3 0	10 0
Greenish, shaly mudstone much weathered to clay ...	3 6	13 6
Grey, calcareous flag with <i>Naiadita lanceolata</i> Buckman ...	1 6	15 0
Greenish-grey, shaly mudstone containing innumerable fragments of shells ; these are mainly indeterminable but <i>Cardinia</i> sp. nov., <i>Cardium cloacinum</i> Quenstedt, <i>Modiolus</i> sp., <i>Pecten</i> sp., <i>Pleuromya</i> sp., <i>Protocardia rhætica</i> (Merian), <i>Gyrolepis alberti</i> Agassiz, and ? <i>Lepidotus</i> sp. have been identified ...	0 6	15 6
RHÆTIC : WESTBURY SHALES		
Grey, weathered shale with selenite and poor fossils ...	1 0	16 6
Grey, earthy limestone	0 6	17 0
Black, weathered, fissile shale which yielded <i>Modiolus minutus</i> (Goldfuss), <i>M. sodburiensis</i> (Vaughan),* <i>Pteria contorta</i> and <i>Pteria</i> sp. nov.†	5 0	22 0
Grey limestone with unidentifiable shell fragments	0 2	22 2
Fissile, black shale containing <i>Modiolus sodburiensis</i> *, <i>Placunopsis alpina</i> (Winkler), <i>Pteria contorta</i> and <i>Gyrolepis alberti</i> ...	0 7	22 9
Fragments only of black shale with <i>Pteria contorta</i> were recovered.	2 6	25 3
Fissile, black shale	2 6	27 9
Coarsely conglomeratic bone bed	0 3	28 0
TRIAS : KEUPER MARL		
Greenish-grey, arenaceous, calcareous marl, sometimes with small angular fragments of limestone	12 0	40 0

* "These specimens are considerably larger than those figured by Vaughan, which came from the Lower Rhætian of Chipping Sodbury". *L. R. Cox.*

† "The most closely comparable described species is *Pteria dcshayesi* (Terquem) figured from the Rhætian of Italy by Capellini, but the body of the shell and the auricles differ appreciably in shape". *L. R. Cox.*

	Thick- ness ft. ins.	Total Depth ft. ins.
Greenish-grey, mottled with darker green, arenaceous, calcareous marl with wisps of alabaster	3 0	43 0
Red marl with angular pieces of limestone up to $\frac{1}{4}$ inch in size	1 0	44 0
Fine-grained, calcareous, grey breccia with limestone fragments up to one inch in size	2 0	46 0
Hard, red marl	4 0	50 0
Hard, calcareous red and grey marl	2 0	52 0
Grey and yellow limestone with dolomite	2 6	54 6
Yellowish-grey, hard, calcareous, including dolomitic, marl	1 6	56 0

The base of the Trias was not reached.

Borehole 48

Height above Ordnance Datum : 255 feet

GEOLOGICAL SUCCESSION

Soil	1 6	1 6
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JURASSIC : LIAS

Yellow clay with grey-weathering, blue-hearted limestone...	3 6	5 0
Yellowish-grey clay with flaggy, earthy limestone	3 0	8 0
Fissile, grey shale with harder, more calcareous bands	5 0	13 0
Earthy, grey limestones with <i>Mactromya arenacea</i> (Terquem), <i>Modiolus lævis</i> , <i>Pleuromya tatei</i> and <i>Protocardia phillipiana</i> (Zone of <i>P. tatei</i> .)	9 4	22 4

RHÆTIC : COTHAM BEDS

Cotham Marble	0 2	22 6
Green and grey banded shale with harder, highly calcareous bands. Thin layers composed of minutely comminuted fish-remains and shells occur at intervals throughout the thickness of the bed; the following fossils have been recognised : <i>Ctenoptychius</i> sp., <i>Gryolepis alberti</i> , <i>Saurichthys</i> sp. and <i>Pecten</i> sp.	4 6	27 0

The core of the ridge extending to the north-north-east from Almondsbury is shown by the traversing boreholes to be composed of Carboniferous Limestone, the surface of which must, however, descend westwards underneath Triassic strata at a minimum average angle of 15 degrees (fig. 10). The inclination of this unconformity is in marked contrast, as it generally is elsewhere in the Bristol district, with the unconformity beneath the Rhætic rocks where the surface is almost horizontal. A thin veneer of Rhætic rocks effectively obscures most of the Carboniferous Limestone of the Almondsbury ridge on the eastern side.

Further south-eastwards along the line of section Liassic strata are introduced and may be explained either by a gentle dip in that direction or by the effect of a fault or faults possessing a down-throw to the east. The records from boreholes 46 and 48 are

significant because the thin Cotham Marble occurs respectively at 266 feet and 233 feet above Ordnance Datum, requiring a down-throw of 33 feet if the strata are assumed to be horizontal ; midway between the boreholes there is a pronounced topographical feature, and faulting, instead of gentle dip, appears better to explain the difference in level of the Cotham Marble.

TEMPORARY EXPOSURES AND BOREHOLE RECORDS IN THE BRISTOL AREA

IV. BOREHOLES ON MENDIP

BY W. F. WHITTARD, D.Sc., Ph.D.

(Received, Dec. 22, 1948. Read in title at General Meeting,
Feb. 3, 1949.)

BOREHOLES which have been sunk to tap water on Mendip have not generally proved satisfactory of recent years, and of the three recorded herein one alone can be claimed as successful. The several Old Red Sandstone anticlines of Mendip succeeded by the Lower Limestone Shales of the Carboniferous have not infrequently been quoted as examples of water in permeable, anticlinal cores being held back by impervious shales. Theoretically, the sandstones might be expected to yield considerable supplies; in practice, they usually possess an exceedingly low porosity ratio because secondary silica occupies the voids. The sandstones are massive, bedding planes are tight and joints are so close set as to be of no importance from the viewpoint of rock permeability. The optimum conditions often exist alongside a fault zone, but even these may prove disappointing because the joints are infilled by minerals, particularly calcite, which may have been derived from the overlying limestones of Carboniferous age. Springs are well known to flow near the Carboniferous—Old Red Sandstone junction but the quantity is invariably small. The Old Red Sandstone of Mendip is so far from being a good aquifer that it is generally true to state that only under exceptional circumstances will supplies in excess of 5,000 gallons an hour be won from the ground.

I am indebted to Dr. Stanley Smith for the identification of the fossils.

Priddy Borehole

Location: well, in coppice, 400 yards E. 36° N. of St. Lawrence's Church, Priddy, Somerset.

Height above Ordnance Datum: 800 feet.

Remarks. A well 15 feet deep had been dug several years ago and a small water-supply piped to Priddy Village. A borehole was sunk in the bottom of the well with a view to increasing the yield.

GEOLOGICAL SUCCESSION

Depth of well	Thick- ness ft. ins.	Total Depth ft. ins.
Sediment	6 0	15 0 21 0
CARBONIFEROUS LIMESTONE : K₂ SUBZONE		
Dark grey, calcareous shales with thin bands of darker grey limestone	4 0	25 0
Dark grey, crinoidal limestone which provided <i>Chonetes stoddarti</i> Vaughan, <i>C. cf. hardrensis</i> Phillips, orthotetid fragments, <i>Productus (Avonia) bassus</i> Vaughan, <i>Camarotæchia mitcheldeanensis</i> Vaughan and <i>Spirifer tornacensis</i> de Koninck... Uncored	4 0 4 6	29 0 33 6
Dark grey, crinoidal limestone, sometimes stained pink, with thin, calcareous shale-partings and two beds, 9 inches and 6 inches thick, of bryozoal limestone. The grey limestones yielded <i>Chonetes</i> sp. belonging to the <i>C. cf. hardrensis</i> group and comparable with <i>C. tuberculata</i> McCoy, fragments of young orthotetids, <i>Productus (Avonia) bassus</i> and <i>Camarotæchia</i> sp. The bryozoal limestones provided fragments of the above-listed forms and in addition <i>Spirorbis</i> sp.	11 6	45 0
Dark grey, calcareous shale carrying thin, sometimes crinoidal, limestone	9 0	54 0
Bryozoal limestone	9	54 9
Dark grey, calcareous shale with thin limestones not exceeding 1 inch in thickness	7 3	62 0
Medium grey, crinoidal limestone with <i>Rhipidomella michelini</i> l'Eveille, <i>Chonetes</i> of the <i>C. cf. hardrensis</i> group, <i>Camarotæchia</i> sp. and ? <i>Eumetria</i> sp.	1 3	63 3
Dark grey, calcareous shale	2 3	65 6
Bryozoal limestone	6	66 0
Dark grey, calcareous shales with a few thin limestone bands rarely reaching a thickness of 4 inches; the latter provided <i>Orthotetes (Schellwienella) crenistria</i> Phillips and an allied type with a rounded form and shorter hinge	17 6	83 6
Dark grey, fine-grained, non-crinoidal limestone	1 6	85 0
Dark grey, calcareous shales with dark grey limestones up to 9 inches thick	7 0	92 0
Dark grey, crystalline, fine-grained limestone containing <i>Orthotetes (Schellwienella) crenistria</i> and <i>Productus (Avonia) bassus</i>	1 6	93 6
Dark grey, calcareous shale	4 6	98 0
Medium grey, crystalline limestone	1 0	99 0
Dark grey, calcareous shale	6	99 6
Bryozoal limestone with <i>Rhipidomella michelini</i> , <i>Orthotetes (Schellwienella) crenistria</i> , <i>Productus (Avonia) bassus</i> and <i>Spiriferina octoplicata</i> (Sowerby)	1 6	101 0
Light grey limestone which contained <i>Rhipidomella michelini</i> in abundance, <i>Orthotetes</i> sp., <i>Leptæna analoga</i> Phillips and <i>Syringothyris cf. principalis</i> North	1 6	102 6
Dark grey, calcareous shale	12 6	115 0

The dip of the beds is 20°. The fauna shows nothing unusual except the abundance of *Chonetes* at certain levels; the beds can be correlated with the K₂ subzone of the Carboniferous Limestone. Bryozoal limestones are not frequently developed so high in the K zone and five bands were found; although these distinctive

rock-types are commonly associated with the α horizon, Welch has recorded the presence of similar beds at the top of K_2 in the Eastern Mendip.*

A pumping test was run for nineteen days, and over a period of thirteen days the yield of water fell from 6,000 to 5,000 gallons per hour. The flow of water is from the south-west along a fissure. The total water hardness is 19 parts per 100,000, of which 5 are permanent and 14 temporary hardness.

Eastwater Borehole

Location : 550 feet due east of old quarry alongside Eastwater Drove north of Eastwater Farm.

Height above Ordnance Datum : 890 feet

GEOLOGICAL SUCCESSION

	Thick- ness ft. ins.	Total Depth ft. ins.
CARBONIFEROUS LIMESTONE : K ZONE		
Predominantly crystalline, grey limestones (sometimes with wisps of dark grey shale) and some interbedded dark grey shales. The rocks are unfossiliferous except for crinoid ossicles. The dip is 48°	73 0	73 0
Micaceous, dark, bluish-grey shales with occasional thin beds up to 8 inches thick of crinoidal, crystalline limestones, much veined with calcite. No Bryozoa Bed was recognised. A dip of 60° was measured at a depth of 110 feet. The fossils recovered included <i>Chonetes</i> cf. <i>hardrensis</i> Phillips, <i>Orthotetes</i> sp., <i>Productus</i> (<i>Avonia</i>) <i>bassus</i> Vaughan, <i>Camarotechia mitchel-deanensis</i> Vaughan, <i>Syringothyris cuspidata</i> Martin, <i>Spirifer tornacensis</i> de Koninck and <i>Eumetria</i> sp.	117 0	190 0
OLD RED SANDSTONE		
Grey, pink and brown, massive, calcareous sandstones with many veins of calcite, bands up to 2 inches thick of conglomerate, and occasional beds up to 2 feet thick of brick-red and greyish-green shale, and maroon, micaceous shales	110 0	300 0

The borehole yielded little water, and on test produced no more than 200 gallons per hour. The rocks were extensively jointed but in nearly all cases the joints were mineralised.

A borehole was driven in 1943 by Messrs. Clements for the Ecclesiastical Commissioners, the position being 700 feet from the Eastwater borehole in a direction $E.8^\circ N$. Six-inch perforated lining-tube was inserted within the eight-inch borehole, and test pumping was carried out for about 8 hours at maximum capacity of 1,000 gallons per hour. During the test the water-level was not depressed to more than 20 feet from the surface; normally the water stands at 2 feet below ground level. The only geological data are those provided by the contractors, who report that the

* Q.J.G.S., vol. lxxxix, 1933, pp. 15-16.

hole was 86 feet deep, that broken, red sandstone and sand were penetrated to a depth of 83 feet, harder rock being met through the last 3 feet of drilling, and that the water was found nearly at the bottom of the hole. This report suggests the presence of a considerable thickness of hillwash material derived from the Old Red Sandstone.

Erlong Lane Borehole

Location : Erlong lane, 900 yards W. 110° N. of St. Paul's Church, Easton, Somerset.

Height above Ordnance Datum : about 45 feet.

Remarks. Some years ago the borehole had been cut to a depth of 208 feet and then abandoned. Work continued in 1943 when a depth of 350 feet was attained.

GEOLOGICAL SUCCESSION

	Thick- ness ft. ins.	Total Depth ft. ins.
Soil	2 0	2 0
TRIAS : KEUPER MARL		
Red marl	178 0	180 0
Red marl interbedded with greenish-grey bands	28 0	208 0
<i>Borehole re-opened in 1943</i>		
Sludge of mud	20 0	228 0
Red marl with greenish-grey bands	4 0	232 0
Grey limestone-breccia with fragments and pellets of calcareous shale	6	232 6
Red marl	5 6	238 0
Greyish-green marl	4 0	242 0
Greyish-green and red marl with bands of gypsum (satin-spar) up to 15 inches thick	2 0	244 0
Red marl with occasional greyish-green marl	84 0	328 0
Greyish-green marl with bands of gypsum	2 0	330 0
Red marl	20 0	350 0

A continuous pumping test was run for fourteen days and a steady supply of 5,000 gallons per hour was maintained. The rest-level before pumping was 15 feet below ground-level, and the depressed level during pumping was 130 feet; the water returned to 17 feet twenty-four hours after the conclusion of the test. The water proved excessively hard and analysed 64.5 parts per 100,000, of which 54 were permanent and 10.5 temporary hardness; chlorine, calculated in terms of sodium chloride, was present to the extent of 5.7 parts per 100,000.

The thickness of marls proved greater than was expected, particularly in view of the outcrop of hard, massive Dolomitic Conglomerate which occurs $\frac{1}{4}$ mile to the north-east and supplies good potable water.

THE TERRESTRIAL ISOPODA OF STEEP HOLM

BY HUGH BOYD

(Received, Jan. 20, 1949. Read in title at General Meeting,
March 3, 1949.)

WHILE visiting Steep Holm on May 2, 1948, with a party of members of the Society, the writer made a collection of terrestrial Isopoda. Since less than three hours could be devoted to collecting, it is obvious that a thorough examination of the island was not made, and it is most unlikely that examples of all the species present were obtained. Nevertheless, the publication of a brief account of the collection is deemed to be justified by the occurrence of several species not previously recorded for the island.

Two previous lists of the terrestrial Isopoda of Steep Holm have been published. Pearcey (1915) collected on the island at the end of May, 1914. He found only four species. Hamilton (1939) took part in the biological survey carried out by several members of the Society in July, 1938. He names five species, and notes another for which the specific determination was not made.

The following list is of all the species so far recorded. Identification of the 1948 collection was carried out by the writer.

Ligia oceanica (Linn.). Recorded by Pearcey as "not common on rocks at low water." Not listed by Hamilton, but stated by Yonge and Lloyd (1939), in their report on the shore fauna, to be "abundant in cracks in the rocks at and above high tide mark." Not looked for in 1948.

Trichoniscus pusillus Brandt. Found in 1938, but not in 1914 or 1948. A surprising omission from the recent collection, for this species is usually readily apparent where it occurs.

Platyarthrus hoffmannseggii Brandt. Found in 1938 and 1948, but not in 1914. This species is common in ants' nests, conspicuous, and readily identified, so that it is odd that it was not found by Pearcey.

Porcellio scaber Latr. Numerous in 1948, especially in heaps of stones. Recorded by Pearcey. Hamilton lists a species of *Metoponorthus* (= *Porcellionides*) or *Porcellio*, not more precisely identified, which he equates doubtfully with Pearcey's *P. scaber*.

Porcellionides pruinosus (Brandt). One taken in 1948. Not previously recorded.

Tracheoniscus sp., prob. *ratzeburgii* (Brandt). Only one obtained, 1948. Not previously recorded.

Oniscus asellus Linn. Found in 1914, 1938 and 1948. Though numerous in the latter year, not the most abundant species.

Philoscia muscorum (Scop.). Taken in 1938 and 1948, but not in 1914. Another surprising omission from the earliest list, for, though it did not seem very plentiful in 1948, the species is more active and obvious than most.

Armadillidium vulgare (Latr.). In all three collections. Abundant and widespread in 1948. In 1914 noted as "common under stones at base of cliffs near ruins of Hotel." Found on plateau and in dampish situations, 1938.

A. pulchellum (Zencker). Not taken in 1914 or 1938. Recorded as numerous in 1948, especially near the huts in the south-west.

A. pictum Brandt. One found 1948. Not previously recorded.

Thus the 1948 collection adds four species to those previously found. It will be remarked that three of the new records are based on single specimens. This is probably an indication of scarcity, though the possibility that the collector paid relatively little attention to the habitats favoured by these species cannot be excluded.

The adequacy of the 1914 collection is doubtful. It was made in a single day and may thus have been even less comprehensive than that of 1948. The 1938 survey extended over three days and might be expected to be fairly representative. However, in 1948 the collector was concerned only with Isopoda and Myriapoda, whereas the earlier visitors were not so restricted, and this may have reduced the effectiveness of the latter.

In view of the inadequacy of the material, it would be imprudent to assert that significant changes in the isopod population of Steep Holm have taken place since 1914; but, equally, the possibility cannot be dismissed. It is, indeed, likely that some changes have occurred, for several modifications in the environment have taken place, and have been such as to favour these animals. Two wars have provided an abundance of temporary structures, giving rise in their decay to a multitude of suitable micro-habitats. A great increase in the numbers of nesting gulls has added to the amount of vegetable debris, and the re-emergence of Alexanders (*Smyrniium olusatrum*) as a dominant plant over extensive tracts may also be of importance in this respect.

Clearly, further collections of Isopoda on Steep Holm are desirable, to establish more certainly the number of species present and to determine the status of each. That the comparison of the three collections made so far appears to indicate several changes in

the isopod fauna, even between 1938 and 1948, suggests that repeated biological surveys of the island, at intervals of not more than ten years, would be of value, for it may be supposed that comparable changes are also taking place in other elements of the biota.

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THE OCCURRENCE OF LEISLER'S BAT (*Nyctalus leisleri* (KUHL.)) at BRISTOL

By L. HARRISON MATTHEWS, M.A., Sc.D., and W. E. MAYES
(Received, and read in title at Council Meeting, May 4, 1949.)

ON 10 July, 1948, an example of Leisler's Bat was picked up dead at Stoke Bishop, Bristol, and brought to the City Museum. Examination showed that the animal was a female and that she was carrying, clinging to the fur, a recently born young one which was still living. The occurrence of this species at Bristol is of interest for it has only once previously been recorded from the district, from Winscombe, Somerset, in 1915, as noted by Wiglesworth (1915) and Tetley (1941).

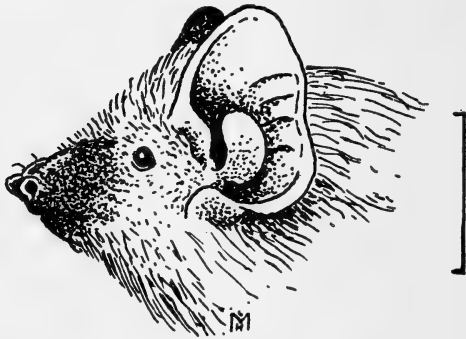


Fig. 11

Leisler's Bat is generally regarded as a rare species in England, being known chiefly from parts of Yorkshire, Cheshire and the valley of the Avon in Warwickshire, Worcestershire and Gloucestershire (Barrett-Hamilton, 1910). Elsewhere it has been found only as isolated examples at infrequent intervals. The Somerset specimen mentioned above exemplifies this, as does a more recent one found in Cambridgeshire (Harrison, 1946). There appear to be practically no further records of the species, at least by reliable observers. On the other hand, the resemblance of the species to the common Noctule Bat may have led to its being overlooked, as also may its habits for it is said to inhabit inaccessible holes in trees far above ground level; it may thus be less uncommon and restricted in its range than is generally supposed. In Ireland it is common and widely distributed over the eastern half of the country.

The fur of the present specimen is rusty brown ; lighter, almost buffish, below, and darker on the head, neck and throat. The rusty brown colour is, however, confined to the tips of the hairs, about the outer third of each, the rest being dark brown. The dimensions in the flesh were, head and body 65.0 mm., tail 40.0 mm., expanse of wings 270mm. The young one is a female, its measure-



Fig. 12

ments being, head and body 38.0 mm., tail 18.0 mm ; the body was hairless and unpigmented, only the flying membranes, the ears and face being dark brown in colour. The formula of the milk dentition is $\frac{-23.1.12}{123.1.12}$ on each side. Both $\underline{m_i}$ are three-pointed, the lingual point being the larger ; $\underline{m_c}$ is slightly recurved. Each $\underline{m_i}$ bears three, short, rounded cusps ; $\underline{m_c}$ bears two, small points—one posterior, the other posterior and lingual to the main one,

which is slightly recurved. All the post-canines are simple points.

Fig. 11 shows the head of the adult female ; fig. 12 shows the under surface of the naked young one ; the scale in each represents 1.0 cm.

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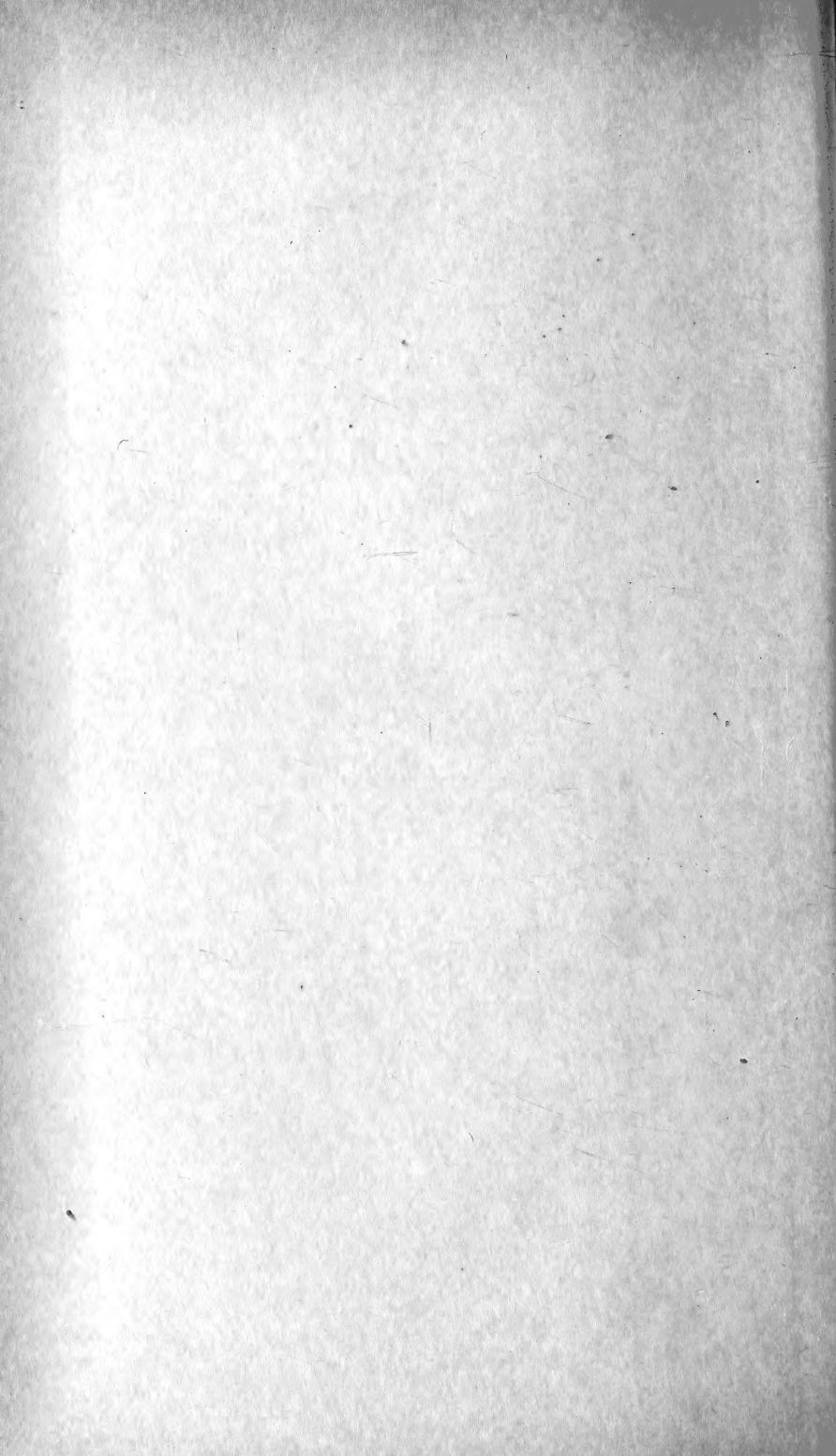
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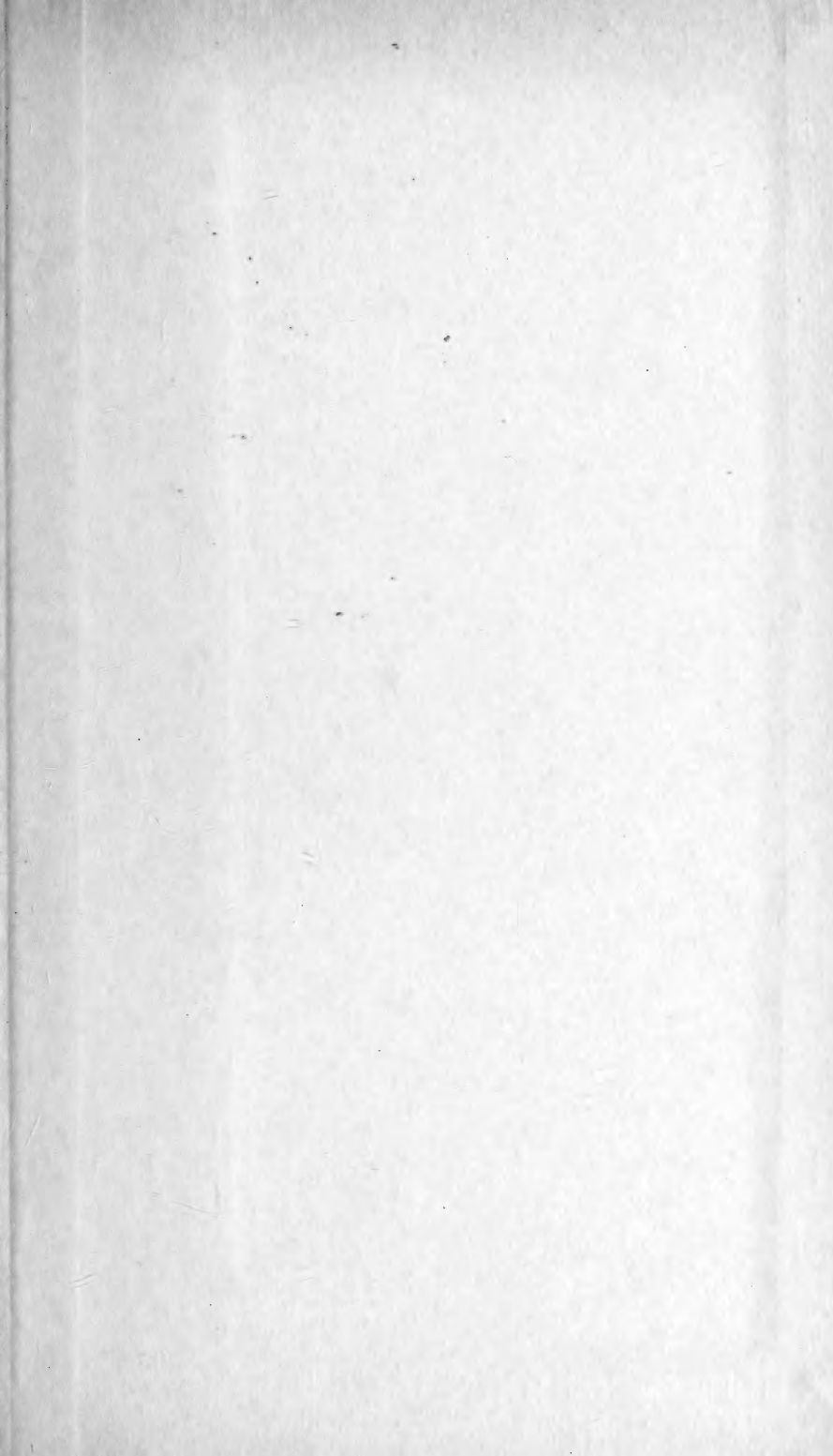
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