

THE REV. C. W. H. DICKER, R.D.,
HON. EDITOR AND VICE-PRESIDENT.

PROCEEDINGS

OF THE

DORSET NATURAL HISTORY

AND

ANTIQUARIAN FIELD CLUB.

EDITED BY

C. W. H. DICKER

AND

HERBERT PENTIN.

VOLUME XXXIII.

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The Dorset Natural History and Antiquarian Field Club.

INAUGURATED MARCH 26TH, 1875.

Presidents :

- 1875-1902—J. C. Mansel-Pleydell, Esq., B.A., F.G.S., F.L.S.
 1902-1904—The Lord Eustace Cecil, F.R.G.S.
 1904 * Nelson M. Richardson, Esq., B.A.

Vice-Presidents :

- 1875-1882—The Rev. H. H. Wood, M.A., F.G.S.
 1875-1884—Professor James Buckman, F.S.A., F.G.S., F.L.S.
 1880-1900—The Rev. Canon Sir Talbot Baker, Bart., M.A.
 1880-1900—General Pitt-Rivers, F.R.S.
 1880 * The Rev. O. Pickard-Cambridge, M.A., F.R.S., F.Z.S.
 1885 * The Earl of Moray, M.A., F.S.A. Scot., F.G.S.
 1892-1904—Nelson M. Richardson, Esq., B.A.
 1900-1902 } * The Lord Eustace Cecil, F.R.G.S.
 1904 }
 1900-1909—W. H. Hudleston, Esq., M.A., F.R.S., F.G.S., F.L.S., *Past Pres. Geol. Soc.*
 1900-1904—Vaughan Cornish, Esq., D.Sc., F.C.S., F.R.G.S.
 1900 * Captain G. R. Elwes, J.P.
 1902 * H. Colley March, Esq., M.D., F.S.A.
 1904 * The Rev. Herbert Pentin, M.A.
 1904 * The Rev. W. Miles Barnes, B.A.
 1904 * The Rev. Canon Mansel-Pleydell, M.A., R.D.
 1904-1908—R. Bosworth Smith, Esq., M.A.
 1908-1909—Henry Storks Eaton, Esq., M.A., *Past Pres. Roy. Met. Soc.*
 1909 * The Rev. Canon C. H. Mayo, M.A., *Dorset Editor of "Somerset and Dorset Notes and Queries."*
 1909 * E. R. Sykes, Esq., B.A., F.Z.S., *Past Pres. Malacological Soc.*
 1911-1912—The Rev. C. W. H. Dicker, R.D.
 1912 * Alfred Pope, Esq., F.S.A.

Hon. Secretaries :

- 1875-1884—Professor James Buckman, F.S.A., F.G.S., F.L.S.
 1885-1892—The Earl of Moray, M.A., F.S.A. Scot., F.G.S.
 1892-1902—Nelson M. Richardson, Esq., B.A.
 1902-1904—H. Colley March, Esq., M.D., F.S.A.
 1904 * The Rev. Herbert Pentin, M.A.

Hon. Treasurers :

- 1875-1882—The Rev. H. H. Wood, M.A., F.G.S.
 1882-1900—The Rev. O. Pickard-Cambridge, M.A., F.R.S., F.Z.S.
 1901-1910—Captain G. R. Elwes, J.P.
 1910 * The Rev. Canon Mansel-Pleydell, M.A., R.D.

Hon. Editors :

- 1875-1884—Professor James Buckman, F.S.A., F.G.S., F.L.S.
 1885-1892—The Earl of Moray, M.A., F.S.A. Scot., F.G.S.
 1892-1901—Nelson M. Richardson, Esq., B.A.
 1901-1906—The Rev. W. Miles Barnes, B.A.
 1906-1909—The Rev. Herbert Pentin, M.A.
 1909-1912—The Rev. C. W. H. Dicker, R.D.

* The asterisk indicates the present officials of the Club.

New Members

ELECTED SINCE THE PUBLICATION OF THE LIST CONTAINED
IN VOL. XXXII.

PROPOSED DEC. 5TH, 1911.

<i>Nominee.</i>	<i>Proposer.</i>	<i>Seconder.</i>
C. H. Blackett, Esq., of Rasapenna McKinley-road, Bournemouth	The Rev. T. Russell-Wright	Dr. F. T. Atkins
W. E. Blackett, Esq., of Blanchland, McKinley-road, Bournemouth	,,	,,
The Rev. J. H. Cooke, M.A., LL.D., of Shillingstone Rectory, Dorset	The Hon. Secretary	The Rev. L. S. Plowman
The Rev. A. Hippisley Smith, of Knowlton House, Surrey-road, Bournemouth	Sir Henry Peto	The Hon. Secretary
E. A. Rawlence, Esq., of Newlands, Salisbury	Captain J. E. Acland	The Hon. Editor

PROPOSED FEB. 13TH, 1912.

<i>Nominee.</i>	<i>Proposer.</i>	<i>Seconder.</i>
The Rev. E. W. Baker, B.A., of The Rectory, Witchampton	The Rev. J. M. J. Fletcher	Miss Saunt
Jerome N. Bankes, Esq., F.S.A., of 63, Redcliffe Gardens, London, S.W.	Henry Symonds, Esq.	Captain J. E. Acland
J. G. Neilson Clift, Esq., of 8, Princes Street, Westminster, S.W.	The President	The Hon. Secretary
F. H. Haines, Esq., M.R.C.S., L.R.C.P., of Winfrith, Dorset	The Hon. Secretary	The Rev. Canon Usherwood
R. Kersley, Esq., of Upwey Manor, Dorchester	Lieut.-Colonel F. G. L. Mainwaring.	Dr. W. Hawkins
J. C. Swinburne-Hanham, Esq., of Manston, Sturminster Newton	A. Pope, Esq.	H. Syndercombe Bower, Esq.

PROPOSED MAY 9TH, 1912.

<i>Nominee.</i>	<i>Proposer.</i>	<i>Seconder.</i>
The Rev. E. T. Butler, M.A., of Okeford Fitzpaine Rectory, Shillingstone, Dorset	Captain G. R. Elwes	The Hon. Treasurer
G. Dru Drury, Esq., M.R.C.S., L.R.C.P., of Corfe Castle, Ware- ham	W. W. Collins, Esq.	The Rev. H. L. Wright
George Romilly, Esq., M.A., of The Grange, Marnhull, Dorset	The Rev. E. W. J. Hellins	The Rev. W. E. H. Sotheby
The Right Rev. The Lord Bishop of Salisbury, D.D., of The Palace, Salisbury	The Hon. Treasurer	The Rev. Canon H. E. Ravenhill

PROPOSED JUNE 18TH, 1912.

<i>Nominee.</i>	<i>Proposer.</i>	<i>Seconder.</i>
Mrs. Carr Glyn, of Wood Leaze, Wimborne	The Rev. Canon H. E. Ravenhill	Sir Richard G. Glyn, Bart.
B. F. H. Dammers, Esq., of Harbour House, Bridport	J. Suttill, Esq.	H. Symonds, Esq.
Colonel Dickson, of Southill, Dean Park, Bournemouth	The President	Captain G. R. Elwes
Mrs. Dickson, of Southill, Dean Park, Bournemouth	„	„
Miss Jordan, of The Ridge, Durlston Park Road, Swanage	Miss M. Dillon- Trenchard	The Hon. Secretary
F. G. Symonds, Esq., of the Wilts and Dorset Bank House, Blandford	The Hon. Treasurer	Dr. T. Fielding

PROPOSED JULY 23RD, 1912.

<i>Nominee.</i>	<i>Proposer.</i>	<i>Seconder.</i>
Miss E. N. Ferguson, of Elwell Lea, Upwey, Dorchester	Dr. T. H. Sanderson Wells	The Rev. H. Hawkins
Miss Constance Ferguson, of Elwell Lea, Upwey, Dorchester	„	„

PROPOSED SEPT. 11TH, 1912.

Miss Constance Alexander, of The Grange, Chetnole, Sherborne	The Rev. T. L. Jenkins	Mrs. Morgan
Mrs. T. S. Hichens, of Flamberts, Trent, Sherborne	W. W. Oules, Esq.	Miss Catherine Oules
Mrs. Arthur S. Williams, of Hill House, Yetminster	Mrs. Morgan	Major Coney

The Proceedings
OF THE
Dorset Natural History and Antiquarian
Field Club

FROM DECEMBER, 1911, TO MAY, 1912.

FIRST WINTER MEETING.

Tuesday, Dec. 5th, 1911.

Present : The President, Lord Eustace Cecil, the Honorary Secretary, Treasurer, Editor, Captain G. R. Elwes, Dr. H. Colley March (Vice-Presidents), and a large attendance of Members.

Four new Members were elected, and five nominations announced.

THE BRITISH ASSOCIATION.—Mr. ALFRED POPE, as delegate to the Meeting at Portsmouth on Aug. 30th, presented his Report, and was duly thanked by the Club for his good offices.

THE STUDY OF DORSET FUNGI.—The HON. SECRETARY reported the receipt of a letter from the British Mycological Society offering guidance to local natural history societies in their study of the fungi occurring in their districts. Sir DANIEL MORRIS mentioned the interesting address on the subject made at the meeting of the British Association by Professor Wager, who suggested, among other things, encouraging the study of fungi among school teachers and children.

THE CONGRESS OF ARCHÆOLOGICAL SOCIETIES.—The HON. SECRETARY stated that a copy of the Annual Report of this

Congress had been sent to every Member of the Club. Captain ACLAND, alluding to that part of it which dealt with Church Restoration, made some remarks on the desirability of getting expert guidance whenever such work was taken in hand. It was unanimously agreed that Canon Mansel-Pleydell should be asked to bring this point before the Diocesan Church Building Association.

THE CARE OF "ANCIENT MONUMENTS."—EARTHWORKS AND STONE CIRCLES.—The HON. SECRETARY reported the receipt of letters from the Hon. Sir Schomberg McDonnell, K.C.B. (Secretary of H.M. Office of Works), and from the Dorset County Council in regard to co-operation for the preservation of "ancient monuments." The Rev. C. W. H. DICKER, secretary of the Earthworks Committee of the Club, said that the committee had drawn up a circular which they wished to have authority to issue to all the clergy of the county and others interested in the matter, calling attention to the provisions of the Act, and seeking their assistance in the first place in preparing a list of all the works that they could find still existing, together with the names of the owners, and then communicating with the owners with the view of their availing themselves of the provisions of the Act. The HON. SECRETARY observed that land-owners ought to welcome this Act, for while it in no way infringed their rights of property, it enabled any ancient remains on their estates to be duly preserved. Already Maiden Castle, the stone circle at Kingston Russell, and the Nine Stones at Winterborne Abbas had been taken over by the Office of Works under the provisions of the Act. Mr. POPE proposed that the Earthworks Committee be authorised to print and circulate their report at a cost not exceeding £5, and this was carried unanimously.

EXHIBITS.—Mr. E. A. RAWLENCE exhibited some roughly-worked flints from the gravel beds of Blackmore Vale. The PRESIDENT exhibited an English 14th or 15th Century earthenware garden watering-pot, and the rose of another of slightly later date, and also a valuable early 16th Century illustrated

book, *Calendarium Romanum magnum* (1518), containing varied information on medicine, astronomy, geography, &c.

CIST VAENS AND SKELETONS AT PORTLAND.—Mr. W. DE C. PRIDEAUX produced portions of two skulls and bones and flints from a cist at Portland, removed in the process of quarry work. With the second skull were found a few iron nails and a portion of a Romano-British pot. He expressed his gratitude to Mr. Cotterell, the managing director of the Bath Stone Firms, and Mr. Sansom and Mr. Pearce, his co-directors, for the kindly assistance that they had given him, and also for the promise that in future any further finds of the same kind should be reported to him before they were disturbed. Mr. F. J. BARNES added further interesting particulars.

Mr. J. G. NEILSON CLIFT read a paper entitled "The Mystery of Corfe." (p. 50.)

PORTLAND FLORA.—Mr. W. BOWLES BARRETT read a valuable paper entitled "Contributions to a Flora of Portland." (p. 96.)

ANCIENT MEMORIAL BRASSES.—Mr. W. DE C. PRIDEAUX read a few notes in continuation of his series on "The Ancient Memorial Brasses of Dorset," and exhibited some interesting rubbings and a stereotype reproduction prepared by Mr. Miller Christy (Treasurer of the Monumental Brass Society) of the brass to "Master Wyllym Goldynge, somtyme parson" of Piddlehinton Church. This he presented to the Museum, and was cordially thanked.



SECOND WINTER MEETING.

Tuesday, Feb. 13th, 1912.

Present: The President, Lord Eustace Cecil, the Hon. Secretary, Editor, and Dr. Colley March (Vice-Presidents), Mr. and Mrs. Thomas Hardy, and 45 other Members.

Five new Members were elected, and six nominations announced.

RELICS FROM MAUMBURY RINGS. — Captain ACLAND exhibited a number of interesting objects found during the excavations at Maumbury Rings in 1910 and now in the Dorset County Museum. The first was a piece of prehistoric pottery, found in the deep shaft at a depth of 18ft. and associated with the antler picks, which he also exhibited. He mentioned the result of an interesting test of the practical utility of these primitive tools, a workman finding that he could work as well and quickly with them as with a modern pickaxe. Captain Acland also showed a small Romano-British urn found close to the right hand of a skeleton lying on loose silting a foot above the Roman entrance. For comparison he produced a similar urn found in 1893 just outside Maumbury, 25 yards to the north of the entrance. With this were two Roman coins, one of Faustina junior, d. 175. In other Roman or Romano-British burials adjoining were found a two-handled cup and iron nails. Another interesting exhibit was a beautiful bronze brooch, much like a modern safety-pin. Captain Acland added the reminder that the finding of the prehistoric relics did not, of course, disprove Maumbury Rings being a Roman amphitheatre. It simply showed that before the Romans came the place was used as a flint-quarry by the prehistoric flint-knappers, after which the Romans used the same site for quite another purpose. Mr. ALFRED POPE, in thanking Captain Acland for

showing these interesting relics, said he hoped that the Club would increase its grant towards defraying the cost of the next excavations, which he understood were to be carried out in the coming autumn. The PRESIDENT suggested that this matter should be left over for consideration at the Annual General Meeting of the Club to be held in May, when they hoped to have their Treasurer with them. Dr. COLLEY MARCH called attention to a valuable book on "amphitheatres" by Scipio Maffei, translated by Alexander Gordon in 1730. For those who followed the Maumbury excavations it contained much of interest.

THE MORINI IN DORSET.—The PRESIDENT mentioned that Mr. Joseph Whitby, of Preston, Yeovil, desired information about any original evidence of the existence of the Morini in Dorset, referred to in Hutchins (Vol. I., pp. ii., viii., and ix., last edition).

THE PROCEEDINGS.—The PRESIDENT called attention to a specimen copy of the new volume of the Club's "Proceedings," upon which he offered congratulations to the Honorary Editor.

FINE BRASS RUBBINGS.—The walls of the Reading Room were adorned temporarily with nearly a score of fine rubbings of famous and representative monumental brasses, from the earliest examples downward, exhibited by Mr. R. BARROW, of Parkstone, by whom they were rubbed. He called attention to how the rubbings, arranged in chronological order, illustrated incidentally the development and change of armour—the chain-mail in the early examples gradually giving place to the plate armour, in which in course of time the knight's body came to be entirely cased. Lord EUSTACE CECIL said that Mr. Barrow was much to be congratulated upon the excellence of his work in this interesting branch of archæological record. The HON. SECRETARY added that Mr. Barrow's fine collection comprised some of the most famous examples in England. The examples shown included the brasses of Sir John D'Abernon, *circa* 1277, said to be the earliest known brass, and in Stoke D'Abernon Church,

Surrey ; Sir John's eldest son, in the same church, date 1327 ; Robert de Waldeby, Archbishop of York, 1397, in St. Edmund's Chapel, Westminster Abbey ; Abbot Thomas de la Mere, 1395, a Flemish brass, in St. Alban's Cathedral ; Sir John Harpedon, in plate armour, 1457, in Westminster Abbey ; and John Cherowin, an incised slab of Purbeck stone, 1441, in Brading Church, Isle of Wight.

EXHIBITS.—The PRESIDENT exhibited some flints from the drift gravel on Bloxworth Heath, collected by the Rev. O. Pickard-Cambridge. Mrs. THOMAS HARDY exhibited a beautifully-finished coloured drawing, made by herself, of a gold torque or collar. It was, she said, found at Boscastle years ago by a diligent investigator, who called it an Irish chieftain's collar. Captain ACLAND observed that there were a great many of such collars to be seen in Ireland, and it was interesting that this specimen had been found at Boscastle, one of the nearest points to Ireland.

Mr. HENRY SYMONDS read extracts from a long and valuable paper on "The History of Bridport Harbour." (p. 161.)

Mr. J. G. NEILSON CLIFT read a paper by Mr. HERBERT S. TOMS on "Piddletrenthide Valley Entrenchments." (p. 34.).

Mr. ALFRED POPE read a paper on "Some Dew-ponds in Dorset." (p. 22.)

The PRESIDENT read the Rev. O. PICKARD-CAMBRIDGE'S paper on "New and Rare British Arachnids, noted in 1911." (p. 70.)



ANNUAL MEETING.

Thursday, May 9th, 1912.

Notwithstanding the strong counter-attraction presented in the presence of the King and the manœuvres of his Fleet at Weymouth, there was a good attendance of Members at the Annual Business Meeting, held in the Reading Room of the Dorset County Museum. The President presided, supported by five Vice-Presidents.

Six new Members were elected, and four nominations announced (amongst the latter being the Bishop of Salisbury, Dr. F. E. Ridgway).

The PRESIDENT having read his Annual Address (p. 1), a vote of thanks was proposed and seconded by Captain ELWES and Canon USHERWOOD, and carried with acclamation.

The HON. SECRETARY read his Report. (p. xxiii.)

The HON. EDITOR having read his Report (p. xxiii.), Captain ACLAND raised the question as to whether the Volume of Proceedings should be brought out in future immediately after the Annual Meeting, instead of at the beginning of the following year, as heretofore. A strong feeling was shown amongst the Members present in favour of the change. The HON. SECRETARY mentioned that it would involve the publication of an interim volume containing the Presidential Address read that day and the seven or eight papers read at the December and February meetings. For defraying the extra cost of producing this Volume, to adjust matters, it would be necessary to draw upon the reserve fund invested in Consols. It was decided to put the matter on the agenda for the first summer meeting, so that Members absent that day might be duly notified.

CLUB FINANCE.—Canon MANSEL-PLYDELL, as Hon. Treasurer, presented his Annual Statement of Accounts. (p. xxvii.)

DORSET PHOTOGRAPHIC SURVEY.—In the absence of Mr. C. J. CORNISH-BROWNE, Hon. Director of the Photographic Survey of the County, the HON. SECRETARY read his Report. (p. xxiv.)

GIFTS TO THE COUNTY MUSEUM.—Captain ACLAND, Curator of the Dorset County Museum, presented his Report. (p. 144.)

NUMISMATICS.—The HON. SECRETARY read a short Report from Mr. HENRY SYMONDS, F.S.A., of Bridport, the Corresponding Secretary of the Numismatic Sectional Committee. (p. xxv.)

EARTHWORKS COMMITTEE.—The Rev. C. W. H. DICKER (Corresponding Secretary of the Earthworks Sectional Committee) reported that notices were about to be sent out to landowners, clergy, and other suitable persons in the county stating that, at the suggestion of the First Commissioner of Works (Sir Schomberg McDonnell) the Earthworks Committee had undertaken to prepare a list of the principal camps, enclosures, barrows, and megalithic remains belonging to prehistoric times, which are now to be found in the county. It is hoped that eventually the owners of the land may be led to avail themselves of the provisions of the new Ancient Monuments Act, by placing the safe-keeping of these remains in the hands of the State. In the first instance the Committee proposed to make a rough census of all the known earthworks, stone circles, &c., in the county, and in this task asked for the kind co-operation of the persons addressed.

MAUMBURY RINGS.—The Maumbury Rings Excavations Committee, who were re-elected, reported that they proposed to resume the work of excavation during the autumn. Captain ACLAND explained, with the aid of plans, that the committee would turn their attention to linking up and completing, as far as possible, the work already done in 1908, 1909, and 1910, but suspended last year.

PRESENTATION OF THE ESSAY MEDALS.—The PRESIDENT announced that the "Mansel-Pleydell" silver medal and prize had been awarded to Mr. Cyril Douglas Day, B.A., of Glenhurst, Dorchester, for an essay on the Natural History of the

actual contents of a pond in Dorset ; and the "Cecil" medal and prize to Mr. Eric Moullin, of Fermain, Swanage (son of their old and esteemed member, Mr. A. D. Moullin), for an essay on "The most recent discoveries in wireless telegraphy and their practical advantages in commerce and war." The prize essays were laid on the table for inspection. Lord Eustace Cecil, who played so important and so generous a part in the foundation of the medal competitions, was sorry that he could not be there to present the "Cecil" medal personally, as he was unable to leave London. This year, continued Mr. Richardson, the medals were awarded for essays of high excellence. Mr. Cyril Day had already won the "Mansel-Pleydell" medal and prize in 1908 with an essay on "Radium," and now he had secured the companion "Cecil" medal. His paper, of fine quality, was beautifully illustrated with good drawings and micro-sections, which his father, Dr. Day, had present, with a microscope to let any members who were interested see. In a letter Mr. Day said "The majority of the species I kept under careful observation during many weeks in a micro-aquarium in my workshop." The paper was full of original work, and well deserved the medal and prize. Canon Usherwood had also written an excellent and interesting essay.

18TH CENTURY DRIED FLOWERS.—The PRESIDENT mentioned that Mr. T. H. Winwood, of Rothesay House, Dorchester, had brought for exhibition, and had also generously presented to the County Museum, a large volume containing a pressed collection of botanical specimens, mostly Dorset, made in 1766 by a Dr. Hawkins, who lived at Weymouth. He regarded the book as of great value, since there were few dried specimens existing from so distant a date. For instance, the specimens of wheat and barley were of much interest, as since then the varieties had much developed.

IMPORTANT FIND AT WHITCOMBE CHURCH.—The Rev. C. W. H. DICKER mentioned that a very interesting discovery had just been made at Whitcombe Church. A part of the chancel wall was in a ruinous condition and had to be rebuilt, and in the work were found large



FRAGMENTS OF AN ANCIENT CROSS, WHITCOMBE.

fragments of what appeared to be a Saxon cross, since built into the wall as coign stones. He produced the photographs which he had taken of the stones, showing the details of the interlacing carving. Mr. St. John Hope pronounced the stones to be parts of a very fine churchyard cross of Saxon work—unique in Dorset, he believed. The Rev. E. C. LESLIE, Rector of Came and Whitcombe, expressed indebtedness to Mr. Dicker for his kind offices, and mentioned that, as Whitcombe was a small and poor parish, he would receive gratefully any small contributions towards the absolutely necessary work of preserving the beautiful little church which, the first charge of the Rev. William Barnes, the Dorset poet, had suddenly sprung into fame through this interesting discovery. Whitcombe was worth only £12 a year, and with no residence. The Rev. HERBERT PENTIN, as Vicar of Milton Abbey, mentioned that in bygone days Whitcombe was a *capella* of Milton Abbey, and in the Abbey Church they had two somewhat similar stones, but not nearly so fine. Indeed, he had seen nothing like them in the county, with details so rich and crisply defined. Mr. DORAN WEBB pronounced the upper piece to be a portion of the arm of a 10th Century cross, and probably, if they trenched across between the chancel walls, they would find the rest of the cross. On Canon RAVENHILL'S motion two guineas was voted towards the cost of this work being done.

RE-ELECTION OF OFFICERS.—Canon RAVENHILL said that, as one of the few remaining original Members of the Club, he had great pleasure in proposing the re-election of the President. The Club were singularly fortunate in having so distinguished and so devoted a man as Mr. Richardson to fill the office, and he trusted that he might long be spared to preside over the Club with the same ability and geniality as in the past, and to give them presidential addresses of the same diverse interest. The proposition was seconded by Canon USHERWOOD and carried with acclamation. The PRESIDENT, in returning thanks, said he was glad to see the Club prospering

so, and promised to continue to do his best to promote its welfare.

Captain ELWES proposed that their present excellent Honorary Secretary should be asked kindly to continue in office. Mr. FLOYER seconded the proposition, and the PRESIDENT, in supporting it, observed that it should be coupled with a vote of thanks to Mr. Pentin for his past services. Mr. Pentin did a great deal to make the Club as successful as it was, and was not at all sparing in pains. The proposition having been carried, the HON. SECRETARY said that he should be glad to continue to act, and added that he had pleasure in re-nominating as the Assistant Secretary Mr. H. Pouncy, who did much valuable work. The PRESIDENT said he wished also to express the thanks of the Club to Mr. Pouncy, who took a great deal of trouble at the summer meetings.

Mr. FLOYER, in proposing the appointment of Canon Mansel-Pleydell as Honorary Treasurer, said that they were especially glad to have a Mansel-Pleydell in office, since he served as a living link between the present and the past, when for so many years his distinguished father occupied the Presidential Chair. The PRESIDENT confirmed this sentiment, observing that Canon Mansel-Pleydell's association with the Club helped to give a sense of personal continuity to it. Canon MANSEL-PLEYDELL, in response, observed with characteristic modesty and humour that he was glad with some ostensible reason, such as looking after their money bags, for keeping in touch with the Club, for which his dear father had so great an affection, and to which he devoted a large part of his life and energy. He was grateful to the Club for having granted him the services of an Assistant Treasurer.

Mr. VERE OLIVER, in proposing the re-appointment of the Rev. C. W. H. Dicker as Honorary Editor, observed that Mr. Dicker had exceptional qualifications for the work, for, besides being a scholar, he was a good antiquary, artist, and naturalist, and able efficiently to supervise the pictorial as

well as the literary side of the "Proceedings." The Club were greatly indebted to him for the able way in which he brought out the volume. It continued to improve, and became more interesting every year. Colonel MAINWARING seconded the proposition, which, like those foregoing, was carried with unanimity and applause. Mr. DICKER, in response, observed that the Editorship would be a very laborious job if he had to draw up the reports of all the meetings; but, thanks to the excellent work which Mr. Pouncy did in that respect, his labours were much lightened.

A NEW VICE-PRESIDENT.—The PRESIDENT re-nominated all the Vice-Presidents, and proposed the addition of Mr. Alfred Pope, who was an original Member of the Club, a Fellow of the Society of Antiquaries, the reader of various interesting papers before the Club, and the author of the valuable book entitled "The Old Stone Crosses of Dorset."

DELEGATES.—The Club proceeded to the nomination of a delegate, "who must be or become a member of the British Association," to represent the Club at the meeting of the Corresponding Societies at Dundee. The HON. SECRETARY said that he had written to Lord Moray (formerly the Hon. M. G. Stuart-Gray, an ex-honorary secretary of the Club), and it was hoped that he would act as their representative; or perhaps Sir Daniel Morris would be willing to do so. Messrs. Nigel Bond and E. A. Fry were willing again to represent the Club at the Congress of Archæological Societies in union with the Society of Antiquaries of London.

SECTIONAL COMMITTEES.—The following sectional sub-committees were appointed:—

PHOTOGRAPHIC SURVEY.—Mr. Cornish Browne (director), the President, Captain Aeland, Miss Hilda Pope, Mr. C. H. Mate, the Revs. S. E. V. Filleul, W. Miles Barnes, and J. Ridley, Dr. K. Le Fleming, and Mr. A. D. Moullin.

EARTHWORKS.—The Revs. C. W. H. Dicker (corresponding secretary) and C. W. Whistler, Dr. H. Colley March, Mr. Alfred Pope, Messrs. C. S. Prideaux, W. de C. Prideaux, Vere Oliver, H. Le Jeune, and J. G. N. Clift.

NUMISMATIC.—Messrs. H. Symonds (corresponding secretary) and H. F. Raymond, Canon Mansel-Pleydell, Dr. Crallan, Captain Acland, Lieut.-Colonel Mainwaring, and Mr. W. de C. Prideaux.

SUMMER MEETINGS.—It was decided to hold a two-day meeting at Marlborough, visiting Savernake Forest and Avebury, and one-day meetings at Beaulieu Abbey, Yeovil (for Trent and Bradford Abbas), and Cerne Abbas.



ADDITIONAL EDITORIAL NOTES.

BLACKMORE VALE.

1. BISHOP'S CAUNDLE. In *Somerset and Dorset Notes and Queries* (Dec. 1910) Canon Mayo gave an interesting account of some carved stones built into the fireplace of a cottage of Jacobean date. Last year this cottage was pulled down, and the fragments carefully removed to Sherborne by Mr. E. A. Rawlence, agent for the Castle Estate. The stones prove to have formed the base of a handsome cross of the 15th century. Three of the principal faces bore representations of scenes of the Passion and Resurrection, and on the angles were figures in bold relief of the Evangelists, with their Apocalyptic symbols. Portions of a plinth were also found bearing an inscription, which is undecipherable.

2. LOWER BUCKSHAW. To Mr. Rawlence we are also indebted for a find of some geological, as well as archaeological, importance. In digging for gravel in the bed of the brook which runs from Holnest northwards and eastwards, two large oak-trees were found lying across the stream in a bed of gravel at a depth of nearly 6ft. from the surface. They were covered by a bed of blue clay, above which was a thicker bed of yellowish clay and alluvial soil. Under one of the logs was found the antler of a roe-deer, and close by a portion of an oak stake appeared to have been driven into the ground at the same level. Dr. Ord, of Bournemouth, has written an interesting paper on the geological aspects of this discovery, which we hope may in due course be read to the Club.

LYME REGIS.

ANCIENT ARCHWAY. In April a report was received from Mr. A. C. G. Cameron, of Uplyme, that some ancient masonry had been discovered in the cellar of one of the houses adjoining and abutting on the Buddle Bridge. On examination it became fairly certain that this work was part of a 12th century bridge of several arches, crossing the river when the stream was much broader than it is at present. A photograph showing the arch has been kindly given to us by the Rev. Cecil Urquhart. It is to be hoped that the Lyme authorities will be very careful, in carrying out the contemplated improvements to the street, to preserve all such old work as may come to light.

The present bridge consists of one arch of large span, and appears to have been built (probably in the 14th century) when the bed of the river was hewn out of the rock to an extra depth of 8ft.

TOLPIDDLE.

RECOVERY OF A 12TH CENTURY EFFIGY. For many years (probably since the "restoration" of the Church in 1855) a large slab bearing the upper part of a priest's figure has lain embedded in the turf to the south of the chancel. The Rural Dean reported to the Bishop on more than one occasion the desirability of bringing this valuable memorial within the church. Thanks to the energy of the present Vicar, and of Mr. W. de C. Prideaux (a prominent member of our Club), the work was put in hand last year. The crowning achievement, however, has been the discovery and removal of the remaining portion of the slab, which has been built into the quoign of the Chancel wall. This year the whole was put together, and now occupies a worthy resting-place in the north transept of the church.

The effigy is that of a priest in Eucharistic vestments. Around the plinth is the following inscription, in typical characters of the 12th century:—SI QS AMAT. . . PM Q SARCOPHAGVM ISTVM. . . DICAT PRESBITERO REQVIEM DA CRISTE PHILIPPO.

The Club contributed £2 towards the cost of the work, which has been admirably carried out.

WHITCOMBE.

At the Annual Meeting of the Club a short report was made of some carved remains of a Cross of the 10th century, which has been found in rebuilding the Chancel wall of the little Church at Whitcombe. The Chancel is of the 13th century, built on to a much earlier nave; some portions of the north wall being apparently of pre-Norman date. Many other portions of the Cross have now been found embedded in the walls, but only three pieces seem to have any carving left on them.

On stripping off the plaster inside the building, a number of mediæval paintings have come to light—particularly, a very fine St. Christopher, bearing the Christ Child on his shoulders and walking through the water. The Child holds the orb in His left hand, and His right hand rests upon the giant's head. Christopher carries the pine-tree staff in his right hand, and in the water a large figure of a mermaid is seen.

The Church is situated in the midst of an ancient earthwork.



REPORTS OF OFFICERS AND OF SECTIONAL COMMITTEES.

THE HON. SECRETARY'S REPORT.

During the past twelve months the membership of the club has again fluctuated between 390 and 400 members. The rule limiting the membership of the club to 400 members, about which there was so much divided opinion at the time, seems to be proving itself a work of super-erogation, as the deaths and resignations continue to balance automatically the influx of new members. The summer meetings were normally attended. The attendance was less than in the previous year, but larger than in the year still earlier. For some years the attendance at the two days' meetings has been disappointingly small. It has perhaps been a fault that these meetings have been held in too well-known places, with which many members have already been familiar. Whether a two days' meeting shall be held this year or not should be considered carefully. The attendance at the winter meetings continues to increase slightly, but it ought to be much larger than it is. These meetings are of great educative value; and members wishing to enlarge their knowledge of the natural sciences and archæology find them a great help. There is a balance in hand of £7 4s. on my statement of accounts, so the reduced levy of 1s. 6d. per diem for "incidental expenses" at the summer meetings will be continued this year. The accounts have been duly audited, and the vouchers pertaining thereto lie on the table.

THE HON. EDITOR'S REPORT.

In our forthcoming volume we hope to include the following papers, contributed during the winter session:—

A continuation of the Rev. O. Pickard-Cambridge's "Arnachnids."
 A further contribution on Ancient Memorial Brasses, by Mr. W. de C. Prideaux.

"Contributions to the Flora of Portland," by Mr. W. Bowles Barrett.

"Bridport Harbour through seven centuries," by Mr. H. Symonds.

"Piddletrenthide Valley Entrenchments," by Mr. H. S. Toms.

"The Mystery of Corfe," by Mr. Neilson Clift.

"Some Dew-Ponds in Dorset," by Mr. Alfred Pope.

"Notes on Stukeley's description of Maumbury Rings," by Captain Acland.

The volume will also include the essay, by Mr. Cecil Day, which has gained the Mansel-Pleydell Medal this year; and the valuable statistics of weather and first appearances, &c.

REPORT OF THE DIRECTOR OF THE PHOTOGRAPHIC SURVEY OF THE COUNTY, 1912.

The Director is able to report that progress is being made with the work of the Photographic Survey of the County; 130 photographs have been given since the last annual meeting of the Field Club by the following contributors:—Mr. Mate, 8; Captain Acland, 8; Dr. Le Fleming, 15; Mr. Dicker, 45; the Director, 54.

The new arrangement of the collection grouped under parishes with various sub-divisions and stored in boxes is found to work well, any photograph wanted being easily met with.

Further offers of assistance from members of the Field Club and others interested in the county, who are photographers, will be very welcome.

The Director and Committee desire to express their thanks to those who have in various ways helped forward the work during the past twelve months.

REPORT OF THE EARTHWORKS SECTIONAL COMMITTEE.

We are sorry to have to record the long-continued and serious illness of one of our number, the Rev. C. W. Whistler. A great many important and interesting earthworks have been examined and classified by Dr. Colley March and myself, and during the coming summer we are hoping to prepare some sketch-plans of a good number of these.

The circular which was decided on at the December meeting is in course of distribution throughout the county, and we hope that it will be instrumental in calling attention to the need of preserving many of these interesting relics of prehistoric times.

I shall be grateful to any of our members who will kindly furnish me with the names and addresses of any persons to whom the circular should be sent.

C. W. H. DICKER.

REPORT OF THE NUMISMATIC SECTIONAL
COMMITTEE.

This committee of seven members was constituted in May, 1911, and held a meeting on the 26th of the following July to determine the general lines of its procedure. It was decided to invite the members of the Field Club to report any finds or hoards, and a subsequent notice-paper contained a paragraph in these words:—

“ The Numismatic Sectional Committee would be glad if Members of the Field Club would make known in their respective districts the desirability of reporting to one of the Members of the Committee any Dorset finds of British, Roman, or Saxon coins, and of English coins or tokens earlier than 1700, with particulars as to locality and date of discovery, in order that the information so obtained may be recorded.”

The duties of the Committee have been, unfortunately, very light, as no hoards have been brought to their notice during the past twelve months. A few isolated examples of Roman and mediæval coins have, however, been reported from various districts, but nothing of much numismatic interest; and it is rather unsafe to draw any inferences from such stray discoveries, as the items may have been dropped accidentally at a recent period in the places where they were found.

It may be of advantage to mention in this report the discovery at Poole of 366 Roman third-brass coins at a date before the inauguration of the Field Club. The hoard is described in *Num. Chron.* N.S. IX., p. 283 (1869), and is stated to have been dug up some years before the list was communicated to the Royal Numismatic Society. There were specimens of the coinages of eight Emperors and one Empress, from Gallienus to Aurelian, both inclusive; but there was no information as to whether the find was kept together or distributed. Two

third-brass coins of types not represented in the County Museum collection have been found in Dorchester at different times :

Constans I.

- O.* D.N. Constans P.F. Aug. Diademed bust to right.
- R.* Fel. Temp. Reparatio. Phoenix standing on a funeral pyre.

Theodosius I.

- O.* D.N. Theodosius [P.F. Aug.] Diademed bust to right.
- R.* [Victoria Augg.] Victory walking to left.

Another third-brass of Constans was found at Affpiddle, the reverse showing two figures of Victory, facing. *Victoriae D.D. Augg. Q. NN.* Struck at Trèves. This type, although not rare, has not been previously noted in Dorset, as far as I have observed.

HENRY SYMONDS.



Dorset Natural History and Antiquarian Field Club.

HON. SECRETARY'S ACCOUNT FOR SUMMER MEETINGS.

DR. CR.
STATEMENT FROM MAY, 1911, TO MAY, 1912.

	1911.	£	s.	d.		£	s.	d.
May 2—To Balance brought forward ..		8	6	0				
" Receipts from Members attending the Four Summer Meetings, namely:—								
June 8—West Dorset		18	7	0	By Postages, Telegrams, and Incidental Expenses (Hon. Secretary and Assistant Secretary)	3	17	2
July 6—Gillingham, Mere, and Stourhead		7	11	0	June 8—West Dorset	13	1	3
Aug. 1—Mid-Pydel Valley		14	15	6	July 6—Gillingham, Mere, and Stourhead	4	1	7
Sept. 12 and 13—Winchester		22	4	6	Aug. 1—Mid-Pydel Valley	9	8	0
					Sept. 12 and 13—Winchester	20	7	0
					Assistant Secretary: Honorarium ..	12	10	0
					W. Hutchings (Museum Attendant),			
					Gratuity for preparing room for			
					Three Winter Meetings	0	15	0
					Balance in hand	7	4	0
						£71	4	0

Examined and found correct—
ARTHUR R. LEGG,
May 9th, 1912.

HERBERT PENTIN,
Hon. Secretary.



En Memoriam.

THE REV. C. W. H. DICKER.

CHARLES WILLIAM HAMILTON DICKER was born in 1855 at Chichester, where his father, the Rev. Hamilton Dicker, who, however, died at an early age, was on terms of close friendship with Bishop Gilbert and Dean Hook. From his father, who was an "all round man," he inherited many of his tastes, and especially his love of architecture, which was developed by his father's intimate association with his cousin, George Bodley.

While living at Lewisham he came under the influence of Canon Rhodes Bristow, and sang in the choir at S. Stephen's. Being a delicate boy he was educated privately, but in course of time went to King's College, London, where he took his Associate's degree in 1881. In the same year he was ordained by the Bishop of Lichfield, in whose diocese he served for the next four years as Assistant-Curate of Pensnett, in the "Black Country." But after a year at Holy Trinity, Winchester, he sought a wider experience in the Colonial Church, having been selected by his cousin, the late Canon H. B. Bromby, for the Minor Canonry of S. David's Cathedral, Hobart, at the request of the then Dean—the present Archdeacon of Dorset. In this capacity he did excellent work for nearly three years, when the Bishop of Tasmania appointed him to the parish of Hamilton. In this extensive parish, fifty miles across, Mr. Dicker laboured devotedly for eight years. He had a number of different Churches to

serve, one at least of which was built through his efforts, and this involved incessant riding and driving over rough country. On more than one occasion he met with serious accidents, as he was quite fearless. (Indeed, previously he had been very nearly drowned while yachting in the River Derwent near Hobart, a sudden gust from the mountain having upset his boat, when he risked his life supporting his young companion for a long time, until he was completely exhausted, and was barely saved by a boat coming to his rescue.) While Rector of Hamilton he married a Tasmanian lady, but her early death, leaving him with an infant son, led to his return to England, where his sisters took the mother's place, in 1897. After six years spent at Portslade and Norwood, Archdeacon Dundas invited him to become his colleague once more, at Charmingminster. Thus commenced Mr. Dicker's personal knowledge of Dorset, to which he became so deeply attached (though he had a connexion with it through his uncle, the Rev. Melville Lee, formerly Rector of Bridport, and his father served at Chideock for a short time). In 1905 Bishop Wordsworth appointed him Vicar of Pydeltrenthide, where he faced the difficult circumstances existing at that time with characteristic courage, and by persevering work and ready self-denial won the hearts of his parishioners. In 1908 the Bishop showed his recognition of Mr. Dicker's work by making him Rural Dean of Whitchurch (Bere Regis portion), and more than once subsequently spoke of the able manner in which he fulfilled the duties of that office, and the ideal character of his triennial Report. Quite recently the present Bishop of Salisbury invited him to undertake the widely-extended parish of Broadwindsor, where he was to have moved in a few weeks' time, and to his work in which he was looking forward with hopeful anticipation.

But it was not to be. On Monday morning, 26th August, he started from home, especially bright and happy, intending to go for a few days' holiday to visit a brother at Emsworth. But within five minutes, and before he had got outside the

limits of his own parish, his spirit had passed into the higher life. Apparently his motor-bicycle side-slipped while he was trying to pass a steam-lorry, under the wheel of which he fell and was instantly killed.

Mr. Dicker was especially noticeable for his great versatility and for his unusually varied gifts and attainments. He was an able musician, choir conductor and bandmaster; an excellent designer, and master of pen and pencil; a good craftsman—he carved the oak Altar Rail in Charminster Church, and the Oak Reredos in his own Church, and sent various exhibits to the Dorset Arts and Crafts Exhibitions;—and a composer (he even wrote a successful song in the Dorset Dialect). Among other acquirements he possessed a good knowledge of Architecture, of Botany (he often took the Hobart Cathedral choristers botanising on Mount Wellington), and of Archæology, and was a valued contributor to the Dorset Photographic Survey. He also made an intelligent study of the antiquities of the county, and took a keen interest in the Dorset Natural History and Antiquarian Field Club, of which he was a Vice-President, and of whose “Proceedings” he has been for some time Editor; while several volumes contain various articles of his own, and the illustrations of the Dorset Bells (among many others) were mainly taken from his drawings.

The writer of the obituary notice in the *Dorset County Chronicle* well says that in Mr. Dicker the Field Club loses one of its most active and valuable officers:—

“ Besides devoting his scholarship, diverse knowledge, and artistic faculty to the work of Editor, he also acted as Organiser and Secretary of the Earthworks Sub-Committee, and had only recently issued a carefully-prepared and illustrated form inviting the assistance of the landowners, tenants, and clergy of the county in an effort to compile a complete record of all ancient earthworks, stone circles, cromlechs, barrows, and other such relics in the county, with a view to their proper preservation. His help had of late been enlisted in sundry archæological enterprises in various parts of the county. To Lyme Regis he went to pronounce upon and sketch the newly-found arch of the Norman bridge over the Buddle, to Maumbury Rings to help in the

excavations, to Whitcombe to photograph the fragments of the Scandinavian cross. He was never tired of roaming among the swelling downs around Pydeltrenthide, Plush, and Buckland, picking up prehistoric worked flints and observing the ancient valley enclosures and sites of villages. The very successful Pydel Valley Pageant of 1910, following the Sherborne Pageant of 1905, and preceding the Bradpole Pageant of 1911, was planned, written, and organised by him ; in it he played leading rôles, and upon its whole setting and presentation he lavished all his knowledge, historical, archæological, and all his artistic taste and ability. It was a little triumph, and, after due allowance for all the valuable assistance that he received, it was primarily his own. When we think that we have pretty well covered the whole ground of his activities, we are sure to have made many omissions. One may then wonder how a man found time, after the faithful performance of his first duties, to crowd so much work into his fruitful leisure ; and then one perceives that he belonged to the little band of ceaseless workers, to whom Goethe's motto applies—*Ohne Hast, aber ohne Rast*, the unhurrying but untiring ones. There only remains to add mention of the softening and sweetening influence upon his character and disposition of a deep and simple piety, that gave the unmistakeable ring of sincerity to his religious life and ministrations."

Into all that he did Mr. Dicker threw himself with zeal and energy, doing it thoroughly and to the best of his power. In fact, Conscientiousness was a salient mark of his character, and he never shrank from, or played with, what he felt to be his duty.

C. L. D.



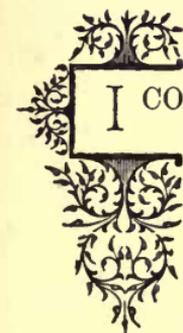


Anniversary
Address of the President.

By NELSON M. RICHARDSON, Esq., B.A.

(Read May 9th, 1912.)

OBITUARY.



I COMMENCE my Address by recording with regret the loss by death of three of our Members. John Wordsworth, Bishop of Salisbury, was one of those talented men who are so rarely met with and whose death is a loss to the world and not only to their own circle. A great scholar, he has left behind him the fruits of his learning, by which we may all benefit. We can but regret that the many calls upon his time prevented him from taking much part in the doings of our Club. Mrs. H. Hawkins, of Martinstown, and Miss Samson, of Upwey, occasionally attended our Meetings and took a general interest in our Proceedings. I have also to record the death of a former Member, Rev. A. A. Leonard, Vicar of Beaminster, who will be much missed in his parish. Though not personally connected with us, I do not like to let the death of the

late Lord Lister pass without a word of notice, especially as his brother belonged to our Club for many years and we still number his niece, Miss Gulielma Lister, amongst our Members. Lord Lister's unique position as a scientist and one of the greatest benefactors to the human race is well known, and I cannot say more than that we have doubtless all been indebted to his discoveries at one time or another, if not for our lives, yet for some relief from suffering. I should like here to mention that Miss Lister has lately brought out a second edition of the Monograph of the Mycetozoa, written by her father and now revised and augmented by herself. A paper on this subject by the late Mr. Arthur Lister, F.R.S., is contained in Vol. XIII. of our Proceedings. I now pass on to my first heading of Zoology, and shall as usual endeavour to give a slight account of some of the principal scientific discoveries and developments which have taken place in the past year.

ZOOLOGY.

There is often an absence of evidence as to the antiquity of things which we regard as recent discoveries, but it sometimes unexpectedly turns up. In regard to sleeping sickness, about which we have heard so much of late years, a description was published in 1732 of the existence in 1721 of a disease called "the sleepy distemper" on the Guinea coast. The latest question that has been before the public in this connection is whether the big game of Africa, though the disease does not harm them, form permanent receptacles for the trypanosomes, whence they may be conveyed by the agency of tsetse flies to human beings, but this is so far absolutely unproved, the only wild animals hitherto found naturally infected with the trypanosome of sleeping sickness being, apparently, two monkeys, the few investigations made having been negative in their results, as far as wild

animals at large are concerned. What has been shewn is that certain animals can be experimentally infected by the bite of the tsetse fly, which is a very different matter. A commission is now at work on this question, but even were it shewn that wild animals were infective agents, their complete destruction might only make the flies do tenfold damage amongst human beings, when their usual food was taken from them. At the same time there are stated to be districts where there is no big game and which swarm with the flies, and *vice versa*, so that the matter is a most complicated one and any rash action would be dangerous and undesirable. Though it is now 14 years since Ross discovered in India the connection of mosquitoes with malaria, it is only in November last that the Indian Government has recognised this fact officially and proposed measures for the prevention of malaria by mosquito destruction. The final Report of the Royal Commission on Tuberculosis has now been published, in which the very important fact is stated on incontrovertible evidence, after full experimental investigation, that bovine tuberculosis is the same as that found in human beings. This was denied by Koch in 1891, which led to the appointment of this Commission, which, with the consequent legislation, will doubtless do much towards removing one source of this disease. Experiments have shewn that flies of various species are liable to become disseminators of disease germs by carrying them attached to their feet, also that they may congregate in houses at a distance of $\frac{3}{4}$ mile or more from their breeding place, and under certain conditions they may undoubtedly be a danger. Recent experiments tend to confirm the belief that boring shells (*Pholas* and *Saxicava*) work by mechanical and not by chemical means. The movement is chiefly produced by the formation of a vacuum by the mantle and foot of the animal. Some of the lower forms of life vary very much in shape and appearance in the same species, sometimes locally, sometimes seasonally, or without any obvious cause. This is often the case with moths and butterflies to such an extent

that formerly many forms of what has now been proved by breeding to be one species, were described as distinct and given separate specific names. Recent observations on the Daphnids, a group of small Crustacea, shew great seasonal variations in the same species, which will in like manner tend to bring under one specific name various different forms. It is clear that much remains to be discovered amongst the smaller Crustaceans, as in an account of the Norwegian species, out of 291 Copepoda enumerated, 40, many of which were new to science, were added in 1910. To turn to insects, those of the Seychelles Islands are peculiar in containing a large proportion of species not found elsewhere. In the Lepidoptera, this is the case to such an extent that more than half of the total number are not known to occur in any other part of the world.

A very interesting discovery has been made with regard to the light emitted by fireflies, which is found to have similar qualities to those of the X-rays. The light passes through wood, leather, flesh, &c., substances opaque to ordinary light and affects photographic plates. It would be worth while making experiments in this country with glow-worms, to see whether their light has the same properties. Legislation has been brought forward in the United States to prevent as far as possible the introduction of insect pests. Two of the worst, the gipsy and brown-tail moths, occur in England, but are so rare that they do no damage. Very little is known of the causes which determine the abundance or scarcity of insects at any given time or place; probably climate and weather, the number of enemies that prey on them, the abundance or scarcity of food, disease and other circumstances are more or less responsible, and above all their enormous fertility under favourable conditions enables them to be abundant, even though they have been very scarce in the previous year. This April, Caddis flies have swarmed in my neighbourhood, in fact I have never seen so many about, and one would hardly have thought that a hot dry summer like the last would have encouraged their breeding. In a

recent American work on the Starfishes of the N. Pacific, allusion is made to certain very variable species which are on that account difficult to classify, as in the cases of insects and Crustaceans which I have cited above. The President of the Zoological Section of the British Association, in the course of his address, attempts to explain some of these cases of variability by an effect of surface tension, different forms being assumed by the pseudopodia. In the report of the Southern Sea Fisheries Committee, particulars are given of the fisheries at various places along the Dorset Coast, mention being also made of the damage done to them in the Lulworth district by warships firing, about which representations have been made to the Government. The first well authenticated specimen of a flying fish taken on the British Coasts occurred at Wyke Regis, near Weymouth, last summer, the length being $11\frac{3}{4}$ in. An interesting observation was made in the S. of France at the end of last September, on the resurrection of large numbers of fish of several species which had buried themselves in the muddy bottom of a canal, which had been entirely dried up by the long continued drought. As soon as rain came and formed small pools, the fish began to rise, none the worse for their burial. A similar circumstance is suggested as a cause of the occasional beds of fish-remains found in the old Red Sandstone and elsewhere, the fish having, it is supposed, buried themselves in mud and died, the water not having come in time to enable them to rise. The British bird fauna has been enriched by the following species, which, though only casual stragglers, have not been before recorded. The pine-bunting (*Emberiza leucocephala*) at Fair Isle, Oct. 30, 1911; the thrush-nightingale also at Fair Isle, of which there was one previous doubtful record; the American peregrine (*Falco peregrinus anatum*), two examples in Leicestershire and Lincolnshire; the slender-billed curlew (*Numenius tenuirostris*), three in Romney Marsh, and the Alpine ring ouzel, a sub-species (*Turdus torquatus alpestris*) at Guestling, Sussex. The Passenger pigeon, a species which not long ago used to exist in vast

numbers, is believed now to be represented by one solitary female in the Cincinnati Zoological Gardens. The University of Aberdeen is attempting to solve some of the questions of bird-migration by affixing numbered rings to the feet of birds, nestlings and others, and will be pleased to hear from any willing to help in the investigation of this little known subject. A conference has been recently held on the subject of seal fisheries and has laid down certain rules, including the stoppage of pelagic seal fishing for 15 years, which, if adhered to, will, it considers, give the seals a good chance of again becoming numerous. Like the passenger pigeons, they assemble in great numbers at certain spots, and are, therefore, liable to indiscriminate slaughter. On July 1st about 60 pilot whales, measuring up to 25 feet in length, were stranded on the beach of Mounts Bay, Penzance. This is a most rare occurrence so far south. The power of some animals to exist for long periods without drinking has often been stated, and it is found that black buck and some other antelopes, as well as giraffes, are able to live for long periods in situations where there is no water, some, at all events, using as a substitute succulent plants. The question of the possibility of the inheritance of acquired characters by animals or plants is one which is being perpetually discussed and on which much difference of opinion exists. It is well known that the domestic cat has, generally speaking (though there are some unfortunate exceptions), a wonderful power of distinguishing between the domestic chicken and other birds. This may sometimes be the result of teaching on the part of the mother cat or in some cases the mother hen, but we have frequently had stray kittens introduced to the house at too young an age to have received such instruction, which have, when old enough, to the best of our knowledge never attempted to molest a chicken, though they will spring on to a sparrow feeding in the midst of a brood. How can this habit be caused except by inheritance, and, from its nature, it must have been originally acquired and not evolved.

BOTANY.

The Address of the President of the recently separated section of Agriculture in the British Association contains many valuable suggestions as to the problems in that branch which at present seem most pressing, but holds out little hope of their being solved without much patient and careful work. With regard to plant diseases, he lays stress on the importance of doing something more than carrying out the usual preventive measures when the disease appears. We may discover strains of the plant that are less susceptible to the disease, as has been and is done in the case of potatoes and other plants, but we may in time go a step further, and get some knowledge of what it is that causes this resistance to attack. In ourselves and animals this subject has received far more attention and met with a certain amount of success. Weight is given to the above remarks by the fact that a scheme of research in connection with Agriculture has been sanctioned by the Government under which specialists will be appointed and scholarships provided, as well as other means for the investigation of agricultural and farming matters generally, both animals and plants. An interesting discussion took place at the British Association as to whether any British plants had survived the Glacial period in this country or whether they were all exterminated at that epoch, all our present plants being of more recent introduction. On this point, however, there was much difference of opinion, two of our distinguished Honorary Members, Mr. Clement Reid and Dr. Wallace, taking opposite sides, so that we may regard the question as still open. In his communication, Dr. Wallace stated that there was absolutely no doubt that the whole of the flora of the Azores had been introduced there, across a width of ocean of about 1,000 miles, during the Tertiary Period, but he thought that some plants had survived the Glacial period in this country. The recent Antarctic expeditions have shewn that the flora of that region is less rich than that of

the Arctic zone, but species are found there which do not occur in the North, for instance, seven mosses out of 34 collected by one expedition are new to science.

GEOLOGY.

At a meeting of the International Association of Seismology held at Manchester last July, two types of small earthquake waves were alluded to, which are only to be perceived by delicate instruments, one apparently due to the action of the wind over a large land surface, the other suspected to be caused by the striking of waves on the sea shore. An instrument has been set up to test this. The reports of various luminous phenomena in connection with earthquakes, such as lights playing on distant hills during the Valparaiso earthquake of 1906, have led to experiments being made which shew that rock surfaces at times exhibit sufficient luminosity to affect a photographic plate, but the origin and nature of this light is still uncertain. Violent earthquakes occurred in Mexico on June 7 and in the islands of Zante and Cephalonia on Jan. 24 last, whilst about the same date two or more slight ones took place in Monmouthshire and parts of Scotland, also a somewhat severe one in S. Africa on Feb. 20 of this year. The effect of a tidal load of 10 feet at Ryde has been shewn to be a deflection of the land of 0·85", and at Bidstone, in Cheshire, at two miles inland, 0·2". An eruption of Etna commenced on Sept. 10, and a much more severe one took place on Jan. 30 in the Taal volcano in the Philippines, which buried the neighbouring villages, causing great loss of life. Owing to other causes, probably the dry summer and wet winter, an immense fall of the cliff took place at Dover on Dec. 31, producing great alteration in its appearance. The final report of the Coast Erosion Commission has been issued shewing that in the past 35 years, 6,640 acres have been lost and 48,000 reclaimed from the sea, so that, on the whole, England is distinctly growing in size. They deal with various

modes of coast protection by groynes and otherwise, and advise that the care of the coast should be assigned to the Board of Trade, which should be invested with considerable powers. A valuable address on Petrology by the President of the Geological Section of the British Association can be referred to by those interested in the subject, but is hardly suitable to be dealt with here. Immense deposits of anthracite coal have been discovered in British Columbia, and will perhaps postpone that time when our unfortunate successors will have to find a substitute for that useful article owing to the exhaustion of our coalfields, though if recent events repeat themselves, we may ourselves be compelled to consider this question seriously before long owing to the difficulties of obtaining it, but so long as we have sun heat and tide force to draw upon, I believe that we shall manage to get along, and though it does not seem worth while at present to utilise these agents, recent attempts to use sun heat have been attended with success. The great difference in the quality of the diamonds found in different S. African mines is shewn by their average prices, which vary from 14s. per carat in one mine to as much as 85s. in another. A large diamond of 175 carats has lately been found in Brazil. To turn to fossil animals, it is very rarely that we are able to learn anything about their skin unless it is covered with bony armour, but in a specimen of *Trachodon*, a Dinosaur from Wyoming, the finely tuberculated skin is well preserved. Some of the Dinosaurs found in German East Africa are of enormous size, considerably exceeding the *Diplodocus* in the Natural History Museum and indeed any other known fossil reptile. A fine skull of the horned Dinosaur, *Triceratops*, from Wyoming has lately been added to the National Collection. It measures $3\frac{1}{2}$ feet in length and is the first exhibited in Europe. The discovery of a large fossil rat, much bigger than our brown rat, in the Pleistocene of Crete, makes us thankful that we did not live in those times, and there has recently been uncovered at Freshwater West in Pembrokeshire a fossil forest, probably of Neolithic date, which had hitherto

been hidden by sand and shingle. There are stumps of trees embedded in a foot or so of peat covering an old land surface. The description is extremely like that of a similar forest in Swansea Bay which I used to know well, and points to a subsidence of that coast in recent times, as at Swansea the forest remains are chiefly, if not entirely, below high water mark, the shore is very flat, and the tide goes out an immense distance.

ASTRONOMY.

I alluded in my last Annual Address to an eclipse of the Sun which had just taken place on Ap. 28, 1911, for which great preparations were made, and which it was hoped might have been successfully observed, but it turned out to be a great disappointment, as the eclipse could hardly be perceived through the clouds which obscured it, and the expedition to the distant island of Vavau was practically a failure. On Ap. 17, 1912, an eclipse of the sun was calculated to take place, but it could not be definitely settled whether it would be total anywhere or only annular. If total at all it would only be so for a few seconds in some parts of Spain, Portugal, or France. The result appears to have been much in accordance with this, the totality being barely complete anywhere and lasting but a second or two. The British Expedition in Portugal obtained satisfactory observations. In this country it appears to have been watched by almost everyone. No animals, however, seem to have taken any notice of it. We observed particularly that not a single fowl went to roost. The only one to be seen on the perches was a hen which had just laid an egg and was crowing vigorously. The fall in temperature, the crescent-shaped images of the sun in the interstices of the foliage shadows and the curious thunderstorm-like appearance of the atmosphere were the most striking effects. One of the most important eclipse investigations is the chemistry of the corona, about which nothing seems to be known. Though photographs

of its spectrum have been often taken, no known substance has been identified. Saturn's rings were last January causing some interest owing to certain sparkling flocculent appearances observed in the outer ring. It was suggested that this might have been caused by the collision of two of the small bodies of which the ring is believed to be formed. A recent theory put forth suggests that the rings are due to an electrical radiation from the planet on account of their similarity to what is seen when a magnetised globe is placed in a strong electric field. On Mars, brilliant white spots were observed in October and November, 1911. An exhibition of lunar study will be held at Barcelona from May 15 to June 15, and is intended to bring together all the varied knowledge we possess about the moon. No less than seven new comets were discovered in 1911, but no very bright ones such as that which appeared in 1910. Encke's, a well known comet, having a short period of 3.3 years, was visible, but not to the naked eye. Brooks' comet was more conspicuous and could be seen in the autumn without a telescope. Of meteors, several very fine ones were seen between April 30 and May 4, 1911; a bright one in full sunlight in S. Africa on Aug. 24. In Dorset one was seen a few minutes after sunset on Oct. 31, at Godmanstone, and also by some men nearer Dorchester. It was moving from S.W. to S.E. Also one in sunlight in Lincolnshire on Mar. 28. On April 10, 1911, a great noise was heard at Catania, preceded about three minutes before by a brilliant flash of bluish-green light, due to the explosion of a meteor. No pieces have, however, been found. In Lower Egypt a meteorite fell on June 28, 1911, and about 40 pieces were found, weighing altogether 10 kilograms, over an area of about $4\frac{1}{2}$ kilometres in diameter. By a new method, the surface brightness of the star Algol has been computed to be 26 times that of the sun, with a temperature of $13,800^{\circ}$, that of the sun being only $5,320^{\circ}$. A large number of careful observations on the Pole Star have confirmed the suspicion of its variability to a small extent, the period being nearly four days. A new star of the 11th magnitude has been detected

in Perseus and a second *Nova* of 4th or 5th magnitude in Gemini near to the one which was discovered in that constellation in 1903. Good photographs of the spectrum of the latest *Nova Geminorum* have been quite lately taken and shew it to be very like that of *Nova Persei* in 1901.

METEOROLOGY.

It would appear that the remarkable summer of 1911 has given meteorologists so much to write and think about that there is not very much else of interest in this department of science to lay before you. Taking the year 1911 as a whole, the mean temperature was above the average over all the United Kingdom, and exceeded it by about 2° in most English districts. A maximum temperature of 100° , the highest ever recorded in Great Britain, was registered at Greenwich on August 9th, and more than 90° in most parts of England. The rainfall was deficient, but was brought up to a great extent by the records of the last three months of the year. The duration of bright sunshine was excessive, the greatest excess being 336 hours in the S.E. of England, which may perhaps be better appreciated by saying that there were 28 whole days of 12 hours each of sunshine more than usual! But even these and many other statistics which might be quoted scarcely give an idea of the summer, which consisted of one bright hot day after another for months with hardly an interval, drying up the ground to a most unusual depth, so that one wondered how any plants survived. Houses on clay round London and elsewhere suffered greatly, the clay shrinking from dryness under their foundations and causing serious cracks and displacements in masonry. If the foundations of a building cannot be made deep enough (it would have required a depth of three or four feet or more last summer), it is important that they should be of uniform depth, so that the

building may sink to about the same extent in all parts. After this continued heat a very cold winter seemed to be generally expected, but the contrary has been the case, and there has been only one winter, 1898-9, as warm in the last 35 years, whilst the rainfall has been above the average. This hot summer weather was by no means universal, for in Egypt the temperature was below the average and excessive rains fell in the regions of China, Japan, and the Philippines. A few available records of the temperature in the upper air during this hot period shew that the heat was confined to the portions near the earth, for the excess above the average diminishes with the height, until at 7.5 kilometres the temperature became normal, whilst at 12.5 kilometres it was 7° centigrade less than the average. From observations on Ben Nevis extending over 15 summer months in different years, it is found that diurnal variations in wind force occur with extraordinary regularity, the maximum being always between 1 and 2 a.m., the minimum at from 3 to 5 p.m. in different months. Storm frequency shews a regular daily variation with two maxima and minima occurring at different times in different seasons of the year. These double daily periods have also been observed elsewhere. Risks from rain can now be insured against, but one would think that a large margin would be allowed for by the insurers on account of the uncertainty. Last summer would have been most profitable to them. An extraordinary hailstorm occurred in the Pyrenees on August 16th. Hailstones of the size of marbles fell in a thick shower, mixed with some almost as large as golf balls. A second storm followed, in which a similar shower was experienced, followed suddenly by a shower of hailstones of the size of lawn tennis balls, all the mountains round appearing as if covered with snow in the height of summer. A storm of almost equal dimensions occurred in the Orkneys in 1890. A fall of explosive hail, in which the hail stones, from half an inch to one inch in diameter, exploded with a sharp report on striking the ground, is recorded from America on November 11, 1911.

ELECTRICITY.

I am much pleased to say that the subject set for the Cecil Medal last year, "The Most Recent Discoveries in Wireless Telegraphy," has produced an excellent prize essay, to which I would refer any of those present interested in this branch of science, and I will therefore proceed to my next heading of

CHEMISTRY.

The photographing of the paths of the minute particles which form the emanation from radium has been accomplished by condensing water upon them immediately after their liberation, dense and sharply defined clouds being formed. I am not sure if the β and γ rays have yet been photographed, but straight radiating threads are visible on similar treatment. It has been found that the air for some distance above the ground contains an appreciable quantity of radium emanation, the supply of which is kept up by exhalation from the soil. Certain radio-active substances have now been tested for several years, with the result that it is found that they vary, some having decreased in activity during that period whilst others showed no appreciable change. From this their duration of life in their present form can be determined. The last determination of the atomic weight of radium is 226.36, which approximates to previous ones. A new metal, which has been named Canadium, has been discovered in British Columbia. It possesses a brilliant white lustre which is not tarnished by damp air, and quantities up to three ounces in the ton have been found in the rock in which it occurs native in minute grains and also alloyed with other platinum metals. The element Boron has, after many previous attempts, been isolated in a pure form and proves to have some remarkable properties. It is next to the diamond in hardness and will scratch corundum, and shews an extraordinary rise in electric conductivity with a slight

increase of temperature. Though diamonds, with the exception of exceedingly small ones, cannot be made artificially, yet both rubies and sapphires are produced by melting up small cuttings and bits of real stones, or by melting colourless corundum with a colouring matter. The difference between the natural and artificial gems can be seen by examining any small air bubbles, &c., present, which in the natural stones follow in shape and position the planes of crystallisation.

ENGINEERING.

No one having yet invented a means of passing freely and making long excursions through the water or the earth, the conquest of the air remains for the present the most exciting engineering novelty, and fresh records are continually made as flying machines are improved and aviators gain experience. Aeroplanes have now been actually used in warfare and have shewn that they can act without very great danger to themselves, and drop bombs amongst the enemy as well as reconnoitre their position, yet so far they do not seem in either of these points to have actually been of very important service. A postal service was instituted but soon abandoned, but the longer distances covered in various race competitions shew that the science is developing. Experiments have been made with a gliding machine, without power, which with a strong wind has enabled the aviator to support himself in a stationary position in the air for more than five minutes. The large airships which have been tried are cumbersome and very liable to disaster, and do not appear to increase in reliability to the same extent as the aeroplanes. Amongst the subjects which occupied the engineering section of the British Association were the rolling of ships, their electrical steering and propulsion, and the gyro-compass, consisting of a gyroscope running in a mercury bath at 20,000 revolutions a minute. Owing to the difficulties of preventing disturbances of a magnetic compass through the large quantity of iron in a

modern ship, such a contrivance, if reliable, would be a great boon. The chief thought in our minds at present in connection with ships is however the dreadful shipwreck which has so lately taken place of the Titanic, which was not only the largest and finest ship afloat, but was looked upon as practically unsinkable owing to her elaborate system of watertight compartments. Yet she sank on her first voyage. An enormous steel tank, holding 9,000,000 gallons, has been constructed at Leeds for the water supply of Calcutta. It is 321 feet square and 16 feet deep, and will be supported on steel columns at a height of 110 feet. Kinematography has improved very greatly of late and wonderful results have been obtained in moving coloured pictures, but the most recent development of this art is the representation in a highly magnified form of moving creatures of extremely small dimensions. Blood is shewn circulating and the micro-organisms which produce fevers and other diseases can be seen in their various forms moving about amongst the blood corpuscles in their deadly course. And these are said to be much more distinct in their forms and motions than one can see them when looking into a microscope. The difficulty of illumination is overcome by illuminating the objects from the side and viewing them, when thus lit up, against a dark background.

GEOGRAPHY.

Though we may naturally regret that the honour of being the first to reach the South Pole has not fallen to the lot of an Englishman, yet we cannot do otherwise than admire the pluck and energy shewn by Captain Amundsen and his men in succeeding where many have failed, in reaching the South Pole on Dec. 14 last. The Pole itself lies in the midst of a vast elevated plain of ice, presenting no special features. Careful observations were taken during the days during which the party remained before beginning their homeward march. Captain Amundsen also discovered the end of

Ross' Great Ice Barrier and was the first to set foot on King Edward VII.'s land. The English Antarctic Expedition, under Captain Scott, has been doing valuable scientific work, but has not yet got near to the Pole. At the British Association meeting, the question of what should be included in Geography was much considered and the various subjects mentioned which may be said to form parts of this very comprehensive science. As one of the chief portions of it was thought to consist in the scientific accounts of voyages and travels made with a view to exploration, I am justified in rather limiting my remarks under this head to these, and this I have done.

ARCHÆOLOGY AND ANTHROPOLOGY.

Last year the Maumbury Amphitheatre rested from the excavations which had been carried on for the three previous years, and which it has been decided to renew this summer. Meanwhile the third year's excavations have been made at Avebury, where worked red deer antlers, prehistoric pottery, and other finds confirm the Neolithic date given to this great prehistoric monument. At Meare more work has been done and many specimens of articles used by the ancient dwellers have been brought to light, of bone, antler, flint, glass, pottery, Kimmeridge shale, stone, lead, iron, bronze, and one ornamental bead-shaped object of tin. In connection with this I should like to call attention to the very elaborate and beautifully illustrated account of the Glastonbury lake dwellings, lately published by the Somerset Society. The skull of an ancient type of horse has been unearthed at Bristol and another at Bishops Stortford from under 6 feet of peat, where one was, it may be remembered, also found recently. Remains of similar slender-limbed horses have been found in Kent's Cavern, Torquay. But the most interesting find of the past twelve months, subject to its general acceptance as of pre-glacial age, is that of a human skeleton under a glacial deposit

at Ipswich. The details have been made so familiar to us by the illustrated and other papers that it is unnecessary to go into them, but before accepting such a date for the existence of man in this country, it is desirable that the evidence should be most carefully weighed and that it should be clearly proved that it was not an interment in the boulder clay, which at that point was only $4\frac{1}{2}$ feet in thickness. In its important features the skeleton is of a modern type and does not resemble the massive boned Neanderthal man. Flint implements found in pre-glacial beds and supposed to have been made by pre-glacial man, seem to be usually of such a character that no reliance can be placed on them as being of human make and not shaped by natural causes. Some teeth of a Palæolithic man have been found in a cave in Jersey. These are very thick and resemble those of the Heidelberg and other early skeletons. A Neanderthal skeleton has also been found at Quina in the department of Charente, in France. Only about nine skulls, five or six of which are associated with other parts of the skeletons, are known of the Neanderthal race, and their rarity and interest may be deduced from the fact that one incomplete and broken skeleton was sold to a Berlin Museum for £8,000. No very early remains of man have hitherto been found in Australia, but recently, in New S. Wales, some black fellows' ovens have been found under a covering of 18 feet of alluvium, associated with remains of *Diprotodon*. The geological date, however, seems to be a little uncertain. Excavations at Corfu have revealed portions of a temple probably about the 7th century B.C., and are also being made in various places in Greece and the Greek Archipelago. At Meroë, in Ethiopia, extensive explorations have uncovered great and small temples, and many other buildings and tombs, and a large number of pottery vases with paintings in colours and embossing have been found, of a new type, not shewing Egyptian influence. A Roman bronze bust twice life size, perhaps of Augustus, has also been found, but as the Romans are not known to have penetrated so far South it may have

been imported. Besides these, amongst other treasures, are royal jewels inscribed with names, and a quantity of nuggets and gold dust in two jars. In Egypt a set of iron beads has been found in a pre-dynastic tomb, and an analysis of a resin from a mummy has shewn it to contain fragments of cypress or cedar wood, cedar resin, resins arising from styrax, mastic, Aleppo pine and asphalté. Though I spoke in my Address in 1909 of the explorations of Dr. Stein in Central Asia, I may be excused for now alluding to the account of his wonderful discoveries in that region lately published, with many illustrations of the extraordinary collection of ancient art treasures and manuscripts, some dating back to the 3rd Century, which he brought back with him. Some excavations have been made in stone circles in Gambia which shew them to have been sepulchral monuments. In style they resemble European objects of this class. In excavations at Carchemish, which was successively tenanted by the Hittites and Assyrians, a quantity of small pottery horses have been found, amongst other things, but their use is not known. The attempt in India to abolish the Central Department of Archæology, which had done most important work in directing excavations and preserving ancient buildings and other art treasures, has fortunately failed in a country where there is so much of interest and such opportunities for destroying it if no control is exercised.

GENERAL.

Though in America Universities and similar Institutions are accustomed to receive immense sums as gifts from millionaires, in England the gift of £200,000 from three donors to Reading University College is one which is not often equalled. In contrast to this new University is the University of St. Andrews, which in September celebrated its 500th anniversary with great *éclat*. An attempt is being made to found a modern University in Central China, where, as I understand, Western

traditions and learning are to be followed. It is to be hoped that all the wonderful and ancient traditional learning and art of the Chinese will not be destroyed by this and similar institutions, as this would be a great loss to the world, but one can hardly see how they can survive such influences which are yearly springing up around them and have already affected the arts both of them and other nations prejudicially. I was surprised and pleased to find that the President of the Educational Science Section at the British Association strongly upheld in his Address the mode of pronouncing Latin like English, and not in the foreign manner. His argument was that it was much more important that boys should learn it, than that an attempt should be made to pronounce it as the ancient Romans are supposed to have pronounced it, especially as we do not want to speak it, and that the foreign method of pronunciation created a prejudice against it. The derivation of English words was also much more obvious if similarly pronounced. For myself I have found the very moderate knowledge of Latin (and less Greek) that I possess so very useful in my pursuits, both Natural History and Archæological, so much more than Mathematics, the subject I specially studied, that I think it most important that boys, and girls too, should have some knowledge of it, and if they should ever take an interest in any of the branches of a Club like ours, they will find it an immense advantage. A German Bibliography of the divining rod has lately appeared containing a long list of books on the subject covering 103 pages from 1532 onwards. Whether the belief in its powers is true or not, it is undoubtedly very ancient and widespread, and from my little experience of it I am certainly inclined to credit it. The only suggestion towards explanation given by the author is that, according to experiments, the gamma-radiation over even small sources of water is said to be lessened. He also says that certain inventions have been made for demonstrating this, but he has not been allowed to test their powers, which makes him doubtful of them. Diviners seem rare, but the one of whom I had experience not only found

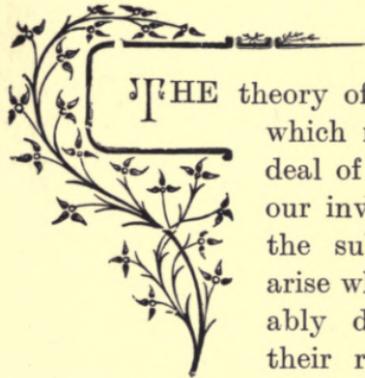
water successfully, but made the rod turn at certain spots in my own and other people's hands by holding their wrists, without himself touching it, which is a very strong piece of evidence of its independent movement. It not only turned but if held tightly, twisted itself almost to breaking. But no doubt there are plenty of frauds as well as the few genuine performers! The Earthworks Committee of our Club are issuing a circular asking for information as to the Prehistoric Monuments of Dorset, in order to draw up a list as complete as possible. It is hoped that all Members will do what they can to help, especially with regard to those Prehistoric Monuments which are not indicated on any map, or otherwise generally known. This is one of the ways in which the Dorset Field Club can, in the words of our first Rule, "promote the preservation of the Antiquities of the County," for when attention has been called to an object by including it in a list, it is far more likely to be taken care of both by its owner and other people. I hope that the search for Antiquities in their neighbourhood may also prove a source of interest to all our Members who have any taste for Archæology and I end my Address by wishing them and the Club every success in the coming year.





Some Dew-Ponds in Dorset.

By ALFRED POPE, F.S.A.



THE theory of "The Dew-Ponds" is a subject which must be approached with a good deal of caution, for the further we carry our investigations the more difficult does the subject become, and grave doubts arise whether the many ancient ponds so ably described by Messrs. Hubbard in their recent work on "Neolithic Dew-Ponds and Cattle Ways," particularly those in the immediate vicinity of Cissbury Ring and Chanctonbury Ring, and that on Maiden Castle, near Dorchester, and other so-called "dew-ponds" were really "dew-ponds," in the strict sense of the word, but rather rain or mist-ponds.

In approaching the subject it is of course primarily necessary to consider how dew is formed, and as to this there is no unanimity of opinion. The old and popular theory, and that favoured by Mr. A. E. Martin, F.G.S., who has made the subject of "dew-ponds" a study and has given us the



DEW-POND ON BURTON DOWN.

benefit of his researches in those very interesting papers read before the Royal Geographical Society and printed in "The Geographical Journal," August, 1909, and October, 1910, is that dew is formed by the precipitation of the aqueous vapour already existing, in the lower layers of the atmosphere, when the radiation of heat from the earth has caused its surface to be in the condition to chill, below the dew point, the layer of saturated air in contact with it. Precipitated moisture may appear in the form of dew, hoar-frost, mist, fog, or cloud, but in dew and hoar-frost (which may be described as white particles of frozen dew) there is precipitation without a cloudy intermediary.

A later theory propounded by Dr. J. Aitkens is that dew is really formed from the moisture which rises out of the soil with the radiation of heat, and that it is this which precipitates when the air into which it passes has been so reduced in temperature as to be unable to hold it as aqueous vapour. If this theory is the correct one it would at once dispose of the suggestion that dew-ponds are fed and filled by true dew, since the acquisition of dew could only then be obtained at the expense of itself by earlier evaporation.

Having shortly considered the formation and constituents of dew we will now turn our attention to the "dew-pond" itself. Messrs. Hubbard tell us that these ponds are formed by first hollowing out a place far in excess of the apparent requirements of the proposed pond; the whole of the hollow is then covered with a coating of dry straw. The straw in its turn is covered with a layer of well-chosen finely puddled clay, and the upper surface of the clay is then closely strewn or packed with chalk or stones or pitched with flints to prevent the cattle treading through the clay. The puddled clay is chilled by the process of evaporation, and the dry straw, being a non-conductor, prevents the heat of the earth from warming the clay. The result being that during the night the moisture of the comparatively warm air is condensed on the surface of the cold clay and the pond becomes gradually filled. Care has to be taken that the margin of

the straw is effectively protected by the clay, since if the straw becomes wet it will cease to attract the dew, as it ceases to act as a non-conductor of heat, and becomes of the same temperature as the surrounding earth. It is certain, however, that many alleged dew-ponds are not formed on this plan. "Dew-pond" has come to be a generic term, and, apart from its original conception, as applied to those ponds formed by the Neolithic People in or near their hill camps for the purpose of watering their flocks and herds, is now applied to the many kinds of ponds, made at far later dates by modern man on the hilltops or other elevated positions for the use of his cattle and sheep—such as rain and mist ponds, drip-ponds, catch-ponds, &c.—each of which I propose to consider and give examples of later on.

But to return to our "dew-pond." We have seen that Messrs. Hubbard use dry straw, then prepared clay, and then chalk or stones, or packed flints, and give their reasons for doing so.

Mr. G. G. Desmond, writing in the Nature Notes Column of the *Daily News*, gives a different arrangement for the basis of the dew-pond. He first forms his hollow, then lays down a bed of concrete, this is covered with dry straw, over which is placed another bed of concrete. I doubt very much if Neolithic man made his dew-ponds in this way. Mr. H. P. Slade, in a pamphlet on "dew-ponds," written in 1877, discards the term "dew-pond" in favour of "rain-pond," and says that "dew" had little or no part in filling his pond, which he lined first with a layer of clay 12 inches thick, mixed with lime to prevent the working of worms, second a coating of straw to keep the clay moist and prevent the sun from cracking the clay in the event of the pond becoming dry; and thirdly, a layer of loose rubble to prevent the hoofs of cattle trampling upon and perforating the clay and thus causing the pond to leak. This pond, which had a diameter of some 70 feet and was situate on the Thorpe Downs near Loughborough at a height of 450 feet above sea level, was seldom if ever known to be dry.

In re-making two ponds for me on Stratton Down Mr. Lane, a well-known pond maker, of Fordington, used first a layer six inches thick of well-worked-up clay laid on the solid chalk, then a coating of gas tar, to prevent the worms working through, then another six inches of puddled clay, the whole being covered with a coating of flint pitching to prevent the cattle treading the clay, no straw being used. As rain or mist ponds these have been most successful.

Thus it will be seen there is a great divergence of opinion as to how these ponds should be formed, but I think it will be generally admitted that rain, mist, and fog are the chief elements which contribute to their supply.

I now propose to give you some account of my researches in this direction, on the downs around Dorchester during the late summer, and for the convenience of reference I propose to number my ponds.

No. 1,

Which, for the sake of further distinction, we will call the "Grimstone Down Dew-Pond," I examined on the 3rd of August, 1911. This pond on plan is practically square, being 42 feet by 40 feet in measurement at the top of the bank, with runlets at the corner angles; it is 6ft. 6in. deep, including the bank, and as there is a silting up of about a foot, the original depth would have been 7ft. 6in. It is made on the north-west side of the hill, and would command a considerable gathering surface. It is placed some 580 feet above sea-level, as shown by the contour on the Ordnance Map. It is covered with vegetation, and has not been known to contain water within living memory. On cutting a trench through the centre I first came upon a layer, some 10 inches thick, of black alluvial soil, which had the appearance of a silting up, or might have been decayed vegetable matter. Then came a carefully laid layer of packed flints, followed by a layer of stiff red clay mixed with lime, which appeared to have been laid on in layers on the solid chalk, to a thickness

of seven or eight inches. I produce a specimen of this clay, which, at the time it was taken out, was quite damp and soft. I could find no trace of any layer of straw or other non-conducting material, either above or below the course of clay.

No. 2

Pond I examined the same day; this is situate some 550 feet above sea level, to the north of the Grimstone clumps. It is of a somewhat similar shape to Pond No. 1, about 36 feet square and 6ft. 6in. deep, made with puddled clay, pitched with flint, no trace of straw either above or below the layer of clay being found. The bottom and sides are grown over with herbage, and there is a considerable growth of rushes near the bottom, which alone would account for its not holding water, being situate on the flat high ground; it had not the gathering surface of No. 1.

Both these ponds are placed without, though within the immediate vicinity of, the ancient British settlement on Grimstone Down.

No. 3.

Another pond of much the same character and shape as the two before mentioned is to be found on Maiden Castle, near the dividing scarp, within the rings. This pond measures 51ft. by 48ft., with a probable depth, including the embankment, of eight to ten feet.

Like No. 1, it is practically square on plan, and has a considerable rain-collecting area or watershed, some 15 to 18 feet wide, formed by its surrounding embankment, outside and above its flint-pitched or water-containing area.

Messrs. Hubbard describe this pond as a "dew-pond," and refer to its unusual position—"within the rings"—a reason for which they say is to be found in the fact that outside the rings a supply of running water was near at hand, in this respect presenting a contrast to Chanctonbury-cum-Cissbury, where these ponds are found outside the rings.

and that, being near the dividing central scarp, it is conveniently placed to supply the needs both of the human community who occupied the Eastern Division, and of the animals to which the Western Division was devoted.

These three ponds are somewhat of a puzzle to me, the acknowledged shape of the Neolithic "dew pond" being circular, whilst these, as we have seen, are square, with runlets at the angles, so that it seems probable that these ponds have been re-formed and re-shaped in comparatively modern times, in fact we know that this was the case with the Maiden Castle Pond, which was re-made and enlarged by the late Mr. Henry Hawkins about 40 years ago.

No. 4

Pond is on Stratton Down, and, like Nos. 1 and 2, is without, though within the immediate vicinity of, the British settlement on Grimstone Down. This pond is circular in form, about 30 feet in diameter, and was originally some 5 to 6 feet deep. On cutting a section, North and South, I came upon one foot of soil, mixed with flints. Then came a layer of clay, mixed with lime, resting on the solid chalk, but not so thick or well defined as that in the Grimstone Down Ponds. I have never known this pond to hold water.

No. 5

Is a pond circular in form—also on Stratton Down—which was always dry. Some five or six years ago I had this pond re-formed and re-puddled by Lane, of Fordington, and the runlets cleared out, since when it has always contained a supply of water, even through the severe test furnished by the drought of last summer (1911).

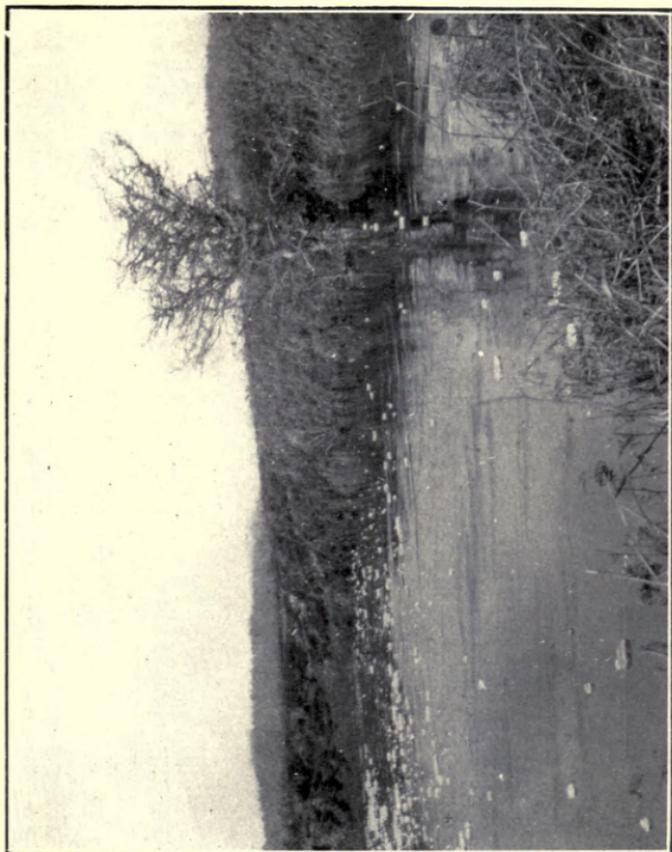
No. 6.

There is a pond of great antiquity and interest, known as "Greenhill Pond," situate on the elevated plateau on the

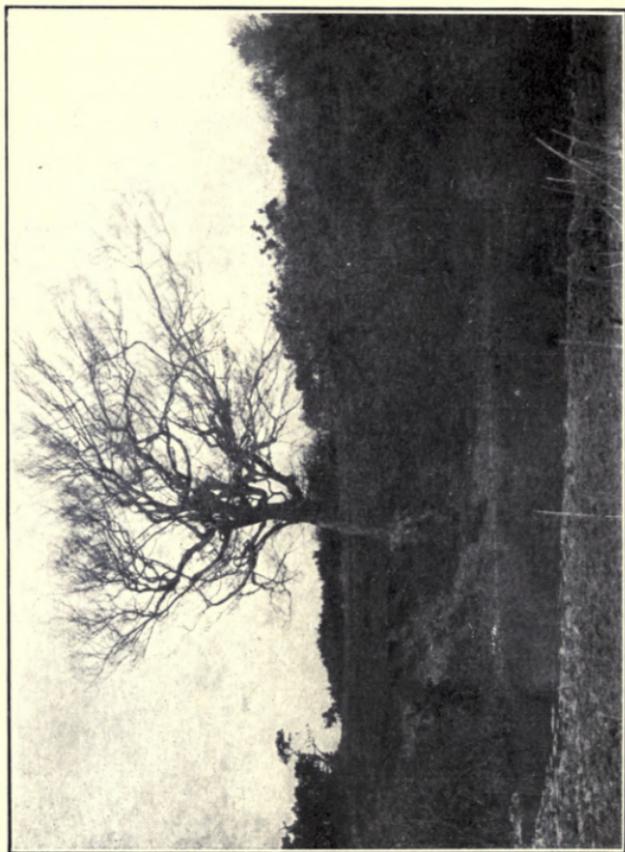
North side of Piddletown Heath, near the trackway leading from Higher Bockhampton to Piddletown, at a point where the trackway diverges towards Ilsington Wood.

This plateau overlooks, on the South, the three British Tumuli known as "rain-barrows" and the remains of the Beacon Keeper's hut used in the war with Napoleon, and referred to by Mr. Thomas Hardy in "The Dynasts;" and on the North is a most extensive view of Piddletown and the Valley of the Piddle. This pond, which from its form and situation has every appearance of being a Neolithic dew-pond, measures about 90 feet in diameter, including its outer scarp—the water holding area being about 45 feet in diameter. The depth is considerable, but I had no means of ascertaining its exact measurement, and would, when full, have contained a large condensing area. It seems probable that this pond may have been formed from one of the "soaks" of which there are a large number upon the heath.

By the courtesy of Mr. Thomas Hardy I am permitted to give you, in his own words, an account of the following interesting adventure which happened to an ancestor of his (the author's grandfather), beside this very pond, as nearly as possible a century ago. He was crossing the heath, one midnight in June, by the path which then, as now, skirts the pond, when he became aware that he was followed by two men whom he had noticed watching him when he left Piddletown. He had now little doubt that they were bent on attacking and robbing him, for times were more lawless then than they are at present. It had so happened that while crossing a green field called "Coomb" a little earlier in his journey, he had been struck by the great number of glow-worms that were shining in the grass, and being a young man he beguiled his walk by gathering several and placing them on the brim of his hat. As he was unarmed, and the men were gaining upon him, the only way of escape that occurred to him was by playing upon their superstitious feelings. He accordingly rolled a furze faggot into the path, and, sitting down upon it, took off his hat, placed it on his



GREENHILL POND, PUDDLETOWN HEATH.



DRIP-POND ON WOLVERTON DOWN.

knees, stuck two fir fronds on his head to represent horns, and pulled from his pocket a letter he chanced to have with him, and began reading it by the light of the glow-worms. The men approached, stopped suddenly, and then bolted at the top of their speed down the hill and disappeared. In a few days there was a rumour in the neighbourhood that the devil had been seen at midnight by "Greenhill Pond," reading a list of his victims by glow-worm light. He tried afterwards to discover who the men were, but they never revealed their identity.

No. 7.

Another pond worth a visit is "Rushy Pond," situate on the South side of Piddletown Heath near the trackway leading from Bhompston northward to Yellowham Bottom, at the point where the trackway intersects the old Roman Road from Dorchester, through Weatherby Castle to Badbury Rings. This pond is of a different form and character from that last described, and appears to be fed from the surface water collecting at this point from the trackway and the Roman Road, and I think should be classed as a "Catch-pond." It has seldom, if ever, been known to be dry.

No. 8.

Through the courtesy and with the assistance of Mr. Arthur Symonds, of Wolfeton Manor, I examined in August last (1911) a very ancient pond on the Wolveton Estate, on what was formerly a part of the Charminster Down, near the Northern boundary, between that parish and Piddlehinton. This pond, which is seldom dry, is placed on the Down, swept by the thick sea mists from the South-west, some 500 feet above sea level. Its situation is at the foot and on the south side of a steep declivity—covered with thick brush-wood and high gorse, with an ancient overhanging beech tree on the west. It is 32 feet in diameter and some 7 feet

deep. The theory of its never failing supply of water is that the moisture-laden currents of air from the South-west—and these sea mist drifts are heaviest in the early morning and towards evening—deposit their moisture on the branches and smooth leaves of the overhanging beech-tree and on the leaves of the brush-wood and gorse, and cause a continuous “drip” into the pond below, which is thus kept fully supplied with water; hence its designation of “drip-pond.”

No. 9.

There is a pond of similar form and construction on the adjoining down, part of Burton Farm, in the occupation of Mr. Cake. This pond is considerably larger than No. 8 and has overhanging trees of beech, ash, and Scotch fir on its North and West sides. These collect the rain and the mist from the South-west, giving a bountiful supply of water to the pond, which is seldom empty, even in the driest summer.

No. 10.

Of Catch-ponds there are numerous examples to be found. These are as a rule kept filled by the surface water from the roads and gullies close by. Two excellent examples of Catch-ponds may be seen at the bottom of Kingston Hill on the London Road, one on the right just inside the Park gate, fed by the rain water collecting on the Eastern quarter of the road, the other on the left, through the gate leading to Higher Kingston Farm, fed by that collecting on the Western quarter of the road, supplemented by the drip from overhanging beech trees; but these ponds hardly come within the purview of my paper.

Doubtless other ponds of ancient date placed on our Dorset Downs may be known to members of our club, but the above are all that I have had time to examine and describe. Possibly my investigations may be carried further at some future time.

Messrs. Hubbard, in the 2nd Edition of their work, give a most interesting chapter on dew-pond experiments. These they carried out on rather a large scale. They obtained a suitable site and excavated the ground over a space of 100 feet square, thus obtaining a superficial area of 10,000 feet. The excavation was carried to a uniform depth of 1ft 6in., and a layer of 4in. of concrete was laid over the whole.

Upon this they put a coating of pitch or tar to stop any moisture from below from penetrating through the concrete to the layer of non-conducting material they intended to lay upon it, spreading dried sand over the tarred surface.

For this non-conducting layer they used mica, which is a well-known non-conducting medium; on this was laid a coating of asphalt to bind the whole upper surface together. This was successful to a certain point, namely, that their pond gathered a considerable quantity of water by night, though no rain fell, which was lost by evaporation by day. The rainy season having set in they were obliged to postpone their experiments until the following summer.

Unfortunately, through an accident, the asphalt got damaged in several places, thus admitting the water to the layer of mica, reducing it to a useless pulp, so that the experiment had to be abandoned.

Further experiments were conducted by Mrs. George Hubbard on ponds constructed on the same principle, but employing different materials, but though the results she obtained were encouraging, they failed to prove that water in any considerable quantity could be collected from dew, on the principle upon which they sought to prove that Neolithic man obtained his water supply for his camps situated in elevated positions on the tops of our downs, where they are usually to be found.

From some interesting experiments conducted by Mr. J. G. Cornish on the Berkshire Downs in January, 1910, it was found that after a night of fog the surface of his pond had (on January 18th) risen $1\frac{1}{2}$ inches; the next day, following another heavy fog, it had risen no less than 2 inches, and on

January 24th an inch was measured. It is not recorded what was the principle on which the bottom of this pond was laid, or if there were any overhanging trees.

Attempts have been made from time to time to measure dew falls, and Mr. G. Dines, in a paper "On Dew, Mist, and Fog," gave the average of dew fall during the year at 1.397 inches, or on the grass alone at somewhat less, namely, 1.022 inches. He says: "Making a liberal allowance for contingencies it may, I think, be fairly assumed that the average deposit of dew on the surface of the earth falls short of 1.5 inches." This, if correct, completely overthrows the theory, advanced by some, of the "Neolithic Dew-Pond."

From the foregoing I think it may be gathered that rain, dew, mist, and fog each contribute largely to the filling of ponds placed at high altitudes, and doubtless Neolithic man was fully aware of this, and so placed his ponds on these Dorset Downs near his camps, that they might get the full advantage of the rains, mist, and fog driven inland from the sea by the south-westerly breezes.

Be this as it may, the present generation have no longer the same need of these ponds. Modern machinery and modern plant have enabled us to carry water from the springs in our valleys to the top of our hills and on to our elevated plains, from whence it commands our pastures and waters our flocks and herds.

Within 20 yards of Dew-pond No. 2 on Grimstone Down, above described, now stands, some 550 feet above sea level, a cypress wood reservoir capable of containing 10,000 gallons of water, filled, by means of a pump driven by a wind engine, from a copious spring in the valley below, from whence the cattle and sheep on the three surrounding farms are plentifully supplied with water, run through galvanised iron pipes into drinking tanks, by gravitation, from the store reservoir, any surplus being made use of for irrigating purposes. A similar means of supply may be found on the adjoining estate of Godmanstone, on Clan Down, in the parish of Winterborne St. Martin, and on Maiden Castle, with galvanised



MIST-POND ON CHARMINSTER DOWN.

drinking troughs, within the very confines of the ancient earthwork itself, and not far distant from the Neolithic dew-pond described by the Messrs. Hubbard.

I fear I have not treated my subject quite as scientifically as I ought, or given it the same patient study that Mr. Martin and other writers on the subject seem to have done ; but the result of my investigations has been to very much shake my belief in the theory of the Down-land "dew-pond," and I have arrived at the conclusion that unless rain, mist, and fog may be comprised in the word "dew," and if we are still to use the word "Dew-pond," we must do so in the widest sense as including ponds filled by any form of condensation out of the atmosphere. Mr. Martin, in his paper above referred to, seems to hold this view and abandons the theory of the "dew-filled pond" with feelings of regret. He says : "The mystery surrounding the quite invisible formation of dew has a fascination for me, as for most people, but the result of greater knowledge must prevail, and the dew which waters our down-land grass and the corn on our dry flint-bestrewn down-land fields cannot longer be held to have any important bearing on the 'mystery' (which is no longer a mystery) of the Dew-pond."

The subject is an extremely interesting one, and I hope the fact of my bringing it forward may lead to its being further discussed and enquired into by other members of the Club.

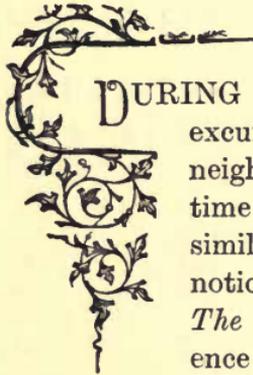




Notes on some
Surveys of Valley Entrenchments in the
Piddletrenthide District, Central
Dorset.

By HERBERT S. TOMS

(Curator of the Brighton Museum and formerly Assistant to the
late General Pitt-Rivers).



DURING the summer of 1907 your Club made an excursion to some valley entrenchments in the neighbourhood of Piddletrenthide. For some time previously I had taken an interest in similar works on the Sussex Downs, and the notice of your excursion which appeared in *The Antiquary* led to immediate correspondence with the Rev. C. W. H. Dicker. I also paid a flying visit to the Piddletrenthide earthworks that year. This visit proved of the greatest value during subsequent study of the valley entrenchments of Sussex. In fact so materially did Mr. Dicker's sketches and notes assist the endeavour to form a provisional scheme of classification, that it was felt imperative to obtain, for comparative purposes, larger and more detailed plans of the

Piddletrenthide examples than those given on the Ordnance Surveys. For this purpose I spent the greater part of July 1910, at Piddletrenthide, and the object of the present communication is to stimulate your interest in the subject by bringing forward for exhibition tracings of the actual surveys which were then made.

THE SQUARE-SHAPED ENTRENCHMENTS OF THE HILLS AND VALLEYS.

Among the less imposing earthworks of Sussex, Wilts, and Dorset, more or less rectangular examples are to be met with, both on the hills and hidden away in the valleys. The importance attached to their study was, I believe, first ventilated at the Dorchester Meeting of the Archæological Institute of Great Britain and Ireland, on August 3rd, 1897, in an address which should be familiar to all Dorset archæologists. (1) But the earliest mention of this type of earthwork appears to be that made in 1827 by the Rev. T. W. Horsfield. After briefly referring to the square-shaped but slight entrenchment situated near the summit of Kingston Hill, Lewes, Sussex, he says that "the number of these square encampments, on different parts of the Downs in this district, is very great; and as they are found in the valleys, as well as on the summits of the hills, it is difficult to say by whom or for what purpose they were constructed. . . . It may be remarked, however, that the square enclosures in the valleys are not so large as those on the higher parts of the Downs; the embankments are lower, and the area is much less extensive. It is not improbable that the latter may have been occupied as the residence of one or other of the many British tribes, whilst the encampments on the hills were

1. Introduction to "*Excavations in Cranborne Chase*," Vol. IV., by General A. Pitt Rivers.

resorted to as temporary places of refuge in times of alarm." (2)

So far as one's observations go, this description is equally applicable to similar entrenchments in Wilts and Dorset. It is also of interest from the fact that the valley works are considered as a class apart from the square-shaped entrenchments on higher ground. The mention that their number was very great is worthy of note ; for, presuming the roughly rectangular cultivation terraces were not mistaken for entrenchments—a failing not unknown even now, it seems evident, judging by their present number, that many quadrilateral earthworks have been swept away by cultivation during the last 80 years.

EXCAVATION OF THE SQUARE-SHAPED CAMPS.

The prehistoric origin of the square-shaped hill-entrenchments was maintained by the late General Pitt Rivers in his monograph on "The Hill Forts of Sussex." (3) In this work, published in 1869, the entrenchments of the valleys receive no mention, either because they were unknown to the author, or that they were not considered by him to be works of defence. In both the hill and the valley type, however, he ultimately became especially interested, and, by extensive excavations in the neighbourhood of Rushmore, he proved that some of them belong to the Bronze Age. (4) In North-east Dorset and South Wilts "the people of the Bronze Age certainly did live in enclosures of squarish shape and slight relief. They were probably strengthened by stockades on the banks, without which they could hardly have served for

2. "*The History and Antiquities of Lewes and its Vicinity*," pp. 151-2, by the Rev. T. W. Horsfield, F.S.A.

3. "The Hill Forts of Sussex," by Col. A. Lane Fox, "*Archæologia*," Vol. XLII. (1869).

4. "*Excavations in Cranborne Chase*," Vol. IV.

defence, but probably their chief use was to keep off wolves and wild animals. They must have been a pastoral people having flocks and herds, and there are not wanting indications that they may also have cultivated the soil in fields from the prevalence of line ; of terrace near them." (5)

The square-shaped entrenchments excavated in Cranborne Chase were as follows :—

The South Lodge Camp, Rushmore, Wilts ; *Martin Down Camp*, Wilts ; *The Angle Ditch* (apparently a partially constructed Camp) on Handley Down, Dorset—all of which proved to be purely Bronze Age structures ; and the *Handley Hill Entrenchment*, which was ascribed to Bronze Age or Early Roman times.

Of the above, only the Martin Down entrenchment was situated in a valley ; and no other valley example appears to have come under the observation of Pitt Rivers during his later years. That he regarded both classes as a whole seems evident from the following extract :—

“The position of the Bronze Age Camp on Martin Down, in a slight hollow, shows that it must have been selected chiefly for shelter, and the vicinity probably of water at that time and not exclusively for defence. The positions of the South Lodge Camp and the Handley Hill entrenchment close to the summits of hills, but on one side of them, were probably chosen for the same reason. Had defence been their only object, a command of view on all sides would have been very important. . . . We must not assume that because the Bronze Age Camps here described were of small size and squarish form, all Bronze Age Camps were the same. These may have been chiefly for agricultural purposes, whilst the defensive camps and fortresses were different.” (6)

The irregularity of the line of the ditches of the above entrenchments is a point emphasised in the same address :—
“This is in accordance with what I have constantly found in

5. Ibid. Introduction to, p. 19.

6. Ibid. Introduction to, p. 20.

entrenchments of the Bronze Age. Unlike Roman entrenchments they were marked out by the eye rather than measured with the rod. . . . The entrenchments of the Bronze Age, in so far as my experience goes, were of very slight relief. The ditches, before excavation, are seen as mere indentations on the surface, and irregularities in their construction cannot be noticed until the hard sides are laid bare down to the very bottom for a considerable distance." (7)

VALLEY ENTRENCHMENTS OF SUSSEX.

The mutilation and partial destruction of several Sussex valley entrenchments tend to show that many sites have been entirely eradicated by cultivation in recent years. An endeavour is being made to discover and survey all our Sussex examples, so that, if necessary, steps may be taken to arrest further destruction.

In 1909, the remains of two intersecting valley entrenchments situated on the cliff edge near the old Beachy Head Lighthouse, were brought to my notice ; and, as cliff erosion was hastening their destruction, it was determined to investigate them at the earliest opportunity. Their survey and excavation was carried out under the auspices of the Brighton and Hove Archæological Club in August, 1909. (8)

These earthworks, which lie within the great promontory fort of Beltout, were perhaps more regular in outline than those excavated in Cranborne Chase, and, judging from the shallowness of their ditches, must have been far less imposing structures when first made. However, our week's excavation revealed the interesting fact that they are of the same period as those on the North-east Dorset border, *i.e.*, Bronze Age.

7. "*Excavations in Cranborne Chase*," Vol. IV., p. 186.

8. An illustrated report on the Beltout excavations will be included in the next volume of the *Sussex Archæological Society's "Collections."* The large valley entrenchment at Beltout differs from any example known at present in that its ditch lies within the rampart.

VALLEY ENTRENCHMENTS IN WILTSHIRE.

Since the investigations at Beltout, a stronger incentive to the further and methodical examination of valley entrenchments has been supplied by the excavation of two apparently anomalous valley enclosures near Morgan's Hill in Wiltshire. (9) One of these is an unusually large example, nearly square in plan and enclosing about seven acres. The other, of small area, is situated near the centre of the large work. No attempt can be made here to summarise the results of their excavation, but it certainly has been shown that some of our valley entrenchments may be even mediæval.

VALLEY ENTRENCHMENTS OF THE PIDDLTRENTHIDE DISTRICT.

A study of the quadrilateral valley entrenchments in Sussex, Wilts, and Dorset, has led to their being provisionally divided into three types :—

- A. The Valley-head Enclosure.
- B. The Valley-side Enclosure.
- C. The Valley-proper Enclosure.

The positions of the valley entrenchments here referred to in the Piddletrenthide district are all delineated on the six inch Ordnance Survey of Dorset, Sheet XXXI., N.E. ; and the plans now exhibited show that each of the above types is represented. (10)

9. "A Mediæval Earthwork near Morgan's Hill," by Mrs. M. E. Cunnington, *Wilts. Arch. and Nat. Hist. Mag.*, Vol. XXXVI., p. 590.

10. The field surveys were made with the assistance of Mrs. H. S. Toms and Mr. B. W. Harrison (members of the Brighton and Hove Archæological Club), and Mr. Harry Hicks, of Piddletrenthide, from the 14th to 20th July, 1910. The magnetic variation for the period was obtained from the Director General of Ordnance Surveys, Southampton.

*Fig. 1.*THE CRATE MEADOW ENTRENCHMENT, THORNCOMBE
BOTTOM, PIDDLTRENTHIDE.

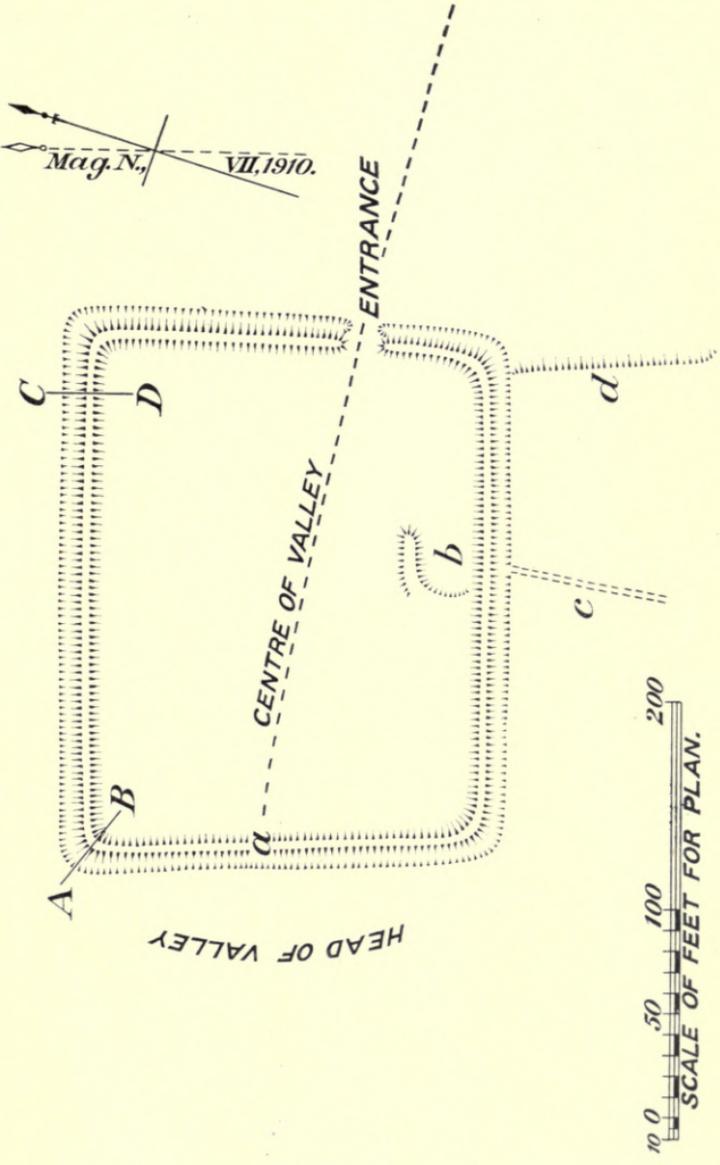
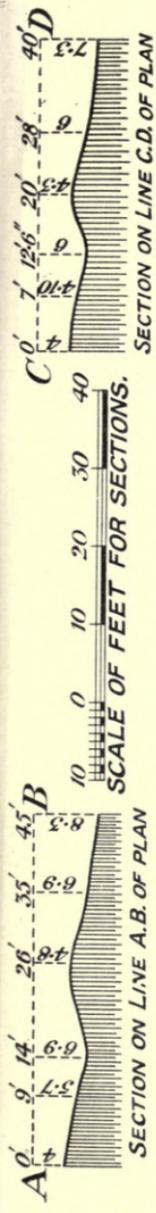
In the enclosures of type A. the ditch and rampart are wholly confined to the sides of the surrounding hill, except where the entrenchment at its lowest point crosses the valley, and the space enclosed thus consists entirely of the valley head.

From Figure 1 it will be gathered that the Crate Meadow entrenchment strictly accords with the above type. It is situated between the 500 and 600ft. contours at the head of a shallow coombe tributary to Thorncombe Bottom. This coombe, formed by a broad groove in the gently sloping hill-side, is enclosed by hedges, and the field containing the entrenchment is "marked *Croft Meadow* on the farm map, although commonly called *Crate* by the villagers and labourers." (11)

The entrenchment is more regular in outline than the North-east Dorset examples, but the ditch and vallum are of about the same relief as the Beltout and other Sussex valley entrenchments. The north side is the most pronounced. Originally there appears to have been only one entrance, *i.e.*, that in the west side. The continuation of the ditch opposite the present gap ("a" on plan) in the west side, obviously marks this opening as of later date than the earthwork. The stall-shaped excavation ("b" on plan) adjoining the south rampart, and the filled-in trench ("c" on plan) running towards this depression and into the ditch, also appear to be later than the original construction.

An interesting feature in connection with this entrenchment is the reduced ancient cultivation balk ("d" on plan) adjoining the south-east angle. At this point the ditch

11. This information was kindly given by Mr. J. P. Homer, of Piddletrenthide.



A.P. 11

FIG. 1. VALLEY-HEAD ENTRENCHMENT, CRATE MEADOW, PIDDLTRENTHIDE.

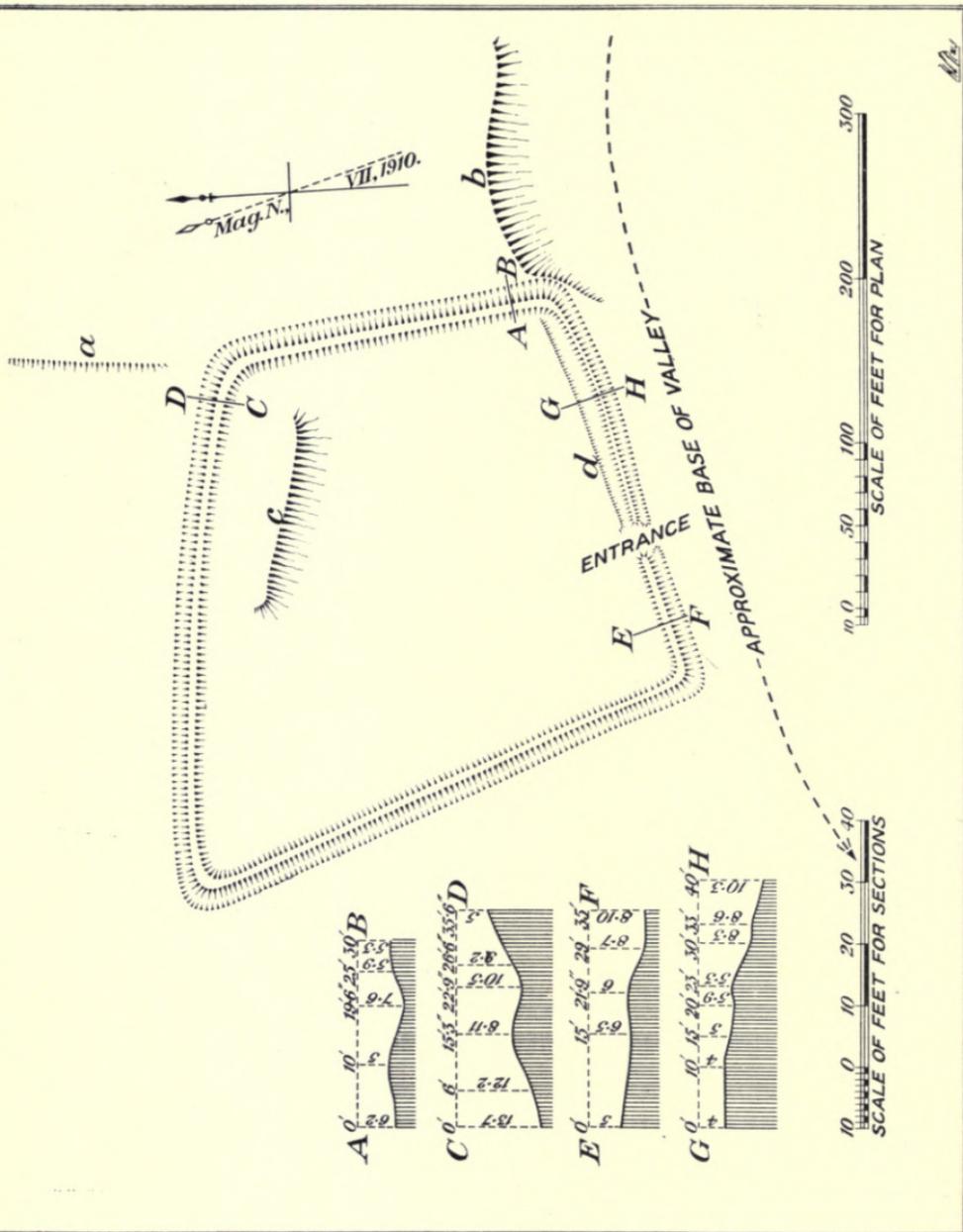


FIG. 2. VALLEY-SIDE ENTRENCHMENT, SOUTHCOMBE, PIDDLTRENTHIDE.

A/2

intersects the balk, thereby affording suggestive evidence that the cultivation is earlier than the earthwork.

Fig. 2.

SOUTHCOMBE VALLEY ENTRENCHMENT,
PIDDLTRENTHIDE.

In the construction of enclosures falling under type B, the side of a valley seems to have been preferred; but, in each example, the lowest rampart runs approximately parallel to and adjoins the base of the valley.

Like the Bronze Age Camp on Martin Down, and the smaller work at Beltout, the Southcombe valley entrenchment conforms to this type. It is situated just below the 500ft. contour on a natural hollow in the north side of a valley which has been known as Southcombe since 1815. (12) The entrenchment lies about a quarter of a mile south of two other valley enclosures in Tenant's Bottom, from which it is separated by the ridge of Lower Down.

The east and west ramparts run at about the same inclination downhill, and, with the exception of the slight platform and scarp ("c" on plan), the interior is practically an even plane sloping gently from north to south. It is difficult from a mere superficial examination to account for the origin of the scarp "c." Its greatest vertical height is about 10ft., and it curiously resembles the platform and scarp which partly traverse a Sussex valley entrenchment in Bramble Bottom, near Eastbourne.

The greater part of the western rampart is covered with bushes. Some of the hawthorns, especially the lower clump, have stems over one foot in diameter.

12. So named in plan of land for sale; 21st March, 1816.

The terrace ("a" on plan) running south towards the N.E. angle, is of very slight elevation. There are well-marked cultivation terraces on the hill above, and this may have been produced by the same system of cultivation. There are also indications that the interior rise ("d" on plan) bordering the southern rampart, may be due to cultivation of the ground above. It would appear from the plan that this forms the continuation of the strong scarp ("b" on plan) which approaches the S.E. angle. The arrow, shown at the S.W. end of the dotted line representing the base of the valley, indicates the direction in which the latter ascends.

Fig. 3.

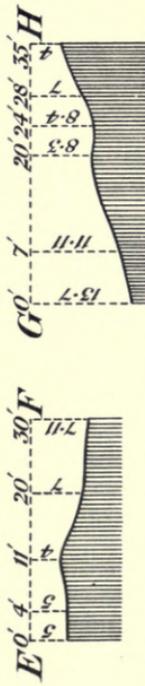
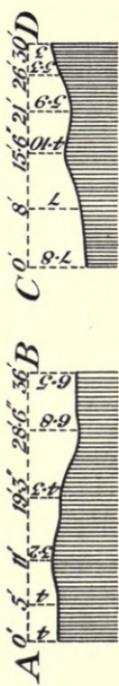
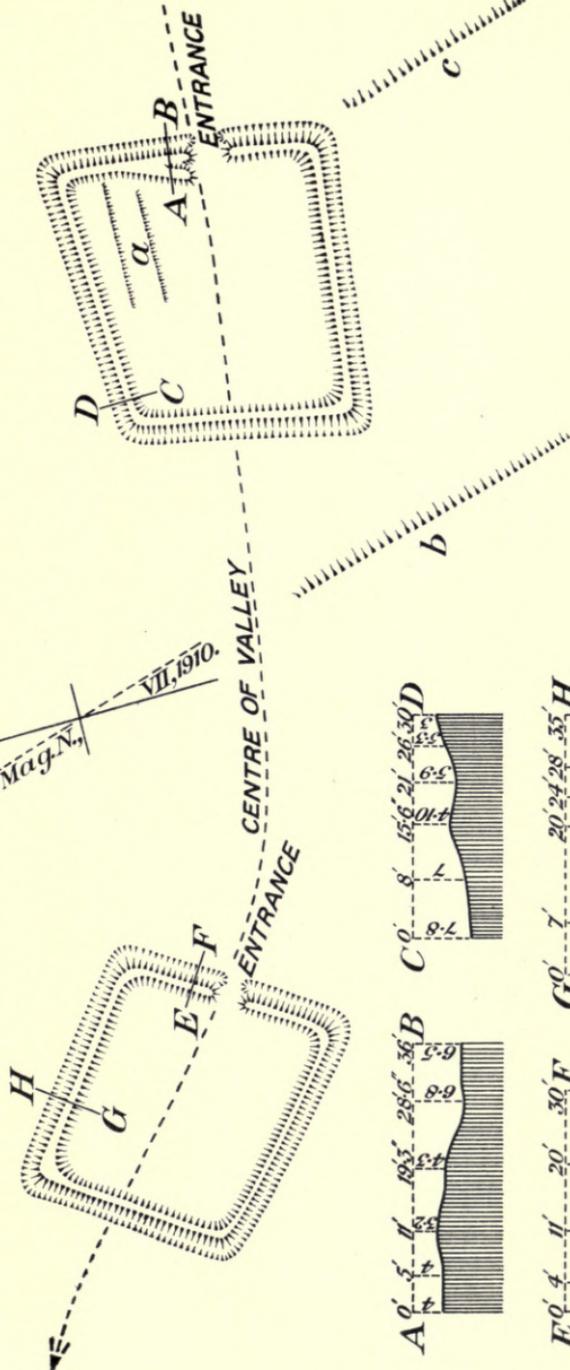
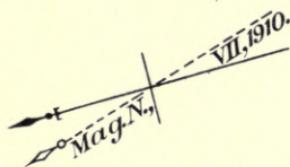
VALLEY ENTRENCHMENTS IN TENANT'S BOTTOM, ALTON
PANCRAS.

In the valley-proper enclosures (type C of the provisional classification) are included all those which appear to have been so designed as to enclose not only the valley floor but portions of each side of the valley as well. This is our rarest type in Sussex, only one perfect example being recorded. (13) The largest, though imperfect, valley entrenchment at Beltout—a Bronze Age work—is also a valley-proper enclosure.

The two small but extremely interesting entrenchments of Tenant's Bottom occupy the centre of a narrow coombe which fines out on Rake Hill, in the direction of the arrow, some 200 to 300 yards from the western entrenchment. The ramparts traversing the valley are extended uphill on each side, so that their north and south sides run approximately parallel to, but at a higher elevation than, the valley floor. It will thus be seen that these two enclosures form

13. "Ancient Cultivations," by R. Blaker, *Sussex Arch. Coll.*, Vol. XLV.

PIT

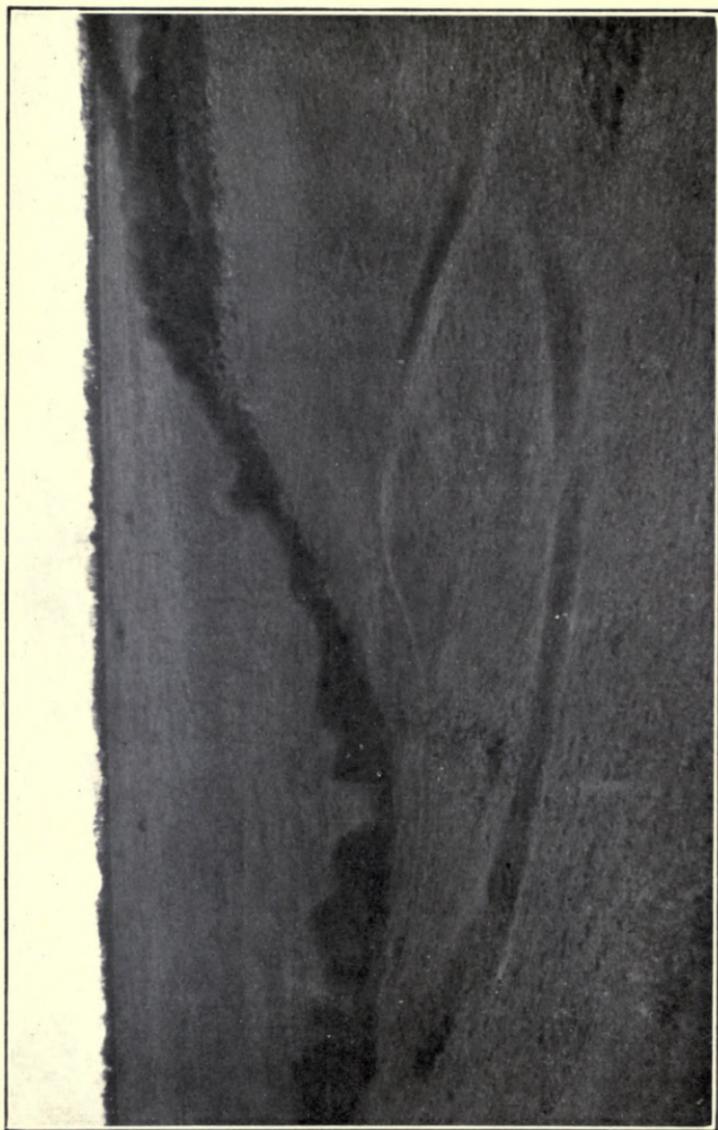


H.P.A.

FIG. 3. VALLEY-PROPER ENTRENCHMENTS, TENANT'S BOTTOM, ALTON PANCRAS.







TENANT'S BOTTOM.
WESTERN ENCLOSURE.

typical examples of the valley-proper type. They lie between the 500 and 600ft. contours.

Their ramparts and ditches are in a fairly good state of preservation. The bifurcation of the rampart near the entrance of the eastern enclosure is puzzling. From the levels shown in Section A.B. it would appear that such a feature may have been produced by later reconstruction of the rampart at this point. In the eastern work a line of rank grass borders the interior slope of the north rampart. Excavation may prove that this growth of grass is due to a shallow but filled-in trench running along the base of the rampart.

A characteristic of great interest in connection with the study of the ancient cultivations of the Chalk Downs, is that the lower earthwork lies between two reduced but distinct cultivation balks ("c" and "b" on plan). Similar terraces exist on the sides of the valley east of and below the earthworks, and they seem to belong to that system of cultivation (seen in other coombes near Piddletrenthide and in Sussex, as well) in which the balks run from hill to hill in direct lines across the valley. A comparison of the nearly perfect state of the earthworks with the very reduced condition of the terraces certainly favours the view that the cultivation divisions "c" and "b" are earlier than the entrenchments. (14).

In the eastern enclosure two very slight terraces (bordering "a" on plan) run nearly parallel to the north rampart. These may have been produced by a single, though not necessarily ancient, cultivation of the central patch "a." The western rampart of the lower work is now broken in two places by cart tracks; but in each case the ditch opposite is continuous. The pit on the hillside north of the eastern entrenchment is about three feet deep and may be modern.

14. "The Problem of Ancient Cultivations," by Herbert S. Toms, *The Antiquary*, November, 1911, pp. 411-417.

CONCLUSION.

Comparatively little has yet been done in the study of valley entrenchments, and although it has been proved by excavation that certain examples, including the valley-side and valley-proper types belong to the Bronze Age, one feels the urgent need for further investigation. It remains to be shown whether any of our Sussex and Dorset valley entrenchments belong to periods earlier or later than Bronze Age times.

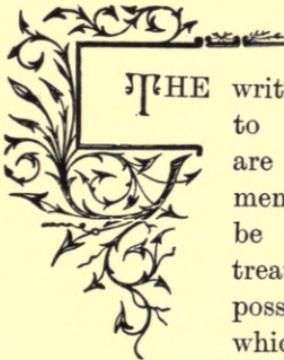
That these valley works were not constructed for defence against man is evident from their situations, which are most defective in this respect. One inclines to the view that they were thrown up (at least in prehistoric times) as cattle folds, or in some instances for the protection of flocks and herds from attack by wild beasts. The classification advanced must not be considered an arbitrary one, for the slight quadrilateral entrenchments of the hillsides may have well served the same purpose.





A Comparison of Dr. Stukeley's
Account of the Roman Amphitheatre at
Dorchester
with the Result of the Excavations,
1908-1910.

By Captain JOHN E. ACLAND.



THE writings of Dr. Stukeley are well known to students of Archæology, but as they are not perhaps readily accessible to all members of the Dorset Field Club it may be of interest if I refer briefly to his treatise on our most valuable antiquarian possession, the Roman Amphitheatre, of which we have heard a good deal locally during the last two or three years.

Dr. Stukeley, who was born in Lincolnshire in the year 1687, was (even as a child) of a most enquiring disposition, with a mind bent on research. It is reported of him that when an undergraduate at Cambridge "he frequently went a simpling, and began to steal dogs and dissect them ;

he also made a handsome sceleton of an aged cat." On leaving the University he studied medicine and surgery, and went into regular medical practice, first in his own county and then in London.

When only 30 years old he was elected a Fellow of the Royal Society, and shortly afterwards took part in establishing the Society of Antiquaries. In the year 1729, at the age of 42, he gave up his medical profession, took Holy Orders, and held the living of Stamford for some years until presented to St. George's, Queen Square, in London.

In addition to his enthusiasm as an antiquary, he was an ardent student of astronomy, saying that he congratulated himself on living in an age fruitful of the grand phenomena of the celestial bodies, and was pleased that besides the total eclipse of the sun he had seen in the space of two years the great conjunction of the five planets, a transit of Mercury across the sun, and a comet. It is even related that on one occasion he postponed his church service that the congregation might see an eclipse! He was described by one of his oldest friends as "a learned and honest man, but a strange compound of simplicity, drollery, ingenuity, superstition, and antiquarianism." He died in 1765.

Stukeley was the author of many works on medical and antiquarian subjects, that which we are now considering being entitled "*Itinerarium Curiosum*," or "An Account of the Antiquities and Remarkable Curiosities in Nature or Art, observed in travels through Great Britain."

Dorchester was included in his tour of the year 1723, and he devotes 12 folio pages to the description of The Amphitheatre, accompanied by five illustrations, or plans. Before dealing with his account I will remind members of the Field Club of the discoveries made on the site by the recent excavations, that they may realise how accurate Dr. Stukeley was in his observations, a result partly due (no doubt) to local tradition heard on the spot, for, notwithstanding the incredulity of modern critics, "local traditions" are generally proved to be very near the truth.

1. Beneath the grass, as we now see it, there is a perfectly level solid floor, formed by cutting away the natural chalk, which was left at the sides to form the walls of the arena.

2. At the base of the walls there are at regular intervals square holes, arranged in two parallel lines, evidently meant for posts carrying two barriers or palisades, with a pathway between them.

3. The entrance to the arena was only 22 feet wide, instead of about 40ft. as it appears now. On both sides of the entrance there are pathways which would serve for the spectators to reach their places.

4. Opposite the entrance there is a square enclosure cut in the natural chalk, which from its construction would be well adapted for holding the wild beasts used in the "games."

5. No trace has been discovered of tiers of seats; but opposite the centre of the arena on the short diameter there is a square recess on a well-worn platform, slightly higher than the floor of the arena.

I will now give in a condensed form the description of the site taken from Dr. Stukeley's work, written nearly 200 years ago. "The area," he says, "has been ploughed up these many years, to the very skirt of the amphitheatre within and without, so greedy are the country people of an inch of ground. The jambs of the entrance are worn away, and the plough encroaches on its verge every year. Never did I see corn growing (which of itself is an agreeable sight) with so much indignation as in this noble concavity, where once the majesty of Rome used to shew itself."

With regard to the general construction Dr. Stukeley says:—"It is to be noted that half of this work is above and half below the surface of the ground, so that great part of the matter was dug out of the middle; for it is a *solid bed of chalk*, and the rest fetched from elsewhere. It is not much inferior in strength to those of stone, though infinitely less expensive, and for use of convenience there is very little difference; and as to beauty, as far as relates to the seats, and what was visible on the inside, our work was

no doubt very handsome, and even now it is a very pleasant sight. Nor does the meanness of its materials debase, but rather enhance, its value and its art, for though less costly and lasting than stone and marble, yet for the same reason less liable to rapine, and the covetous humour of such as plunder them for other uses. Therefore I believe in the main it is as perfect as most abroad, and has so long escaped common observation."

One of the most insistent of the popular traditions was that which assigned the southern end of the work to the cave for wild beasts. On this subject Dr. Stukeley writes, "The receptacle, or cave of the gladiators, wild beasts, &c., I suppose to have been at the upper end under the ascent to the terrace, being vaults under that part of the body of the work; whether they were of the same chalk or timber, or whether they were arched with brick or stone, I cannot say. It is easily understood by the plan and section given, that I suppose a passage quite through from the outside into the area, which must open at the bottom of the podium, or wall of arena, with a squarish door." All these suppositions are practically confirmed by our recent excavations, and the only part of the work that seems to have led Dr. Stukeley astray is that which has puzzled many others; unless again we accept the "popular tradition" that assigns the long gradual slope at the southern end to military construction during the XVII. Century Civil Wars. This "tradition" was amply confirmed by the fragments of pottery and other things found in the course of the cutting made there in 1909. It is, however, somewhat curious that Dr. Stukeley did not know of this himself, as he studied the site within 70 or 80 years of the construction of the "works at Maumbury" for the defence of Dorchester.

Another discovery made quite unexpectedly was, however, referred to, and even the position of it drawn by Dr. Stukeley. The object of the square recess that we found in 1910 below the highest portion of the terrace, is apparently described thus: "The chair of state for the prætor was on one side,

and probably another opposite for the ' editor ' of the shows, and it is remarkable that a little prominence is still left in these places. They are set in the middle of the podium upon the shortest diameter, and were covered with canopies like a tabernacle." Many of the details shown in our excavations can be best explained by accepting Dr. Stukeley's suggestion.

He evidently devoted much thought to a consideration of the seating arrangements for spectators. He draws a plan showing 24 tiers of seats, and says " We may well infer that they were covered with planks, if not made wholly of it. But again the people of Rome originally stood at the games ; and if any one would rather think that ours never had any seats, but that the people stood upon the grassy declivity, I shall not be averse to it. Yet it seemed to me, viewing the sides very curiously, when the sun shone upon them with a proper light and shade, that I could see the very marks of the poles that lay upon the slopes whereon the benches were fastened." Dr. Stukeley even calculates the number of people that might be commodiously present, saying there were 12,960 places for spectators upon the whole range of seats, omitting all that might occasionally stand on the terrace at the top, on the ascent up to it, and at the entrance.

Having now dealt with the chief features of this interesting work, I think we may fairly claim that the " local tradition," as embodied in the treatise of Dr. Stukeley, has been proved by the recent investigation to be substantially correct, and that Maumbury Ring is the site of the Roman Amphitheatre.

There is of course no objection to the discussion of rival theories, and indeed I agree with Dr. Stukeley's remark, " Difference of opinions, though false, is often of great service in furthering discovery of truth."





The Mystery of Corfe.

By J. G. NEILSON CLIFT.



EDWARD THE MARTYR was murdered. Of that one fact there is no reasonable doubt. From the outset it has always been alleged that he did not die a natural death, and his end is generally asserted to have been a sudden and violent one. Edward the Martyr was murdered. When, where, how, by whom, and why the crime was committed, are, however, problems, and the evidence relating thereto clearly requires a somewhat more critical examination than it has hitherto received.

Edgar the Peaceful had been gathered to his fathers at a comparatively early age, leaving behind him a somewhat doubtful reputation ; an orphan son, Edward, by his first wife ; Elfrida, his second spouse, and her only boy, Ethelred, little better than an infant in years. Strong, fearless, hardy, and dissolute was Edgar, utterly lacking in self-restraint, and, moreover, given to outbursts of violent passion. Not without some primitive virtues, not wholly without some good qualities, neither better nor worse perhaps than the men of his

rank and station who were his brethren in arms. Whatever his character, he had undoubtedly ruled with a firm hand the turbulent subjects under his charge, aided by the master mind of Dunstan.

That Edward inherited the qualities of his father, alike the good and bad, there is amply testimony, and the opposition to his succession to the Crown seems to have been largely based upon the fact that he had a violent temper, and was in the habit of constantly maltreating his servants or any others who displeased him. Another, though perhaps less forceful, reason put forward by the supporters of Elfrida and her son, Ethelred, was that Edgar, although he was actually in possession of the Throne, had not been crowned when Edward was born. It seems more probable, however, that the true reason for the hostile attitude of many of his subjects to his succession was based upon the fact that Edward's legitimacy was somewhat doubtful. For it is to be observed that while Elfrida appears as witness to many charters after her marriage to Edgar, the mother of Edward does not once sign, so far as I am aware. This fact is not of course by any means conclusive, but bearing in mind Edgar's character as revealed by the early Chronicles, the supposition that Edward was illegitimate is by no means unlikely. Whatever the reason may have been, it is clear that a considerable number of those whose opinions had weight supported the claims of Elfrida and her infant in opposition to Edward.

Be the rights of the case what they may, Edward had been designated by Edgar as his successor, and it would seem that prior to the year 971 he was regarded as heir to the Kingdom, for in the will of Elfeah, who died in that year, there is a bequest to "the Elder Athling"—"the king's son and heir."* Ethelred, be it remembered, was, at the death of Edgar, a child of about seven years of age, and although perhaps a pawn in the game, he cannot have exercised any

* Birch : Vol. III., p. 432.

direct influence at so tender an age. The two most prominent figures in the struggle are before you, Elfrida and Edward, and although the former was a woman of exceptional beauty, excessive ambition, and endowed with considerable gifts in various directions, there were others who would seem to have been in a large measure directly responsible for the fatal outcome of the dispute, Elfhere, duke of Mercia, a cousin, or at any rate a relative of Elfrida's, and Dunstan the Archbishop. Elfhere, it may be presumed, was of Elfrida's party, at any rate during the reign of Edward; and no doubt their aims were, during that period, similar in character. Dunstan, on the other hand, supported Edward, and ultimately crowned him King.

The first question with which it is proposed to deal relates to the date of the murder, and fortunately there is no doubt on this point, for although certain copies of the Saxon Chronicle place the event in the year 979, this is apparently a slip of the pen, and the true date is 978. The day seems to be correctly given, as the 15th of the Kalends of April and this would mean March 18th of the latter year. The crime is generally stated to have been committed at eventide, and the hour of four is probably a close approximation to the truth.

The exact site of the incident of the murder must next be considered, and while it would be both pleasant and easy to perpetuate the notoriety of Corfe Castle as the scene of the episode, yet there is no shred of evidence worthy the name which in any way supports the claim of that spot. That the crime took place somewhere within the County of Dorset, there can, I think, be no manner of doubt, but in deciding upon the precise locality there are many important points to be considered, sifted, and weighed. By common consent the scene of the misdeed was at a house or residence which either belonged to Elfrida, or at which she happened to be staying at the time, together with her son Ethelred.

The second alternative has, however, little to support it, as it is only based upon the fact that in a few of the records nothing is noted but that Elfrida was staying at a house.

and there is no indication given of whether it was her own property or not.

It may, I think, be conceded that the house or residence was the property of Elfrida, and there are three sites which will require careful consideration.

The first to be dealt with is that which has been generally accepted since the 12th Century, to wit Corfe Castle.

Let the matter be stated quite clearly, the allegation being that the fatal blow was struck within the precincts of the present Castle. Now, be it remembered, the conditions requiring to be fulfilled are that the site must have belonged to Elfrida, and that she must have had a residence there. Unless one or both of these statements can be proved, the claim of Corfe Castle fails. It is not enough to advance the statement in Brompton ; it is necessary to prove from other sources that his declaration is correct. This is impossible, and that being so, it may be fairly stated that there is no evidence extant which in any way connects Corfe Castle with the crime or criminals. But this is only a bare statement of fact, and is of course not very satisfactory, for if it be impossible to prove that Brompton is correct it seems equally impossible to prove that he errs in his statement.

Here then the question must be studied from another point of view, and the problem is, to prove that the site of the Castle belonged to some one else both before, during, and after the episode of the murder.

It cannot be denied that William the Conqueror acquired from the Abbess of Shaftesbury one hide of land, part of sixteen hides comprising her manor of Kingston, in exchange for the advowson of the Church of Gillingham, and that upon the land thus acquired he built the Castle of Warham.*

Furthermore, it is certain that the site of the Castle of Warham was precisely the same as that upon which the Castle of Corfe stood. †

* Domesday.

† Testa de Neville.

Again it is clear that Shaftesbury Abbey held the manor apparently under two charters, the first a grant by Eadred to one Alfthrit in A.D. 948, and the second a charter by the same king to one Whitsige of 16 mansis of land at Corfe and Bleckenamwelle, granted in A.D. 956. There is also in the Shaftesbury Cartulary a doubtful charter perhaps relating to the same land, but no other charter whatsoever relating to property in the Isle of Purbeck appears in the Cartulary, and one or other of those here noticed must have been the deed whereby Shaftesbury Abbey held the estate.

Alfthrit is presumed to have been an Abbess of Shaftesbury, and she is referred to in the charter as a religious woman. It therefore seems certain that there were no intermediate holders of the land upon which Corfe Castle stands between the years A.D. 948-956 and A.D. 1084, for had either Alfthrit or Whitsige granted the land to any one else, then this holder must have granted it to Shaftesbury Abbey. But the Cartulary contains no evidence that any such intermediate grant occurred, and upon the face of it the evidence, as it stands, indicates that the Abbey of Shaftesbury held the land under one or both of these charters and they are both of them dated prior to the year 978. Moreover, the evidence is as strongly as can be in favour of the contention that the site in question during the whole of that period belonged to no one else; therefore the supposition that it belonged to Elfrida cannot for a moment be entertained, and as it did not belong to her and there is no evidence that she ever stayed there, there is no testimony that it was the place of the murder of Edward the Martyr.

It is just possible that the fact that the original grantee of the site in 948 bore the same name as the Queen, may have given rise to the obvious error into which the early chronicles have fallen. For it is not very difficult to understand how a grant of land to one Alfthrithe could easily have been assumed to have been a grant to another person bearing the same name; and anything like a critical comparison of dates and witnesses was not to be expected at so early a period.

Again the question of the name requires some slight consideration. It is stated that the murder took place at Corfe Geate; but while this may be so, it does not follow that Corfe Geate and Corfe Castle were one and the same place, even although they were considered to be so in the 12th Century, for prior to about 1130 there seems to be no doubt that Corfe Castle was known as Warham Castle, and although the place or its vicinity was termed Corfe, yet there is no evidence whatever of an independent nature which goes to prove that the name Corfe Geate was ever applied thereunto. Corfe was a fairly common place name in certain parts of England, while Corfe Geate, so far as I am aware, occurs but seldom.

Where then was this Corfe Geate and what evidence is there connecting it with the crime? There is direct testimony from an unimpeachable source that there was a tract of land, or a site, at or near Portisham which was known as Corfe Geate. In a charter of Canute * granted not many years after the death of Edward, Corfe Geate is mentioned as a boundary of an estate demised to one Orc, and although there is no direct evidence that Elfrida held this land, yet such may well have been the case, and indeed one copy of the Chronicle of Roger Hovenden names Coryates as the site of Edward's decease, and Coryates is not far from Portisham and may easily be a corruption of Corfe Geate. It is, however, only fair to point out that this evidence is not conclusive, but that it is only partly confirmatory, the missing link being the lack of anything pointing to the fact that Elfrida had an estate there.

On the other hand the probabilities in favour of this site are stronger than those in favour of Corfe Castle, even supposing the weight of testimony against the latter spot be totally ignored. Again it is clear that the earliest records simply stated that the murder was committed at a house of Elfrida's;

* Dugdale, Vol. 3, p. 54.

and if it be assumed that the Saxon chronicler altered this statement to the extent of inserting the name of one of her properties, the location of which he knew, then it is clear that she had property at Corfe Geate, or Coryates, and that some scribe after the year 1016 inserted Corfe Geate in the chronicle. But in later copies than this, there is no mention of any specific site.

In the other early chronicles little is to be gleaned. Indeed in an early life of St. Dunstan no mention is made of Edward the Martyr. In a life of that Saint by Adelard, written prior to 1011, it is simply noted that Dunstan crowned Edgar, and his son St. Edward the Martyr, together with Ethelred. In the life written by Osbern, precentor of Christchurch, Canterbury, a few more details are given, but there is nothing bearing upon the questions under consideration.

Eadmer adds but little to our knowledge. The *Vita Sancti Oswaldi*, however, which seems to have been compiled between A.D. 995 and 1005, is valuable evidence, as probably the events concerning Edward were related by Oswald himself to his biographer, and Oswald assisted Dunstan to crown the Martyr. The facts then, according to the author of the life of Oswald, were as follows :—

Certain of the nobles of this reign wished to elect as king the elder son, whose name was Edward, while some of the principal men wished for the younger son, Ethelred, since he appeared to be gentler both in speech and action. The elder son inspired all not merely with fear, but even with terror, for he would display his anger not only with words, but even with dreadful blows, and especially in the case of members of his own household. Meanwhile the ninth month had passed and the tenth day of the following month (or the tenth moon) was shining on the world, since Edward's election, when the partisans of his brother rose against him while he was on his way to hold an interview with the brother he loved. Treacherously and maliciously they sought the life of the innocent, whom Christ had predestined to become a sharer in the honour of martyrdom. One day towards evening the illustrious and elected king came, as we have said, to the house in which his beloved brother lived with the queen, wishing to receive the comfort of his brother's love. The nobles and chief men, who dwelt with the queen his mother, came out to meet him as was

proper. They took evil counsel amongst themselves, having so accursed a mind and such devilish blindness that they feared not to lay hands upon the Lord's anointed. Armed men surrounded him on every side, and with them stood a butler, ready to perform his humble office. The king had with him only a few soldiers, because he feared no one, trusting in the Lord and in the power of His virtue. He had been taught the Divine Law by Bishop Sideman, and he was strong and hardy of body.

When the conspirators ringed him round, just as the Jews once surrounded Christ, he remained sitting fearlessly on his horse. Equal folly and madness was in them. Then the vile wickedness and truculent folly of the Beelzebutine enemy flamed up in the minds of those venomous soldiers; then the poisoned arrows of the crime of Pilate rose up in cruelty against the Lord and against His anointed, who, on losing his father, had been elected to guard the kingdom and empire of a most pleasant people. The soldiers laid hold of him, and one on his right drew the king towards himself, as though he meant to kiss him; another roughly took him by the left hand and wounded him. The king cried out as loudly as he could, "What do you mean by breaking my right hand?" and quickly leapt from his horse and died. The martyr was taken up by the servants and carried to the house of a certain feeble person, where no Gregorian harmony was heard as his funeral song, but the renowned king of the whole country lay covered with a vile covering, waiting for the light of day. Beholding the evil deeds of these miserable men, the King of Kings willed not that His soldier and chosen viceregent on earth should be left alone for ever, as though he were a wicked man and a criminal, but permitted him to be buried, though not so suitably as He afterwards allowed to be done. At the end of six months, according to the days of the Solar and Lunar years, came the illustrious Duke Aelfhere with a multitude of people, and ordered that his body should be taken up out of the earth; when this had been done they found him naked, and saw that he was as free from any decay or pollution as he was in the beginning. Seeing this, all were astonished, and rejoiced triumphantly in the Lord, Who alone works wonders in the world. Then the attendants washed the body of the revered king, clothed it with new garments, and placed it in a chest or coffin, and noble soldiers, taking the bier upon their shoulders, carried him to a place where they buried him with all honour; and there masses and holy oblations were celebrated for the redemption of his soul by the direction of Aelfhere. When these ceremonies were ended, the madmen who committed the crime asserted that the King of the Heavenly City did not from the exalted throne of His Glorious Majesty see, or saw and forgot, the blood of His soldier which in its innocence had been shed, but thus it happened.

There is much that is apparently contradictory in this account of the murder, and much that does not tally with the other stories, for in the first place it is clearly stated that it was the partisans of Ethelred who rose against Edward, and that they did so while he was on his way to hold an interview with his brother; other discrepancies will be readily noted. The chief point, however, which stands out in this account is the fact that Elfrida is not accused of active participation in the event, the butler obviously presenting the horn of wine. Again, in this story the king was evidently accompanied by some members of his suite, and nothing is said of the hunting episode, which must have been introduced later.

The kiss is a common factor, but it will be observed that it is here stated to have been proffered by one of the soldiers, and the wild ride through the forest dragged by one stirrup has no place.

The humble burial, and the subsequent discovery of the body in an uncorrupt state by Elfhre are duly set forth, together with the subsequent reburial in a more honourable fashion. Without entering into any discussion as to the possibility of the body being in a perfect state of preservation after so lengthy a period, it seems necessary to carefully consider the last paragraph in the story. It is an obscure passage, and except upon one supposition has no meaning. The only interpretation which will meet the case is simply that Elfhre did not find the body which he asserted to be that of Edward anywhere near the spot where those who had been responsible for the murder had concealed it. If this meaning of the paragraph in question be the correct one, it would seem that the true body of Edward the Martyr still lies buried in a lowly grave somewhere on a wild heath in Dorset.

There is yet another possible site that requires very serious consideration, and the story contained in Geoffrei Gaimar's History of the English is so circumstantial that, although it stands absolutely alone, it is worthy of careful analysis. Inasmuch as there is external evidence which tends to corroborate

in an important particular the account which he gives, it is desirable to sift his story of the tragedy thoroughly.

According to Gaimar he obtained most of the facts which he relates from certain books which were placed at his disposal, and it is to be presumed that one or other of these books contained in some form the details relating to Edward's death which he weaves into his own account. The date of the History of the English may be placed between the years 1135 and 1147, and the account of the manner in which Edward met his end begins with the assertion that the king had dined in Wiltshire, and that he had with him a certain dwarf named Wolstanet, who seems to have been an accomplished personage. After dinner (at least this is the presumption) the King, desiring to be amused, called the dwarf to him and ordered him to perform. The dwarf apparently declined, and upon a repetition of the order in milder tones, he seems to have flown into a rage, and used language of an insulting nature towards the king. Edward lost control of his temper, and Wolstanet, mounting his horse, which was standing ready, fled towards Elfrida's house, which is described as being very near Somerset, and either one league distant therefrom, or a similar distance from the spot where the quarrel occurred. In the vicinity there was an extensive wood, and thither the dwarf rode. The king mounted and followed in the same direction, and, without drawing rein, galloped to Elfrida's house. Wolstanet had apparently turned aside to seek shelter in the wood, for when Edward made enquiries no one knew anything of him, but Elfrida offered to send and seek him, maintaining at the same time that he had never come to the house, but asserting the opinion that the search of her servants would be successful.

She then appears to have offered the king refreshment, and after she had complied with his request that she should drink first, Edward drained the horn and returned it to her. Then, says Gaimar, there came some foe, I know not who, and with a great knife smote the king to the heart. Edward fell from the saddle, uttered one cry, and the horse, dragging

the body by the stirrup, fled towards Cirencester. The corpse was found and hurriedly buried afar off on an unfrequented moor, where it was alleged to have been subsequently found, apparently owing to the intervention of a certain wise priest of Donhead. Many miracles were reported from the site of the interment, and ultimately the body was translated to Shaftesbury.

Now the story unfolded here is so circumstantial that it is difficult to believe that it is a pure invention, and if it be borne in mind that Elfrida undoubtedly had property near Sherborne, the site of which would agree almost exactly with the description of the house as being near Somerset and, as I read the sentence, only a league therefrom. At any rate at some date prior to 971, Elfeah, * her relation, had left her by will his property at or near Sherborne, and it is curious that this fact appears to have been overlooked by previous writers. On the other hand it is quite possible that Gaimar or his authority may have also made a mistake, and may have assumed that Elfrida's house at which the murder took place was at Sherborne, simply because they were aware of the fact that she had property in that locality. Curiously enough it is the only spot in Dorset which has been connected with the murder of which this fact can be definitely asserted, the supposition that she had property at Corfe geate or Coryates being supported only by inferential evidence. It may be objected that the nearest part of Wiltshire is too far from Sherborne to render the story probable, but although the distance is about 16 miles, it is not asserted by Gaimar that the ride started in Wiltshire; only that the king had dined there, and as the time of the murder is stated by almost every authority to have been eventide, there is a margin of time which would be of ample duration for the accomplishment of a far longer ride. And again, the description of the site of the burial of the body on a desolate moor afar off, does not

* Birch, Vol. III., p. 432.

in any way conflict with the statement that it was buried at Wareham without any kind of kingly ceremony, and if we can accept the testimony of William of Malmesbury, there are ample grounds for assuming that the king was not buried in hallowed ground.

The story related by William of Malmesbury compares very unfavourably with that told by Geffrei Gaimar, for there are several assertions made by him which are self contradictory. The story set forth in the *Gesta Regum* is to the effect that Edward practically resigned the Royal power into the hands of Elfrida, but that she, desiring the crown for her son, began to meditate a subtle stratagem and to lay a treacherous snare for her stepson, and, according to William of Malmesbury, she accomplished her design in the following manner. One day Edward was returning from the chase gasping with thirst from the exercise, while his companions were following the dogs in various directions. Upon hearing that Elfrida dwelt in a neighbouring mansion, the king proceeded thither at full speed unattended. On his arrival, the chronicler proceeds, Elfrida, alluring him to her with female blandishments, made him lean forward, and after she had saluted him, while he was eagerly drinking from the cup which had been presented, the dagger of an attendant pierced him. Dreadfully wounded, he clapped spurs to his horse and sought to join his companions, when, his foot slipping from the stirrup, he fell, and was dragged through the paths of the wood, while the streaming blood gave evidence of his death to his followers. Moreover, they then commanded him to be ingloriously interred at Wareham, envying him even the holy ground when dead, as they had envied him his royal dignity while living.

Now the first point to be noticed in criticising this account of the murder is the statement that Elfrida began to meditate a subtle stratagem and to lay a treacherous snare in order to encompass the king's death. It is, of course, quite conceivable that this may have actually been the case, but it must be borne in mind that Malmesbury himself says that it was only

upon learning that the Queen lived near a spot where he chanced to be, that Edward proceeded to the house at full speed unattended. Furthermore, he discloses no fact that would warrant the assertion that a stratagem of any sort was employed by the Queen in order to lure Edward to destruction, rather as I read the chronicle, Edward's presence on the fatal spot was the result of pure chance, for even if it were likely that Elfrida foresaw or had information of his presence on a hunting expedition, it is unlikely that she could have arranged that he should lose all his attendants, it is unlikely that she could have arranged that just at the right moment he should have been informed that he was near a house where she was staying, and it is impossible that she should have arranged that he should have felt thirsty. Again, after the dagger had pierced him, Malmesbury maintains that he set spurs to his horse in order to join his companions; but even had this been his intention, how in the first place could Edward have informed anyone of the fact, or how could he have formed the project of joining companions of whose whereabouts he must have been absolutely ignorant? For he had clearly lost all trace of them when he started on the fatal ride towards Elfrida's house.

William of Malmesbury appears to have been solely responsible for the statement that the murder took place at Corfe, for while all or nearly all the previous writers had designated the locality Corfe geate, he boldly makes the statement that Edward was killed at Corfe, which was near the sea and not far from Warham. But it has already been pointed out that Corfe geate was by previous writers asserted to have been the site of the deed, and evidence has been advanced to show that Corfe geate was near Portisham, many miles to the west of Corfe, and the whole connection of Corfe with the site of Elfrida's house, where the murder was accomplished, rests upon the assumption evidently entertained by Malmesbury that Corfe and Corfe geate represented one and the same spot. Now to sum up the question in relation to the site of the murder, there is no evidence that Elfrida had

a house at Corfe ; the murder took place at her house. Corfe geate was probably the name applied to a place or locality now called Coryates, near Portisham, and in one copy of Hovendon, Coryates is given as the site of the murder. Lastly, one account, and one only so far as I am aware, locates the site of the deed at about a league from Somerset, and within a moderate ride of Wiltshire, and strangely enough Elfrida can be proved to have held property at a spot corresponding with practically every circumstance demanded by that account, namely, at Sherborne.

It is now desirable to consider what evidence there is in existence bearing upon the question of who instigated the murder, or, in other words, premising that there was a conspiracy of some kind to bring about Edward's death, who were the conspirators? Now it has already been pointed out that, as far as can be judged from the writings of William of Malmesbury, Elfrida was regarded as the prime mover in the crime, if she did not actually commit the deed. Further it has been pointed out that the events of the fateful afternoon almost precluded the possibility of the circumstances having been previously arranged, and without premeditation there can have been no conspiracy. If there was no conspiracy, Elfrida must be quitted of all blame, and if there was, it does not seem at all likely that Elfrida had any part in it. She was, as I read her character, a woman who was exceedingly unlikely to do a desperately foolish action. It must have been perfectly evident to her that if the king was murdered anywhere near her, that she would be charged with the crime, and, understanding this, as she must have done, it seems little short of folly to believe that Elfrida deliberately lured Edward to the very spot that it was least desirable should be the scene of his murder, namely, her own house. Had there been anything in the nature of a conspiracy and had she taken any part in it, it must have been obvious to all that the residence of the arch-conspirator was the most unsuitable place for the commission of the deed ; always provided that there was any reason for secrecy.

There is one curious detail that seems to have been preserved through all the various accounts, and it consists of the statement that after Edward had found out that Elfrida's house was near at hand, he proceeded thither in haste. This statement is a common factor in practically all the versions; but if his thirst was so great and he was wearied out with hunting, as Malmesbury states, then it does not seem reasonable to assume that his horse could have been in a very good condition; and furthermore, if he had previously entirely lost all his attendants, as Malmesbury asserts, who can have witnessed his furious ride towards Elfrida's house? Clearly none of his own attendants, for he had parted from them, and they only came up afterwards. Obviously, then, there are many points in Malmesbury's version that are very obscure, and there are some that are self-contradictory. But on the other hand, if Edward was really chasing the dwarf Wolstanet, with a view to inflicting corporal punishment, and if, as seems probable, the chase started from a temporary halting place, than it is easily understandable that a description of the incident, and the start, could have been furnished by more than one person, while the details of the finish could probably have been supplied by as many more, while the incident of Wolstanet making for the wood could have been related only by Wolstanet. For if Edward had been aware that the dwarf had made for the wood, he would hardly have enquired of Elfrida whether he was in her house. And if Edward's attendants saw the dwarf making for the wood, the king, who was ahead of them, must have seen him also. Now Edward was, as has been stated, somewhat brutal to his inferiors, and of such a temperament as would no doubt lead him to pursue the object of his anger for a considerable distance, and as the incidents of the pursuit are set forth with such seeming accuracy, it is more than likely that the account came from the lips of the dwarf in the first instance — by no means an improbability, as the latter, if Gaimar is to be trusted, was an accomplished person. Then, too, the description of Elfrida's greeting and the incident of the horn

of wine, all point to an eye witness as having given the account, an eye witness, moreover, who was present at the beginning of the quarrel, who was present during the chase, who knew exactly what Wolstanet, the King, and Elfrida did and said, and who gives a consistent homogeneous story from beginning to end ; but who, be it observed, accuses no one of the actual deed. "Some one, I know not who," are the words applied to the murderer, and if, as seems not unlikely, Wolstanet was the guilty man, it is only natural that he should have refrained from being precise as to the identity of the assassin. It may be pointed out, however, that this particular version of the story is only met with in Gaimar, but too much importance must not be attached to this fact, as other versions of the same kind may have existed and been lost. After a careful consideration then of the facts in so far as they are accurately known, it would seem that the sole evidence for fastening the blame on Elfrida consisted in the fact that she happened to be Edward's stepmother, that the deed was committed near her house, and probably in her presence.

Now in dealing with the next point, that is to say the question of Elfrida's guilt, it is necessary to bear in mind that the actual power seems to have been already in her hands, and that Edward was in any event but a figure head. It is also perfectly true that Elfrida was intensely ambitious, and further that she was smarting under a supposed wrong done her, or rather her son, by the coronation of Edward, whose legitimacy was perhaps doubtful. On the other hand it seems clear that Edgar had designated Edward as his successor while under the influence of Elfrida, and further this choice had been ratified by the nobles, although a strong party supported the queen and Ethelred. Now the point to be considered is whether in any of her other recorded acts there can be found a trace of the merciless ferocity with which she has been credited. One incident, and one incident only, namely, the beating she inflicted upon Ethelred when he made certain allusions to Edward, is the only case that cannot be explained or excused by the fact that she was a woman, and

that one incident may have been grossly magnified in importance.

Bearing all the evidence in mind, there does not seem to be any good and sufficient ground for asserting that she was guilty of the deed laid to her charge, and the fact that it was committed at her house, and in her presence, and in the presence of numerous witnesses, rather tends to prove her innocence than confirm her guilt, for had she desired to achieve the end that resulted, surely she would have employed more subtle means and avoided as far as possible any direct participation in the deed. That there was a conspiracy about this period I will not attempt to deny, but it occurred after the death of Edward and arose out of the incidents attending thereon. I need scarcely remind you of the struggle that took place relating to the question of the regular and secular clergy, but it is desirable that a certain amount of emphasis should be laid upon the fact that the contest between the two orders was a very bitter one. Now as I read the chronicles, Elfrida's party undoubtedly supported the Secular clergy, and it is clear that Elfhære, who was one of her chief adherents and a blood relation, expelled all the monks within his earldom of Mercia. But apparently, after Edward's death, Elfhære changed sides and in their turn the Seculars were ousted. Dunstan, it is to be noted, took no very decided line, though it is to be inferred that his sympathies were with the Regular clergy. Now this change of policy on the part of Elfhære, brought him into direct conflict with Elfrida's party, unless, of course, she had changed her views as well. It must be remembered that she was all powerful during the reign of Edward, and that this authority would continue during the minority of her son Ethelred. Edward was dead, and as a dead king his power for good or evil was at an end, but if it be possible to accept the view that the responsibility for his death could in the remotest degree be connected with Elfrida's name, it follows as a reputed martyr and as a reputed miracle worker, the influence of his sanctity would be very considerable. Therefore, as I

read the history of the period, what happened was this. Elfrida, it was whispered, was interested in Edward's death to a great extent, and the murder had been, in all probability, committed in her presence, but no one would dare to roundly accuse her of the crime, and even if the accusation were made, justice would have been satisfied by a monetary payment to the next of kin, otherwise Elfrida herself. But observe the course of events. Just when Elfhære would have desired to break Elfrida's power, just when the Monastic party were gaining the ascendant, miracles are attributed to the dead body of Edward, and the first hint is given by a member of the Regulars "a priest of Donhead," if we accept Geffrei Gaimar. Forth goes the whole story; the lame, the blind, the halt, and maimed, all flock to the site of the burial on a lonely moor. Then comes Elfhære and, together with Dunstan, he translates the king's body to Shaftesbury, and mark the rumour that circulates. Elfrida's horse is said to have refused to follow the procession. This story was quite enough. Elfrida's power was broken, and the ignorant superstition of the period would complete the object of the conspiracy. Living, Edward was of little account, dead, Edward was of no account, but the fact that his alleged remains had the power of working miracles attributed to them, were supposed to have been discovered by a Regular priest, translated by Elfhære and Dunstan, and caused his memory to be revered as a martyr and a saint, was just the very factor that would settle the dispute between the two parties in the Church, and moreover, would settle it, the very direction which Elfhære, as a convert to the party of the Regulars, would desire. Now let us sum up the conclusions. In the first place the site of the murder was not Corfe Castle; it may, however, have taken place at either Coryates or Sherborne, the latter being the most likely spot if Geffrei Gaimar's account is of any value. In the second place no evidence is in existence which would tend to prove that his death was the result of a deliberate conspiracy, but what evidence there is rather goes to show that it was the direct result of a quarrel with an attendant, and

generally speaking the facts that are contained in the chronicles would support the contention that an attendant was the culprit. If Gaimar's story be accepted, the dwarf Wolstanet certainly appears to have been the guilty party. Again, with regard to Elfrida's guilt, there can be no doubt that the deed was attributed to her, but while she had much to gain for her son by the murder, the facts as stated in no way implicate her in the deed, but rather tend to show that her connection with the tragedy was the result of pure accident.

Lastly, in all the events which occurred after the death of Edward, I seem to see the powerful hand of Dunstan, guiding, directing, conspiring, attaining by any means in his power, the end in view, aided and abetted by Elfhere of Mercia, who, with a convert's zeal, brooked no resistance or opposition to the end which he desired to achieve.

NOTE BY THE EDITOR.

The preceding Paper appeared in the Christmas Number of the *Dorset County Chronicle*, and gave rise to a number of comments, some of which will probably interest our readers.

The evidence upon which the story rests, as received by all our standard historians, may be briefly summarised as follows :—

Accounts of the murder are furnished by William of Malmesbury, Henry of Huntingdon, Roger Hovenden, John Brompton, Roger of Wendover, and the Saxon Chronicle. Of the last-named work five or six copies are extant of an earlier date than the other authorities mentioned : and in three of these copies *Corfe Gate* is specified as the scene of the crime. The "Canterbury" MS. "A" of the Chronicle (completed within 80 years of the event) includes a Latin as well as an English text ; and it tells us that "Edward the King was slain at *Corf geate*"—the Latin version having *in loco qui dicitur, Porta Corf*.

The Castle at Corfe was built by King William upon land acquired from the Abbess of Shaftesbury ; but it is not at all unlikely that the Queen should have occupied a house on the Conventual Manor. The title given to the Castle, *Castellum de Warham*, would describe it as it seemed to Norman eyes,—the fortress commanding the one "gate"

upon the vulnerable side of Wareham, at that time the most important town in Dorset.

"Coryates" (in Roger Hovenden) is merely a variant equivalent of *Corf gate*; and in the absence of any evidence locating it at that period in the Portesham neighbourhood, it may be assumed to indicate the traditional site. It is not likely that the King's body would have been carried to Wareham from a place so distant as the farm now called Coryates.

Gaimer's rhyming "History" was written in Normandy, and coming from the hand of a total stranger to England can hardly be accepted as a rival of the national chronicles.

Several recent writers of high repute uphold the generally-received story. Hodgkin, in his "Political History of England," writes: "There can be no doubt that he [Edward] was foully murdered at Corfe in Dorset. We have no contemporary evidence connecting his step-mother with the crime; but the silence, as all the chroniclers for the next 30 years would be somewhat in fear of Elfrida and her son, cannot be counted as strong evidence in her favour. On the other hand, there is some evidence that Corfe was the place where Elfrida was at the time dwelling with her boy, and all the later historians speak unhesitatingly as to the quarter from whence the blow came.

. . . The misery which fell upon the nation in the long and dreary reign of Elfrida's son is heaven's answer to the cry of the innocent blood."

Sir James Ramsay says "There is no reason to connect his [Edward's] fate with the ecclesiastical question that was dividing the country . . . the few charters of his reign show him enjoying the support of Alphere of Mercia, the leader of the antimonastic party; and to him he was eventually indebted for the honourable sepulture withheld from him by his own people, the men of Wessex." (*The Foundations of England, I., 332.*)

Prof. Ransome writes: "Edward, who was not more than thirteen, became king; but three years later he was murdered by a party which had always been in favour of the accession of his half-brother Ethelred; and Dunstan, though he remained Archbishop of Canterbury, was deprived of all political influence." (*History of England, 67.*)



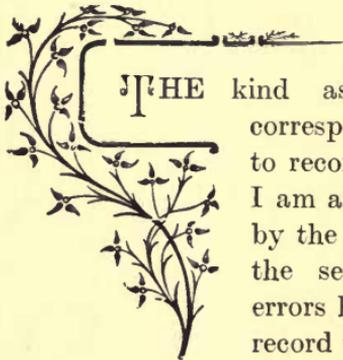


On New and Rare British Arachnids

NOTED AND OBSERVED IN 1911.

By the Rev. O. PICKARD-CAMBRIDGE, M.A., F.R.S., &c.

(Read February, 1912.)



THE kind assistance and work of various correspondents during 1911 enable me to record several species new to science. I am also able to correct some synonyms by the discovery and proper allocation of the sexes in cases where unavoidable errors had been previously made, and to record the discovery of the female in some cases where hitherto the male only was known. I must also mention here that under one name, *Ero thoracica*, Wid. (identical with *Ero furcata*, Villers), we have hitherto mixed up two species, the additional one being *Ero Cambridgii*, Kuleczynski, only now recorded as a British form. The species considered to be new to science are *Theridion salvum*, from Warmwell; *Leptyphantes nigrescens*, Lichfield, Staffordshire; *Bathyphantes explicata*, Kew

EXPLANATION OF PLATE A.

Proc. Dorset N.H. and A.F. Club, Vol. XXXIII., 1912.

Fig. 1.—*Titanceca quadriguttata*, Hahn-Sim.

1. *Cephalothorax*; 2. *profile of ditto*; 3. *Eyes from above and behind*; 4. *Maxillæ, labium, and sternum*; 5. *Spinners*.

„ 1A.—*Protadia patula*, Sim.

1a, *female, Spider without legs*; 2a, *male, eyes from above and behind*; 3a, *left palpus, male, from underneath*; 4a, *ditto from outer-side*; 5a, *metatarsus of 4th pair of legs of female shewing calamistrum*; 6, *genital aperture of female*; 7, *hinder end of sternum*.

„ 8.—*Theridion salvum*, sp.n., male.

8, *right palpus from outer-side*; 9, *left palpus, outer side in front*; 10, *right palpus of Theridion denticulatum, Walck., male, for comparison with fig. 8*.

„ 11.—*Leptyphantès nigrescens*, sp.n., male.

11, *Profile of Cephalothorax*; 12, *eyes from above and behind*; 13, *left palpus from outer-side*.

„ 14.—*Bathyphantès explicata*, sp.n., male.

14, *Right palpus from outer-side*; 15, *portion of ditto from above and behind, shewing form of radial joint*.

„ 16.—*Maro Falconerii*, Jackson, female.

16, *Profile without legs*; 17, *eyes from above and behind*; 18, *genital aperture*; 19, *hinder end of sternum*.

„ 20.—*Maro persimilis*, sp.n., female.

20, *Cephalothorax*; 21, *eyes from above and behind*; 22, *profile of abdomen*; 22a, *genital aperture*.

„ 23.—*Styloctetor morula*, Cambr., male.

23, *profile of Cephalothorax*; 24, *eyes from above and behind*; 25, 26, *left palpus in two positions, shewing form of radial joint*; 27, *coxal joint of fourth pair of legs*; 28, *outer margin of spiracular plate*; 29, *spiracular plate shewing transverse dentiform striation*.

„ 30.—*Ero Cambridgii*, Kulez., male and female.

30, *left palpus, male, digital joint from outer side, directed inwards*; 31, 32, 33, *genital aperture, female, from different examples*.

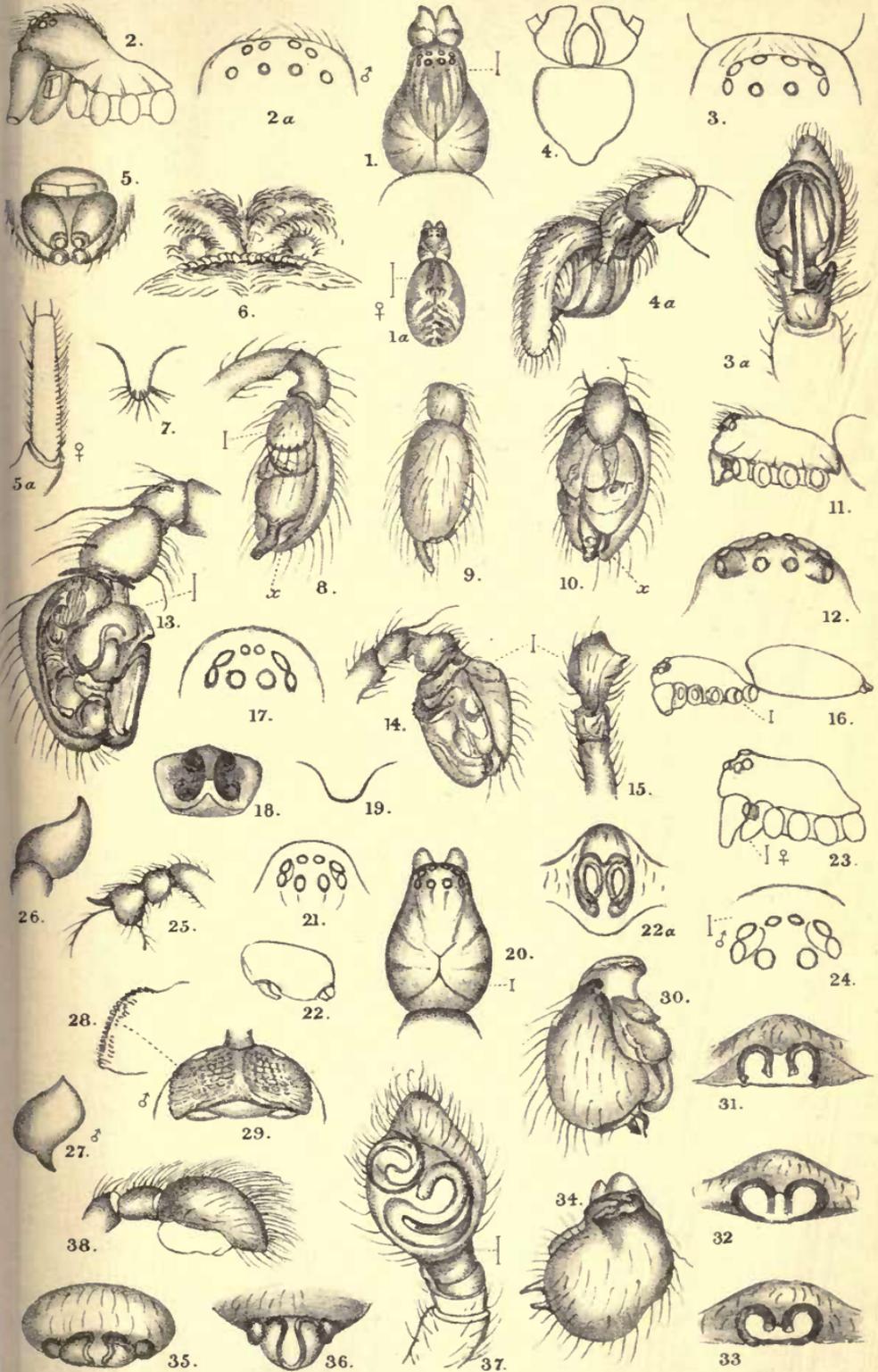
„ 34.—*Ero furcata*, Villers.

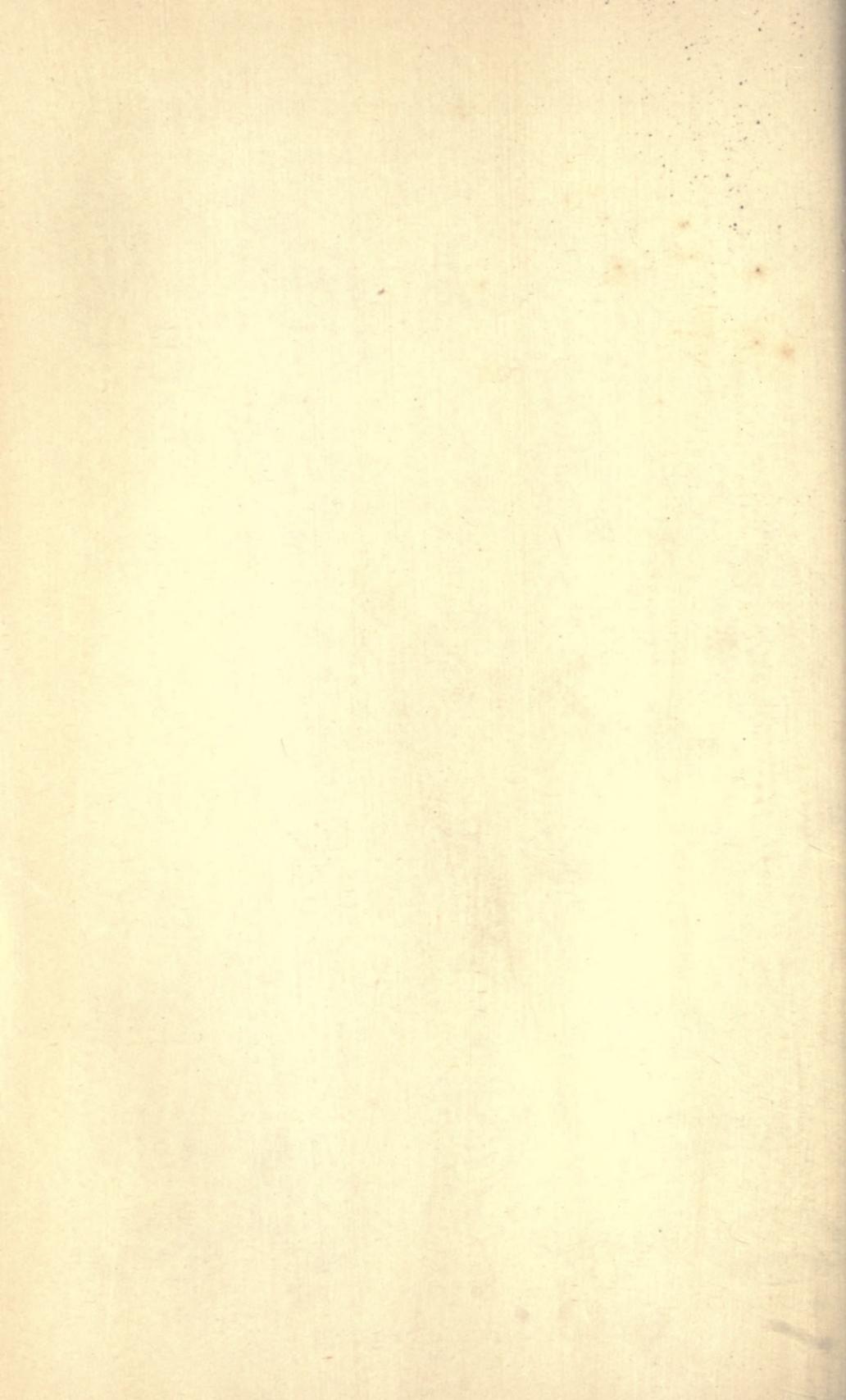
34, *right palpus, male, digital joint from inner side*; 35, 36, *genital aperture, female, from different examples*.

„ 37.—*Euophrys molesta*, sp.n.

37, *left palpus, under side*; 38, *right palpus, outer side*.

N.B.—In all cases the short lines denote the length of the different spiders.





Gardens ; *Maro persimilis*, from Bagenalstown, Ireland ; and *Euophrys molesta*, from near Plymouth. I have also further received from near Plymouth *Titanoeca quadriguttata*, Hahn., which is also, both genus and species, new to Britain.

Further notes will be found, with full descriptions of some of them, upon all the above species in the following pages, as well as upon those cases where one or other of the sexes has been hitherto unknown, or where they may have been erroneously allocated. Almost all the correspondents mentioned in my Paper (Proc. Dorset Field Club, Vol. XXXI., p. 48) have continued to send me materials, without which my study of our British Arachnids would be greatly curtailed ; and my thanks to them all are very sincere.

I would again here refer to the following publications in which further information on some of the species in the following list may be obtained : “ *Spiders of Dorset*,” 1879-81 and the numerous supplemental papers contained in the annual volumes, since published, of the Dorset Nat. Histy. and Antiq. Field Club, 1882-1911 ; *The List of British and Irish Spiders* (Sime and Co., Dorchester, 1900) ; as well as the Monographs on *British Phalangidea* or Harvest Men, and on the *British Chernetidea*, or False Scorpions, published in Vols. XV., 1890, and XIII., 1892, of the Dorset Field Club Proceedings.

Since Vol. XXXII. Proc. Dorset Field Club was printed, several papers upon British Arachnida have appeared, viz. :

“ *On a Spider new to Science recently found in Ireland*,” “ *Irish Naturalist*,” Vol. XX., pp. 28-31, pl. 1, figs. 1-7, 1911. By Dr. A. R. Jackson, M.D., D.Sc.

“ *A List of Spiders Collected at Forres (“ Moray ”) in August, 1910*,” “ *Annals of Scottish Natural History*,” April, 1911, pp. 79-82. By the Rev. J. E. Hull, M.A., Whitfield, Northumberland.

“ *New and Rare British Spiders*,” Trans. Nat. Hist. Society of Northumberland, Durham, and Newcastle-upon-Tyne, n.s. Vol. IV., pp. 42-57, pl. II., figs. 1-17, 1911. By the Rev. J. E. Hull, M.A., Whitfield, Northumberland.

“ *New and Rare Yorkshire Spiders,*” “ *Naturalist,*” Aug., 1911, pp. 283-288, figs. 1-4. By Mr. W. Falconer, Slaithwaite, near Huddersfield.

“ *Keys to the Families and Genera of British Spiders,* and the families’ genera and species of British Harvestmen and Pseudo-Scorpions,” “ *Naturalist,*” 1910, pp. 233-477. By Mr. W. Falconer, Slaithwaite, near Huddersfield.

“ *A Synopsis of the False Scorpions of Britain and Ireland,*” Proceedings of the Royal Irish Academy, Vol. XXIX. Section B, No. 2, pp. 39-64, pl. iv., v., vi., 1911. By Harry Wallis, Kew.

ARACHNIDA.

ARANEIDEA.

Fam. DRASSIDÆ.

Micariosoma minimum, C. L. Koch.

Phrurolithus minimus, C. L. Koch.

Micariosoma minimum, C. L. Koch ; E. Simon, *Arachn. de France*, Vol. IV., p. 277. Dr. A. R. Jackson, M.D., *Lancashire Naturalist*, 1911, p. 385, pl. xii., fig. 1-3.

Adults of both sexes of this spider were sent to me by Dr. A. R. Jackson, M.D., &c., by whom they were found at Box Hill, Surrey, in June, 1911. It is only very recently that this spider has been noted as British ; it is nearly allied to the rather larger and more strongly marked species, *Micariosoma festivum*, C. L. Koch, which is widely dispersed and abundant, and with which the present might easily be overlooked.

Fam. DICTYNIDÆ.

Protadia patula, Sim., pl. A, figg. 1a, 2a, 3a, 4a, 5a, 6, 7.

Lethia patula, Camb. Spid. Dors., p. 470.

Dictyna patula, Sim., Arachn. de France, I., p. 197.

Both sexes, adult, have been sent to me, in June, 1911, by Dr. A. R. Jackson, by whom they were found at Queensberry Ferry, on the river Dee. Until now the female only of this species has been known; examples of this sex have been received from some other localities, as well as from Sussex, where the first known British specimens occurred. The male closely resembles the female in colours and markings. For a fuller description see postea (p. 85).

Titanoeca quadriguttata, Hahn, pl. A, figg. 1, 2, 3, 4, 5.

Titanoeca quadriguttata, Hahn, Simon, Arachn. de France, tom I., p. 215.

An immature male of this spider was sent to me from near Plymouth by Mr. J. H. Keys in 1911. The genus is allied to *Amaurobius*, C. L. Koch, as well as to *Dictyna*, Sund. The example recorded has been examined by Mons. Simon, and, though not adult, is considered by him to belong to this species (*quadriguttata*, Hahn.). I may remark that Mons. Simon, in his latest work, includes *Titanoeca*, Thor., as generically the same as *Amaurobius*, C. L. Koch. At present I have thought it best to keep them apart. (For a description of this spider *vide* p. 87, postea).

Hahnia candida, Simon.

Hahnia candida, Simon-Cambr. Spid. Dors., p. 71.

Adults of both sexes were met with by Dr. Jackson in the Island of Portland in September, 1911. This is the first record of its occurrence since it was found in the same locality by myself many years ago.

Fam. THERIDIIDÆ.

Theridion salvum, sp.n., pl. A, figg. 8, 9.

An adult male, taken at Warmwell by the Rev. R. J. Pickard-Cambridge on iron railings in June, 1911. It is nearly allied to *Theridion denticulatum*, Walek, but may be easily distinguished by the structure of the palpal organs. Sec pl. A, fig. 10. Bösenberg describes and figures ("Die spinnen Deutschlands, pl. ix., fig. 124, p. 101) the male palpi of a spider he calls *Theridium pinastri*, L. Koch, bearing some resemblance in the palpi to the present species, but the spider he represents is I think certainly not *T. pinastri*; at any rate it is quite different from types of *Theridium pinastri* sent to me some years ago by Dr. L. Koch himself; it is also different in the palpi, and in other respects from the spider now described; and even if it were the same, it would need re-naming, Bösenberg's spider not being *T. pinastri*. Bösenberg also, *l.c. supra* describes and figures another allied species (*Theridion braccatum* L Koch—a Tyrolese spider). I have not seen a type of this species, which, though allied to the present, is also, I believe, distinct. (For description of *T. salvum*, vide postea, p. 88.).

Laseola prona, Menge.

Euryopis prona, Menge-Cambr., Spider Dors., p. 481, and Proc. Dors. F. Club, Vol. XIV., p. 151, 1893.

Laseola jucunda, Cambr., Proc. Dors. F. Club, XXIX., p. 170.

Both sexes received from Dr. A. R. Jackson, June 1911, and found in Dorsetshire. A careful comparison of these with the type of *L. prona*, Menge-Cambr., proves the identity of this spider with *Laseola jucunda*, Cambr.

Laseola inornata, Cambr.

Laseola dissimilis, Cambr., female, Proc. Dors. F. Club, Vol. XXVII., p. 84, fig. , Vol. XXVIII., p. 126, and XXIX., p. 170.

The identity of *Laseola dissimilis*, Cambr., female, and the female of *L. inornata*, Cambr., seems to be certain.

Leptyphantes nigrescens, sp.n., pl. A, figg. 11, 12, 13.

The adult male was contained in a collection of spiders received from Dr. Carr, University College, Nottingham, and found by his nephew, Mr. Lancelot Carr, near Lichfield, in 1911. This genus is now very numerous in species, but I believe the present to be quite distinct and hitherto undescribed. In the male sex the form and structure of the palpi and palpal organs furnish the strongest characters for the identification of the species. (For full description see postea, p. 90).

Bathyphantes explicata, Cambr., pl. A, figg. 14, 15.

Bathyphantes explicata, Cambr., Bulletin Roy. Gard., Kew, 1911, p. 370.

Among other spiders received in 1898 from the Royal Gardens at Kew, an adult male was overlooked at the time. I quite believe it to be an indigenous species. It differs from all of this genus known to me in the form and structure of the palpi.

Hilaira nubigena, Hull.

Hilaira nubigena, Hull, Trans. Nat. Hist. Soc., Northumberland, Durham, and Newcastle-upon-Tyne, n.s., Vol. IV., p. 47, pl. ii., figs. 1. 4, 5, 6, 7, 13, 1911.

Both sexes of this very distinct new species and fine addition to our British List were received from the Rev. J. E. Hull, by whom they were discovered at Killhope Lane, Northumberland, in 1910 and 1911.

(?) *Oreoneta fortunata*, Cambr.

Tmeticus fortunatus, Cambr., Proc. Dors. Field Club, Vol. XVI., p. 123, pl. A, fig. 6, and XXV., p. 104.

An adult male of this still rare spider, found at Warmwell Rectory, was received in June, 1911, from the Rev. R. J. Pickard-Cambridge.

***Gongylidiellum faustum*, Cambr.**

Sintula fausta, Cambr., Proc. Dors. Field Club, Vol. XXXI., p. 53.

Monsieur Eugène Simon having examined typical examples of this species considers them to belong to the genus *Gongylidiellum*, Sim., and to be nearly allied to *G. placidum*, Sim., Arachn. de France, Vol. V., p. 603, fig. 419.

***Microneta sublimis*, Cambr.**

Neriene sublimis, Cambr., Spid. Dors., p. 491.

Neriene morula, Cambr., Spid. Dors., p. 494 (female only).

The spider described as the female of *Neriene morula*, l.c. supra, proved to be the female of *Microneta (Neriene) sublimis*, Cambr., l.c., p. 491.

***Maro Falconerii*, Jackson, pl. A, figg. 16, 17, 18, 19.**

Maro Falconerii, Jackson, Trans. Nat. Hist. Soc., Northumberland, Durham, and Newcastle-upon-Tyne, Vol. III., part I., p. 15, pl. iv., figs. 16-20.

An adult female (set aside at the time of capture for further examination) was found by myself at Hoddesdon, Hertfordshire, many years ago; and another female received from Dr. Jackson in 1901 was taken by him at the Lakes in Cumberland.

(?) *Maro persimilis*, sp.n., pl. A, figg. 20, 21, 22, 22a.

Although differing slightly in the form of the cephalo-thorax, when looked at from above and behind, and in some other respects, at present I include this minute spider in the genus *Maro*; its species is certainly distinct from either of the two already described (*Maro minutus*, Cambr., and *M. Falconerii*, Jackson). It was found and sent to me in 1909 by Mr. D. R. Packe Beresford, Fenagh House, Bagenalstown, Ireland. Possibly this spider may, when the male is discovered, be found to belong more properly to a closely allied genus, *Gongylidiellum*, Sim. (For description see p. 91, postea.

Diplocephalus latifrons, Cambr.

This species has again occurred at Bloxworth during the past summer, an adult male having been found by A. E. Ll. Pickard-Cambridge. It appears to be a much more abundant spider in the north of England.

Entelecara Thorellii, Westr.

Adults of both sexes were received from the Rev. J. E. Hull, Northumberland, where it appears to be plentiful, see Trans. Nat. Hist. Soc., Northumberland, Durham, and Newcastle-on-Tyne, n.s., Vol. IV., p. 49, 1911.

Styloctetor morula, Cambr., pl. A, fig. 23—29.

Neriene morula, Cambr., Spid. Dors., p. 494 (male), and Trans. Lnn. Soc., p. 545, pl. xlvii., fig. 16 (male).

Sintula morula, Cambr., Brit. and Irish Spid., p. 36 (male).

Styloctetor uncinus, Cambr. (male), Proc. Dors. F. Club, XXVI., pp. 51, 65, pl. A, figs. 22-25.

I had long been aware that *Sintula* (*Neriene*) *morula*, Cambr., belonged to the genus *Styloctetor*, or close to it.

and that the female was most probably that of some other spider ; but it is only recently that, on the suggestion of Dr. Jackson, I find, by comparison of the types, that *S. morula*, Cambr. (the male only), is identical with the male of *Styloctator uncinus*, Cambr., the latter first taken by Dr. Jackson on Scafell Pike, Cumberland (see l.c. supra). The female of *Sintula (Neriene) morula* is undoubtedly that of *Neriene sublimis*, Cambr., Spid. Dorset, 491, and Proc. Berwickshire N. H. Club, Vol. VII., p. 314, 1875.

(?) **Cnephalocotes incurvatus**, Cambr.

Tapinocyba incurvata, Cambr., Spid. Dors., p. 503, Proc. Dor. F. Club, Vol. XXX., p. 106.
Cnephalocotes incurvatus, Cambr., J. E. Hull, Trans. Nat. Hist. Soc., Northumberland and Durham, n.s., Vol. IV., 1911, p. 57, pl. II., fig. 10, female.

This spider seems to me to be out of place in the genus *Tapinocyba*, and to be nearer to *Cnephalocotes*, Sim. The male only has been hitherto described. The Rev. J. E. Hull, however, sent to me some time ago a female spider as, conjecturally, belonging to this species, and he has now recently described and figured dissections from another specimen which he considers to be identical (see l.c. supra), from the coast of Northumberland. This seems to be most probably, as conjectured, the female of *C. incurvatus*, Cambr., and Mr. Hull's figure agrees well with the specimen he sent to me.

Panamomops bicuspis Cambr.

Panamomops bicuspis, Cambr., Proc. Dors. F. Club, Vol. XIV., p. 154.

Adults of both sexes were found at Warmwell on iron railings, and brought to me by the Rev. R. J. Pickard-Cambridge in April, 1911. It is a minute spider, but an

exceedingly remarkable and unmistakable one. It is widely distributed, but so far as known still a rare species.

Tigellinus furcillatus, Menge.

Wideria nigriceps, Cambr., Proc. Dors. F. Club, Vol. XIV., p. 157 (and other references there quoted).

I have never until lately been able to identify satisfactorily any male spider of which *W. nigriceps* might be the female. My son, A. E. Ll. Pickard-Cambridge, has, however, found female examples lately at Bloxworth, and with them the male of *T. furcillatus*, Menge. From these I have come to the conclusion that *W. nigriceps*, Cambr., is undoubtedly the female of *T. furcillatus* Menge.

Ceratinella scabrosa, Cambr.

An adult male on iron railings, Bloxworth Rectory, taken by R. J. Pickard-Cambridge, May 17, 1911.

Fam. MIMETIDÆ.

Ero tuberculata, Degeer.

Ero tuberculata, Degeer, Cambr., Proc. Dors. F. Club, 1911, Vol. XXXII., p. 42.

An adult male taken by Dr. Jackson on Bloxworth Heath, September 26th, 1911, close to the spot where many years ago (September, 1878) an example of the same sex was found by myself: since then, besides the present record, it has only been found here once (vide l.c. supra). The egg-cocoon has, however, been found by myself, though at some distance from the above locality. (See Proc. D. F. Club, XVIII., pl. A, fig. 7.) It appears to be not only a very rare but also a very local species.

Ero Cambridgii, Kulcz, pl. A, figg. 30, 31, 32, 33.

Ero Cambridgii, Kulcz, Revue Suisse de Zoologie, Tom 15, fasc. I., 1907, p. 125 pl. ii., figs. 78, 81, 82.

Ero thoracica, Wid.-Cambr., Spid. Dors., p. 233, ad partem.

Theridion variegatum, Bl., Spid. G. B. and Ir. p. 203, (ad partem).

Professor Kulczynski informs us that some years ago he received from the late F. O. P.-Cambridge a spider under the name of *Ero thoracica*, Wid. (*Theridion variegatum*, B.l), which he (Dr. Kulczynski) considered to be new to science, and that he had described it under the name *Ero Cambridgii* (l.c. supra). It appears on examination that we have two species in England under the name of *E. thoracica*, Wid., and the recognition of these two adds a fresh species to the British List. I find both species mixed in my collection from various localities, chiefly in Dorset. The two are exceedingly similar in general character and appearance, but differ, among other characters, in the form of the palpi and palpal organs of the male, and in the form of the epigyne in the female.

I have lately received an adult male *E. Cambridgii* Kulcz., from Mr. Lancelot Carr, taken near Lichfield, Staffordshire.

Ero furcata, Villers. pl. A, figg. 34, 35, 36.

Aranea furcata, Villers-Sim., Arachn. de France, V., p. 36.

Ero thoracica, Wid.-Cambr., Spid. Dors., p. 233, ad partem.

Theridion variegatum, Walck-Blackw., Spid. of B. and Ir., p. 203, ad partem.

What the true synonyms of this species may be, it is not easy to say, unless we had types or authentic typical examples of some other nearly allied species described

by various authors, for comparison ; at any rate the present and the preceding (*Ero Cambridgii*, Kulcz.) comprise, so far as we know, the two species hitherto recognised as *Theridion variegatum*, Bl. (or *Ero thoracica*, Wid.-Cambr.). Both seem to be about equally abundant as far as my experience goes, and widely distributed. In the absence of any types of Mr. Blackwall's *Ero* (*Theridion*) *variegatum* it is of course impossible to say with absolute certainty which of our two now acknowledged forms he had before him ; it is possible that he had both ; but as Prof. Kulczynski has certainly separated *Ero Cambridgii* by well marked characters, it creates less prospective confusion to conclude that our now remaining form is the present *Ero furcata*, Villers (*Theridion variegatum*, Bl.), ad partem, (female) ; *E. thoracica*, Wid.-Cambr., ad partem.

Epeira dromedaria, Walck.

Epeira dromedaria, Walck-Cambr., Proc. Dors.
F. Club.

Adults of both sexes of this fine and very distinct *Epeira* were received in June, 1911, from Dr. A. R. Jackson, M.D. ; by whom they had been then lately taken at Burnham Beeches, Buckinghamshire. The male had not before been found in England.

Fam. THOMISIDÆ.

Xysticus robustus, Hahn.

Xysticus robustus, Hahn.-Cambr., Spid. Dors.,
p. 305 ; Proc. Dors. F. Club, Vol. IV., p. 153.
and Vol. XXXII., p. 43.

An immature female of this fine and rare species was found among heather on Bloxworth Heath on August 10th, 1911, by Rev. R. J. Pickard-Cambridge.

Philodromus prædatus, Cambr.

Philodromus prædatus, Cambr., Spid. Dors.,
p. 332.

An adult, well characterized male, was found at Bloxworth Rectory at the beginning of June, 1911, by A. E. Ll. Pickard-Cambridge. It seems to be doubtful whether this spider is more than a variety of *Philodromus aureolus*, C. L. Koch, of which several varieties are recognised by Continental authors. Mons. Simon considers it to be a good species. But I have never yet met with any female which I could certainly distinguish from those of *P. aureolus*, C. L. Koch, an abundant species here and in numerous other English localities.

Fam. LYCOSIDÆ.**Trochosa robusta**, Sim.

Lycosa robusta, Sim., Arachn. de France, Vol.
III., p. 286.

Trochosa robusta, Sim.-Cambr., Proc. Dors. F.
Club., Vol. XVI., p. 119, and Vol. XVIII.,
p. 112.

The Rev. J. E. Hull tells us that Mr. J. W. H. Harrison has lately met with examples of a *Trochosa* on the Cleveland Coast of Yorkshire, which on comparison with types of *F. robusta*, Sim. (taken by Dr. A. R. Jackson at Swanage in 1911), prove to be of that species. This species, as British, has only been before recorded in Dorsetshire.

Tarentula fabrilis, Clerck.

Adult males were found by Dr. A. R. Jackson on the 26th of September, 1911, on Bloxworth Heath. This fine

and conspicuous Lycosid has only as yet been taken, as British, in this Dorset locality.

Lycosa postuma, Cambr.

Trochosa postuma, Cambr., Proc. Dor. F. Club,
Vol. XXVI., pp. 55-70, pl. B, figs. 25, 26.

An adult female was sent to me by the Rev. J. E. Hull ; it was found in September, 1910, at Forres, N.B. This species was inadvertently described, l.c. supra, as a *Trochosa*. (For a description of this spider see postea p. 92.)

Lycosa agricola, Thor.

Lycosa agricola, Thor.-Cambr., Spid. Dors.,
p. 598.

A very distinct and interesting variety of this species was sent to me some little time since by the Rev. J. E. Hull, who tells me that it is confined to the coast of Northumberland by Holy Island. This variety is chiefly remarkable for the almost complete absence of the hoary hairs with which the normal form is covered, and which usually conceals the characteristic pattern of the spider.

Fam. SALTICIDÆ.

Euophrys molesta, sp.n., pl. A, figg. 37, 38.

An adult male was sent to me in April, 1911, by Mr. J. H. Keys, by whom it was found at Whitsand Bay, near Plymouth. It seems to be allied to *Euophrys baliola*, Sim. (Arachn. de France III., p. 192), and also to *E. frontalis*, Walck ; but believing it to be distinct from both, I have here described it as a sp.n.) See description postea p. 93.)

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***Protadia patula*, Sim.**

Adult female, length 1 3-4th lines.

Cephalothorax considerably longer than broad ; caput very broad and almost squarely truncate at its fore extremity ; lateral marginal impressions at caput strong ; profile well raised at caput, and depressed posteriorly ; colour yellow brown, caput much deepest, and furnished with coarse hoary hairs on the ocular area ; the normal indentations and grooves are well indicated by converging dark yellowish brown lines.

Eyes of moderate size, and of no greatly differing size ; the hinder row has its slight curve directed forwards ; the quadrangle of the four central eyes is rather broader than

long, and its fore side shorter than the hinder side. The interval between the hind-central eyes is less than that between each and the hind-lateral next to it.

Legs moderate in length and strength ; 1, 2, 4, 3 furnished with hairs only on (so far as could be observed) two small ones at the inner side of the fore extremity of the metatarsi of the third pair. The fourth pair have a long celamistrum on the outer side of the metatarsi, which last were also furnished thickly with short stray hairs underneath ; the metatarsi of the other pairs also are more or less similarly furnished with hairs. The colour of the legs is a uniform yellow brown.

Palpi similar to the legs in colour.

Falces strong ; roundly prominent at their base in front ; and similar in colour to the caput.

Maxillæ strong, straight, only slightly inclined to the labium and slightly obliquely truncate at their extremity.

Labium oblong, truncate at the apex, about two-thirds the length of the maxillæ ; colour (as also of the maxillæ) yellow brown.

Sternum roundish-heartshape hollow truncate, pointed before ; colour, pale yellow-brown.

Abdomen of ordinary obtuse and oval form ; the genital aperture much concealed by coarse hairs, but of characteristic form (see fig. 6) ; and there is a transverse *cribellum* in front of the spinners. The colour and markings had entirely gone from * the specimen above described before its particulars were noted.

The following is taken from an adult female found by Dr. Jackson on the banks of the river Dee, in Cheshire, and which I feel no doubt is of the same species : " On the upper side is a dark black-brown longitudinal central basal marking of rather indefinite shape, but pointed behind, and enclosed by an obscure pale curved whiteish line on each

* It may be remarked that the colours of all parts of this specimen had become much faded and almost obliterated.

side, followed towards the spinners by a series of angular bars or chevrons indicated by their intermediate spaces, being clothed with hoary hairs, the general colour of the abdomen being dark yellowish-brown. This pattern might thus well be described as having the *chevrons* of a hoary colour."

An adult male received also from Dr. Jackson agreed with the above description, and the *palpi* are of very characteristic form. (See fig. 3a.) Although as yet a rare and little known species, the present will probably be found not uncommon when properly worked for.

***Titanoeca quadriguttata*, Hahn. (1831, sub. *Theridion*).**

Titanoeca quadriguttata, Hahn.-Simon (Arachn. de France I., p. 215).

Immature *male*, length 1 1-3rd lines.

This spider closely resembles an *Amaurobius* in general form and structure; the example under consideration appears to be about half the size of an adult of the same sex. The *Cephalothorax* is dark yellow-brown, and longitudinally striped with black-brown lines; the caput paler; the ocular region is clothed with long coarse white adpressed hairs; viewed in profile the caput is considerably raised above the level of the thorax.

Eyes in two transverse lines, rather small, and not greatly differing in size; the posterior row has its slight curve directed backwards, that of the anterior row is directed forwards; those of each lateral pair are separated from each other, and the four centrals form a square.

Legs moderate in length and strength; 1, 4, 2, 3 furnished with hairs only; no spines; colour pale dull brownish yellow, more or less of the anterior portion of the joints dark brown, giving them an annulated appearance. The femora are almost or altogether dark coloured, and there is a long conspicuous calamistrum on the metatarsi of the fourth pair.

Palpi moderately long, undeveloped, but the digital joint of large size. Similar in colour to the legs.

Falces long and strong, similar to the caput in colour, and near fore surface seems to be covered thickly with minute granulations.

Maxillæ rather long, strong, straight, a little inclined to the labium, obliquely truncate at their extremity, and similar to the falces in colour.

Labium oblong, about half the length of the maxillæ, and like the sternum in colour.

Sternum dark brown, of ordinary form.

Abdomen black, with obscure traces of some whitish markings on the upper side, but no pattern was traceable. In front of the ordinary spinners is the transverse one (or *Crivellum*), rather dark, and subdivided; this is always found, correlated with the *Calamistrum* on the metatarsi of the fourth pair of legs (though in the *adult* males one or both these portions of structure are either absent altogether or are very difficult to trace).

In the absence of adult examples it is impossible to be quite certain as to the species of this spider. Its occurrence in Devonshire is of much interest; and I feel very little doubt but that by careful search, where it occurred, it would turn up pretty frequently. The usual habitat of these spiders is under pieces of wood or stone or other shelter in dry places; perhaps dried sea-weed along the coast, left by high tides and storms, would be a likely situation to find it in. As noted above (p. 73) M. Simon now includes this genus under "*Amaurobius*."

***Theridion salvum*, sp.n.**

Adult female length, 1 line.

Cephalothorax of normal form; colour, dull yellowish brown; caput and a tapering band thence to the posterior margin suffused with black-brown; and a narrow marginal border of the same hue with indications of brown converging lines on the sides.

Eyes of central quadrangle form a square ; the fore pair largest, the interval between those of the hinder pair rather more than a diameter.

Legs moderate in length and strength, 1, 2, 4, 3, anterior pair much longest ; colour pale dull yellowish, clearest on the femora ; the other joints somewhat suffused with duller yellowish ; banded faintly with dark brown, chiefly at the extremities of the joints ; furnished with hairs, bristles, and a very few long slender spine-like bristles.

Palpi short, similar to the legs in colour, and of the ordinary *Theridion* form, Digital joint of moderate size ; obtuse oval in form ; palpal organs well developed, but not complex ; the most noticeable process is a projecting one of a somewhat cylindrical form, issuing from their anterior extremity (see figg. 8, 9).

Maxillæ, Labium, and Sternum normal, dark brown the latter, tinged with yellowish, and furnished with long, curved, bristly hairs.

Falces normal ; colour yellow-brown.

Abdomen oval ; moderately convex above, of a dull luteous ground colour, thickly spotted with variously-shaped small spots of black and white, among which, under a lens of low power, may be traced a longitudinal series of transverse curved white lines running over and down the sides and a broken central longitudinal very obscurely dentated band, with a transverse curved white bar round the fore extremity. The whole abdomen is covered on the upper side with long bristly black hairs. The greater part of the fore half of the under side consists of a coriaceous dark yellow-brown plate, rounded and rather prominent behind and somewhat striated on its surface. The rest of the under side is also dark yellowish brown, and devoid of spots or markings. Halfway, however, between the coriaceous plate is a strong transverse fold or impression, but whether merely a fold in the epidermis or connected with any orifice or not could not be ascertained.

This spider is allied to *Theridion denticulatum*, Walck, but independently of other differential characters, in the abdomen,

&c., the projecting process at the extremity of the palpal organs distinguishes it readily. It was found by the Rev. R. J. Pickard-Cambridge on iron railings at Warmwell Rectory at the middle of June, 1911.

Leptyphantes nigrescens, sp.n.

Adult male length 1 2-3 line (of another example 1 1-8).

Cephalothorax of ordinary form, longer than broad; caput broadly truncate at the fore extremity; lateral constriction at the thoracic junction slight; looked at in profile, the upper marginal line throughout is on the same level and slightly curved, the hinder slope not steep, and slightly curved; only a small impression at the thoracic junction; the height of the clypeus is about equal to half that of the facial space, and the former is much impressed below the anterior eyes and prominent at the fore margin. *Colour* yellow-brown, the caput, normal indentations, and grooves, black brown.

Eyes of moderate and not greatly different size; the fore-central and two lateral pairs are seated on strong tubercular prominences; the three groups forming a transverse figure and occupying the whole width of the caput; the four centrals form a quadrangle rather longer than broad, the anterior side shortest. The posterior row is not quite straight, the convexity of its curve being slight and directed forwards; its two central eyes are nearer together than each is to the lateral on its side.

Legs long, rather slender, 1, 2, 4, 3, of a dull pale yellow-brown colour, the anterior joints slightly suffused with a darker hue. There are several spines on the tibiæ of the two fore pairs, and two or three on the metatarsi, one on the outer, another on the inner side, and one nearer the extremity. This last armature seems abnormal for *Leptyphantes*, the ordinary number on the metatarsi being one only.

Palpi yellow-brown, suffused with a darker hue; short; the radial joint stronger and longer than the cubital, and expanding at its fore extremity; a long, straight, slender tapering spine at the fore extremity on the upper side of the cubital, and another not quite so long near the fore extremity on the upper side of the radial joint. These spines are straight or slightly curved. The digital joint is of moderate size, and the palpal organs are well developed and rather complicated; the precise form and position of the processes can only be understood from the figure 13.

The *falces* are long, strong, slightly divergent at their extremity but not projecting, and are of a dark black-brown colour. The *maxillæ*, *labium*, and *sternum* are normal, and similar in colour to the falces.

The *Abdomen* is oblong-oval; black; thinly furnished with short, fine hairs; and apparently without markings, or if any, only slight traces of a longitudinal pale whitish broken line or stripe on each side.

This fine species, which I believe to be undescribed, was sent to me in a collection of spiders from near Lichfield, by Mr. Lancelot Carr in 1911.

? *Maro persimilis*, sp.n.

Adult female, length 1 18th of an inch (2-3 line).

Cephalothorax considerably longer than broad, rounded at its fore extremity; its profile slightly convex at the caput, with a slight dip to the thoracic junction, and the hinder slope is long, moderately steep, and with a slight dip at its upper end; the clypeus is equal in height to half that of the facial space. Colour dull brownish yellow; the normal grooves and indentations are marked by dusky yellow-brown converging lines; marginal line brown.

Eyes of moderate size; on black spots in two transverse rows forming a semi-circle, whose convexity is directed forwards; the very slight convexity of the hinder row is

directed backwards; each lateral pair is seated on a low tubercle; the quadrangle formed by the central four is rather broader than long; its fore side much the shortest, and the eyes of this side are much the smallest of the four; the size of the rest is nearly or quite equal; the interval between the hind-central pair is rather greater than that between each and the hind lateral next to it. Excepting the fore-centrals, which are dark coloured, all the rest are of a bright pearly white.

Legs of moderate length and strength, apparently 4, 1, 2, 3, furnished with hairs, a very few spiniform bristles, and a long slender prominent spine from the upper side of the tibiæ of the fourth pair. The colour of the legs is like that of the *cephalothorax*.

Palpi similar in colour to the legs.

Falces rather strong, straight, vertical, similar in colour to the *cephalothorax*.

Maxillæ short, strong, similar in colour to the legs, inclined to the labium, which last is very short, blunt pointed at the apex, not more than half the length of the maxillæ, and impressed across the middle.

Sternum large, as long as broad, truncate before, drawn into a broad point at its hinder extremity, and of a dull yellowish colour clouded with brown.

Abdomen (rather mutilated) somewhat oblong-oval, and of a dark dull blackish hue. The genital aperture formed by a long very characteristically shaped process (see figure 22*a*). Received from Mr. D. R. Packe Beresford, Fenagh, Ireland. genus appears doubtful.

Lycosa postuma, Cambr.

Trochosa postuma Cambr. Proc. Dor. F, Club
XXVI., pp. 55, 70, pl. B, figg. 25, 26.—
1905.

Owing to the specimen from which the type of this species was described having lost its colours and markings before

description, those characters were to a great extent unreliable. The specimen, however, now received from the Rev. J. E. Hull agrees with the type in the more important points of structure, and enables me to give a better idea of its colours and markings. In the present example the lateral bands on the *cephalothorax* are deep brown, and the *caput* is suffused with black brown. The *legs* are bright and rather orange-yellow, strongly and, excepting the tarsi, distinctly annulated with black. The *palpi* are similar in colour and markings to the leg. The *abdomen* is deep brown, the fusiform central marking on the fore half of the upper side is of a dark yellow-brown margined with black; the ordinary Lycosid markings (of oblique lines or circumflex markings on the hinder part) are only indicated by a row on each side of obscure pale spots. The *sternum* is black.

The specimen above described was taken at Forres, N.B., and kindly sent to me by the Rev. J. E. Hull, of Whitfield, Northumberland.

The type of *L. postuma* was, by an oversight, described (*l.c. supra*) as a *Trochosa*.

Euophrys molesta, sp.n.

Adult male, length 1 1-2 lines.

Cephalothorax longer than broad, and well elevated; the profile forms an even curve from the ocular area to the beginning of the posterior slope, which is straight and tolerably steep, an angle of 45deg.; sides (viewed from above) subparallel. The ocular area occupies the whole width of the *caput*, and is much wider than long (about double the length); colour black-brown; *caput* darkest; the whole furnished with a mixture of black and hoary hairs; the black hairs at the fore margin and sides of the *caput* are longest.

Eyes of the front row evenly separated, and form a line equal in length to that of the third row; the small intermediate eye on each side (forming the second row) is equally

distant between the fore lateral and the hind lateral eye, and is in a straight line between them; the ocular area is distinctly wider than long. The eyes of the anterior row have some yellow scaliform hairs encircling them and black bristly hairs about them. The lower margin of the clypeus is furnished with a dense fringe of strong, bright yellowish hairs, and the four central eyes are double the size of the fore-laterals.

Legs 4, 3, 1, 2, short, strong; those of the first and second pairs are black, excepting the tarsi, which are pale yellowish white; those of the third and fourth pairs are of a lighter black brown, with a somewhat linear-striate appearance on the femora and tibiæ, the tarsi being similar in colour to those of the first and second pairs. The undersides of the tibiæ and metatarsi of the first and second pairs are densely furnished with strong bristly black hairs and some strong spines, whose number and nature I could not satisfactorily ascertain. There were also a few spines on the tibiæ, tarsi, and metatarsi of the third and fourth pairs.

Palpi short; radial and cubital joints yellow-white clothed with white hairs; a slight fringe of the same is directed inwards at the fore extremity of the radial joints on the inner side; the digital joints are of moderate size, white with a slight yellowish tinge, and clothed with white hairs; palpal organs much like those of *E. frontalis*, Walck.

Maxillæ and *labium* black-brown, tipped with pearly white.

Sternum black-brown.

Abdomen short-oval, black-brown, composed of numerous black-brown striæ on a yellow-brown ground, but I could trace no distinct pattern; the whole is densely clothed above with strong hairs, white in front and on the sides, and mixed with dark hairs; those on the central portion, especially, reflecting a strong golden hue along the upper side. The inferior spinners are black above, the rest deep brown; under side black-brown, obscurely marked with yellow-brown laterally and along the middle. An immature female, taken at the same time and place resembled the male excepting in the legs. These were of a uniform pale yellowish white, distinctly and

evenly annulated with black rings ; and the abdomen had on each side a narrow whitish irregular longitudinal line.

This spider is allied to *Euophrys frontalis*, Walck., but the complete absence of the long, very conspicuous and characteristic group or tuft of long shiny white hairs from the cubital joints of the palpi and extending over the digital joint, distinguishes it at once. There are also several other marked differences. It seems to be allied to *Euophrys baliola*, Sim. (a Corsican species), as well as to *Euophrys frontalis*, Walck. ; it was taken by Mr. J. H. Keys near Plymouth in the spring of 1911.





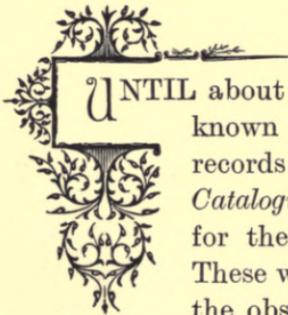
Contributions to a Flora of Portland,

WITH SPECIAL REFERENCE TO

LIMONIUM RECURVUM, *C. E. Salmon.*

By **W. BOWLES BARRETT.**

(*Read Dec. 5th, 1911.*)



UNTIL about 55 years ago, comparatively little was known of the flora of Portland. Some scanty records had come down to us in Dr. Pulteney's *Catalogue of Dorset Plants*, probably compiled for the most part, between 1765 and 1785. These were augmented, from time to time, by the observations of occasional visitors to the Island. The first edition of the late Mr. Mansel-Pleydell's "*Flora of Dorsetshire*" was published in 1874, and the 2nd Edition in 1895. He made fairly frequent visits to the Island. My own observations of Portland plants have extended, at intervals snatched from a busy professional life, over a period of about 37 years. The Island has now been well worked. This is one of innumerable instances of

the immense advance made during the last half-century, in investigating the geographical distribution of vegetation in the British Isles.

I contributed to the Club in 1905 a Paper on the Flora of the Chesil Bank, including the shores of the Fleet, from Abbotsbury to the mouth of the Fleet called Smallmouth. (a) The present Paper gives the result of the examination of the coast line in continuation from Smallmouth southwards to the Bill of Portland.

The geographical position and geological formation of Portland supply congenial conditions for a large proportion of our maritime plants, but we naturally miss most, but not quite all, of the species of the Heaths and Woodlands, and of aquatic and paludal plants; the ferns, too, are but few.

The native flora has suffered much in recent years by interference with the old Common, the construction of the Government Works on the Verne and in the Mere, the making of the Easton and Church Hope Railway through the most romantic part of the Island, and by extensive quarrying operations, especially on its south-eastern side. The efforts of the quarrymen have destroyed the beautiful Maiden-hair Fern, dozens of specimens of which, bearing fronds 4 to 5 inches long, I found, in 1877, in the crevices of a sunny Portland cliff. Thirty years ago, some of the Islanders used to grow in pots native specimens. The desirability of recording native plants, the knowledge of the past existence of which might otherwise be lost to science, may be mentioned as one proof of the value of local floras.

In relation to the British Flora generally, the following are the rarest Portland plants:—*Polycarpon tetraphyllum*, Linn., *Sedum rupestre*, Linn. var. *minus*, Syme, *Valerianella eriocarpa*, Desv., *V. dentata*, Poll, var. *mixta*, (Dufr), *Hieracium platyphyllum*, Ley, *Limonium recurvum*, C. E. Salmon and *Muscari racemosum*, Lam. & D C. Other

(a) *Proc. Dors. N.H. and A.F. Club*, Vol. 26, p. 251.

rare plants are enumerated in the catalogue at the end of this Paper.

As regards the plan of the following Flora, I have adopted the nomenclature of the 10th Edition of *The London Catalogue*. The area under review I have divided into two botanical districts, both comprised within the civil parish of Portland. District I. comprises the sandy tract and the two beaches lying between Smallmouth and Chesil. This is classic ground for the botanist and furnishes some of the rarer plants. District II. embraces Portland proper. To save space, where there is more than one species in a genus, the name of the latter is not repeated in full, the initial letter only being given, as *R. hederaceus* for *Ranunculus hederaceus*. Synonyms are supplied only when thought to be needed. The initial letter or abbreviation immediately following the Latin name of each species stands for the name of the botanist who first so named the species. I am responsible for all localities followed by a full stop. Those given on other than my personal authority are followed by a semi-colon, and the authority is printed in italics. In some cases where I have myself seen a specimen in a locality recorded by another, I have placed this sign (!) after the record.

The following abbreviations have been used:—Com., Common; Freq., Frequent; Cult., Cultivated; Flo., Flora.; Var., Variety; Obs., Observation; F., G. E. Fulleylove.

I am greatly indebted to Mr. G. E. Fulleylove, who has resided for many years in the Island, for numerous records of localities and other valuable assistance kindly supplied. His observations have extended from 1906 to 1911.

I mentioned just now, as occurring in Portland, the Recurved Sea-Lavender, *Limonium recurvum*, C. E. Salmon. This is a plant which we highly prize on account of its extreme rarity, there being, in fact, no certain record for it from any other part of the world. It belongs to the Natural Order Plumbaginaceæ, of which the common Thrift or Sea-pink is the most familiar British example. It is a beautiful



C.E. Salmon del.
S.C. Hendrey htd.

West, Newman imp.

Limonium recurvum.

plant; the spikes of the purple flowers are remarkably dense, stout and recurved, often forming a cross at the end of the branches. (*b*)

The first record of this species in Portland (though not at that time correctly identified) was in 1832, by Professor Henslow, a former Professor of Botany in the University of Cambridge. In that year he made a historic visit to Portland and found there a species of *Limonium*. His visit led to a singular result, namely, a controversial and critical examination of the plant and its affinities, extending over 60 years,—a good illustration of persistent scientific investigation crowned at length with success. It is only within the last eight years that the Portland plant has been satisfactorily determined as a species new to science. The honour is due to my friend, Mr. C. E. Salmon, F.L.S., who for some years made an exhaustive study of the British species of the genus *Limonium* (formerly known, *pro parte*, as *Statice*). The subject being not only of scientific but of local interest, I propose to relate, in some detail, the history and result of the critical elucidation of the species. For that purpose I shall, with Mr. Salmon's consent, make free use of an admirable Paper on *Limonium recurvum* which he contributed, in March, 1903, to *The Journal of Botany* (Vol. 41, p. 65.) My warm acknowledgments are also due to him for other valuable assistance.

Ten years after Henslow's visit, Girard, a French botanist, published in *Les Annales des Sciences Naturelles* (*c*) his diagnosis of a plant found in France and Belgium, named by him *Statice Dodartii*. In 1849, Mr. Charles Cardale Babington, the late Professor of Botany at Cambridge, published in *The*

(*b*) The accompanying plate, for leave to reproduce which we are indebted to the courtesy of Mr. James Britten, K.S.G., F.L.S., Editor of the *The Journal of Botany*, is an excellent representation of the plant.—*Editor*.

(*c*) *Sér. 2, Vol. XVII., 31 (1842)*.

Annals and Magazine of Natural History (d) a Paper on the British species of Plumbaginaceæ; in that Paper he shortly described Girard's plant, and cited for it four localities in England and Wales. But *Limonium* is a protean and remarkably puzzling genus, and, 11 years later, Babington altered his opinion and stated (e) that, having seen a specimen of the true French *Dodartii*, he now considered the plants from the four localities referred to, to belong not to *Dodartii*, but to the allied species *Statice occidentalis*, Lloyd, now generally known as *Limonium binervosum*, C. E. Salmon. But, unfortunately, he added a dictum which has caused scientists much confusion and trouble. He argued that, anyhow, *S. Dodartii* should be restored as a British plant, remarking, "There has long been an unnamed specimen of *Statice* in my herbarium which was gathered at Portland, Dorset, in September, 1832, by Professor Henslow. This is quite similar to the authentic *S. Dodartii* supplied to me by Billot, agrees well with Girard's description, and is of a very different aspect from any state of *S. occidentalis*." As a matter of fact, however, the Portland plant and *S. Dodartii* differ materially (f).

On the strength of this misleading statement of Babington and in deference to his high authority, the Portland plant continued, wrongly, to appear in our text books, including the standard work, *Syme's Eng. Bot.*, Ed. 3, as *Dodartii*, *Gir*, until the publication of Mr. Salmon's Paper eight years ago.

It may be useful to field botanists to add that, as is well pointed out by Mr. Salmon, the descriptions of *Dodartii* given by Hooker, Babington, and Syme, although misleading as regards true *Dodartii*, fit the Portland plant perfectly well.

(d) *2nd Series*, Vol. III., 433 (1849).

(e) *l.c.*, Vol. 5, 402.

(f) Henslow's plant, still preserved at Cambridge, is actually *Limonium binervosum*, Salmon.

The difficulty in arriving at a satisfactory conclusion as to the plant in question was not lessened by the fact that in Portland it is intermixed with *Limonium binervosum*, a species varying greatly according to local conditions, as is well shewn in Dorset specimens (g).

Matters remained as mentioned above for six years, until in 1866 the well-known authority, the late Dr. Boswell-Syme, Editor of *Eng. Bot.*, Ed. 3, accompanied by a veteran botanist, the late Mr. T. B. Flower, of Bath, went to Portland to examine the plant *in situ*, but they missed the limited area within which it grows, and found only plants which, on being submitted to Professor Babington, were unhesitatingly referred by him to *L. binervosum*: (*Eng. Bot.*, Ed. 3, Vol. VII., 165.)

Interest in the question was revived in 1872, when the Rev. H. E. Fox, a botanist then taking clerical duty in Portland, distributed specimens through the Botanical Exchange Club, on which Dr. Boswell-Syme reported as follows:—"These specimens have the spikes curiously contracted and dense, but are certainly not the continental *S. Dodartii*": (*Bot. Exchange Club Rep.*, p. 33, 1872-4.) Syme thus, again, left the plant undetermined, and thought that the habit (dense spikes, &c.), was due to some peculiarity of season; subsequent experience proved that this was not the case. Long investigations were also made by the late Mr. Henry Groves, F.L.S., formerly of Weymouth, but afterwards of Florence, who had specially studied *Limonium* in Italy and on the Mediterranean shores, and by Mr. J. W. White, F.L.S., Special Lecturer on Systematic Botany in the University of Bristol, but it was reserved for Mr. Salmon finally to solve the difficulty. His critical examination of a very large number of European

(g) I may here mention that a distinct marsh form of *Limonium binervosum*, dwarf and thick set, is found in splashy places on the Chesil Bank. This may be *forma compacta*, Corbière (*Flo. Normand*, 480 (1894).

herbaria having failed to reveal any specimen from the coasts of France, Portugal, Spain, Belgium, Holland, Denmark, Norway, or Sweden, similar to the Portland plant, and it being clear that that plant was not *Dodartii*, Mr. Salmon found that we have in Portland a species new to science, and this he named *Limonium recurvum*. Under that name it now appears as a full species in the last Edition of *The London Catalogue of British Plants* (h).

Limonium recurvum, as pointed out by Mr. Salmon, may be distinguished from its near ally and neighbour, *L. binervosum*, by its robust habit, stout scape, short branches, and especially by its dense recurved spikes. (i) He has found the characters constant under cultivation in his garden, and remarks that even in the richer soil of his rockery the branches remain short.

It was reported in *The Journal of Botany*, Vol. 41, p. 68, some time since, that the plant in Portland had been destroyed. I am glad to say that this is not the fact ; it is, however, entitled to all the protection that the members of the Club can give it.

I have referred above to the variable character of *Limonium binervosum*, (*Statice occidentalis*, Lloyd). Syme, *Eng. Bot.*, Ed. 3, VII., p. 164, gives as segregates of *Statice occidentalis* (α) *occidentalis*, Lloyd ; β *intermedia* ; γ *Dodartii*, Gir. He distinguishes his var. *intermedia* from *occidentalis* proper thus, "Scape branched from the middle or from above the middle, rarely below it ; rarely a few of the lower branches sterile ; spikes spreading or spreading-ascending, thick." This variety has been reported from Portland, but Salmon remarks (*Journ. Bot.* Vol. 41, p. 69) that the forms of

(h) Dr. F. N. Williams, in his *Prod. Flo. Brit.*, Vol. I., p. 437, published last year, says, referring to *Limonium*, "In none of the recent continental floras, which include species found in Britain, have Mr. Salmon's views as to the delimitation of species and grouping of forms been either modified or even seriously contested."

(i) In *Dodartii* the spikes are never recurved, *Gir. l.c.*

occidentalis, dependent on situation, soil, and surroundings, are innumerable, and that it is impossible to keep Syme's var. *intermedia* apart. The Portland botanist, therefore, need not trouble himself much with this so-called variety.

To return now to the more immediate subject of this Paper, the following is a list of plants (excluding the commonest), which at any time have been found in Portland, with notes of their habitats, &c. :—

Clematis Vitalba, *L. Traveller's Joy*. Native. II. Freq. East and West Weares. Southwell.

Adonis annua, *L. (autumnalis, L.) Pheasant's Eye*. Alien or Colonist. II. Freq. Thoroughly established in central and southern cornfields.

Obs. Probably of ancient introduction. "They grow wild in the West of England among their corn"; *Culpepper, Herbal*, p. 11 (1652).

Ranunculus trichophyllus, *Chaix. Water Fennel*. Native. II. Rare. East Weare near Higher Drum, 1882. Pond south of St. George's Church, 1879.

R. hederaceus, *L. Ivy-leaved Water Crowfoot*. Native. II. Very rare. By rivulet below Verne fort, 1856; doubtless now destroyed.

R. parviflorus, *L. Small-flowered Crowfoot*. Native. II. Abundant on cult. ground.

R. arvensis, *L. Corn Crowfoot*. Colonist, though sometimes apparently native. II. Freq. on cult. land.

Papaver dubium, *L. Long Smooth-headed Poppy*. Colonist. II. Very rare. Cult. land between Prison and Rufus Castle, 1857; *H. Groves!* (a)

P. Lecoquii, *Lamotte. Yellow-juiced Poppy*. Colonist II. Very rare. Cult. ground near Wesleyan Chapel Southwell, many plants, 1881.

(a) The Henry Groves referred to in this Paper was the Botanist of that name, late of Florence.

- P. Argemone, L.** *Long Prickly-headed Poppy.* Colonist. II. Very rare. Noted G. S. Gibson, 1843, in *Flo. Dor.* Ed. 2, p. 3. Cult. ground between Wakeham and the Lighthouses, 1857; *H. Groves.* There 1908, *F!*
- P. hybridum, L.** *Round Prickly-headed Poppy.* Colonist. II. Very rare. Capricious in appearance. Cult. ground near Prison, 1882. There 1911; *F!* Near St. George's Church; *J. W. White.* Black Nore, 1882.
- Glaucium flavum, Crantz.** *Horned Poppy.* Native. I. Not com. Shore and sandy wastes Smallmouth to Chesil. II. Rare and local. East Weare and shore below Prison. Shore near Black Nore. Churchope; *F.*
Obs. Much now destroyed by "trippers." Uncertain in appearance. Called locally Squat-maw or Bruise-herb.
- [**G. phœniceum, Crantz.** Alien. II. An old record of a continental weed introduced with imported grain. Long since extinct.]
- Fumaria officinalis, L.** *Common Fumitory.* Native or colonist. II. Freq. Cult. ground.
- F. parviflora, Lam.** *Small-flowered Fumitory.* Native or colonist. II. Rare. Cult. ground East Cliff; *F.!*
Obs. This may perhaps be *F. Vaillantii, Lois.*
- Cheiranthus Cheiri, L.** *Wallflower.* Alien or Denizen. II. Freq. East Cliffs.
- Radicula sylvestris, Druce** (*Nasturtium sylvestre, Br.*). *Creeping Cress.* Native. II. Very rare. Thicket Verne slope above shore end of Breakwater, 1911; *F.!*
- Barbarea verna, Aschers** (*præcox, Br.*) *Early-Winter Cress.* Colonist. II. Scarce. Quarries about Wide Street and the Prison; *F.!*
Obs. *B. vulgaris, Ait.* rare or absent.
- Arabis hirsuta, Scop.** *Hairy Rock-Cress.* Native. II. Freq. Quarries and rubble between Verne and Rufus Castle. East Weare; *F.*
Obs. Auricles of cauline leaves obsolete.
 [*Cardamine flexuosa, With.* Absent.]

- Erophila verna**, *E. Meyer* (*Draba verna*, L.). *Common Whitlow-grass*. Native. Rather local. I. Sandy ground Smallmouth to Chesil. II. Verne; East Weare abundant; *F*.
- Cochlearia officinalis**, L. *Common Scurvy-grass*. Native. II. "Portland"; *Rev. H. E. Fox*, 1872, in *Flo. Dor.*, Ed. 2, p. 20. Not confirmed, but may occur, having been reported from Chesil Bank Abbotsbury, by *Revd. Hy. Riddelsdell*; (*Journ. Bot.* 1908, p. 384).
- C. danica**, L. *Danish Scurvy-grass*. Native. Abundant. I. Smallmouth to Chesil. II. "On the Cliffs;" *Pulteney*. Generally distributed.
- Sisymbrium officinale**, Scop. *Hedge-Mustard*. Var. *leiocarpum*, DC. II. "Portland," *G. C. Druce*, in *Journ. Bot.* 1908, p. 384. A glabrous-podded state, apparently rare.
- Obs.* Mr. Druce's Portland records were made in 1895 and 1907. I am indebted to him for kindly aid.
- S. Alliaria**, Scop. *Sauce-alone*. Native. II. Local and rather rare. Near Rifle Butt, King's Pier; East Weare under Prison, 1911; *F*.
- Erysimum cheiranthoides**, L. *Wormseed*. Colonist. II. Very rare. "Portland;" *Druce* in *Journ. Bot.* 1908, p. 384.
- [**Brassica oleracea**, L. *Wild or Sea Cabbage*. Native "II. Grows, as I have been informed, on the cliffs of Portland Isle"; *Pulteney*. Long since extinct.]
- B. nigra**, Koch (*Sinapis nigra*, L.). *Black Mustard*. Native. II. Com.
- Diplotaxis muralis** DC. *Sand Rocket*. Colonist. I. Freq. Railway banks Smallmouth to Chesil. II. Com.
- Var. **Babingtonii**, Syme. Colonist. I. Sandy ground Smallmouth to Chesil, much increasing (1876). II. About Verne Ditch (1878), Easton (1908). East Weare (1911); *F*.

Obs. Both the type and the variety are of recent introduction, principally by railway ballast, and

are now spreading rapidly. Neither is mentioned in *Sole's* M.S. List of Weymouth and Portland plants (1782), nor as a Portland plant in *G. S. Gibson's* List (1843); not observed in this area by *T. B. Flower* (1858), nor by *J. W. White* (1864-5). The Author first observed it in I. in 1876.

Coronopus didymus, *Sm. (Senebiera DC)*. *Lesser Wart Cress*. Alien or Colonist. Com. I. Beach wastes. II. Chesil to Southwell, 1911.

Obs. Usually diandrous with petals present. Probably introduced from America about 150 years ago. Has spread greatly in recent years.

C. procumbens, *Gilib.* *Common Wart Cress*. Native. I. and II. Com.

Lepidium ruderales, *L.* *Narrow-leaved Pepperwort*. Alien or denizen. II. Very rare. Amongst cinders deposited in newly-made land in the Mere near the Castle, 1908.

L. campestre, *Br.* *Field Pepperwort*. Native. II. Very rare and local. East Weare 1882.

L. heterophyllum, *Benth.* *L. Smithii*, *Hook.* Native. II. Rare. "Portland;" *Druce* in *Journ. Bot.* 1908, p. 384, under *L. canescens*, *Gren. and Godr.*

L. Draba, *L.* *Whitlow Pepperwort*. Alien. II. Rather rare. Godnore and Black Nore in plenty; field Southwell 1910; *F.!* "Portland"; *Druce* in *Journ. Bot.* 1908, p. 384.

Obs. Introduced probably within the last 60 years; likely to spread and become an agricultural pest.

Thlaspi arvense, *L.* *Penny Cress*. Colonist. II. Rare and local. Lawns Grove Cliff; *F.!*

[**Iberis amaris**, *L.* *Bitter Candytuft*. Alien. II. Cornfields near Prison, in some plenty, 1857. Not found since.]

[**Crambe maritima**, *L.* *Sea Kale*. Native. I. "On Chesil Bank and about Weymouth," *Pulteney*. Extinct.]

Obs. *Hutchins* wrote, referring to the Chesil Bank, "On it grows much *Eryngo* and, formerly, much *Sea* or *Beach Kale*, which latter is now

almost all destroyed ;" (2 *Hist. Dor.* Ed. 2, p. 364).
 " First record given as Pulteney, 1799, but is not
Brassica marina silvestris multiflora Lob. . . .
 ad Portlandiam insulam, *Lobel Adversaria*, 92,
 (1576), this plant ? " ; *Druce in Journ. Bot.* 1908, p.
 385. As to former use, for edible purposes, of
Crambe maritima obtained from Chesil Bank, see
 " *Notes and Queries*," (Mar. 1868).

Cakile maritima, *Scop. Purple Sea-Rocket*. Native. I.
 Local. Sands close to Smallmouth, abundant in 1860.
 " Portland," *Druce in Journ. Bot.* 1908, p. 385 ; doubt-
 less the above station.

Raphanus Raphanistrum, *L. Jointed Charlock*. Colonist.
 II. " Portland ; " *Flo. Dor.* Ed. 2, p. 28.

R. maritimus, *Sm. Sea Radish*. Native. I. Rare and
 local. Sands east of railway south of Smallmouth ;
 flowers yellow and white ; six plants 1910 ; *F. !*

Obs. Uncertain in appearance. The beaks vary much
 in length, even on the same plant. It is only when
 dry that the pods appear strongly ribbed.

Reseda lutea, *L. Wild Mignonette*. Native or Colonist. II.
 Rare. Cliff by Prison ; cult. ground above Culverwell ;
F. !

R. luteola, *L. Dyers Weed. Weld*. Native. II. Freq.
 By Folly Pier ; *F.* Admiralty Incline near Higher
 Drum, &c.

Helianthemum Chamæcistus *Mill. (vulgare, Gaertn.)*. *Common*
Rock Rose. Native. II. Rather local, not com. Near
 Rectory House. Cliffs Pennsylvania. Verne ; East and
 Chene Weares, *F.*

Viola hirta, *L. Hairy Violet*. Native. II. Not com.
 Stony places Verne. East Weare.

Var. calcarea, *Bab.* II. Portland, *Babington's " Manual "*
 Ed. 9, p. 44 ; not confirmed.

Obs. Prof. Babington wrote me in 1878 that he had
 never visited Portland, and was unable to state the
 authority for *V. calcarea*. It has been found at

Swanage; (*Revd. E. F. Linton's "Notes on the Dorset Flora," Proc. Dors. N. H. & A. F. Club, Vol. 29, p. 16, 1908*).

V. arvensis, *Murr. Heartsease. Pansy.* Colonist. II. Rare. Cult. ground Grove Cliff, *F.* Cornfield Black Nore 1882. *Obs.* All the other *Violas* except those named and *V. Riviniana, Reichb.* apparently absent.

Silene maritima, *With. Sea Campion.* Native. I. Com. Chesil Bank; *Pulteney.* Beach wastes. II. Not com, local. East Cliff; Shore underneath Prison; *F.*

Obs. This is one of the most abundant species on Chesil Bank, and forms a striking feature of the flora. "Chesil Beach, often as a small-leaved form, but not so extreme as the Looe Pool Bar variety;" *Druce in Journ. Bot. 1908, p. 385.*

Lychnis Githago, *Scop. Corn Cockle.* Colonist. II. Rare. East Cliff 1881; *Sir W. C. Medlycott.* Cult. ground Grove Cliff, 1911; *F.*

Obs. *Lychnis alba* scarce. *L. dioica* apparently absent.

Cerastium tetrandrum, *Curt. Four-cleft Mouse-ear Chickweed.* Native. I. Com. Beach wastes Smallmouth to Chesil, forming strong bushy plants. II. East Weare, very common. The Bill; *Druce in Journ. Bot. 1908, p. 385.*

C. semidecandrum, *L. Little Mouse-ear Chickweed.* Native. Freq. I. Beach wastes Smallmouth to Chesil. II. No doubt occurs. Much less com., I think, than *C. tetrandrum.*

Stellaria Holostea, *L. Greater Stitchwort.* Native. II. Scarce. Verne slope above Castleton; East Weare; *F.*

Arenaria serpyllifolia, *L. Thyme-leaved Sandwort.* Native. I. and II. Com.

A. peploides, *L. (Honckeneja peploides, Ehrh.). Sea Purslane.* Native. I. Locally freq. Sands South of Smallmouth, more freq. there formerly. Mere beach. II. No modern record.

Obs. "First record in Angliæ insulis Australibus, ea præsertim quæ Portlandia vocatur;" *Lobel, Adversaria*, 195, (1576); *Druce in Journ. Bot.* 1908, p. 385.

Sagina maritima, *Don.* *Sea Pearlwort*. Native. I. Beach wastes Smallmouth to Chesil, plentiful. II. Scarce. "Portland;" *W. Borrer in Flo. Dor.* Ed. 2, p. 41. East Weare. Cliffs Lower Lighthouse.

S. procumbens, *L.* *Procumbent Pearlwort*. Native. II. Not very com. The Grove; *F.*

S. nodosa, *Fenzl.* *White Sandwort*. Native. I. Rare. Damp parts of roadsides and beach wastes Smallmouth to Chesil; the glabrous form.

Spargula arvensis, *L.* *Corn Spurrey*. Native or Colonist. **Var. vulgaris** *Boenn.* II. Rare. "Portland;" *Druce in Journ. Bot.* 1908, 385.

Spargularia salina, *Presl.* (*Lepigonum salinum*, *Fries*). *Lesser Sea Sandwort-Spurrey*. Native. I. and II. Very com. on seashores.

Var. media. I. Chesil Bank; *Druce in Journ. Bot.* 1908 p. 385.

Var. neglecta, (*Syme*). Com. I. Beach wastes, &c. Smallmouth and Chesil. II. North shores.

Obs. Many seeds unwinged.

S. marginata, *Kittel.* *Sea Sandwort-Spurrey*. Native. I. Shore Smallmouth to Chesil, abundant. II. Rather freq. Rocks between Cave Hole and the Bill. Eastern shore; *F.*

Obs. Usually (invariably?), **var. glandulosa**, *Druce*; (see *Journ. Bot.* 1908, p. 385). Probably the prevailing form in South-West Britain.

S. rupestris, *Lebel* (*L. rupicola*, *Kindb.*) *Rock Sea Spurrey*. Native. II. Locally freq. Exposed cliffs the Prison to Chene.

Obs. First record for Dorset obtained from Chene, *Mansel-Pleydell* 1874, *Flo. Dor.* Ed. 2, p. 44.

Polycarpon tetraphyllum, *Loefl.* *Four-leaved All-seed.*
Native. I. Extremely rare. Sandy ground near Chesil Bank.

Obs. First record *W. Hudson* 1778, *Journ. Bot.* 1908, p. 386. Found by *Revd. J. Lightfoot* 1774, (a) *Sole* 1782, *A. B. Lambert* 1797, *Revd. A. Goodenough*, afterwards *Bishop of Carlisle*, (died 1827), and by *Borrer* circa 1850; rediscovered by the *Author* 1876.

Hypericum perforatum, *L.* *Dotted-leaved St. John's Wort.*
Native. II. Local. East Weare near large Rifle Butt, plentifully; *F.*

H. montanum, *L.* *Mountain St. John's Wort.* Native. II. Rare. East Weare near King's Pier, plentiful 1911; *F.!*

[**Althæa officinalis**, *L.* *Marsh Mallow.* Native. "Grows, as I have been informed, about Portland and by the Fleets of Chesil Bank." *Pulteney*. Extinct "about Portland" and does not occur in I.]

[**Lavatera arborea**, *L.* *Tree Mallow.* Probably indigenous; its natural home being on maritime rocks. Recorded by *Ray* 1724, "in *Bishop Gibson's* Edition of *Camden* as a Native of Portland and of Chesil Bank, where it still continues to be found, and from thence has been introduced into the gardens of the villages of the Island and the neighbourhood;" *Pulteney*. No record since.]

Obs. Although extinct in a wild state, still found in the gardens of the neighbourhood.

Malva moschata, *L.* *Musk Mallow.* Native. II. Rare. Lawn South of Prison, 1878. Between Pennsylvania Castle and Chene, 1881; *W. R. Garratt*. West Cliff; beyond Southwell; *F.!* Usually single plants only.

M. sylvestris, *L.* *Common Mallow.* Native. Com.

Obs. Called in Portland "Bread and cheese."

(a) Specimen in Herb. Mus. Brit. labelled "Ex Herb. Banks, . . . Portland Isle, 1774, Mr. Lightfoot."

M. rotundifolia, *L. Dwarf Mallow*. Native. II. Very rare. Near Prison and Rufus Castle. West Cliff 1905; *Revd. H. Boyden*.

Linum angustifolium, *Huds. Narrow-leaved Flax*. Native. II. Freq. "I have it from Portland;" *Pulteney*. Verne Slopes; Grove Cliffs; Chene; *F.*
Obs. The ciliæ of the sepals absent.

Geranium molle, *L. Soft Crane's Bill. Forma floribus albis*. II. By "Perryfield House," Weston; several clumps, 1911, *F.*

G. rotundifolium, *L. Soft Round-leaved Crane's Bill*. Native. II. Very rare. Slopes of Verne near Merchant's Railway, 1878; there, 1909. Roadside between Southwell and West Cliff, 1909; *F.!*

Obs. Very thinly distributed in South England,

G. columbinum, *L. Long-stalked Crane's Bill*. Native. II. Rare and local. Rocks at Portland, Gibson. Above East Battery, 1882. East Weare near "Shepherd's Dinner," 1882. East Weare near Admiralty Incline, many plants, 1909; *F.!*

Obs. Centuries ago, considerable subsidences occurred on the East and South-East sides of Portland. The tracts of land which slipped away are from 50 to 150 feet below the top of the adjacent cliffs, and are known as the East Weares. In their general features, they remind us of the Undercliff in the Isle of Wight. Being still pretty much in their original wild state, and being sheltered by the high cliff in their rear from the westerly and north-westerly winds which blow across the Channel, these Weares afford highly favourable ground for plants loving shelter, sunshine, and warmth. One of the best spots in Portland for the Field Botanist is at a place called "Shepherd's Dinner," near "Long Tout." In by-gone days, the Weares formed a feeding ground for numbers of sheep, which in due time supplied the renowned "Portland mutton."

To save time and labour to the shepherds, it was the custom for one of the children of the family to carry dinner down a pathway—one of the few in the precipitous face of the cliff—to the plateau below. The path thus became known as “Shepherd’s Dinner,” by which name it was recognised throughout the Island. This relic of former pastoral days was destroyed by the making of the Portland and Church Hope Railway about 20 years ago.

- G. lucidum**, *L. Shining Crane’s Bill*. Native. II. Locally freq. East Weare.
- G. Robertianum**, *L. Herb Robert*. **Var. purpureum** (*Vill.*). II. “Portland Isle;” *Druce in Journ. Bot.* 1908, p. 385. *Obs.* Recorded from Chesil Bank, Abbotsbury; *Revd. H. J. Riddelsdell (ibid.)*.
- Erodium cicutarium**, *L’Hérit. Common Stork’s Bill*. **Var. vulgatum**, *Syme.* Native. I. Freq. Roadsides Smallmouth to Chesil. II. East Weare; Verne slopes, plentiful; *F.*
- E. moschatum**, *L’Hérit. Musk Stork’s Bill*. Native. II. Extremely rare. “Portland cliffs, Native;” 1907; *Revd. H. J. Riddelsdell in Journ. Bot.* 1908, p. 385. *R. Rowston*, 1911.
- Euonymus europæus**, *L. Spindle-tree*. Native. II. Very Rare. East Weare below “Shepherd’s Dinner;” 1880. Below Second Drum; East Weare in thicket near the Range house; *F.!*
- Acer campestre**, *L. Maple*. Native. II. Scarce. Thicket by pond near King’s Pier; *F.*
- Trigonella ornithopodioides**, *DC. (Falcatala ornithopodioides, Brot.)*. *Bird’s Foot*. Native. Rare and local. I. Chesil Bank close to Portland; *Gibson*. Sandy waste near Chesil old Railway Station, 1857; *H. Groves* (probably same habitat). II. Turfy roadside between St. George’s Church and Weston, plentiful, 1879.
- Medicago sativa**, *L. Lucerne*. Alien. II. Freq. Borders of fields. Naturalised.

- M. denticulata**, Willd. *Reticulated Medick*. Native. Rare
 I. Waste ground near Chesil old Railway Station, 1880.
 II. Grassy places North side of Island; *Flo. Dor.* Ed. 2, p. 62. By Tramway east of Fortune's Well. Cult. ground near Prison.
- M. arabica**, Huds. (*maculata*, Sibth.). *Spotted Medick*. Native.
 II. Freq.
- Melilotus altissima**, Thuill. (*officinalis*, Willd.). *Common Melilot*. Native. I. Railway banks. II. Rather scarce. East Weare below Grove Coastguard Station; behind Prison; *F*.
- M. alba.**, Desr. *White Melilot*. Alien. II. Very rare. Quarries Chene, 1905; *Revd. A. Boyden*. By disused tramway near Drill Hall, 1911; *F*! Recent introduction.
- M. officinalis**, Lam. (*arvensis*, Wallr.). *Field Melilot*. Alien. II. Rare. "Portland;" *Druce* in *Journ. Bot.* 1908, p. 385.
- Trifolium subterraneum**, L. *Subterranean Trefoil*. Native. II. Very rare. In turf West Cliff beyond Black Nore, 1880; *G. E. Eliot*!
- T. squamosum**, L. (*maritimum*, Huds.). *Teasel-headed Clover*. Native. II. Freq. Cliffs and cult. ground mostly towards the Bill. Doubtless also occurs in I.
- T. arvense**, L. *Hare's-foot Trefoil*. Native. I. Freq. Beach sandy wastes.
- T. scabrum**, L. *Rough Rigid Trefoil*. Native. Abundant. I. Beach wastes, Smallmouth to Chesil. II. Verne, Weares, pastures, and banks.
- T. fragiferum**, L. *Strawberry-headed Trefoil*. Native. II. Freq. Doubtless in I. also.
- T. procumbens**, L. *Hop Trefoil*. Native. II. Com. Cult. ground, quarry heaps, &c.
- T. filiforme**, L. *Least Yellow Trefoil*. Native. I. Not com. Sandy ground Smallmouth.
- Anthyllis vulneraria**, L. *Common Kidney Vetch*. Native. I. Freq. Beach wastes Smallmouth to Chesil. II. Freq.

Obs. A form in Distr. I with a terminal head and about three axillary sessile heads, the lowest about six inches below top of peduncle; see *Symes' Eng. Bot.*, in loco.

Lotus corniculatus, *L.* *Common Bird's-foot Trefoil*. **Var. crassifolius**, *Pers.* Native. Freq. I. By Chesil Bank. II. Banks towards Castleton. The Weares.

L. tenuis, *Waldst. & Kit.* *Slender Bird's-foot Trefoil*. Native. II. Freq. on Hill.

Hippocrepis comosa, *L.* *Horseshoe Vetch*. Native. I. Freq. Sandy ground Smallmouth to Chesil; *Flo. Dor.* Ed. 2. II. Very abundant.

Onobrychis viciæfolia, *Scop.* *Sainfoin*. II. Freq. in cult. ground.

Obs. Probably only a relic of cultivation.

Vicia gracilis, *Lois.* *Slender Tare*. Native. II. Rather common. "Cornfields Portland;" *Gibson.* Cornfields from centre of Island to Lower Lighthouses. Undercliff between Rufus Castle and Southwell; *Mansel-Pleydell.*

V. sylvatica, *L.* *Wood Vetch*. Native. II. Undercliff; *Revd. H. E. Fox* in *Flo. Dor.* Ed. 2, 73. Not since recorded.

V. sepium, *L.* *Common Bush Vetch*. Native. II. Rather common but local. Bushy places East Weare.

[**V. lævigata**, *Sm.* *Smooth-podded Sea Vetch*. "Dates (as *V. hybrida*) from the Second Edition of *Hudson's Flora Anglica* 1778;" *Druce* in *Journ. Bot.* 1908, p. 385. "Among the shingles on Chesil Beach and in Portland, *Sir T. G. Cullum* 1797;" "Portland Island among the shingles near Chesil Bank and even flowering under the stones some depth;" *ibid.* Extinct.]

Obs. In *Herb. Mus. Brit.* are two specimens of *V. lævigata* on one sheet, *ex herb. Banks*, labelled in *Sir Joseph Banks'* handwriting, "Portland Isle, *Mr. Lightfoot* 1774. Among the pebbles at the foot of the reach," (sic). The Chesil Bank has been repeatedly but unsuccessfully searched for *V.*

lævigata. It is clear that all the above records referred, not to the Chesil Bank, but to the beach near Lodmoor, Weymouth.

V. bithynica, *L. Bithynian Vetch*. **Var. angustifolia**, *Syme.*
Native. II. Very rare. Field between Reforne and West Cliff, 1879; *Sir W. C. Medlycott!*

Lathyrus Aphaca, *L. Yellow Vetchling*. Colonist, but possibly native in places. II. Plentiful as a weed in cornfields. East Weare; *F.*

L. Nissolia, *L. Grass-leaved Vetch*. Native. II. Rare. Top of Slopes above Second Drum on Admiralty Incline; *F!*

L. latifolius, *L. Broad-leaved Everlasting Pea*. Alien. II.
“Naturalised on the ” (East) “Undercliff;” *Druce* in *Journ. Bot.* 1908, p. 385!

Obs. Merely the relic of a former garden near this spot.

[**L. maritimus**, *Bigel. Sea-side Everlasting Pea*. I. “On the sand and naked pebbles of Chesil Bank, running from Portland to Abbotsbury;” *Pulteney.*]

Obs. Habitat as stated, now too wide. Not found, I believe, within the last 70 years at least, on the Chesil Bank south of Smallmouth.

Prunus insititia, *L. Bullace*. Native. II. Rare. Thicket East Weare; *F.!*

Spiræa Filipendula, *L. Common Dropwort*. Native. II. Rare and local. Cliff, and waste ground near Prison. East Weare by Rifle Butt; *F.*

Rubus rusticanus, *Merc.* Native. II. Very com.

Obs. The prevailing species of the genus in Portland, as is usual in limestone districts.

R. leucostachys, *Sm.* Native. II. Freq.

R. cæsius, *L.* Native. II. Freq.

Geum urbanum, *L. Wood-Avens*. Native. II. Very rare. Inside ruins of old church Churchope, 1911; *F.*

Potentilla sterilis, *Garcke. (Fragariastrum, Ehrh.). Barren Strawberry*. Native. II. Local. Plentiful in East Weare from below Prison to near Churchope.

Obs. *P. Anserina*, *L.*, is very rare or absent.

- Poterium Sangulsorba**, *L. Lesser Burnet*. Native. II. Com.
- P. polygamum**, *Waldst & Kit. (muricatum, Spach.) Muri-
cated Salad Burnet*. Alien or Colonist. II. Rare. Near
Verne. Borders of fields beyond Southwell. A relic of
cultivation.
- Rosa spinosissima**, *L. Burnet Rose*. Native. II. Local. "I
observed it plentifully on the eastern cliffs of Portland ;"
Pulteney. East Weare, abundant, but less freq. South of
Prison.
Obs. Many plants have the peduncles and lower
portions of the calyx-tubes glandular-hispid.
- R. micrantha**, *Sm. Small-flowered Sweet Briar*. Native. II.
Local. East Weare abundant South of Prison.
Obs. Liable to be mistaken for *R. Eglantheria*, *Huds.*
Lower halves of fruits frequently more or less setose,
sometimes quite up to the disks.
- R. canina**, *L. Dog-rose*. **Var. dumalis**, (*Bechst.*). Native.
II. Freq. East Weare.
- R. stylosa**, *Desv. Var. systyla*, (*Bast.*). *Columnar-styled
Dog-rose*. Native. II. Not. com. East Weare.
Obs. No record for *R. arvensis*, *Huds.*
- Pyrus Aria**, *Ehrh. White Beam*. Native. II. Very rare. East
Weare below Second Drum Admiralty Incline, 1908 ; *F!*
- Saxifraga tridactylites**, *L. Rue-leaved Saxifrage*. Native.
II. Freq. In East Weare plentiful ; *F.*
- Cotyledon Umbilicus-Veneris**, *L. Navel-wort*. Native. II.
Rare and local. Wall old Vicarage House, Wakeham ;
F. Walls Pennsylvania, 1880, now destroyed. Church-
yard retaining-wall Churchope ; *F.*
- Sedum reflexum**, *L. Crooked Yellow Stonecrop*. Denizen.
II. ; *Flo. Dor.* Ed. 2, 115.
- S. rupestre**, *L. Rock Stonecrop*. **Var. minus**, *Syme.* Native.
II. Freq. but local. Plentiful on rocks from King's Pier
throughout nearly whole of East Weare. West Weare,
half mile South of Chesil, sparingly.
Obs. Flowers very freely. Identified as *S. rupestre*,
var. minus, on specimen gathered by the Author in

1878. New to Dorset. "It is just the St. Vincent's Rocks plant;" *T. B. Flower, in litt.* Appears in *Flo. Dor.* Ed. 2, 115 and 17 *Journ. Bot.* p. 342, as *S. Fosterianum Sm.*, in error.

Sempervivum tectorum, *L.* *Common Houseleek.* Alien. II. Rare. On house-roof in the Grove; *F.*

Epilobium hirsutum, *L.* and **E. parviflorum**, *Schreb.* II. Not com.

E. montanum, *L.* *Broad-leaved Willow-herb.* Native. II. Singularly rare. Noted by *Revd. H. E. Fox* in *Flo. Dor.* Ed. 2, 120. Garden, Grove; *F.*

Obs. E. tetragonum, Curt. Rare or absent. *E. obscurum, Schreb.*, absent.

Circæa lutetiana, *L.* *Enchanter's Nightshade.* Native. II. Rare and local. Caves East Weare and Churchyard at Churchope, 1880; Gone. Garden at Grove, 1911; *F.*

Hydrocotyle vulgaris, *L.* *Pennywort.* Native. II. Very rare. Culverwell, 1880. "Near the Lighthouse," (meaning, doubtless, Culverwell); *Revd. H. J. Riddelsdell* in *Journ. Bot.* 1908, p. 386.

Eryngium maritimum, *L.* *Sea Holly.* Native. I. Freq. Sandy wastes between Smallmouth and Chesil.

Obs. Formerly much more frequent; is now being destroyed by excursionists. More care is taken in Prussia. There the plant is guarded on the sea-shores by police orders. ("*The Care of Natural Monuments,*" by *Prof. Conwentz*, p. 128, cited in *Flora of Bristol* p. 330.

Sanicula europæa, *L.* *Sanicle.* Native. II. Very rare. Thicket East Weare above Folly Pier, numerous plants, 1909 and 1911; *F.!*

Conium maculatum, *L.* *Hemlock.* Native. II. Generally distributed on Top Hill.

Smyrnum Olusatrum, *L.* *Alexanders.* II. Freq., local. Borders of fields about Weston; Churchope Cove; *F.* Southwell, abundant.

Obs. Probably native on cliffs, but, in most cases, the remains, no doubt, of very ancient cultivation; hence its plenty about Southwell, one of the oldest of the villages. *J. W. White* remarks (*Flo. Bris. p.* 347), "For fifteen hundred years or more this was one of the commonest pot-herbs cultivated in gardens. It was much esteemed as a green vegetable, and the root, also, was served at table."

Bupleurum tenuissimum, *L. Slender Hare's Ear*. Native.

II. Very rare. Above West Cliff; *Revd. H. E. Fox*. Rough ground North side of Lower Lighthouse, abundant, 1876.

Apium graveolens, *L. Celery*. Native. I. Not com.

Roadside by Railway Embankment; *F.*

A. nodiflorum, *Reich. fil. Procumbent Water Parsnip*. Native.

II. Scarce. Culverwell; *F.*

Carum petroselinum, *Benth. & Hook. fil. Common Parsley*.

Alien. II. Rare. By quarries about Priory, 1881.

Obs. This plant, so frequently found around old castles, is wanting at Rufus Castle.

C. segetum, *Benth. & Hook. fil. (Petroselinum segetum,*

Koch). Corn Parsley. Native. II. Freq. Quarries near Rectory; *Revd. H. E. Fox* in *Flo. Dor.* Ed. 2. Above West Cliff. Beyond Southwell, very abundant.

Sison Amomum, *L. Hedge Stonewort*. Native. II. Rare?

Noted in *Flo. Dor.* Ed. 2, 129.

Conopodium majus, *Loret (denudatum, Koch). Pig-nut*.

Native. II. Not com. The late Common; *F.*

Fœniculum vulgare, *Mill. Fennel*. II. Local. "Near

Bow and Arrow Castle;" *Pulteney*; still there, 1911; *F.* Netherfield. Formerly about old Vicarage House Wakeham. Apparently native at Netherfield; elsewhere, probably, a survival from ancient cultivation.

Obs. Persistent. Doubtless formerly esteemed by the Islanders for medicine and for its edible root.

Crithmum maritimum, *L. Samphire*. Native. I. Chesil

Bank and Mere Beach between Smallmouth and Chesil,

abundant. II. "In crevices of the cliffs in Portland;" *Pulteney*. East Cliffs and near Lighthouses. West Cliff towards Black Nore.

Obs. Until late years gathered in Portland and sold for a pickle, but rarely so now. I found an old plant in South Portland, 1879, the stem of which measured three inches and a-half in circumference.

Enanthe pimpinelloides, *L.* *Callous-fruited Water Dropwort*. Native. II. Not com. Near Lighthouses. Fields around Southwell; Culverwell; *F.*

E. Lachenalii, *C. Gmel.* *Parsley Water Dropwort*. Native. Scarce. II. Shore Castleton, 1880; perhaps now destroyed. The coastline around Castleton has been much interfered with recently by Admiralty works.

Silaus flavescens, *Bernh. (pratensis, Bess.)*. *Sulphur-wort*. Native. II. Not freq. East Weare; Culverwell; near Lower Lighthouse; *F.*

Obs. This plant, usually common, is absent from large tracts of South England.

Daucus Gummifer, *All.* *Sea Carrot*. Native. II. On rocks; *Mansel-Pleydell* in *Flo. Dor.* Ed. 2, 136.

Obs. Requires further investigation. Possibly, only a maritime variety of *D. Carota L.*

Caucalis nodosa, *Scop. (Torilis nodosa, Gaert.)*. *Knotted Hedge-Parsley*. Native. II. Rather freq. in dry, sheltered places. Grove Cliffs; *F.*

Cornus sanguinea, *L.* *Dog-Wood*. Native. II. East Weare, less freq. southwards.

[*Echinophora spinosa, L.* "On the Chesil Beach between the Ferry and Portland, August 1837;" *Revd. A. Bloxam; Baxter Phoen. Bot.* vi. p. 478. A strange error! *Crithmum maritimum* probably mistaken for it; see *Druce* in *Journ. Bot.* 1908, p. 386.]

Sambucus Ebulus, *L.* *Danewort or Dane's Blood*. Denizen. II. Local. First evidence *Revd. H. E. Fox, Flo. Dor.* Ed. 2, p. 138. Southwell, in some plenty.

Obs. "Easton," (*Druce in Journ. Bot.* 1908, 386), in error for "Southwell." This plant, like many others, was formerly used in the Island for medicine. It is only within comparatively recent times that a medical practitioner has resided there.

Viburnum Lantana, *L. Mealy Guelder-rose*. Native. II. East Weare, abundant throughout.

Obs. The fruit is called, in Portland, "Cornaps"; *F.*

Rubia peregrina, *L. Wild Madder*. Native II. "Found in Portland by *A. B. Lambert, Esq.*"; (*Pulteney*). About old quarries and in East and West Weares, abundant.

Galium Cruciatum, *Scop. Crosswort*. Native. II. Very rare. Ravine Chene Weare, 1883. Netherfield water-course near Chene. There 1911. *F.*

G. verum, *L. Yellow Bedstraw*. **Var. maritimum**, *DC.* Native. I. Chesil Bank; *Druce in Journ. Bot.* 1908, p. 386.

G. verum x Mollugo. I. Chesil Bank; *Druce ibid.*

G. tricornis, *Stokes. Rough Corn Bedstraw*, Colonist. II. Freq. Cornfields, mostly in East and South parts.

Asperula cynanchica, *L. Quinancy-wort*. Native. II. Freq. in limestone pastures.

Sherardia arvensis, *L. Blue Field Madder*. **Var. maritima**, *Griesb.* Native. II. About quarries. New to Dorset. *Druce in Journ. Bot.* 1908, p. 386.

Obs. Mr. Druce regards *var mutica*, *Wirtg.* as = *var. maritima*, *Griesb.*

Obs. This variety is distinguished from the type by calyx-teeth being triangular not aciculate nor accrescent; in the type they are lameolate aciculate accrescent. See Paper by Druce, *Journ. Bot.*, 1894, 240-243.

Kentranthus ruber, *DC. Red Valerian*. Alien. II. Local Com. East Weare between Verne and Easton Railway Station, remarkably abundant, 1904. "Quite naturalised, also with white flowers;" *Druce in Journ. Bot.* 1908, p. 386.

Obs. Greatly increased since Easton Railway made. Frequently flowers throughout the winter. Called in Portland "Kiss-me-quick," "Convict grass," and "Prince of Wales' feathers." *F.* The closely allied plant, *Valeriana sambucifolia*, is similarly called "Kiss-me-quick" in the North-east of the County; *Revd. E. F. Linton* ("Notes on the Dorset Flora," cited ante). "In the South, *Kentranthus ruber* has a history of three centuries at least;" (*Flo. Bris.* p. 359).

Valerianella olitoria, *Poll.* *Lamb's Lettuce*. Native. I. Mere beach, east side near Highwater mark, plentiful, 1880. II. Freq. Cult. ground, old walls, &c.

V. eriocarpa, *Desv.* *Hairy-fruited Lamb's Lettuce*. Probably Native. II. Added to the Dorset Flora, 1874, by *Mansel-Pleydell*, from specimen on Churchyard Retaining-wall Churchope; (see *Flo. Dor.* Ed. 2, p. 145). Rather freq. in cult. ground between Prison and Churchope 1878 and subsequently. Near Black Nore 1881. By Lighthouse; *Revd. H. J. Riddelsdell* in *Journ. Bot.* 1908, p. 386.

Obs. Withers early and may be easily overlooked. Fruit usually, or always, glabrous in Portland specimens. "May be truly wild in the Portland station . . . being a native of West France;" *Revd. E. S. Marshall* in *Journ. Bot.* 1908, p. 286.

V. rimosa, *Bast.* (*Auricula*, DC.). *Sharp-fruited Lamb's Lettuce*. Colonist. II. Not infrequent. Noted, *Gibson*. Cornfields Grove Cliff, Reforne, and Black Nore, 1878, and subsequently.

V. dentata, *Poll.* *Narrow-fruited Lamb's Lettuce*. Colonist. II. Freq. Cornfields; *Gibson*. Cornfields between Prison and Churchope and at Black Nore, 1880.

Var. mixta, (*Dufr.*) II. Rare. Found by the Author in cornfield Black Nore, 1881; new to Dorset. Cult. ground; *J. W. White* in *Journ. Bot.* 1896, p. 432. "Portland;" *Druce, ibid* 1908, p. 386.

- Scabiosa Columbaria**, *L. Small Scabious*. Native. II. Freq. Verne slopes. East Weare. The Grove. Reforme; *F.*
- Eupatorium cannabinum**, *L. Hemp-Agrimony*. Native. II. Com. About quarries and dry banks; (stem-leaves often undivided).
Obs. Briggs, Flo. Plymouth, 210, refers to the occasional strange adaptation of this plant to dry places.
- Solidago Virgaurea**, *L. Golden Rod*. Native. II. Freq. Noted, *Gibson*. Cliffs and rocks between King's Pier and Chene.
- Aster Tripolium**, *L. Starwort*. Native. I. Freq. Shores Smallmouth to Chesil. II. Scarce.
- [**A. Linosyris**, *Bernh. Goldilocks*. Native. II. Reported to me 1878, by *T. B. Flower*, *in litt.* as having been found some years previously by a lady who gave a specimen to *Revd. A. Bloxam*. Extinct.]
- Erigeron acre**, *L. Blue Fleabane*. Native. II. Not freq. East Weare between Prison and Churchope. West Weare sparingly, 1885.
- Inula squarrosa**, *Bernh. (Conyza, DC). Ploughman's Spikeward*. Native. II. Rather freq. Noted, *Gibson in Flo. Dor.* Ed. 2, p. 162. Quarries and banks. Under-cliff Breakwater to Chene. West Weare, sparingly.
- I. crithmoides**, *L. Golden Samphire*. Native. II. Local. "At Portland;" *Pulteney*. Cliffs Chene to near Lower Lighthouse; plentiful about Cave-hole.
Obs. Dr. Maton's record "Near Chesil Bank," *Flo. Dor.* Ed. 2, p. 162, was, doubtless, an error.
- Matricaria inodora**, *L. Scentless Mayweed*. **Var. salina**, *Bab.* Native. I. and II. Freq. on shores.
- Artemisia Absinthium**, *L. Wormwood*. II. Unusually freq. in places. Yeates. East Weare. Less freq. south of Churchope, and scarce towards the Bill.
Obs. Widely distributed. Appears to be truly native.

- Petasites fragrans**, *Presl.* *Winter Heliotrope*. Alien. II.
By roadway leading from Southwell road through Chene to sea; thoroughly naturalised; *F.*
- Senecio squalidus**, *L.* *Oxford Ragwort*. Casual. Naturalised. II. Sides of Railway at Chesil Station; abundant.
Obs. Introduced with railway ballast 1902. "It is undoubtedly spreading from Oxford along the lines of the Great Western Railway by way of Didcot, Reading, etc;," *Flo. Bris.*, 380.
- S. erucifolius**, *L.* *Hoary Ragwort*. Native. II. Freq.
Extending to Lower Lighthouse.
- Carlina vulgaris**, *L.* *Carlina Thistle*. Native. II. Freq.
Mostly on East side. "Luxuriant specimens;" *Druce*.
- Aretium minus**, *Bernh.* *Lesser Burdock*. Native. II.
Com.
- Carduus nutans**, *L.* *Musk Thistle*. Native. II. Com. White flowers freq.
- Cnicus acaulis**, *Willd.* *Ground Thistle*. Native. **Var. caulescens**, *Pers.* II. West Cliff. Freq. about Churchope.
- Silybum Marianum**, *Gaertn.* *Milk-Thistle*. Denizen or Alien. II. Rare. Noted, *Gibson. Flo. Dor.* Ed. 2, p. 21. Above Fortune's Well, 1878. Quarry Easton; *F.*
- Serratula tinctoria**, *L.* *Sawwort*. Native. II. Rare. Pastures Fortune's Well, 1872; *Revd. H. E. Fox.* East Weare near "Shepherds' Dinner;" *F.* Churchope, 1882; *Sir W. Medlycott.*
- Centaurea nigra**, *L.* *Black Knapweed*. Native. The type is rare. II. Radiate form, (**var. radiata**), at the Bill with pure white and ordinary rose-pink flowers growing together, 1895; *W. Whitwell.*
Var. decipiens, (*Thuill.*). I. and II. Com.
- C. Scabiosa**, *L.* *Greater Knapweed*. Native. II. Abundant on the limestone.
Obs. *C. decipiens*, (*Thuill.*) and *C. Scabiosa*, *L.* are equally com., I think.

- C. solstitialis**, *L.* *Yellow Star-Thistle*. Alien or Colonist. II. Very rare. Several plants in lucerne field above West Cliff; *Rev. H. E. Fox* in *Flo. Dor.* Ed. 2, p. 154.
- Cichorium Intybus**, *L.* *Wild Succory*. Native. II. Scarce and thinly distributed. West Cliff; *Rev. H. E. Fox* in *Flo. Dor.* Ed. 2, p. 166. Cornfields Wakeham and Southwell.
- Picris hieracioides**, *L.* *Hawkweed Ox-tongue*. Native. II. Very com. Throughout East Weare. Banks and cult. land (east side) to within a mile of the Bill. About West Cliff, sparingly.
- P. echioides**, *L.* (*Helminthia echioides*, Gaert.). *Ox-tongue*. Native. I. II. Very com.
- Crepis taraxacifolia**, *Thuill.* *Small Rough Hawk's-beard*. Colonist. II. "Portland;" *Druce* in *Journ. Bot.* 1908, p. 387. First record. Amongst grass and in waste places about Grove District, locally plentiful 1911. *F!*
Obs. Of recent introduction. Will doubtless spread in Portland as it has done elsewhere.
- Hieracium platyphyllum**, *Ley.* *Broad-leaved Hawkweed*. Native. II. Local, on rocks and quarry débris, East Weare from Durdle Pier to Churchope, plentiful. Sparingly in West Weare.
Obs. This very rare plant (doubtless the *H. murorum* of Pulteney), was found in 1879 by the late *Sir W. C. Medlycott*, in East Weare; new record for Dor.; (17 *Journ. Bot.* 342); found by the Author in West Weare in 1885. "A curious extension of area for the species, which is known from West Yorkshire, Brecon, Monmouth, Caermarthen, Glamorgan, and Hereford Counties;" *Revd. H. J. Riddelsdell*. "Phyllaries and branching of panicle just characteristic;" *Revd. A. Ley*. "The Portland plant seems rightly referred to *H. platyphyllum*, from which it differs very slightly and in characters that may be due to climate and situation;" *Rev. E. F. Linton*. *Botanical Exchange Club Report* for 1907, p. 298.

It may be worth recording that the average height of plants from the east side, was found, by measurements taken by *Mr. Fulleylove* in 1911, to be 11in., highest 18in., shortest about 5in. In full flower second week in June.

Hypochæris radicata, *L. Long-rooted Cat's-ear*. Native. Com. I. and II.

Obs. Phyllaries in II., frequently glabrous.

Taraxicum erythrospermum, *Andrz. Red-fruited Dandelion*. Native. I. II. Not very com. Sandy places the Grove.

Lactuca virosa, *L. Acrid or Strong-scented Lettuce*. II. Freq. West Weare; *H. Groves*. About quarries. Widely distributed and undoubtedly native.

L. muralis, *Gaertn. Ivy-leaved Wall Lettuce*. Native. II. Not com. Local. Noted, *Gibson in Flo. Dor. Ed. 2*, p. 173. About quarries near the Verne. East Weare. West Cliff and Weare, sparingly.

Tragopogon pratense, *L. Yellow Goat's-beard*. Native. II. Rather freq. in pastures and grass crops.

Obs. Our plant appears to be *genuinum*. Usually found singly or in small quantity.

Campanula rotundifolia, *L. Harebell*. Native. II. Formerly fairly freq. on the late Common and the Verne; now mostly destroyed. East Weare near Folly Pier; *F.*

Legousia hybrida, *Delarbre (Specularia hybrida, A.DC.)*. *Small-flowered Venus' Looking-glass*. Colonist. II. Freq. Cornfields; *Gibson in Flo. Dor. Ed. 2*, p. 176. Grove District; *F. Reforne*. Weston. Wakeham.

Limonium recurvum, *C. E. Salmon. Recurved Sea Lavender*. Native. II. Cliffs.

Obs. Vide ante. It is thought best not to define the locality more definitely.

L. binervosum, *C. E. Salmon. (Statice binervosa, G. E. Sm.)*. *Lesser Sea Lavender*. Native. I. The Mere. Rare. II. East Weare below Grove Point and thence Southwards to Godnore.

Statice linearifolia *Laterr. Thrift*. Native. I. Com. Railway banks and turfey grounds. II. Freq. Cliffs, as at Chene and Godnore. West Weare. See *Druce in Journ. Bot.* 1908, p. 387.

Obs. "The common Dorset plant, according to my experience, is *S. linearifolia*. *Laterr.*"; *Druce in litt.*

Primula vulgaris, *Huds. Primrose*. Native. II. East and West Weares, rather sparingly.

P. veris, *L. Cowslip*. Native. II. Rather com. North Verne. East Weare. West Cliff, very stunted; *F.*

Veris x vulgaris, (commonly miscalled *Oxlip*). East Weare below the Grove. *F.*

Samolus Valerandi, *L. Brookweed*. Native. II. Scarce and local. The Weares. Culverwell.

Ligustrum vulgare, *L. Common Privet*. II. East Weare, undoubtedly native.

Centaureum umbellatum, *Gilib. (Erythræa Centaureum, Pers.)*. *Common Centaury*. Native. II. Freq. Culverwell, abundant.

Var. capitatum, *Druce. (Erythræa capitata, Koch. II.* Near the Bill; New record for Dorset; *Druce in Journ. Bot.* 1908, p. 387.

C. pulchellum, *Druce. Slender or Dwarf Centaury*. Native. Rather freq. I. Beach excavation by highroad. II. Shore towards Castleton, 1880; now, perhaps, destroyed. East Weare. About Cave-hole and Lower Lighthouse, much dwarfed, forming compact and densely flowered cymes, probably the result of exposure and constant browsings; (see *Townsend's Flo. Hants*, Ed. 2, 254).

Gentiana Amarella, *L. Autumnal Gentian*. Native. II. Rather freq. North Verne; Between Verne and Easton; East Weare; West Cliff; near the Bill; *F.*

Cynoglossum officinale, *L. Hound's-tongue*. Native. II. Rather freq. on Top Hill, but thinly distributed.

Symphytum officinale, *L. Common Comfrey*. Native. II. Very rare. Churchope, in two places; *F.*

Borago officinalis, *L.* *Common Borage*. Alien or casual.
II. Widely distributed.

Obs. The unusual frequency of Borage in Portland cannot be accounted for by bee-culture, which must always have been very limited. It may have been anciently cultivated for its supposed joy-giving virtues, as mentioned by old writers.

Obs. Myosotis, *L.* No record for any species, except *M. arvensis*, *Hill*, and *M. collina*, *Hoffm.*

Lithospermum officinale, *L.* *Common Gromwell*. Native.
II. Freq. East and West Weares. Top Hill.

L. arvense, *L.* *Corn Gromwell*. Colonist. II. Freq. in cornfields.

Echium vulgare, *L.* *Viper's Bugloss*. Native. II. Not com. Verne. East and West Weares. Churchope and thence to near the Lighthouses. Abundant at Chene, 1911; *F.*

Calystegia Sepium, *Br.* *Great Bindweed*. Native. II. Rare. East Weare.

C. Soldanella, *Br.* *Sea-side Bindweed*. Native. I. Rather scarce. Railway banks near Smallmouth. A large patch on Chesil Bank near old Rifle Butts; *A. Pretor*. II. Cave below Pennsylvania Castle. *Revd. H. E. Fox* in *Flo. Dor.* Ed. 2, 184; now extinct there. Not seen in II. by *G. E. Fulleylove*, 1909—11.

Convolvulus arvensis, *L.* *Small Bindweed*. Native. II. A form wholly pubescent (except as to inside of the corolla), in cult. lands in South Portland.

Cuscuta Epithimum, *Murr.* *Lesser Dodder*. Native. Freq. I. Sandy waste by Chesil Bank. Mere Beach, abundant, 1882. II. Verne slopes. East Weare; near Lower Lighthouse, abundant; *F.* "On herbage as well as on furze;" *Druce* in *Journ. Bot.* 1908, p. 387.

C. Trifolii, *Bab.* *Clover Dodder*. Colonist. II. Very rare. Clover field above West Cliff; *Revd. H. E. Fox* in *Flo. Dor.* Ed. 2, p. 186.

Obs. The station "Sandy places, Chesil Bank, Portland," in *Flo. Dor.* Ed. 2, p. 186, quoted on my authority, was not communicated by me, and is an error.

Hyocyamus niger, *L. Henbane.* Probably mostly native. Scarce. I. Roadside Chesil near the Beach. II. Near Verne Ditch, many plants, 1878. Churchope, *Mansel-Pleydell* in *Flo. Dor.* Ed. 2, p. 186. North Verne; Easton; 1909; *F.*

Obs. Of very uncertain appearance.

Verbascum Thapsus, *L. Great Mullein.* Native. II. Freq. Admiralty Incline. East Weare. About old quarries. Churchope.

Linaria Cymbalaria, *Mill. Ivy-leaved Toadflax.* Alien or denizen. II. Freq. Unusually abundant and completely naturalised in East Weare.

Obs. We may infer that *L. Cymbalaria*, now so common in Portland, was introduced there about the middle of the eighteenth century.

L. Elatine, *Mill. Sharp-leaved Fluellin.* Colonist. II. Very rare. Near Lower Lighthouse; *F.*

Obs. Freq. on the mainland; its rarity in Portland is noteworthy.

L. spuria, *Mill. Round-leaved Fluellin.* Colonist. II. Com. in cult. land on the Hill.

L. minor, *Desf. (viscida, Moench). Least Toadflax.* Colonist. I. Com. on ballast of railway. II. Freq. in cornfields, (as to which see *Journ. Bot.* 1908, p. 299).

Obs. Scarcely, if at all, known in I., before construction of the Railway to Chesil.

Antirrhinum majus, *L. Snapdragon.* Alien. II. On walls; *Mansel-Pleydell* in *Flo. Dor.* Ed. 2, p. 194.

Scrophularia aquatica, *L. Water Figwort.* Native. II. A form with pubescent leaves on top of old retaining-wall, Churchope; an instance of sporting in selection of soil (see 2 *Phyt.*; O.S. 19).

- S. nodosa**, *L. Knotted Figwort*. Native. II. About quarries and main road between Verne and Prison. East Weare sparingly.
- Veronica Tournefortii**, *C. Gmel. (Buxbaumii, Ten.)*. *Buxbaum's Speedwell*. Colonist. I. Frequent. II. Generally distributed in cultivated and waste land extending to Lighthouses.
Obs. Introduced in Portland probably about 70 years ago; now abundant.
- V. serpyllifolia**, *L. Smooth Speedwell*. Native. II. Rare. Thicket under North East Verne; *F.*
- V. Beccabunga**, *L. Brooklime*. Native. II. Scarce. East Weare; Culverwell; *F.*
Obs. *V. Anagallis-aquatica*, *L.* apparently absent.
- Euphrasia occidentalis**, *Wettst.* Native. II. Scarce. ? East Weare, towards Rufus Castle, fairly plentiful, 1898; *Revd. E. L. Marshall*. New for Dorset.
- E. curta**, *Wettst.* Native. II. Scarce. ? Near the Lighthouses. "New for Dorset," *Druce in Journ. Bot.* 1908, p. 387.
- Orobanche elatior**, *Sutton. Tall Broom-rape*. Native. I. Rare and local. Railway bank, a little south of the Bridge; many plants, 1880 and 1881. Also noted by *C. W. Dale* in *Journ. Bot.* 1908, p. 387.
- O. Hederæ**, *Duby. Ivy Broom-rape*. Native. II. Rare and local. East Cliff and Weare between Verne and Southwell landslip, 1880. Gardens at Grove; *F. !*
- O. minor**, *Sm. Lesser Broom-rape*. Native. II. Scarce. East Weare; Retaining-wall Churchope; *F. !* On clover Southwell. About Cave-Hole and Lighthouses.
Obs. Usually on clover, but sometimes on *Crepis virens*.
- O. amethystea**, *Thuill. Sea Holly Broom-rape*. Native. I. Very rare and local. Turfy sandy waste south-east of Smallmouth, on *Eryngium maritimum*; *J. W. White* in *Journ. Bot.* 1896, p. 432!
Obs. "Difficult to distinguish from *O. minor* unless compared in a fresh state;" (*Flo. Bris.* 447.)

- Verbena officinalis**, *L. Vervain*. Native. II. Not com. Local. East and West Weares. Churchope.
- Mentha rotundifolia**, *Huds. Round-leaved Mint*. Denizen. II. Very rare. Weston, Roadside near site of former Poorhouse: 50 plants well established, 1908; *F.* ! Partly destroyed by roadscrapings, 1912.
Obs. Doubtless the remains of former cultivation.
- M. aquatica**, *L. Var hirsuta*, (*Huds.*) *Hairy Water Mint*. Native. II. Local. East Weare. Culverwell; *F.*
Var. paludosa, (*Sole*) ? II. East Weare near shore, 1878.
- Origanum vulgare**, *L. Common Marjoram*. Native. II. Local. Com. throughout East Weare.
Obs. Bracts frequently quite green.
- Thymus Chamædrys**, *Fr. Larger Wild Thyme*. Native. II. Rare. "Portland;" *Mansel-Pleydell* in *Flo. Dor.* Ed. 2, p. 203.
- Clinopodium vulgare**, *L. Wild Basil*. Native. II. Rather rare. East Weare, sparingly, Sweethill; *F.*
Obs. Usually with an uppermost terminal whorl of flowers only. Fl. rarely white.
- Calamintha montana**, *Lam. (officinalis, Moench)*. *Common Calamint*. Native. II. Locally freq. Noted by *Revd. E. Binfield*; (*Pulteney*). East Weare between Prison and Churchope.
Obs. Plants dwarfed by soil and exposure, but "our usual type, frequent in Dorset;" *Revd. E. F. Linton in litt.*
- Salvia Verbenaca**, *L. Wild Sage*. Native. II. Com. on the Hill and in Weares.
- Nepeta Cataria**, *L. Cat Mint*. Native ? II. "In Portland" (*Pulteney*). Not confirmed, but has been reported from West Lulworth.
- N. hederacea**, *Trev. (Glechoma, Benth.) Ground Ivy*. Native. II. Singularly rare. Field Easton; Sweethill, one plant, 1909; *F.*

- Scutellaria galericulata**, *L.* *Common Skull-cap*. I. Casual. Railway Bank near Chesil, several plants for several successive years, 1880-1882.
- Prunella vulgaris**, *L.* *Self-heal*. Native. II. Black Nore, the white flowered form with pale foliage, 1882.
- Marrubium vulgare**, *L.* *White Horehound*. Undoubtedly native. II. Not com. Weston and elsewhere on Hill. Near Rufus Castle. West Cliff, 1905; *Revd. H. Boyden*.
- Stachys officinalis**, *Trev. (Betonica, Benth.)*. *Betony*. Native II. Very rare. Near Lighthouses, 1880.
- S. palustris**, *L.* *Marsh Woundwort*. Native. II. Scarce. Near Chesil. Godnore; Southwell; *F.*
- Galeopsis angustifolia**, *Ehrh.* *Var. canescens*, (*Schultz*). *Red Hemp-nettle*. Colonist. II. Scarce. Cornfields. As *G. Ladanum*, *L.*, *Gibson* in *Flo. Dor.* Ed. 2, p. 208. *Obs.* The type apparently absent; var. *canescens* is the usual form in South-west England.
- Lamium amplexicaule**, *L.* *Henbit Dead-nettle*. Colonist. II. Freq. in cult. ground.
- L. Galeobdolon**, *Crantz.* *Yellow Archangel*. Native. II. Very rare. Verne slope between Castleton and East Weare Battery; East Weare near Rifle Butt, numerous plants; 1911 *F.* !
- Teucrium Scorodonia**, *L.* *Wood Sage*. Native. II. Com. on Top of Hill. East and West Weares.
- Plantago maritima**, *L.* *Sea Plantain*. Native. Com. I. Shores. II. Cliffs.
- P. Coronopus**, *L.* *Buck's-horn Plantain*. Native. II. A dwarf procumbent form, with entire leaves, on dry parts of South-eastern Cliffs fits well with var. *pygmæ*, *Lange*. A remarkably woolly form near Lower Lighthouse.
- [**Illecebrum verticillatum**, *L.* *Whorled Illecebrum*. Native. I. Smallmouth sands, west side, near old Parish Limekiln (between the highroad and the beach), 1792; *Sole MS.* Extinct].
- Obs.* An interesting eastern extension record. "Sole knew the plant from Cornwall, so could not

have been mistaken"; *T. B. Flower, in litt.* It may probably have been destroyed here by the Great Storm, 23rd Novr., 1824.

Chenopodium Vulvaria, *L. Stinking Goose-foot.* Probably native. I. Rather com. II. Roadsides Castleton, etc.

C. murale, *L. Nettle-leaved Goose-foot.* Native or colonist. I. Freq. II. Wakeham. Southwell to near the Bill.

C. urbicum, *L. Upright Goose-foot.* Colonist. II. Very rare. Manure heap, Fortune's Well; *Revd. H. E. Fox* in *Flo. Dor.* Ed. 2, p. 228.

Obs. This record is open to doubt. *C. rubrum* is very partial to manure heaps, and has often been confused with *C. urbicum*.

C. rubrum, *L. Red Goose-foot.* **Var. pseudo-botryoides**, *Wats.* Native. II. Near Lower Lighthouse; *Mansel-Pleydell* in *Flo. Dor.* Ed. 2, p. 227.

Obs. Having regard to the habitat, perhaps a dwarf state only of *C. rubrum*.

Beta maritima, *L. Sea-Beet.* Native. Com. I. Chesil Bank; *Pulteney.* Smallmouth sands. II. Cliffs, abundant.

Atriplex littoralis, *L. Grass-leaved Sea Orache.* Native. I. Rare. "Sandy shores at Portland;" *Pulteney.* Railway banks, Smallmouth to Chesil, sparingly.

Obs. *Var. marina, L.*, apparently absent.

A. deltoidea, *Bab. Triangular-leaved Orache.* Native. I. II. Freq. Gardens and cult. ground extending to Bill; *F.!*

Var. salina *Bab.* I. and II. Com. on sea-sand and shingle.

A. Babingtonii, *Woods. Babington's Orache.* Native. I. Com. Sands close to the Bridge (the small form). Shore Smallmouth to Chesil (green and fleshy form, *var. virescens, Lange*). Bright red state observed on Mere beach.

A. portulacoides, *L. Sea Purslane.* Native. I. South-east shore of Mere, abundant.

Salicornia europæa, *L. (spec. collect.) Glasswort. Marsh-Samphire.* Native. I. Com.

- S. ramosissima**, *Woods*. *Branched Glasswort*. Native. I. Mere near Admiralty Oil tanks, abundant, 1908.
- S. procumbens**, *Sm.* *Procumbent Glasswort*. Native. I. Local. Smallmouth. The Mere.
- S. radicans**, *Sm.* *Creeping Glasswort*. Native. I. Rare and local. First record 1857; *H. Groves*. On sand and mud flats between Highroad and Chesil Bank. Mere near Admiralty tanks, abundant, 1908.
- Sueda fruticosa**, *Forsk.* *Shrubby Sea-Blite*. Native. I. Com. Found by *Sir Thomas Brown, M.D.*, circa 1630 (?); *Ray*. East side of Railway to Chesil, abundant.
- S. maritima**, *Dum.* *Annual Sea-Blite*. Native. I. Com. Mere shore, etc. II. East Weare under Prison; *F.* Raised beach near Bill.
 Var. procumbens, *Syme.* I. Com.
- Salsola Kali**, *L.* *Saltwort*. Native. I. Scarce. Noted, *Gibson in Flo. Dor.* Ed. 2, p. 232. Near the Bridge and by road to Chesil; more plentiful formerly.
- Polygonum Convolvulus**, *L.* *Black Bindweed*. **Var. subulatum**, *V. Hall (pseudo-dumetorum, H. C. Wats.)*. Native. II. Scarce. Cult. ground.
- P. aviculare**, *L.* *Common Knot-grass*. **Var. arenastrum**, (*Bor.*) Native. I. II. Com.
 Var. littorale (*Link.*) I. Sands by the Bridge, 1880.
- P. Raii**, *Bab.* *Ray's Knot-grass*. Native. I. Very rare. "Chesil Bank, Portland;" (meaning, doubtless, sands by Bridge); *Mansel-Pleydell in Flo. Dor.* Ed. 2, p. 236, as *P. Roberti*, *Loisel.*
- Rumex pulcher**, *L.* *Fiddle Dock*. Native. II. Rare. Near Castle, Castleton. North Verne. Roadsides Pennsylvania Castle to Southwell. About Lower Lighthouse. Always sparingly.
 Obs. R. Acetosa, L. Fruits called "Sour-dogs," in Portland; *F.*
- Thesium humifusum**, *DC. (linophyllum, L.)*. *Bastard Toad-flax*. Native. II. Locally freq. On clay above Castleton; *F.* Top of Verne, in 1857, extending

over area of a quarter of a mile ; now mostly destroyed. West Cliff. Black Nore to Lighthouses ; *Sir W. Medlycott* !

Euphorbia amygdaloides, *L. Wood Spurge*. Native. II. Freq. West Weare. Slopes beneath Rectory House. East Weare throughout.

Obs. Dr. Boswell-Syme remarks (8 *Eng. Bot.* Ed. 3, 106), " A form of this species grows on stony slopes in the Island of Portland. The whole plant is not above 9 inches to 1 foot high ; the barren shoots about 6 inches ; the leaves of the rosettes densely pilose on the under sides and at the margins with white hairs. On the flowering stem the large leaves of the rosette soon decay, and the part above it is very densely clothed with fulvous hairs ; the branches below the umbel are few in number or absent, so that the paniculate form of inflorescence is not developed."

E. Paralias, *L. Sea Spurge*. Native. Local. I. Abundant, but less common towards Chesil. " It is one of the first plants that occur on passing over to Chesil Bank, and has been frequently represented by inaccurate people as the *Portland Spurge* ; " *Pulteney*.

E. portlandica, *L. Portland Spurge*. Native. First record *Revd. Mr. Stonestreet*. Introduced into *Eng. Flo.* by *Dillenius*, in *Ray's Synopsis*, Ed. 3 ; (a) (*Pulteney*). I. Freq. between Highroad and Chesil Bank, abundant on latter a little South of Smallmouth. II. Com. West Weare. East Weare. On field rubbish.

Obs. Measurements made of East Weare plants, 1911 : height from 2in. to 14in., 12in. fairly freq., average height 6in. ; *F.*

Mercurialis perennis, *L. Perennial Dog's Mercury*. Native. II. Freq. East and West Weares, etc.

Obs. *M. annua* *L.* is abundant in gardens and cult. ground. It seems to have been introduced from the Continent.

Humulus Lupulus, *L.* *Hop.* II. West Undercliff towards Black Nore; most probably indigenous.

Spiranthes spiralis, *Koch* (*autumnalis*, *Rich.*). *Lady's Tresses.* Native. II. Not com. Near Prison. East Weare sparingly. Churchope. About Lighthouses, plentiful; *F.*

Orchis pyramidalis, *L.* *Pyramidal Orchis.* Native. II. Freq. West Cliff and West Weare. East Weare and Cliffs to Cave-Hole. Flowers sometimes white.

O. morio, *L.* *Green-winged Orchis.* Native. Rare. I. Sandy waste, several plants; *H. Groves*; *Phyt.* O.S. 1858. II. Verne western slopes; Culverwell; *F.*

O. mascula, *L.* *Early purple Orchis.* Native. II. Rare. Verne western slopes; East Weare near Folly Pier, several plants; *F.*

O. latifolia, *L.* II. *Broad-leaved Marsh Orchis.* Native. II. Very rare. Near Lower Lighthouse, several plants, 1878. Only one observed 1910; *F.*

Ophrys apifera, *Huds.* *Bee Orchis.* Native. I. "Sands Portland Ferry," *Revd. H. J. Riddelsdell* in *Journ. Bot.* 1908, p. 388. II. Freq. Cliffs and Weares to Southwell.
Obs. The absence of *Blackstonia perfoliata*, *Huds.*, a usual associate of the Bee Orchis, is remarkable.

Iris foetidissima, *L.* *Stinking Iris.* Native. II. Com.

Asparagus maritimus, *Mill.* (*officinalis*, *L.*, pro parte). *Sea Asparagus.* Native. Very rare. I. On sandy waste. Noted *Sole MS.* 1782; *Dawson Turner*; *Dr. Maton*, 1794; *Pulteney*, 1799; *the Author*, 1876. II. A fine plant in the depression of an unquarried stone, close to cliff, towards Lower Lighthouse, 1876.

Allium vineale, *L.* *Crow-Garlic.* *Var. compactum* (*Thuill.*). Native. II. Freq. in cornfields and on cliff borders.

Obs. Rarely with one or two ill-developed flowers among the bulbils.

Muscari racemosum, Lam. & DC. *Grape Hyacinth* or *Starch Hyacinth*. Alien. II. Very rare. On a path-way between cultivated grounds north-west of Higher Lighthouse; *Mansel-Pleydell*, in litt. 1879, and see *Flo. Dor.* Ed. 2, p. 267. Tramway side, near Pennsylvania Castle, 1878; *J. W. White*.

Obs. "The erect abortive flowers on the summit, and the pendant fertile ones below, were as well developed as any I have seen on the other side of the Channel;" *Mansel-Pleydell* in 13 *Journ. Bot.* p. 211.

Scilla non-scripta. *Hoffmgg. & Link (nutans, Sm.)*. *Blue-bell*. Native. II. Not com. Local. Verne slopes, (formerly more frequent). East Weare.

Ornithogalum umbellatum, L. *Common Star of Bethlehem*. Denizen. Local. II. Scattered in grass lawns West of Avalanche Road, Weston, 70 or 80 plants, 1912; has been observed here "time out of mind;" *F!*

Obs. The plant, as found in Portland, is the var. b. of *Bert. Fl. It.* IV. 95, and 0, *angustifolium*, *Boreau*.

Juncus Gerardi, *Lois.* *Mud Rush*. Native. Com. I. and II. Shores.

J. sylvaticus, *Reich.* (*acutiflorus*, Ehrh.). *Sharp-flowered Rush*. Native. II. Rather rare. Culverwell.

Arum maculatum, L. *Cuckoo-pint*. *Lords and Ladies*. Native. II. Abundant in open pastures, but with very starved appearance.

Obs. Much less freq. than formerly, owing to improved cultivation. "The fresh root (corm), like the rest of the plant, is very acrid and poisonous; but it contains a large amount of nutritious starchy fecula. This starch, separated by crushing and washing, was formerly prepared for laundry work and other purposes, and, at one time was much esteemed in the Island of Portland as a food for sick folk. In 1797 the gold medal of the Society of Arts was awarded to Mrs. Jane Gibbs, of Portland, for producing starch suitable for economic

purposes from material unfit for the food of man. This industry, pursued at length by a few old women, has now died out. A Paper on " 'The Portland Arrowroot,' " by the late *Thomas B. Groves* of Weymouth, is published in *Phytol.* IV., p. 1030." *Flo. Bris.*, p. 605.

- Triglochin palustre**, *L. Marsh Arrow-grass.* Native. II. Rare. Culverwell, 1881.
- T. maritimum**, *L. Sea Arrow-grass.* Native. II. Rare. Culverwell, 1881.
- Eleocharis palustris**, *Roem. & Schult. Creeping Spike-rush.* Native. II. Scarce and local. East and West Weares. Culverwell.
- E. uniglumis**, *Schultes. Schultes' Club-rush.* Native. II. Very rare. Near Lower Lighthouse; *Mansel-Pleydell* in *Flo. Dor.* Ed. 2, p. 286.
- Scirpus pauciflorus**, *Lightf. Chocolate-headed Club-rush.* Native. II. Very rare. South-east side of Island; *Mansel-Pleydell.* !
- S. filiformis**, *Savi. (Savi, Seb. & Maur.). Savi's Club-rush.* Native. II. **Var. monostachys.** Very rare. North-West Undercliff; a few plants only! *H. Groves.* Recorded (as *S. Savii* S. & M.), by *Sir W. Hooker* from "East Cliff," *Mrs. M. Frampton* MS: probably the West Undercliff was intended.
- S. Tabernæmontani**, *Gmel. Lesser Bulrush.* Native. II. Very rare. Near Lower Lighthouse.
- S. maritimus**, *L. Sea Club-rush.* Native. II. Local. Shore between old Chesil railway terminus and Portland Castle, 1880.
- Eriophorum angustifolium**, *Roth. Common Cotton-grass.* Native. II. Very rare. Near Lower Lighthouse; first record *H. Groves*, circa 1856. !
- Carex arenaria**, *L. Sea Sedge.* Native. I. Freq. Between Smallmouth and Chesil.
- C. vulpina**, *L. Great Sedge.* Native. II. Com. in East Weare.

- C. contigua**, *Hoppe* (*muricata* auct. angl.). *Greater Prickly Sedge*. Native. II. Local. East Weare, sparingly.
- C. Goodenowii**, *Gay*, (*vulgaris*, Fr). *Common Sedge*. Native. II. Culverwell, in some plenty; a form with 3 male spikes occurs.
- C. distans**, *L.* *Loose or Distant-spiked Sedge*. Native. II. Scarce. Formerly on shore near Portland Castle: probably since destroyed. East Weare. Culverwell.
- C. hirta**, *L.* *Hammer Sedge*. Native. II. Rare. North West Weare.
- Phalaris canariensis**, *L.* *Canary-grass*. Alien. I. Freq. Beach-waste near Chesil.
- Pheum pratense**, *L.* *Timothy-grass*. **Var. nodosum**, *L.* Native. II. North Verne.
- P. arenarium**, *L.* *Sand Timothy-grass*. Native. I. Local. By highroad Smallmouth to Chesil, plentiful. Mere beach.
- Gastridium lendigerum**, *Gaud.* *Awned Nit-grass*. Native. II. Rare and local. Rough ground between St. George's Church and West Cliff, 1882. Near Lower Lighthouse 1882.
- Ammophila arenaria**, *Link.* (*Psamma arundinacea*, Beauv.) *Mat Grass*. Native. I. Local. Sandbanks south of Bridge.
- Trisetum flavescens**, *Beauv.* (*pratense*, Pers.). *Yellow Oat-grass*. Native. II. Com.
- Avena pubescens**, *Huds.* *Downy Oat-grass*. Native. II. Freq.
- A. pratensis**, *L.* *Narrow-leaved Oat-grass*. Native. II. Freq. East Weare to near the Bill.
- A. fatua**, *L.* *Wild Oat*. Colonist. I. Smallmouth sandbanks; *Mansel-Pleydell* in *Flo. Dor.* Ed. 2, p. 308. II. "Portland;" *ib.*
- Sieglingia decumbens**, *Bernh.* (*Triodia decumbens*, Beauv.). *Heath-grass*. Native. II. Rare and local. Culverwell and barren ground north of Lower Lighthouse, 1882.
- Phragmites communis** *Trin.* *Common Reed*. **Var. nigricans**,

Gren. & Godr. Native. I. Near Chesil Bank; Druce in *Journ. Bot.* 1908, p 389, as *subuniflora*, (DC.)

Koeleria glauca, DC. *Glaucous Hair-grass.* Var. **albescens**, (DC). Native. I. Rare. Smallmouth sands; *Revd. H. J. Riddelsdell* in *Journ. Bot.* 1908, p. 389.

K. gracilis, Pers. *Slender Hair-grass.* Native. I. Rare. Smallmouth Sands (the type); *ib.*

Obs. Both the above species were named for the *Revd. H. J. Riddelsdell* by Dr. Karl Domin; (b) (*Revd. E. F. Linton* "Notes on the Dorset Flora," in *Pro. Dors. N. H. & A. F. Club*, Vol. XXX., 1909, p. 128).

Catabrosa aquatica, Beauv. *Water Whorl-grass.* Native. II. Rare. Culverwell, 1881.

Dactylis glomerata, L. *Cocks-foot grass.* Var. **abbreviata**, Bernh. Native. II. Portland; Druce in *Journ. Bot.* 1908, p. 389.

Poa compressa, L. *Flat-stalked Meadow-grass.* Native. II. Very rare. "In arable fields;" Druce in *Journ. Bot.* 1908, p. 389.

Glyceria fluitans, Br. x **plicata**, (*pedicellata*, Towns.). Native. II. Probably occurs in East Weare. Culverwell.

G. plicata, Fr. *Folded-leaved Meadow-grass.* Native. II. Not. com. Formerly between Chesil Railway Station and Castle near Shore; probably since destroyed. East Weare. Culverwell.

G. maritima, Mert. & Koch, (*Sclerochloa*, Lind.). *Creeping Sea Meadow-grass.* Native. Freq. I. Smallmouth to Chesil, in damp sandy places. II. Cliffs Lower Lighthouse to Bill.

G. distans, Wahlb. (*Sclerochloa distans.*, Bab.). *Reflexed Meadow-grass.* Native. Not com. I. Near the Bridge. II. Near Chesil old Railway Station.

G. rupestris, E. S. Marshall. (*Sclerochloa procumbens*, Dum.) *Procumbent Sea Meadow-grass.* Native. Not com. I.

(b) The monographer of the genus.

Chesil Bank near old Railway Station. II. "Portland," *Mansel-Pleydell* in *Flo. Dor.* Ed. 2, p. 316.

Festuca rottboellioides, *Kunth.* (*Sclerochloa loliacea*, Woods) *Dwarf Meadow-grass.* Native. Com. I. Beach wastes Smallmouth to Chesil, remarkably abundant. II. Shore banks, north and east sides throughout.

F. membranacea, *Druce (uniglumis, Soland).* *Single-glumed Fescue-grass.* Native. I. Very rare. "Mr. Lightfoot found it in Portland," *Pulteney*; (doubtless refers to Distr. I.). Sandy turfy roadsides to Chesil and by Chesil Bank to within a quarter of a mile north of Chesil old Railway Station, 1857; there 1911.

F. ambigua, *Le Gall.* *Ambiguous Fescue-grass.* Native. I. Very rare. Smallmouth sands; *Mansel-Pleydell* in *Flo. Dor.* Ed. 2, p. 316.

Obs. This may possibly refer to the north side of Smallmouth.

F. bromoides, *L. (sciuroides, Roth).* *Barren Fescue-grass.* Native. I. Rare. Smallmouth Sandbanks; *Mansel-Pleydell.* II. Freq. Cult. ground (sometimes 18in. high). East Weare.

F. ovina, *L. Sheep's Fescue-grass.* **Var. glauca**, *Hackel.* Native. II. Freq. in south of Island.

F. rubra, *L. Hard Fescue-grass.* **Var. pruinosa**, *Hackel.* Native. II. "Portland;" *Druce* in *Journ. Bot.* 1908, p. 389.

Var. arenaria, *Fr. Creeping Fescue-grass.* I. Sandbanks near the Bridge. Sands west of Highroad. (See *Flo. Dor.* Ed. 2, p. 317).

F. elatior, *L. Tall Fescue-grass.* **Var. arundinacea (Schreb.).** Native. II. Cliffs abundant.

Bromus secalinus, *L. Rye Brome-grass.* Colonist. **Var. velutimus (Schrad.).** II. Rare. Cornfields Southwell.

Obs. I have not found the type.

B. commutatus, *Schrad. Confused Brome-grass.* II. Rare. In pastures; *Mansel-Pleydell.* Between the Grove and Churchope. Wakeham.

Obs. "Var. *pubescens*, *Lon. Cat.*, is equally distributed;" *Flo. Dor.* Ed. 2, p. 320. I have not found this var.

B. hordeaceus, *L. (mollis, L.)*, *Soft Brome-grass*. Native.
I. A nearly prostrate maritime form com. on sand.

Var. *glabratus*, *Doell.* II. Freq. Cult. grounds.

Brachypodium sylvaticum, *Roem. & Schult. False Wood Brome-grass*. Native. II. Com. East Weares, etc., to Cave-Hole. Growing close to highwater mark at Black Nore.

B. pinnatum, *Beauv. Barren False Brome-grass*. Native.
II. Verne. Freq. by edges of fields.

Lolium perenne, *L. Common Rye-grass*. Var. *aristatum*,
Schum. Native. II. Freq. Cult. fields.

Agropyron repens, *Beauv. (Triticum, L.) Common Couch-grass*. Var. *barbatum*, *Duval-Jouve.* Native. II. Near Chesil old Railway Station.

A. pungens, *Roem. & Schult. Erect Sea Couch-grass*. Native. Local. I. Smallmouth sands; *Mansel-Pleydell* in *Flo. Dor.* Ed. 2, p. 322.

Var. *littorale* (*Reichb.*) I. "Smallmouth Sands;"
Mansel-Pleydell in *Flo. Dor.* Ed. 2, p. 322.
Railway banks.

A. junceum, *Beauv. Sand Couch-grass*. Native. Local.
I. Freq. On sands near the Bridge. Railway banks between there and Chesil.

x repens (*acutum*, auct. angl.). *Decumbent Sea Couch-grass*. Native. I. By Railway banks and by shore between the Bridge and Chesil, abundant.

Obs. "Doubtless the *A. acutum* of the *Flora*," (see *Flo. Dor.* Ed. 2, p. 322); *Druce* in *Journ. Bot.* 1908, p. 389.

Lepturus filiformis, *Trin. Sea Hard-grass*. Native. Common. I. Damp places Smallmouth to Chesil. II. East cliffs and shore to the Bill.

Hordeum nodosum, *L. (pratense, Huds.) Meadow Barley*. Native. Freq. (?) II. "Portland;" *Mansel-Pleydell* in *Flo. Dor.* Ed. 2, p. 323.

H. murinum, *L. Wall Barley*. Native. I. and II. Com.
H. maritimum, *Huds. (maritimum, With.) Sea-Barley*. Native.
 Local. I. Sandy wastes. II. About Chesil old Railway
 Station.

[**Adiantum Capillus-Veneris**, *L. True Maiden-hair Fern*.
 Native. II. Fissures of Cliffs near Long Tout !

Obs. Communicated by late *Miss S. M. Payne* to
Mr. Mansel-Pleydell 1868 ; see *Flo. Dor.* Ed. 2 p.
 325, where for "west Side" read "east Side." I
 found it in several places, on the face of East
 Cliff, in 1877 and 1878 ; believed to be now
 extinct, and to have been destroyed by quarrying
 operations].

Asplenium maritimum, *L. Sea Spleenwort*. Native. Local.
 First record, *Pulteney*. II. Grove Cliffs from Prison to
 Southwell landslip, sparingly. West Cliff, very fine.

A. Trichomanes, *L. Maiden-hair Spleenwort*. Native. II.
 Rare. Rocks, etc., between Grove and Churchope.

A. Ruta-muraria, *L. Wall Rue*. Native. II. Rather rare.
 Rocks, etc., between Grove and Churchope. Wall Old
 Vicarage House ; *F.*

Ceterach officinarum, *Willd. Rustyback*. Native. II.
 Found by me on rocks at Yeates, 1855, and by
Revd. H. E. Fox 1872 ; *Flo. Dor.* Ed. 2, p. 327.
 Repeatedly searched for since ; believed to be now
 extinct.

Polysticum angulare, *Presl. (Aspidium angulare, Willd.)*
Angular-leaved or Drooping Shield Fern. Native. II.
 Rare. West Cliff below the Obelisk ; *F.*

Polypodium vulgare, *L. Common Polypody*. Native. II.
 Scarce. East Weare between Grove and Churchope.

Ophioglossum vulgatum, *L. Adder's-tongue*. Native. II.
 Local. Verne slopes above shore end of Breakwater,
 1909 ; Culverwell, very numerous plants within a space
 of 4 square yards, 1909 ; near old Lower Lighthouse,
 150 plants within a space of a few yards, 1911 ; *F.*

Equisetum maximum, *Lam. Great Water Horse-tail*. Native

II. Com. First record, *Pulteney*. Slopes near Break-water end and East and West Weares, abundant.

Var. serotinum, *Braun*. II. East Weare, 1880.

E. palustre, *L. Marsh Horse-tail*. Native. Rare and local.
II. East Weare.

Pilularia globulifera, *L. Pillwort*. Native. Extremely rare.
II. Bog Portland; *Henry Groves* in *Flo. Dor.* Ed. 2, p. 343; (found before A.D. 1890.

Chara vulgaris, *L.* Native. II. Not com. Watercourses
East Weare. Culverwell; *F.*!

ADDENDA.

The following additional records by Mr. C. E. Salmon appear in *Journ. Bot.*, Dec., 1911, viz. :—

Geranium Robertianum, *L.* Var. *purpureum* (*Vill.*). II.
West Weare.

Salicornia appressa, *Dum.* I. Between Wyke Regis and
Portland, [i.e. on mud-flats between Smallmouth and
Chesil].

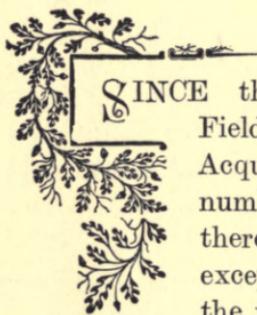
S. lignosa, *Woods.* I. The like.





Notes on Additions to the
Dorset County Museum and Library,
MAY, 1911—MAY, 1912.

By THE CURATOR.



SINCE the last Annual Meeting of the Dorset Field Club, although the pages of the Museum Acquisition Book record a considerable number of useful and acceptable objects, there has been scarcely anything of an exceptional character, or such as would mark the year as memorable in the history of the Museum.

The most unusual acquisition is the model of the sturgeon captured at Bindon Mill, in the river Frome, on 2nd July, 1911, by Captain C. E. Radclyffe. The model was given by him at the request of H.M. King George, to whom the original fish was presented.

Captain Radclyffe supplied the following note:—"The sturgeon, for which extensive fisheries exist in the estuaries of Southern Russia, is of rare occurrence in English rivers.



ANTLER PICKS
IN THE DORSET COUNTY MUSEUM.



The fish, from which the model was taken by Rowland Ward, London, had been observed for some weeks in the river Frome during the summer. It was foul-hooked by Captain Radelyffe when using a salmon rod and fly, and was landed in a small drag-net. It is believed to be the only case of a sturgeon being hooked on a rod and line in an English river, and one of the largest fish ever taken in similar waters."

The fish measured 9ft. 3½in. in length, and weighed 203lb., and it must have created (one would imagine) the utmost confusion amongst the ordinary inhabitants of the placid stream.

Mr. H. J. Sykes has presented two cabinets of moths and butterflies ; but, unfortunately, the majority of the specimens are foreign to the county of Dorset, and should not, therefore, be included in the Museum collections. Our President, however, has most kindly undertaken to remove to our own cases such specimens as may be available.

Of antiquities recently acquired, I may mention several Roman coins, chiefly 3rd Brass ; one without a portrait is said to be a Consular piece, date about 11 B.C., and scarce ; and we have also added two or three Dorset Trade Tokens to our collection. A Roman urn of black ware has been presented by Captain Godman ; it was found (A.D. 1858) in connection with a burial, close to the skull, in a glebe field at Wyke Regis, by the Rev. H. Pigou, and has been figured and described in the Journal of the Archæological Institute, Vol. XVI. A fragment of Roman pavement was uncovered close to Trinity-street, Dorchester. The tessellæ were of the large, coarse, grey and red description, and were taken up and given by Mr. Tilley, together with two Roman coins (3rd Brass). Mr. W. de C. Prideaux has deposited in the Museum the fine reproduction of the brass memorial, a palimpsest, to Master Wyllym Goldynge, in Pydelhinton Church, which was exhibited at a recent Field Club Meeting. With one exception, the same general description of additions to the Library, must be given, as I made use of in reference to the Museum. Some 50 books have been acquired, which it is

hoped will prove useful to our Members ; such as " The Roman Era in Britain " and " Romano-British Buildings and Earthworks," both by Mr. John Ward, F.S.A., " The History of Gothic Architecture in England and France," " The Concise Oxford Dictionary of Current English." Five Vols. : Natural History, Handbooks, or Catalogues, from the British Museum ; Elementary Manual of Roman Coins ; and a History of Amphitheatres translated from the Italian. The chief acquisition of this class is the 1st Volume of the Report by Mr. Bulleid and Mr. Gray of the Glastonbury Lake Village Excavations, 1892-1907. It gives detailed description of the work, with 58 plates, and 136 illustrations in the text, and contains a valuable treatise by Dr. Monro on " our present knowledge of Lake Dwellings." We have acquired several useful maps, including 3 sheets of the new Geological Survey of Dorset ; 3 sheets of the original 1 inch Ordnance Survey 1809-11, and maps of Dorset by Blaeu, Kip, and Morden, XVIIth Century.

The one acquisition to the library which demands special notice is the original MS. of " The Mayor of Casterbridge," presented to the Museum by the Author. It consists of 479 pages of ruled quarto paper, bound in boards, green calf back and corners, and bears the date " Written 1884, 1885." It exhibits not only the care with which the copy was prepared for press, but its interest is enhanced by the names here and there of the compositors through whose hands the sheets passed, and occasionally by the unmistakeable impress of their fingers. We have become possessors of a unique literary treasure which would indeed be highly valued all the world over, but by none surely so much as by ourselves, who may rightly claim as " our own " both the distinguished author himself and the " pleäce the teäles a-twold of."

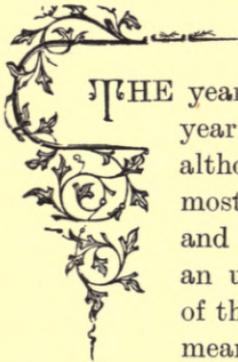
" Vor Do'set dear, then gi'e woone cheer,"

and for Mr. Thomas Hardy.



Remarks on Rainfall of 1911.

By H. STILWELL, M.R.I.



THE year 1911 will always be remembered as the year with the hot and dry summer but although the severity of the drought was mostly felt in the months of July, August, and September, that shortage of rain followed an unusually dry period in the first six months of the year, and by the end of September the mean rainfall in Dorset only amounted to 13·63in., leaving a deficiency of 20·08in. to be made up in the last three months of the year if the mean annual fall should be equalled.

With October a great change in the weather occurred, and before the year ended 17·66in. was added to the total, and thus the ultimate deficiency of the year only amounted to 2·42in.

The rainfall in December was especially heavy, as will be seen in the following Tables, and in many places it exceeded all previous records.

A fall of over 2in. in one day was only noted once during the year, and this occurred at Winterbourne Herrington on 26th May, where 2·60in. was registered. On the same day 1·91 fell at Dorchester Waterworks, 1·23 at Upwey, in a thunderstorm of about 2 hours duration, and 1·17 at Chedington Court, which were the maxima falls of the year at those places. The heavy rain was, however, local, and it did not extend to the eastward beyond Puddletown, nor did it reach Portland.

The heaviest and most widespread rain of the year fell on November 11th, thirty-five stations recording the rain of that day as the heaviest of the year.

At seven stations no fall amounting to 1in. occurred on any day.

A severe and sudden storm of wind, accompanied by lightning, was reported at Lyme Regis on 29th July, but the rainfall amounted only to 0·17 on that day.

An interesting table has been sent by the Rev. J. Cross (given in the following notes), which contains a weekly statement of the height of the water standing in a tube well at Sturminster Marshall from 1st April, 1910, to 1st January, 1912. It shows that at the beginning of 1911, after the heavy rain which occurred in the last three months of the previous year, the water stood at 4ft. 3in. from the top of the tube, but in consequence of the small amount of rain during the first nine months of 1911, the water gradually receded, with hardly any check, until the end of October, by which time the water had fallen to 9ft. 9in. from the top of the tube. By January 1st of the present year the heavy rainfall in October, November, and December, 1911, had restored the water to the level at which it stood in the previous January, making up the loss incurred during the drought of last year.

Owing to the regretted deaths of Admiral Stopford and Mrs. Pretor, the tables for this year contain no returns from Shroton and Wyke Regis, but on the other hand several new returns appear for the first time, namely from Ranston, Gussage St. Michael, Witchampton, Wimborne Westfield and Royston, Creech Grange, and Abbotsbury Castle.

OBSERVERS' NOTES ON METEOROLOGICAL PHENOMENA, &C.

BUCKHORN WESTON.—Christmas Day, a slight thunder-storm at 6.30 p.m., with only two or three claps rather loud.

ST. GILES' HOUSE.—

Months.	Hours Sun.	Mean Temp.	Max. Temp.	Min. Temp.	Max. ° in Sun.	Min. ° on grass.	Highest Barometer Reading.	Lowest Barometer Reading.
January ..	73	38'43	57	18	93	16	30'52	29'47
February ..	96'5	40'73	60	18	103	15	30'51	29'27
March ..	116'5	43	63	21	117	19	30'25	29'40
April ..	186	45'43	66	21	125	21	30'37	29'40
May ..	261	56	79	30	137	28	30'25	29'60
June ..	251	59'416	85	33	141	31	30'40	29'50
July ..	382	63'74	93	39	142	34	30'48	29'70
August ..	247	66	96	39	142	35	30'27	29'55
September ..	227	59	91	30	132	26	30'26	29'49
October ..	129	51'5	70	23	117	18	30'42	29'05
November ..	70'5	43'4	58	25	108	19	30'09	28'81
December ..	48'5	43'3	55	22	93	17	30'19	28'90
Year ..	2088	50'8						

July had an average of 12'32 hours of sunshine. Warmest night, 27th August, 63°. Nine days with a temperature of 90° and above. Thirty-five days between 80° and 90°.

HORTON VICARAGE.—August 9th, maximum in screen, 99°.

STURMINSTER MARSHALL.—Bailie House. 3in. tube well, 50ft. and about 70ft. further 1¼in. bore unlined. On front lawn, say 10 yards S.E. of bow window. Top of tube 1 foot above ground.

WEEKLY RECORD OF DISTANCE OF WATER FROM TOP OF TUBE.

	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.
1910.										
April	5	3	5	6	5	6½	5	10	6	0½
May	6	1½	6	3	6	5	6	7½	6	9¼
June	6	10	6	10½	6	4½	6	9½	7	0¼
July	7	1¼	7	2¼	7	4	7	5	7	5½
Aug.	7	6¼	7	7¾	7	9¼	7	10¾	7	11¼
Sept.	7	10¼	8	0¼	8	1½	8	3	8	4¼
Oct.	8	4¼	8	5½	7	11½	7	6½	7	6½
Nov.	7	5¼	7	1¼	6	11¼	7	1	6	4¼
Dec.	6	3	5	6	3	11	3	7½	4	0
1911.										
Jan.	4	3	4	7¾	4	9	5	2	5	5½
Feb.	5	7¼	5	10¼	6	0½	6	2¼	6	1¼
March	6	0¼	6	1	5	4½	5	9½	5	11¼
April	6	1	6	3¼	6	5½	6	7¼	6	7¼
May	6	7½	6	8	6	9¼	6	11¼	7	0¼
June	7	1¼	7	3½	7	5½	7	6½	7	8
July	7	7¾	7	9¾	7	11¾	8	2	8	4
Aug.	8	4¾	8	6½	8	8½	8	10¼	8	11½
Sept.	9	0	9	1¼	9	3	9	4½	9	5½
Oct.	9	6	9	7	9	8	9	9	9	7½
Nov.	9	7	9	6	9	0	8	5½	8	6½
Dec.	8	6	7	9½	6	5	4	7½	4	0¼*

* N.B.—On 1st Jan. it had risen to 4'4.

This tube well is in the chalk, which was reached at about 23ft. I have never made use of this well, but kept it solely for this measuring (so far) at 9 a.m. each morning. I have a daily diagram if wanted.

WIMBORNE.—In spite of the heavy rainfall in December of 1911, the rainfall for the year is 3·67 inches below the average in Wimborne for the twelve years ending 1910. The average for these twelve years (1899-1910) is 34·22 inches. The rainfall in December, 1911 (8·80 inches), has only been exceeded three times by a monthly rainfall during those twelve years, at each time in the month of October. These were :—Oct., 1903, 10·76 inches ; Oct., 1907, 10·57 inches ; and Oct., 1909, 9·10 inches.

There was a drought of 33 days in May and June, and another of 28 days in July.

WEYMOUTH.—Meteorological returns for 1911 :—

Means, Barometer, 29·99in. ; Thermometers, 9 a.m., 53·4° ; max., 58·9° ; min., 46·8° ; range, 12·1° ; max. and min. mean, 52·8° ; extremes, max., 87°, Aug. 10th ; min., 26·9°, February 2nd. Relative humidity, 76 %. Bright sunshine, 2,091 hours ; sunless days, 59. Rainfall, 24·80in. ; rainy days, 151. Sea temperature, mean, 53·1° ; extremes, max., 68°, July 13th ; min., 41 March 8th, April 10th.

The winds, number of observations, twice daily—North, 106 ; N.E., 50 ; East, 153 ; S.E., 41 ; South, 45 ; S.W., 62 ; West, 216 ; N.W., 48 ; calms, 9.

WEYMOUTH, MASSANDRA.—The weather for the year 1911 may be concisely described as remarkable for the extreme dryness, excessive heat, and exceptional amount of sunshine. Only 12·64in. rain fell in the first nine months, 17·55 falling in the last three, the last month probably being the wettest and warmest December on record.

PORTLAND AND UPWEY.—The three Summer months—July, August, and September—were remarkably fine, the quantity of rain falling only amounting to 2·06 inches, with 21 wet days at Upwey, and 1·63 with 18 wet days at Easton, there being an absolute drought ending the 29th July of

29 days at Easton, and 28 days at Upwey. July was a most remarkable month, possibly the driest on record in some districts, but certainly the driest month generally since July, 1885, rain falling on one day only, and then but $\cdot 11$ at Easton and $\cdot 13$ at Upwey.

The three Autumn months—October, November, and December—were just about as wet as the three previous months had been dry, the total amount registered at Upwey being no less than $15\cdot 61$ inches and at Easton $16\cdot 14$, with 64 wet days at the former place and 67 at the latter. December was by far the wettest month, rain falling on 29 days at Easton and 27 at Upwey. The year, however, was drier than the average, but could not—at any rate, in this district—be called a dry year.

Thunder was heard on 9 occasions at Upwey and 8 at Easton. Snow was remarkable by its absence, there being but a sprinkling on the 25th March and the 5th April.

The heaviest rainfall in Portland was on the 11th of November, when $1\cdot 13$ inches were registered. At Upwey the greatest quantity was recorded on the 26th May during a thunderstorm of about 2 hours duration, and which amounted to $1\cdot 23$ inches. Curiously enough this storm did not reach Portland, no rain being recorded that day. The only other days when 1 inch was recorded were the 12th March at Easton ($1\cdot 05$) and the 11th November at Upwey ($1\cdot 16$).

Gales were very frequent from the 22nd October to the middle of December. Brooks' Comet was visible on the 26th September.

CHICKERELL, "MONTEVIDEO."—An extraordinarily dry, hot summer. Rain most persistent through December, more than half a hundredth of an inch having fallen on each day of the month, a most rare occurrence. Rain fell also on each of the last 5 days of November, making a record of rain on 36 successive days without intermission.

On the other hand there were 28 successive days in July on none of which the fall amounted to half-a-hundredth, and on only two of which a few drops fell.

LYME REGIS, HOLME CLEVE.—July 29th—a storm broke here with tropical suddenness and violence at 4.45 p.m.; lightning, a hurricane of wind, and a little rain.

BEAMINSTER, FLEET STREET.—The year 1911 will be long remembered for its prolonged drought and excessive heat, every month from May to September inclusive being above average in temperature, whilst in rainfall each of the first 10 months was below the average, except March, which had an excess of half an inch. The drought did not terminate until October 17th, up to which time the rainfall since Jan. 1st had been only 15.52 inches, whereas in the remaining 10 or 11 weeks the fall was 18.74 inches, including 10.27 inches in December.

Up to the end of November we were 10 inches short of the average, and bid fair to record the driest year of the past 38 years, according to the records at the vicarage, but the rain of December entirely upset anticipations.

December was wetter than any month during 31 years' observations.

Unfortunately the period of greatest drought and of excessive heat came together in July and August, during which time the rainfall was only 1.02 inch, whilst the max. temp. was always above 70 deg. and often over 80 degs.

During the summer there were 87 days with max. temp. above 70 deg., and of these 48 days were above 75 deg., and 20 days above 80 deg. During the previous 13 years there had been only 22 days above 80 deg. altogether.

July and August were the two hottest months—the average max. temp. of July being 76.5 deg., and that of August 74.7 deg. Rainfall in 1911 was 3.63 inches below average.

CHEDINGTON COURT.—The fall of May 26th was the most remarkable of the year, 1.14 of total fell under 2 hours, 2.15 to 4 p.m. Evidently it was a cloud burst, as it fell in a small radius in such large quantity, a mile to the East and $\frac{3}{4}$ of mile to West the fall was only comparatively slight. The fall of .18 on 25th August fell in 10 minutes.

The total for December is the largest for one month of which we have record here.

WINTERBOURNE STEEPLTON.—The rainfall of the year was 2·11in. less than the mean of the previous 18 years. During the first 28 days of July there was an absolute drought. The last three months of the year gave a total of 19·60, of which 9in. fell in December.

DORCHESTER, WOLLASTON HOUSE.—Notwithstanding the exceptional weather during the summer, the total rainfall for the year exceeded the average by nearly 2 inches. The last 3 months, October, November, and December, giving 19·70, which is considerably more than half of the year's total.

The period from 1st July to 18th September (80 days) yielded only 1·03 inches; this being partly accounted for by the fact that no severe thunderstorms passed over Dorchester. During the same period the maximum therm., Kew Register, hanging in a correct Stevenson screen, registered 80° and over on 26 days, touching 90° on 14th August.

WINTERBOURNE HERRINGSTON.—On May 26th we had a very heavy fall of water, measured 2·60 in an hour, but only over a very small area. On Nov. 11th we had 1·94, and that was with thunder.

BLOXWORTH RECTORY.—The past abnormal year, 1911, will no doubt be more or less minutely recorded in various aspects by others of our "Recorders." I would only remark upon one or two of them. First, upon the cold and ungenial Springtide, which was here very hurtful to the fruit-crops, both in their quantity and quality. This was followed by the long summer drought, during which, in this district, although there were often evident thunderstorms occurring in various directions, only one or two were of any noticeable kind here, and these evidently at a great height overhead, of comparatively short duration, and attended with but slight rainfall. Next I would specially notice that the distribution of the rainfall over the past year was unprecedented in the many past years during which I have registered rainfall here, 12·33in. having

fallen during the first nine months—January to September inclusive—and 18·1lin. during the three last—October, November, and December.

It has been a year which will be long remembered for the difficulties, distresses, and losses it entailed upon gardeners, dairymen, and flockmasters. The general agriculturist, however, has had some compensation in his corn-crops, and the better prices he has realized for such produce.

WINTERBOURNE WHITCHURCH VICARAGE.—Notes on the Weather at Whitchurch :—

JAN.—There was a remarkable absence of frost, and no snow fell throughout the month. The highest temperature occurred on the 23th, 55; lowest was registered during the night of the 14th, when the thermometer sank to 20.

FEB.—Very mild weather prevailed throughout the month. The highest temperature occurred on the 26th, when the thermometer rose to 56. The lowest was registered during the night of the 1st, 21.

MAR.—On the 22nd a remarkable thunderstorm passed over from E.N.E. to W.S.W. between 3 and 5 p.m., a peculiar feature of the storm being a rise of temperature from 53 to 59, which occurred during its earlier stage. I do not ever remember observing a similar occurrence taking place after the commencement of a storm. Highest temperature registered on the 30th, 61; lowest, the night of the 16th, 23.

APR.—The first week of the month was very cold. The 5th was exceptionally so for the time of year. The temperature never rose higher than 38 all day; at 3 p.m. the thermometer fell to the freezing point, and stood as low as 29 at 6 p.m. Snow showers were heavy and frequent throughout the afternoon and evening. Highest temperature occurred on the 15th, 62; lowest, night of 7th, 22.

MAY.—Splendid weather marked the whole month. On no less than 15 days the maximum temperature reached 70 and above in the shade. Sharp thunderstorms occurred on the 10th and 11th, and on the 26th and 29th. Highest temperature was registered on the 26th, 80; lowest, during night of 2nd, 33·5.

JUNE.—There was a cold period from 16th to end of the month. A very severe thunderstorm passed over from N.E. to S.W. on the 5th at 4 p.m., when damage was done by the lightning

at Blandford, Spetisbury, and Bere Regis. In the Vicarage garden here a medlar tree was struck. Highest temperature, 81 on the 6th; lowest, 34 on the 11th, night.

JULY.—This was a brilliant month. No rain fell from the 29th of June till the 29th July. The continued high temperature was also no less remarkable, the thermometer rising to 80 and above on 15 days of the month, the highest point reached being 91·0 on the 29th; the lowest was recorded on the night of the 1st, 43·0. A thunderstorm passed over from S.W. to N.E. on the 29th between 6.30 and 9 p.m.; a veritable sand-storm preceded it.

AUG.—A memorable month for exceptional heat. On only one day did the temperature fail to reach 70 in the shade, on 10 days 80° and above was recorded. On four days 90° and above was registered. The highest shade temperature for the month was 94·5, which occurred on the 12th; the lowest, 42°·0, during the night of the 30th.

SEPT.—The first part of the month was exceptionally warm for the time of year, the temperature rising to 90·0 in the shade on the 8th. After the 13th the conditions became more or less normal. Highest temp. recorded, 90·0 on the 8th; lowest, 32·0 during the night of the 17th.

OCT.—On the 17th the long and remarkable summer really broke up, and gave way to cloud and continuous heavy rains; between that date and the end of the month over four inches of rain fell. Highest temp., 67°·0 on the 18th; lowest, 25°·1, night of 28th.

NOV.—On the 11th 1·30 in. of rain fell during 24 hours; easily the wettest day of the year. Highest temp., 57°·0 on the 4th; lowest, 22°·0 on the night of the 21st.

DEC.—This was the wettest month of the year. A great deal of lightning was seen at night during the month, especially on the nights of the 12th and 15th, and on the night of the 25th. Highest temp., 54°·0 on the 19th; lowest, 24°·0 during the night of the 4th.

The thermometers from which the above observations were taken are Negretti and Zambra standard Kew-corrected instruments, placed in a Stevenson screen, 4½ft. above ground, on grass.

TABLE I.—DEPTH OF RAIN IN INCHES, 1911.

Station.	Observer.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Shaftesbury	Rev. F. Ehlvers	1.10	2.14	2.34	2.19	1.81	2.45	0.10	1.52	1.12	2.61	2.61	6.06	26.65
Gillingham	S. H. Stephens	1.42	2.63	2.44	2.09	2.09	2.22	0.03	0.92	2.80	2.80	3.05	9.14	30.42
Buckhorn Weston	Rev. W. Hughes D'Aeth	1.15	1.91	2.41	2.01	1.72	1.87	0.03	0.74	0.97	2.20	2.53	6.54	24.08
Sherborne Castle	T. Turton	1.27	1.68	2.26	1.94	1.06	2.08	0.10	0.78	1.06	2.57	3.10	9.20	27.10
Leigh Vicarage	Rev. T. L. Jenkins	2.07	1.69	2.46	1.87	1.43	1.87	0.10	0.81	1.23	3.73	3.91	11.63	32.80
Holwell, Westrow	H. Calmes	1.39	1.62	2.51	1.78	1.76	1.72	0.13	0.75	1.07	2.80	3.84	10.86	31.32
Sturminster Newton	A. R. Ballett	1.21	1.82	2.33	1.48	1.49	1.86	0.10	0.63	1.21	2.86	2.78	9.53	27.32
Sturminster Newton Vicarage	Rev. Canon J. C. M. Mansel-Pleydell	1.28	1.67	2.50	1.58	1.58	1.55	0.10	0.63	1.32	2.36	2.92	9.36	27.35
Ranston	Sir R. L. Baker, Bart., M.P.	1.32	1.48	2.72	1.80	0.97	2.86	0.18	0.69	1.62	2.61	3.50	8.97	28.81
Iwerne Minster	W. Neish, for Jas. Ismay Esq.	1.60	1.81	2.78	2.10	1.34	2.72	0.24	0.94	1.57	3.42	3.46	10.95	32.93
Ashmore Rectory	Rev. A. J. Reed	1.68	1.79	2.72	2.83	1.95	3.31	0.12	1.08	1.64	3.05	3.73	10.45	33.77
Gussage St. Michael	Miss Ellen Good	1.51	1.74	2.26	1.67	1.77	2.34	0.13	0.56	1.00	3.49	3.82	9.21	29.50
St. Giles' House	E. Axford, for Earl of Shaftesbury	1.55	2.05	2.51	1.48	1.85	1.87	0.10	0.56	1.18	3.56	4.39	8.84	29.94
Horton Vicarage	Rev. G. Wellington	0.83	1.59	2.29	1.39	2.17	1.52	0.15	0.91	0.96	3.47	3.74	7.45	26.47
Witchampton	Alice M. Homer	1.37	1.54	2.76	1.47	2.31	1.76	0.15	1.27	0.99	3.78	4.05	9.01	30.46
Wimborne, Cadford House	G. H. Batterbury, M.D.	1.47	1.87	2.50	1.81	1.03	1.72	0.16	0.92	1.09	4.71	4.47	8.80	30.55
Wimborne, Stoneham	H. J. Tuck	1.42	1.67	2.41	1.87	1.70	1.87	0.16	0.94	1.00	4.47	4.03	9.00	29.94
Wimborne, Westfield	Gertrude, Countess of Moray	1.38	1.80	2.50	1.83	0.77	1.63	0.15	0.97	1.13	4.01	4.34	8.97	30.08
Wimborne, Royston	E. H. Widnell	1.49	1.87	2.70	1.85	1.03	1.70	0.17	0.90	1.06	4.55	4.27	8.60	30.46
Sturminster Marshall	Rev. Jas. Cross	1.52	1.79	2.31	1.70	2.01	1.90	0.16	0.77	1.53	4.25	4.58	7.90	29.31
Broadstone, "Dunyeats"	J. E. James	1.46	1.90	2.41	1.94	0.66	1.93	0.25	1.42	1.26	4.97	4.30	8.52	31.02
Broadstone	F. W. Beckford	1.64	2.12	2.68	2.13	0.88	2.03	0.26	1.42	1.47	5.16	4.85	8.71	33.35
Kinsdon	F. W. C. Keevil	1.62	1.63	2.81	1.92	1.70	2.17	0.21	1.01	1.36	5.21	5.11	9.01	32.76
Branksome Gas Works,	H. W. Woodhall	1.43	1.58	2.26	1.34	0.56	1.74	0.23	1.20	1.21	4.58	4.60	8.48	29.44
Parkestone, "Ben Hur,"	W. H. Symes	1.42	1.58	2.39	1.64	2.31	1.67	0.34	1.19	1.19	4.59	4.88	8.35	29.91
Swanage, K. Victoria Hotel	H. B. Vincent	1.30	1.63	2.31	1.67	0.47	1.50	0.22	0.74	1.62	5.33	4.97	7.49	29.12
Greenh Grange	J. W. G. Bond	1.79	1.76	2.72	1.68	0.95	1.98	0.34	0.54	1.41	5.78	5.46	8.17	33.38
Wareham, South Street	S. W. Bennett	1.65	1.42	2.39	1.75	0.84	1.62	0.31	0.86	1.25	4.90	4.24	7.50	38.12
Wareham, Worgret Hill	Wm. Sargent	1.63	2.23	1.90	1.65	1.02	1.83	0.21	0.64	1.28	4.76	4.58	8.16	30.89
Trigon	Mrs. Leonard Sturdy	1.92	1.95	2.81	2.02	1.01	1.73	0.23	0.89	1.70	4.84	5.17	8.91	33.18
East Stoke, Bhanegar Hall	Col. Farrar	1.80	1.92	2.74	1.88	1.03	1.63	0.26	0.80	1.34	5.38	5.01	8.97	32.87
Holme	G. D. Bond	1.44	2.05	2.84	1.95	1.05	1.93	0.26	1.07	1.19	5.97	5.38	8.22	33.35
East Lulworth Vicarage	Rev. W. D. Fylliter	1.30	1.83	2.86	1.81	1.30	1.94	0.33	0.75	1.03	5.31	4.29	7.64	30.39
West Lulworth Vicarage	Rev. W. P. Schuster	1.85	2.38	3.22	2.55	1.04	2.32	0.28	0.82	1.40	4.65	5.28	8.08	33.67
Warnwell House	Lord Wynford's Gardener	1.06	1.49	2.23	1.39	0.60	1.25	0.12	0.51	1.03	3.83	4.26	7.01	30.19
Weymouth, Westham	I. J. Brown	1.39	1.92	3.14	1.73	0.83	1.77	0.14	0.65	1.07	4.50	5.11	7.85	30.19
Weymouth, "Messandra"	H. W. Green	1.39	1.92	3.14	1.73	0.83	1.77	0.14	0.65	1.07	4.50	5.11	7.85	30.19

TABLE I. (CONTINUED.)

Station.	Observer.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Portland Breakwater ..	Officer in Charge of Works	1.25	1.71	2.98	1.81	1.09	1.91	0.12	0.02	1.02	4.54	4.39	8.54	29.90
Portland, Easton ..	R. Stevenson Henshaw, C.E.	1.16	1.55	2.69	1.56	0.94	1.79	0.11	0.74	0.78	4.46	4.08	7.60	27.46
Fleet House ..	Mrs. C. E. A. George ..	1.37	1.91	2.57	1.61	0.65	1.23	0.18	0.53	0.83	4.05	4.12	6.89	25.64
Chickwell Rectory ..	Rev. Sealy Poole ..	0.86	1.34	2.12	1.41	0.43	1.36	0.53	0.62	1.17	3.68	3.84	5.43	22.89
Chickerell, "Montevideo" ..	Mrs. N. M. Richardson ..	0.90	1.63	2.45	1.55	0.66	1.36	0.14	0.78	0.62	4.75	4.75	6.80	26.00
Upwey, Portland Waterworks ..	R. S. Henshaw, C.E. ..	1.33	1.90	2.51	1.49	1.90	2.45	0.13	0.74	1.19	4.50	4.32	6.70	29.25
Abbotsbury, New Barn ..	J. C. P. White ..	1.30	1.68	2.66	1.32	0.81	1.59	0.19	0.60	0.81	3.93	3.67	7.00	25.46
Abbotsbury Castle Gardens ..	H. Kempshall ..	1.39	1.35	2.02	1.20	0.76	1.91	0.20	0.53	0.90	3.56	3.12	8.70	25.90
Bridport, Coneygar ..	H. Gordon ..	1.23	1.51	2.61	1.76	0.78	1.51	0.17	0.45	0.89	3.89	3.87	7.38	27.04
Charmouth, Leslie Collage ..	M. E. Mills ..	1.18	1.75	2.88	2.44	1.08	1.71	0.27	0.36	1.29	3.52	4.12	7.29	27.59
Lyme Regis, Colway Cottage ..	James Spurr ..	1.17	1.96	2.78	2.18	0.84	1.88	0.18	0.44	1.29	3.83	4.37	8.40	29.41
Lyme Regis, Holme Cleve ..	Mrs. Laurence Cave ..	1.17	1.96	2.71	2.12	0.67	1.88	0.17	0.40	1.17	3.65	4.11	7.21	27.22
Charlstock Vicarage ..	Rev. A. Lewis ..	1.24	1.67	2.78	2.13	1.40	1.74	0.26	1.06	1.30	4.08	4.98	11.47	34.11
Broadwindsor Vicarage ..	Rev. G. C. Hutchings ..	1.72	1.64	2.54	2.48	1.44	1.86	0.17	0.83	1.42	4.07	5.10	9.91	36.98
Broadwindsor, Blackdown House ..	Rev. G. C. Hutchings ..	1.97	1.93	3.11	2.48	1.66	2.12	0.17	0.84	1.70	4.34	4.86	11.60	34.76
Beaminstor, Fleet Street ..	C. E. M. Pimney ..	1.96	1.96	2.98	2.14	1.90	1.75	0.14	0.88	1.48	4.01	4.79	10.27	34.76
Beaminstor Vicarage ..	James Andrews, Jun. ..	1.94	1.94	2.98	2.03	1.85	1.81	0.13	0.64	1.49	3.97	4.93	9.97	34.13
Chedington Court ..	late Rev. A. A. Leonard ..	2.14	1.94	2.98	2.03	1.85	1.81	0.13	0.64	1.49	3.97	4.93	9.97	34.13
Melbury House Gardens ..	H. Birkinshaw ..	2.28	2.06	2.58	1.84	1.47	1.83	0.08	1.00	1.39	3.86	4.66	11.42	34.60
Cattistock Lodge ..	R. Rintoul ..	1.80	1.55	2.67	1.95	2.11	1.92	0.25	1.93	1.62	4.75	5.16	12.01	39.31
Wintourne Steepleton ..	Major Fagan ..	1.72	2.09	3.06	2.26	2.52	2.05	0.15	0.93	1.02	4.75	5.16	12.01	39.31
Wintourne Steepleton ..	Rev. C. Moulle ..	1.72	2.09	3.06	2.26	2.52	2.05	0.15	0.93	1.02	4.75	5.16	12.01	39.31
Wintourne Steepleton ..	H. Stillwell ..	2.21	2.75	3.29	2.06	1.75	2.10	0.15	0.76	1.37	5.25	5.35	9.00	36.24
Bradford Peveler House ..	Mrs. Middleton ..	2.17	2.47	2.89	2.00	2.30	2.14	0.14	0.73	1.37	5.25	5.35	9.00	36.24
Charminstor, "Brooklands" ..	Capt. Dymond ..	2.01	2.09	2.58	1.94	1.74	1.99	0.11	0.89	1.20	4.69	5.00	8.82	33.21
Dorchester Waterworks ..	H. D. Strange ..	2.24	2.90	2.95	2.29	2.88	1.91	0.14	0.78	1.07	5.12	4.90	8.68	35.71
Wintourne Herringston ..	Capt. J. Acland ..	2.27	2.90	2.81	2.17	2.21	1.95	0.12	0.70	1.15	5.41	4.96	9.33	36.10
Puddletown Vicarage ..	R. B. White ..	1.88	2.64	3.13	1.99	3.61	2.02	0.14	0.68	1.32	6.76	7.07	12.57	? 43.99
Bere Regis, Barrow Hill ..	Miss Williams ..	1.82	2.45	2.99	2.04	3.86	1.98	0.14	0.63	1.10	5.33	5.33	8.94	36.61
Bloxworth House ..	Rev. A. Hells ..	2.18	2.30	2.90	1.95	1.43	2.83	0.17	0.73	1.09	4.68	5.40	9.59	32.49
Bloxworth Rectory ..	A. Lucas ..	1.93	2.63	2.63	1.56	0.98	2.83	0.23	0.68	1.01	4.09	5.11	9.41	32.49
Wintourne Whitechurch Vicarage ..	F. G. A. Lane ..	1.96	2.14	2.87	1.73	0.59	2.15	0.27	0.67	1.44	4.76	5.11	9.23	32.92
Milton Abbley Gardens ..	Rev. O. Pickard-Cambridge ..	1.69	1.82	2.52	1.56	0.60	1.84	0.26	0.55	1.49	4.39	4.96	8.76	30.44
Means of the 20 Stations marked with an asterisk ..	Rev. H. H. T. Bassett ..	1.78	1.83	2.48	1.52	1.07	2.51	0.22	0.63	0.97	4.09	4.95	9.39	32.24
Do. "Longthorns" ..	Samuel Smart ..	2.18	2.11	2.80	1.70	1.09	2.95	0.19	0.60	1.08	4.27	5.56	10.78	35.31
Do. "Longthorns" ..	C. H. Perkins ..	2.08	2.41	2.77	1.57	1.55	2.46	0.20	0.78	1.41	4.33	5.66	11.08	36.90

† The figures given for the last 2 months of the year appear to be abnormal

TABLE II.—RAINFALL IN 1911.

Stations.	Greatest fall in 24 hours.		Days with		Number of Days on which 0.1in. or more was recorded.												Year.	
	Depth.	Date.	in. or more.	than 0.1in.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.		
Shaftesbury ..	1.12	10 May	1	139	13	16	18	14	14	7	12	1	10	9	17	17	160	
Gillingham ..	1.29	10 "	2	147	15	16	18	16	16	6	14	1	8	8	16	21	26	163
Buckhorn Weston ..	0.91	12 Mch.	0	147	15	16	22	12	12	6	13	1	8	8	17	24	28	171
Sherborne Castle ..	0.98	19 Apl.	2	146	15	17	10	14	5	11	10	1	10	9	18	24	28	172
Leigh Vicarage ..	1.16	24 Dec.	0	145	13	15	15	10	6	11	1	1	10	9	15	21	26	152
Holwell, Westrow ..	1.46	21 Oct.	5	147	14	15	16	11	8	9	1	1	7	7	10	15	23	155
Sturminster Newton ..	0.96	20 Dec.	0	132	11	14	15	11	7	11	1	1	7	7	10	16	20	149
Sturminster Newton Vicarage ..	0.91	5 "	0	140	12	15	16	11	6	8	1	1	7	9	16	21	26	149
Kanston ..	1.19	6 "	2	149	12	13	14	0	5	8	1	1	8	9	11	18	25	133
Iwerne Minster ..	1.07	6 "	0	149	17	16	13	15	6	11	1	1	7	9	17	21	27	166
Ashmore Rectory ..	0.89	6 "	0	121	9	11	22	12	7	13	1	1	11	10	15	18	26	174
Gussage St. Michael ..	1.00	5 "	1	128	14	11	12	9	6	11	1	1	8	7	15	24	28	125
S. Giles' House ..	1.07	11 Nov.	2	128	14	11	12	9	6	11	1	1	7	8	19	19	24	142
Horton Vicarage ..	1.31	10 May	2	131	15	15	18	12	7	11	1	1	7	9	18	21	27	161
Witchampton ..	1.20	11 Nov.	2	133	11	12	16	11	4	11	2	1	8	7	16	21	26	152
Wimborne, Godford House ..	1.25	11 Nov.	1	130	10	6	12	9	4	12	1	1	8	8	16	17	25	198
Wimborne, Stoneham ..	1.60	27 Feb.	3	120	10	11	13	9	3	9	1	1	8	11	16	19	25	137
Wimborne, Westfield ..	1.16	11 Nov.	1	129	10	11	15	9	5	11	1	1	9	7	16	19	26	144
Wimborne, Royston ..	1.07	11 "	1	132	12	13	12	9	5	13	1	1	7	10	16	20	24	142
Sturminster Marshall ..	1.20	11 "	1	143	15	16	16	14	5	14	2	1	11	11	16	25	25	167
Broadstone, "Dunyeats" ..	1.22	11 "	1	161	21	18	23	16	6	14	2	1	19	19	24	25	31	218
Broadstone ..	1.21	11 "	1	161	16	14	16	14	4	10	2	1	20	15	20	26	35	156
Kinson ..	—	—	—	—	16	14	16	14	4	10	2	1	20	15	20	26	35	156
Branksome, Gas Works ..	1.21	11 "	2	125	12	11	13	9	5	10	1	1	7	9	19	18	26	140
Parkstone, "Ben Hur" ..	1.24	11 "	3	130	12	15	14	10	5	11	1	1	5	10	18	26	34	143
Swanage, R. Victoria Hotel..	1.31	11 "	3	129	11	14	15	8	2	12	1	1	5	10	17	19	27	141
Creech Grange..	1.51	27 Oct.	4	138	15	15	16	8	4	11	3	6	6	12	16	20	25	151
Wareham, South Street ..	1.30	11 Nov.	3	137	19	18	19	9	3	12	4	13	12	20	22	26	35	177
Wareham, Worgret Hill ..	1.23	11 "	2	137	11	15	9	8	4	10	2	7	11	16	17	25	35	135
Trigon ..	1.37	11 "	7	139	10	15	16	8	4	11	2	2	7	11	16	21	25	147
East Stoke, Binnegar Hall ..	1.41	11 "	3	139	10	15	16	8	4	11	2	2	7	11	16	18	25	147
Holme ..	1.44	11 "	3	138	9	15	16	8	4	11	2	2	7	10	17	19	26	140
East Lulworth Vicarage ..	1.30	27 Oct.	3	147	11	13	16	10	5	13	2	1	7	10	16	19	25	151
West Lulworth Vicarage ..	1.22	11 Nov.	3	144	15	16	16	9	5	13	1	1	8	10	16	20	28	162
Warnwell House ..	1.48	11 "	2	152	14	16	21	12	5	18	1	1	8	10	16	20	28	162
Weymouth, Westham ..	1.10	12 "	1	140	13	13	21	11	6	10	1	1	8	11	16	19	27	151
Weymouth, "Messandra" ..	1.25	11 "	1	160	16	15	25	14	8	13	1	1	8	11	18	24	30	183
Portland, Breakwater ..	1.15	11 "	3	145	11	13	15	12	1	11	1	1	8	11	18	20	28	155
Portland, Easton ..	1.13	11 "	2	131	12	14	16	10	6	11	1	1	7	10	18	20	29	154
Fleet House ..	1.02	10 "	2	116	10	11	10	8	4	8	1	1	5	8	14	13	25	117

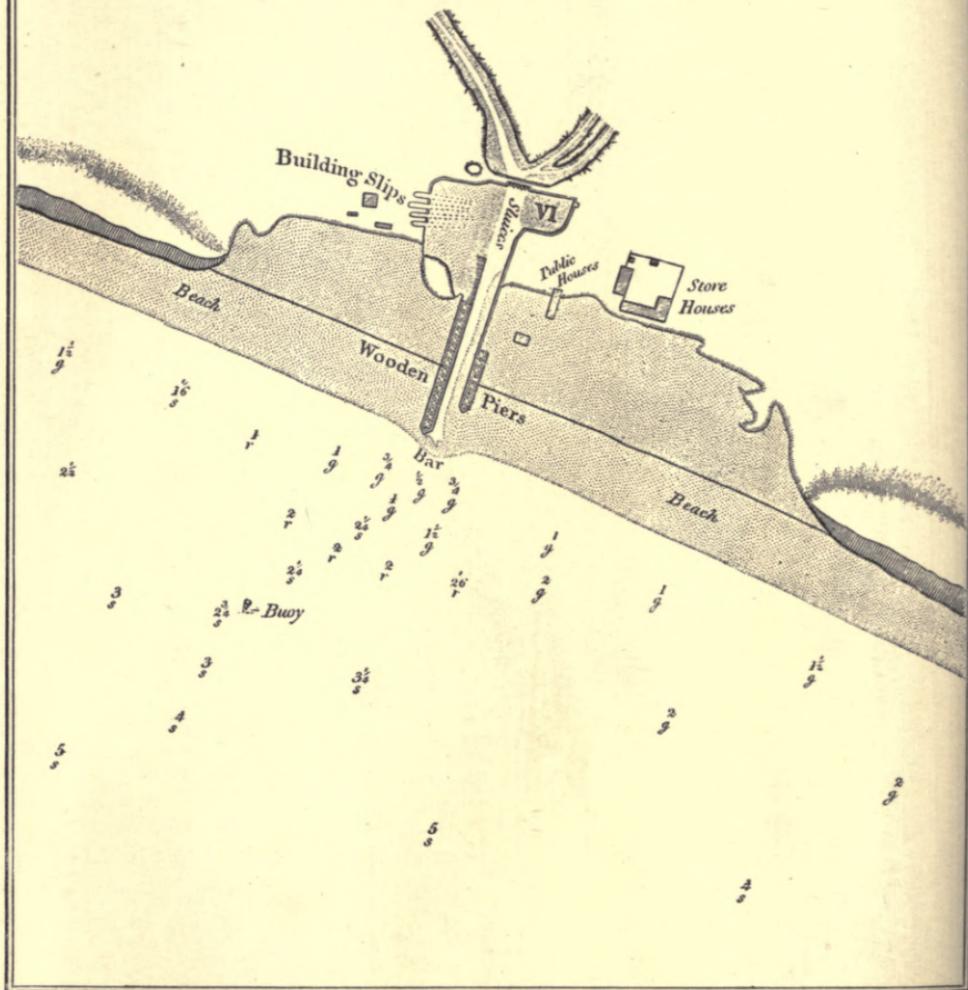
TABLE II.—(CONTINUED)

Stations.	Greatest fall in 24 hours.		Days with more than .01 in.		Number of Days on which .01 in. or more was recorded.																										
	Depth.	Date.	In.	In. or more.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.														
																		0	1	2	3	4	5	6	7	8	9	10	11	12	13
Chickerell Rectory	0.99	11 Nov.	0	128	12	15	14	9	5	12	2	6	11	17	19	25	147														
Chickerell, "Montevideo" ..	1.13	11 "	1	190	13	14	19	9	5	12	1	7	12	18	23	31	164														
Upwey, Portland Water Works	1.23	26 May	2	143	12	16	13	11	10	12	1	10	10	17	20	27	159														
Abbotsbury, New Barn ..	0.98	11 Nov.	0	135	13	15	13	10	5	12	1	6	10	17	22	30	154														
Abbotsbury Castle Gardens	1.03	12 Mch.	1	142	11	13	11	11	9	10	1	10	10	18	20	24	148														
Bridport, Coneygar	1.02	11 "	1	143	11	16	15	12	7	13	1	9	13	18	22	28	166														
Charmouth, Leslie Cottage ..	1.15	12 "	3	131	10	14	12	12	5	11	1	7	9	18	20	26	145														
Lynne Regis, Colway Cottage	1.15	12 "	3	131	10	14	15	11	5	11	1	7	11	18	20	26	147														
Lynne Regis, Hotne Cleve ..	1.60	14 Dec.	3	143	10	16	15	13	6	12	2	6	9	18	22	27	156														
Charlstock Vicarage	1.14	11 Nov.	2	144	12	17	16	15	6	12	2	11	13	20	21	27	170														
Broadwindsor, Blackdown House	1.20	6 Dec.	4	161	16	19	21	12	10	13	2	10	12	22	24	27	188														
Beaminstor, Fleet Street ..	1.11	12 Mch.	2	152	15	18	18	12	8	12	1	11	11	17	22	27	173														
Beaminstor Vicarage	1.19	12 "	2	148	15	17	15	12	8	12	1	11	11	17	22	27	168														
Chedington Court	1.16	26 May	5	144	12	16	15	11	6	11	3	8	12	18	22	27	161														
Melbury House Gardens ..	1.17	21 Oct.	4	139	11	14	12	9	7	11	1	9	10	15	20	23	141														
Cattistock Lodge	1.27	21 "	5	152	17	17	17	10	10	10	2	8	9	19	23	26	168														
Littlebreedy Parsonage ..	1.30	11 Nov.	2	128	12	14	14	01	5	11	1	6	10	15	19	26	143														
Winterbourne Steepleton ..	1.32	11 "	2	146	17	18	16	12	8	12	1	9	10	18	23	28	172														
Bradford Peverell House ..	1.32	11 "	3	148	12	14	13	11	5	12	1	8	12	17	20	26	151														
Charminster, "Brooklands" ..	1.16	11 "	3	129	9	8	13	9	4	11	1	5	8	15	22	24	129														
Dorchester Waterworks ..	1.91	26 May	3	149	14	17	15	10	9	12	1	7	12	19	22	27	165														
Dorchester, Wollaston House	1.40	11 Nov.	4	145	10	18	19	12	7	12	1	7	12	19	22	27	166														
Winterbourne Herrington ..	2.60	26 May	4	190	5	12	13	9	7	10	1	4	10	17	18	26	132														
Winterbourne Herrington ..	2.85	26 "	?	12	14	13	9	7	10	1	1	6	7	15	19	24	136														
Puddletown Vicarage	1.48	10 Nov.	3	142	14	16	16	12	5	12	1	7	11	14	20	24	153														
Bere Regis, Barrow Hill ..	1.36	11 "	1	135	10	16	17	12	5	12	1	9	11	16	19	25	147														
Bloxworth House	1.47	11 "	1	132	15	17	10	4	13	1	6	11	15	22	27	35	158														
Bloxworth Rectory	1.45	11 "	—	8	10	15	8	4	11	1	7	10	14	19	28	35	185														
Winterbourne Whitchurch Vicarage	1.30	11 "	—	133	11	13	12	7	8	10	1	7	10	17	20	25	141														
Winterbourne Whitechapel, Longthorns	1.59	11 "	3	144	12	16	17	11	7	13	1	6	10	16	19	24	152														
Milton Abbey Gardens	1.26	6 Dec.	3	150	16	18	17	13	7	11	1	9	10	17	22	26	167														
Means of the 20 Stations marked with an asterisk	2.85	26 May At Winterbourne Herrington.	140	132	152	160	111	61	113	11	77	99	174	205	265	156															

TABLE III.—STATISTICS OF THE TEMPERATURE OF THE AIR, AND OF THE HUMIDITY AND AMOUNT OF CLOUD, AT WINTERBOURNE STEEPLETON MANOR AT 9 A.M. KEPT BY MR. H. STILWELL.

1911.	Temperature of the Air.							Humidity of Air. Saturation = 100.	Cloud, Overcast = 10.	No. of Days. Tempre. at or below 32°.	
	In Stevenson's Screen.					On Grass.				In Screen.	On Grass.
	Averages of			Extremes.		Average Lowest.	Lowest.				
	Highest.	Lowest.	Mean Daily.	Highest.	Lowest.						
	°	°	°	°	°	°	°			%	
January ..	43·4	33·1	38·5	51·0	21·6	31·5	20·0	91	7·5	16	15
February ..	46·0	35·1	40·6	55·1	20·3	33·2	16·4	90	8·2	9	11
March ..	47·9	35·6	41·6	55·8	22·7	33·5	19·9	88	7·8	8	13
April ..	51·4	37·5	44·1	58·2	24·5	35·5	20·5	84	7·2	9	10
May ..	63·8	44·9	53·8	75·2	34·0	39·0	29·6	82	5·3	—	5
June ..	65·9	49·4	57·1	78·8	35·0	46·5	30·8	82	5·4	—	3
July ..	75·5	52·0	62·9	86·8	42·0	46·9	38·0	71	2·1	—	—
August ..	74·2	54·5	63·8	89·0	43·8	48·9	37·1	80	5·1	—	—
September ..	68·1	46·8	56·9	84·7	34·0	41·1	28·0	74	4·8	—	5
October ..	57·3	43·2	50·0	66·0	26·0	39·0	21·0	86	7·5	4	9
November ..	49·4	36·8	43·1	56·8	24·0	32·5	16·0	86	7·1	10	16
December ..	49·5	40·6	45·2	52·0	25·3	37·1	20·0	93	7·0	3	9
Year ..	57·7	42·5	49·0	89·0 Aug. 9 & 12	20·3 Feb. 2	38·8	16·0 Nov. 22	84	6·3	59	96

BRIDPORT HARBOUR





Bridport Harbour through Seven Centuries.

By HENRY SYMONDS, F.S.A.



ON the coast of Dorset there are several harbours more widely known among mariners than the little haven which I have chosen for the subject of this paper, but it may be doubted whether any of the neighbouring ports can show a more interesting or better authenticated record of long struggles against adversity. And when I speak of adversities it should not be assumed that a complete history of the undertaking, if such a goal were attainable, would be a mere catalogue of woes; it is, however, undoubtedly the fact that when all went well and useful work was being done the sources of history are silent, but when the sun of prosperity ceased from any cause to shine, then we find that contemporary evidence is no longer wanting. We have, therefore, good reason for believing that some at least of the lengthy intervals between the events to be narrated in these pages were periods in which the haven furnished shelter for those who came by sea and profit for those lived in the town. I think it will be conceded by all who know the locality that Nature has not

provided an ideal situation for a port ; accordingly we must seek the motive for harbour building in the dangerous character of the coast and the scarcity of other places of refuge.

This harbour lies at the mouth of a river which flows to the sea through a valley extending in a northerly direction towards Bridport town, one and a half miles from the shore, the waters of the river being tidal for about half that distance, but not at the present day navigable for ships. The opening between the cliffs which stand east and west of the river mouth is a little less than 600 yards in width, the two piers being approximately midway between the high ground on either hand ; at the north or inner end of the piers is an excavated basin. Such, in a few words, are the physical features of the spot.

In order to understand the claims and counterclaims put forward in the thirteenth century as to the barrier of shingle and sand which protected the river valley from encroachment by the sea, it must be remembered that the nearest point of the borough boundary was then one mile inland, and that the townsmen did not own, either collectively or as individuals, the foreshore or the adjacent soil ; they did, however, assert, as the sequel will show, a right to take certain tolls in connection with the estuary of the river, but the origin of that privilege cannot now be accurately defined.

The first charter of incorporation, dated 22 June 37 Henry III. (1253) recites that the King's town of Bridport shall in future be a free borough and that the good men shall hold the same with all the liberties and free customs pertaining to such a borough, paying therefor an increase of 40s. in addition to the "farm" previously rendered to the King, but saving to the King his rights and all services due (*vide* Charter roll of that year). This grant by Henry III. does not contain any specific licence in support of the demand afterwards set up by the inhabitants to tax vessels in a harbour which was outside their borough, but conceivably the general words above quoted were regarded as sufficient to transfer

to the town a right previously exercised by the Crown. Be that as it may, these riparian tolls were the subject of litigation during many years, for the law moved slowly in those far off days.

Let me now say a little about the owners of the beach and the land which lay on the eastern and western sides of the river mouth. The east cliff and the adjoining foreshore were parcel of the manor of Brideton, now known as Burton Bradstock. The manor was among the possessions of the priory of Frampton in this county, the latter being a cell or conventual house under the abbey of St. Stephen at Caen in Normandy, to which the priory had been granted by Henry I. This grant was confirmed by Henry II., who ceded to the Abbey the manor of Brideton "with all dues belonging to it"; these latter words differ from those used in the same charter with respect to the manor of Northam in Devon, in which case the confirmation includes "the dues of the ships that come there." This difference of language may have been held to be material, if not vital, when the Judges examined, as we shall see, the subsequent claim of the prior to take harbour dues at Brideton. The abbot of Caen, or Cadomum, being non-resident in England, left his affairs in the hands of his subordinate the prior, who will become a familiar figure as time goes on. So much for the east side. The west cliff and foreshore were parcel of the manor of Symondsburly which had been held by the abbey of Cerne since Anglo-Saxon days, and afterwards confirmed to that house by charters of Henry II. and III. This abbot was less active than his neighbour the prior in opposing the efforts of the townspeople, there being only one recorded instance of an unfriendly attitude towards them, and on that occasion his privileges had been forcibly invaded. The title of the two prelates to the land and manorial rights between the cliffs is thus well established, but the position of the townsmen was rather that of grain between the two mill stones of the great Benedictine monasteries. As to the date when the harbour first emerges from the mists of the Norman period

and becomes an historical entity, opinions have differed. Some writers suggest that a port was in being as early as the twelfth century, which is not improbable, but as the evidence is so scanty we shall, I think, stand on firmer ground if we say that the annals of the spot do not begin until the accession of Edward I., that is, about 1272.

I shall endeavour so to arrange the facts as to show the true relationship between the somewhat disjointed fragments of evidence which are at my disposal ; many of these contain new matter and now appear for the first time, while others have been printed by the editors of the 3rd ed. of Hutchins's *History* and by Mr. Thomas Wainwright in his excellent notes on the borough manuscripts of Bridport. All the references are to documents among the national archives preserved in the Public Record Office, unless the contrary is stated.

I have occasionally rendered the Latin a little freely in order to make a passage more intelligible, without, I trust, altering the sense of the original text, but it is not always easy to determine the precise shade of meaning which the Angevin lawyers intended to convey to posterity by the use of certain words.

When Edward I. came to the throne in 1272 his advisers are said to have believed that during the long reign of Henry III. abuses had arisen with respect to prerogatives which belonged to the Crown until they had been formally granted to the subjects. Accordingly, in Edward's second year a commission was issued ordering inquisitions in each county, to enquire, with the aid of juries, as to the holders of royal privileges, and whether any unauthorised persons were in possession of such franchises or liberties. The results of the inquisitions are contained in the records known as the Hundred Rolls, which were compiled in 3 Edward I. (1274-5), and among them is the following statement concerning Bridport's claim to exercise rights with regard to ships visiting this part of the coast :—

The jurors say that the abbot of Cernel and the prior of Fromton take all wreck coming from the sea between two cliffs on each

side of the weir (or sluice, *gorges*) belonging to the borough of Bridport, by what authority they know not. And they say that the prior aforesaid does not allow the burgesses to take tolls in the harbour (*portus*) belonging to the borough which they were accustomed and ought to take, nor had he allowed them for sixteen years past, to the damage of the borough of half-a mark (6s. 8d.) yearly.

Hundred Rolls. Extract roll No. 1, m. 2.

By a strange oversight Hutchins (Vol. 2, p. 3) renders the most important passage in the above extract as follows: "the said prior of Frompton does not permit the burgesses of the same borough to take the tolls they were accustomed," &c., thus omitting the crucial words, which show (1) that a harbour and not a market toll is referred to, and (2) that a haven did then exist and that the town claimed to own it. Although we have this direct testimony that there was a harbour (*portus*) in the year 1274, I think that a very limited interpretation should be placed upon the word; indeed, the expression "Bridport Mouth," as used in the Stuart and Georgian periods, would be a more accurate description of the place, the accommodation being probably restricted to piles driven into the sides of the river for mooring purposes. We may be sure that neither piers nor wharves were then to be seen.

To continue the story, Edward I., having obtained these returns from all parts of the country, took further action in such cases as were unsatisfactory, by means of the legal process known as a writ of *Quo Warranto*, which required the defendant to show by what authority he held the privilege in question. The King was apparently desirous of investigating the rival claims disclosed by the last mentioned extract, but it was not until a few years later that a plea was entered upon the rolls which form the records of a court of Assize held at Sherborne in 8 Edw. I. (1279-80) before the Justices itinerant, the case for the burgesses being set out in these terms:—

Borough of Brideport.

The jury present that there is a certain stream of fresh water which reaches to the sea, in which boats come to land (*applicio*) as

far as the borough of Brideport, and there they were accustomed to take for each boat coming to land at that place one penny, until Alveredus the prior of Frompton during all his time took the said penny to the damage of our lord the King of half a mark yearly. And the prior comes and says that the aforesaid toll belongs to him and that he takes nothing unless it is his and upon his land. He asks for an enquiry.

Assize roll 207, m 44, dors.

This presentment and reply are duplicated on two contemporary rolls of the same series, viz., Nos. 204 m. 43 and 206 m. 14 dors, with slight verbal differences which need not be transcribed. The important words from roll 207, rendered above, are as follows:—"Jurati presentant quod quidam rivulus aque dulcis que se extendit in mare in quo batelle applicant usque burgum de Brideport et ibi solebant capere de qualibet batella ibidem applicante I.D quousque Alveredus prior de Frompton dictum denarium toto tempore suo subtraxit," etc. (The abbreviations have been extended.)

Three points of interest are here brought to light, the first of which is the glimpse afforded at the extent of the town's sea-borne trade in 1279-80 or thereabout. The half mark was worth eighty pence and the toll was one penny for each keel, so the larger sum represents the number of ships or boats anchoring there in twelve months. We also learn the name of the ecclesiastic who, rightly or wrongly, was such a sore trouble to Bridport for many years. As far as I can ascertain the prior Alveredus, or Alvredus, is not mentioned by name elsewhere in the pages of history, his personal identity being concealed under the title of his office. There remains for consideration a question of wider scope, which goes to the root of the whole matter. Hitherto I have assumed, in common with other writers, that the mediæval haven was on the coast, but if this passage be accepted in what appears to be the natural sense of the words, although the text is perhaps not so clear as one could wish, it would seem that the smaller craft, at all events, sailed up stream for about a mile to a landing-place which may be provisionally located at a river pool still existing not far from the south side of the old boundary of the town. Now, the modern 25in. Ordnance map shows this pool in con-

junction with a building marked as "Port Mill," the adjoining land on the east side being known as Portfield or Portville. Unless this survival, if it be such, of the word "Port" can be otherwise satisfactorily explained, I shall claim to have established a *primâ facie* case in favour of the pool having been the inland quay or haven, call it what you will, at the time when the burgesses were defending their privileges before King Edward's judges. I would point out that my proposal to fix the river landing-place at this spot in no way negatives the probability that there was, within Bridport Mouth, an anchorage where the larger vessels could lie in comparative safety, and where, also, the toll of a penny could be intercepted from Brideton. Well, the prior doubtless obtained the enquiry sought at the end of the last quoted extract, and he got his answer from the tribunal in due time. The same Assize roll for 1279-80 records on another membrane a second entry which cannot have given much pleasure to the representative of the Norman abbot, as it is to this effect:—

The liberties of the town of Brideport.

The same town claims to have seisin of the toll of keelage (*culagium*) on the coast of Brideport for which they have paid to our lord the King at his exchequer 20s. at the feast of St. Michael, and it claims to have stones and sand on the same shore in all places where the sea flows and ebbs, of which they had seisin. And they ask that it shall be enquired into by the country that the men of the town aforesaid and their ancestors have fully enjoyed the said liberties and that they take nothing from our lord the King. And the Knights chosen for the purpose say upon their oaths that the town of Brideport has seisin of the toll of keelage on the coast between the cliff of the abbot of Cerne of Swonesberh (*sic*) and the cliff of the abbot of Cadamum of Prudeton (*sic*) as the water ascends towards Brideport. And the town aforesaid has seisin where the sea flows and ebbs between the said cliffs for taking and carrying away rocks for the repair of the town or for fences and ditches (*hoyhare et bechiare*) and also sand from between the cliffs. From the east and west sides of the said cliffs the abbot of Cadamum has keelage on his land from a time beyond memory. And therefore let them go without a day with their liberties aforesaid, saving always the King's rights, etc.

Assize roll 204, m. 31 dors.

It will be desirable to make quite clear the meaning of the concluding phrase "Let them go without a day," as much turned upon the use of the words. This was the customary legal formula by which a successful defendant was dismissed from the suit, and may be paraphrased in terms of to-day as "Let there be judgment for the borough." Although victory thus remained with the owners of the haven it brought them only a respite from molestation; the enemy began a new campaign a few years afterwards, as will presently appear.

On the same remembrance (204/31) are inscribed the separate pleas of the two abbots in support of the prerogatives they demanded as lords of the respective manors, and it is significant that the claims of these dignitaries do not include any alleged right, as against the King, to levy keelage dues on land or water between the cliffs.

Those who are familiar with the selections from the borough manuscripts printed by Mr. Wainwright will observe that the passage as translated by him on p. 3 differs very considerably from the verdict and judgment here cited. I take leave to suggest that the memorandum written on p. 289 of the borough's octavo "Dome book" was possibly compiled in part from memory and in part from a scribe's rough draft, as Mr. Wainwright assigns it to the year 1330 approximately, having presumably based his opinion upon the character of the handwriting. The original roll would therefore be about fifty years earlier in date, which might explain the discrepancies. The statement in the verdict last quoted that the town had paid 20s. *p.a.* for the disputed right, induced me to turn to the Pipe roll for confirmation, but unfortunately the taxes for which the sheriff renders an account are entered in two lump sums, viz., the early "farm" of £14 0s. 0d. and the "increase" of £2 0s. 0d. Perhaps the latter includes the 20s., but it is a mere conjecture.

In order to preserve the chronological sequence of events I must turn from the prior and his manor of Brideton to the abbot of Cerne and his manor of Symondsbury, so that I may chronicle some legal proceedings begun by the latter in

9 and 10 Edward I. (1280-1) against Bridport men for taking wreck of the sea from the foreshore within the manor. This right to take wreck had been the subject of grants to the abbey by more than one King, and the license was probably of considerable value in those days. Any portion of a vessel or its cargo thrown upon the beach was liable to seizure by the grantee, provided that neither man nor dog nor cat had escaped alive from the derelict. The pleas advanced during the progress of the suit can be allowed to speak for themselves :—

The abbot attaches the defendants for taking by force of arms and illtreatment certain goods and chattels which were wreck of the sea within his manor of Symondesbergh, viz., ship's woodwork, planks, and ironwork of wrecks. The defendants

Richard de Ramesham	Roger Hux
Nicholas de Prickepeny	John Kyeh
John le Ferur	John Ouky
John de Ramesham	John de Marisco
Robert Corbyn	Richard de Casteleyn
Richard Blaunchard	Henry Pancok
William Pothyn	John Puckeye
Roger Rothom	Edward de Brideport

come and say that they never took wreck from the complainant's manor, and that if anything was taken it lay within the fief (*foedus*) of Bridport and not on the lands of the manor. The abbot replies that the chattels were seized outside the liberty and power of Bridport. Afterwards an inquisition was held at Shaston in 11 Edward I., when it was adjudged that the abbot should recover ten pounds as damages from Richard and the others.

Coram rege roll 65, m. 8, dors.

Richard Blaunchard, one of the above trespassers, is the earliest known instance of a ship owner in the town, his boat having been impounded at Plympton in 1277 to enforce a trading custom. (Hist. MSS. Com. 6th Rep.)

It may be asked, what has this question of wreckage to do with the history of the port? I would say in reply that the invasion of the territory of the monks of Cerne was doubtless incidental to the attempts to carry on the business of the haven in the estuary and to collect the tolls; one or more

vessels belonging to the town may have come to grief on the western beach when making for shelter. The abbot apparently wished to fight a test action, as the defendants represented the chief families of the neighbourhood, including at least five persons who were Bailiffs in the time of Edward I. The mention of the "fief" claimed for Bridport goes to show that some description of easement or privilege was owned by the borough, although it had been overstepped on that occasion.

We may now return to the east cliff and take note of another fragment of information relative to the triangular encounters between the king, the prior, and the town. These differences had temporarily been set at rest by the judgment based upon the verdict of the knights in the eighth year of Edward I., as previously mentioned, but in his sixteenth year (1287-8) the same trouble broke out afresh and the aid of the law was again sought at Sherborne, in the Octave of the Trinity in that year.

The jury present that the prior of Frompton obstructs the burgesses of the King's town of Brydeport in taking toll and keelage of ships coming to land (*aplico*) in Brydeport, between the cliff of the abbot of Cerne and the cliff of the abbot of Cadomum, just as he had been formerly accustomed to take them. Therefore the sheriff was ordered to cause the prior to attend. Afterwards the prior comes and says that the same presentment was made before the treasurer of the King at his last coming to this county. Accordingly the precept to the sheriff was that he should take the said customs into the hands of our lord the King until [the case was decided]. And the treasurer appointed a day in the King's exchequer at Westminster within three weeks of the day of St. John Baptist. Therefore it stands adjourned to that day.

Assize roll 213, m. 49.

A similar presentment is on roll 215 (also 16 Edw. I.), when the case is further adjourned until Michaelmas.

I had hoped to trace the course of the suit after it was thus transferred to the Court of Exchequer, but having failed in that quest I am unable to complete the series of extracts in a fitting manner by citing the final solution of the dispute. It is not impossible, however, that the proceedings had no

formal termination, and ultimately expired from inanition or old age, leaving Edward I. in possession of the kernel of the nut. In any event the priors of Frampton did not subsequently harass the borough and its haven for any long space of time, as grave changes were impending which must have warned those who could interpret the writing on the wall. The year 1324 saw an order given to Richard de Wotton to survey this alien priory (together with others in the county which owed similar allegiance to French prelates) and to take charge of the temporalities on behalf of the King, and I have no reason to suppose that the new owners of the manor of Brideton kept alive the old feud.

Before leaving the Edwardian period I would emphasise the point that it was the Norman abbot of Cadomum who alone demanded the shipping toll, in his capacity as owner of the eastern end of the opening between the cliffs. That being so, if the *portus* had then occupied its present central position we should expect to find the monks of Cerne collecting the pennies from vessels, seeing that the existing river mouth, the piers, and half of the basin all lie within the ancient manor and parish of Symondsbury, and therefore within the jurisdiction of the Dorset monastery.* In a later part of the article I shall contend that this acquiescence of the abbot of Cerne in the matter of the toll is one unit in a body of evidence which supports my belief that the original and natural mouth of the river was close to the east cliff, where it remained until the eighteenth century; then, as I hope to prove, a new channel was cut and a new harbour constructed on the site now occupied by the existing piers and tidal basin.

The fact that Bridport was not called upon by Edward III. to provide a quota for the fleet which was sent to Calais in

(1) In 1260 (44 and 45 Henry III.) the abbot of Cerne entered a plea against Gilbert earl of Gloucester and others in support of his rights over half the water of Melcombe Regis harbour, and claimed dues from ships which came to his land there (Curia Regis roll, 169). This indicates that the abbot collected such tolls when he could.

1347 may be accepted as showing that the burgesses did not then own any vessels large enough for warlike purposes.

On a Close Roll of 43 Edward III. (1369) there is an order to the Barons of the Exchequer to stay their demand upon the Bailiffs of Bridport for an account concerning the forfeitures of gold and silver exported thence ; the Bailiffs having shown that although there was no landing of ships at the said town or within five leagues thereof, nor any port, nor was there ever one, they were being distrained upon to account for such forfeitures as if there was a port there, as there was not. The foregoing minute relates to the Act forbidding any exportation of precious metals, corn, or arms, and it throws an amusing light upon the change of front which the burgesses thought fit to adopt on that occasion. Whatever may have been the condition of their own harbour at that period, there were certainly two other ports within fifteen miles as a bird flies, but nevertheless the judges appear to have been satisfied that the town was being hardly treated.

THE PERIOD FROM RICHARD II. TO CHARLES II.

We shall now be no longer entirely dependent upon the records of litigation for contemporary proof as to current events, and the evidence becomes more direct in character. Richard II. in his second year confirmed the charter of Henry III., but without adding to the town's privileges, maritime or otherwise, and without declaring their nature. A few years later occurs the first definite grant, as far as I am aware, in connection with shipping. The Patent rolls contain four references to the subject, from the first two of which it would appear that the borough, being either unwilling or unable to build, were content to allow a private townsman to obtain the concession from the King. I have abbreviated these four entries as follows :—

1385. 15 Nov. A grant to John Huderfeld, upon his petition to raise funds for the completion of a harbour at Bridport where there was previously none and which he cannot finish without

help, that he may levy from St. Andrew's Day next for three years, one halfpenny upon every horseload of saleable goods imported or exported thence, applying the money so raised to the construction of the harbour only. (a)

Pat. roll, 9 Rich. II., p. 1, m. 20.

1388. 8 Dec. A similar grant to John Huderfeld for another three years from St. Andrew's Day next, upon the same conditions.

Pat. Roll, 12 Rich. II., p. 1, m. 3.

1392-3. 6 Feb. A grant to the Bailiffs on their petition that having begun to build a harbour at great labour and expense, where there was previously none (*portus prius non-existet*), they were unable to finish it. A similar toll may be collected for three years from the feast of the Purification last past, to be used for the construction of the harbour and for no other purposes.

Pat. Roll, 16 Rich. II., p. 2, m. 20.

1395. 24 Oct. Enquiry to be made as to Wm. Laton, controller of customs at Bridport and other places, for having also acted as collector and searcher and for having retained the seals.

Pat. roll, 19 Rich. II., p. 1, m. 9, dors.

This mention of a Customs officer indicates that shipping used the port at that time, otherwise his presence would have been unnecessary. It is also noticeable that the three grants ignore the vexed question of keelage or no keelage, and limit the dues to goods only. In the absence of any information to the contrary I assume that the harbour begun by Huderfeld, and completed by the burgesses, served its purpose for about half a century, until the winter storms destroyed whatever had been done.

I have already shewn that the relations between the town and the ecclesiastical powers of the neighbourhood were of a very unfriendly nature as regards the trade on the coast, but we now approach a happier period during which the Church and the civil authorities worked hand in hand to promote the welfare of the harbour. The effect of this alliance can best be illustrated from the contents of the

(a) Hutchins, vol. 2, p. 15, gives the toll as one farthing, but the original clearly reads *unum obolum*.

Corporation muniment room, which preserves, among other historical treasures, thirteen documents relative to the port during the reign of Henry VI. and more particularly during the year 1446. The inhabitants were then evidently unable to restore the damaged works, and it is not at all unlikely that their temporary poverty, as in 1385, can be traced to the terrible visitation known as the Black Death, which had overthrown the economic and social equilibrium of the country in the second half of the fourteenth century.

By the courtesy of the Town Clerk I have been allowed to examine the unrivalled little collection of writings which throw so much light upon the methods adopted by the princes of the Church to raise funds for what was, after all, a local enterprise in a remote part of England. I have, however, sought in vain for the mainspring which set in motion this elaborate clerical machinery for gathering subscriptions, but it may be that we ought to look to John Helyar, the rector of the parish and a zealous supporter of the harbour's cause, as the man who was instrumental in stirring the sympathy of his leaders. In pre-Reformation days it was usual for the Church as a body to confine its efforts to ecclesiastical matters only, such as the repair of sacred buildings, therefore a general appeal for a purely secular object at such an early date would suggest a considerable degree of good will in high places.

The general tenour of the documents is to urge the faithful to contribute in money or in kind towards the reparation of the port, in return for which indulgences (*i.e.*, relaxations of punishment in purgatory) are offered to those who assist. It is difficult to make a selection from deeds of such exceptional interest, but the one I have chosen has the merit of being shorter than the majority of the grants.

1446. 5 July. The Bishops of London, Exeter, Lincoln, Rochester, Ely, St. Davids, Salisbury, Bangor, Llandaff, Bath and Wells, Chichester, and Norwich, after reciting that the inhabitants of the King's borough of Bridport had begun to construct a harbour near the town and that they were unable to

bear the expense of the work without help from others, grant indulgences for forty days to all the penitent faithful who may give or bequeath any articles for the building of the said harbour.

There were originally twelve episcopal seals attached to this instrument, but some, alas, have disappeared and the others are in a more or less fractured condition, with, I think, one exception. Documents to a similar effect were executed by the Archbishops of Canterbury and York, by Cardinal Beaufort then Bishop of Winchester, and by William (Ayscough) Bishop of Salisbury, who was consecrated in 1438. Nor were the clergy of the town, headed by the rector, less urgent in their appeals to the charitable. Last in order of date comes the King, Henry VI. who calls upon all civil officials and the Church to assist in helping the *portus antiquus*.

Those who wish to read the detailed adventures of John Greve, the chief collector, who was afterwards appointed harbour master, may be referred to the appendix to the sixth report (1877) of the Hist. MSS. Commission, wherein the archives of Bridport are fully discussed. Notwithstanding these combined efforts by the Bailiffs and their allies, which extended throughout the realm, I fear that the result was disappointing, and probably for the same reason which compelled the town to seek aid outside its own borders, namely, the ravages of the Plague.

That the sums then contributed were inadequate for the rebuilding can also be learned from the answer to a subsequent petition presented to the first monarch of the Tudor dynasty shortly after his accession, in the hope of obtaining sympathetic co-operation. Henry's answer takes the form of a quaintly phrased letter of privy seal addressed to the chief burgesses, and, if the recited facts can be implicitly relied upon, I fear that the harbour, and with it the town, went from bad to worse during the years which had elapsed since Church and State made their joint appeal to the country. An epoch which included the savage Wars of the Roses and the death by violence of two of our Kings cannot have afforded any

propitious opportunity for soliciting Royal favour. Now let us see what Henry VII. offered to do for the distressed townfolk :

To William Reclayme and Richard Stredebrigge, bailiffs of Birdporte, William Stikilpath, Richard Orchard, William Colmere, Robert Stredebrigge, and other inhabitants. " We are enfourmed
 " that ther was a werke begune there for makying of an haven XL.
 " yeres agoo or thereaboute which werke for lak of goods was
 " cessed and discontynued. Wherthorowe our said towne is
 " nowe fallen into grete ruyn and desolacon and the substaunce
 " of tenements theryn standyng voide likly to be uttrely lost and
 " decaied, Shewyng unto us also that certyn shippes compelled by
 " wederyng and grete tempests to make cours towards our said
 " towne for their arryvail there, have often tymes been uttrely
 " p'risshed both shippes p'sonnes and m'chaundises, to the grete
 " hevynesse and sorowe of many a creature. We therefore
 " havyng tendre respect towards the p'misses and that our said
 " subgietts and inh'itants been of good herts willes and myndes to
 " spende their labours and goodes upon the said werke as they
 " have p'mysed unto us, and for the same entent have pursued
 " unto us for our l'res of licence under our pryvie seale to be by us
 " graunted unto them for the terme of VIII. yeres, Of our grace
 " esp'al have graunted unto them our said l'res for p'ferment of
 " the said werke accordyng to their peticon, And that our
 " welbeloved s'vauut Robert Lugge shall have the ov'sight of the
 " same werke towards the which we of our more ample grace
 " have graunted to the said inh'itaunts C marc of money of the
 " furst p'fits and revenues that shall come and grow towards us
 " of and upon our custumes and subsidies of our said towne."
 Given at the manor of Greenwich the 8 Dec., 3 Henry VII. (1487).

Memoranda roll. Exch. L.T.R. 267, m. 2.

The state of affairs which called forth this pathetic description of calamities by sea and land may well have moved the King to pity. He concedes for eight years the right to build and use the haven, and promises assistance in the task by a remission of taxes to the extent of £66 13s. 4d., the equivalent of " 100 marks," if the burgesses endeavour to set their house in order. Two years afterwards Henry VII. confirmed, by *inspeximus*, the original charter of the town, but without alluding to his grant of 1487 which recognised, by implication,

the existence of a link between the borough and the maritime district outside its confines.

An interval now confronts me, as to which I can only say that no tidings of the recovery and progress of the harbour have come under my notice, although we may anticipate that one or more previously untapped sources of information will, in the future, throw a bridge across the gap.

It is not until late in the reign of Henry VIII. that I regain the trail and find an incident to be chronicled. In the year 1543 the King had ordered a return to be prepared of the ships and sailors in Dorset, and a certificate by Hugh Pawlet includes the names of the seafaring members of the community at a date which is earlier than the first entries in the surviving parish registers.

“ Burtporte—Thomas Knyght of Shepton hathe a balanger of xviii. tonns, well appareld.

“ Maryners and fysshers.

“ William Bokerell.	John Poynt.	John Cornyssh.
“ John Downe.	John Somer.	Thomas Sengleman.
“ John Furley.	Thomas Robyns.	Cornelyus Hobull.
“ John Warram.	Robert Parker.	John Dyer.
“ Thomas Hoper.	William Downe.	

(Henry VIII. Letters and Papers, 1543. No. 547.)

Only one vessel, a species of barge, is here mentioned as belonging to the harbour, but the same certificate, under the heading of Lyme, states that Robert Hazard of Burtporte owned a ship of 40 tons.

Lyme Regis, under the Tudors, was also distressed by the inroads of the sea, and, like Bridport, it received in 1535 direct pecuniary assistance from the Crown, in the shape of an annuity of £20 charged for ten years upon the Customs revenue of Poole, which subsidy was still being paid in the year 1619. Notwithstanding this help, Nicholas Wadham reports to the Government that the poor men of Lyme had petitioned him concerning the Cobb and the expenses incurred, saying that they had pawned the cross and other jewels of

their church in the hope of King Henry's favour. So Bridport did not stand alone among misfortunes of this kind.

We now reach the days of Queen Elizabeth, when the archives become a little more communicative. In 1561 a partial reconstruction was once again taken in hand by the burgesses, in proof of which a memorandum among the documents of the Corporation records, in a spirit of thankfulness, that "the skluce of the haven of Burporte is begonne agayne to be made and kept for ever to the honor of God, the welthe of the towne and contry, and saffegarde of all men being in daunger at the see."

The prevalence of piracy along the coast, more especially in the neighbourhood of Lulworth, induced the Queen's ministers to appoint in 1565 Sir William Poulet and others as commissioners for enquiring as to the seaports of the county, the shipping, and the men engaged in that industry. Bridport does not figure in the detailed returns as to pirates, and can be honourably acquitted from the suspicion that her harbour was used as a base for such unlawful expeditions. The commissioner's report contains some valuable particulars which I have transcribed, and we are also told that the masters of vessels were placed under bond, with good penalties, not to aid the rovers in any way, and that the same precautions were taken in the case of men dwelling near the shore.

There is one landing place called Bridport mouth, being one mile distant from the town of Bridport, which is the nearest town that doth lie to the same, in which town there are 178 houses and all inhabited. The said landing place is under the governance of the Queen's Majesty and by the licence of the deputy customers, etc., of Lyme, being the Queen's officers, all vessels and boats do lade and unlade there. There is no harbour at the said landing place, neither can any stay or discharge there, but such as may with an engine called a capstone and force of men be drawn upon the land.

There do belong to the said landing place eleven vessels and boats which are employed for the most part in fishing, and there are occupied and attending to get their living in the said vessels

and boats the number of 54 men and 5 boys, all of which dwell not in the said town but are hired out of other places adjoining when occasion doth serve.

[Then follows a list of the ships, with the names of their owners and masters and the numbers of the respective crews :—]

1. GREAT ANNE, 30 tons. John Cowper and Robert Owle are owners, Robert Peach, master. 10 mariners, 2 boys.
2. JOHN EVANGELIST, 28 tons. Rich. Tygens, owner, Wm. Singleman, master. 10 mariners, 1 boy.
3. JESUS, 16 tons, Rich. Davidge, owner, Robt. Parker, master. 6 and 1 boy.
4. CHRISTOPHER, 12 tons, John Cowper and Rich. Tygens, owners, Robt. Norrington, master. 4 and 1 boy.
5. LEONARD, 6 tons, Rich. Davidge, owner, Robt. Norrington, master. 3.
6. PRIMROSE, 3 tons, Rich. Davidge, owner, Thos. Downe, master. 3.
7. LITTLE ANNE, 4 tons, John Cowper, owner and master. 3 mariners.
8. GABRIEL, 6 tons, John Wylshere, owner, John Lake, master. 4 mariners.
9. SPARHAWKE, 6 tons, John Wylshere and Jone Michells, owners, J. W., master. 4 mariners.
10. MARY, 4 tons, Robt. Parker, owner and master. 4 mariners.
11. PETER, 3 tons, Wm. Singlemen and Walter Eyres, owners, Wm. Franke, master. 3 mariners.

Thomas Charde and Henry Waye were appointed "Deputies" for carrying out the instructions.

[In the museum at Dorchester is a customs certificate of the JESUS, dated 1565, authorising her to sail from Bridport with canvas and other products.]

Elizabeth, S.P. Dom. 38. No. 9.

We have in this report an explicit statement that, in the opinion of these Elizabethan men of affairs, the town did not then possess such a shelter for vessels as could be called a "harbour," and therefore we may assume that the accommodation provided at the river mouth during Norman times was of a still more rudimentary character. In the last mentioned year, 1565, there was also an official investigation as to the working of the Customs ports in Dorset, and the

certificate which followed the enquiry bears witness that "at a place called Byrtporte there is taken ropes and other stuff made of heme to be carried by water into Devonshire and Cornwall." (Memoranda Roll 350 m. 340. Exch. QR). This Customs document further helps us with a scrap of negative evidence. The commissioners were instructed to certify if any of the ports were "decayed," to which they reply by naming Wareham, Lyme, and Weymouth as being in need of repair. Accordingly the inference can be drawn, I think, that in 1565 our haven was in good and serviceable working condition, even if the engineering and the appliances were of somewhat early types.

I am able to add to the above list of ships the names of three others which are derived from Exch. accounts of 1586.

George, of Birport, 10 tons, William Singleman, master. The cargo was peas, rope, hemp and "20 couples of balches," for Falmouth.

John, of Birport, 18 tons, William Peach, master. John Tigane, owner. To Fowey.

Mary, of Birport, 10 tons. Robert Bokler, master. Peas and beans.

Although the haven did not equip any vessel to take part in resisting the threatened attack by the Spanish armada (for the sufficient reason that no ships of less than 60 tons were requisitioned by the Privy Council) the military preparations against invasion must have caused anxiety in the town. Again I am able to draw upon the report of yet another commission sent down in 1588 to survey the Dorset coast line with a view to the defence of such bays and creeks as possessed anchorages or other facilities which might encourage raiding by the Spaniards. On the 20th April in that year Sir John Norris, Sir Henry Ashlie, and George Trenchard started eastwards from Lyme on their Staff ride, as I may call it, and finished at Poole on the 24th. Having reached the "entry to Bridporte" they describe it as being "verie comodious for landinge," a remark which would have been rather disturbing to the inhabitants had it reached their ears. The words

almost imply that the river was a highway to the borough. As regards the defence of this assailable creek, the commissioners go on to say that at Bridport twenty horsemen were to be employed in keeping ward along the sea coast. (Harl. MSS. 3324, p. 42.)

A passing word should be devoted to the printed books of authors who wrote on topographical matters before Hutchins's day, such as Leland, Camden (and his successive editors), Blome, Thomas Cox, and Coker. These authors do not add materially to our knowledge, as their treatment of the subject is necessarily rather meagre, consisting for the most part of statements that the haven had possibilities, but had been choked with sand, which was undoubtedly true. I do not therefore propose to cite any passages from these historians.

During the earlier years of James I. efficiency continued and no complaints arose, but shortly before 1619 the tides and the gales had overpowered the work of the sluice and the estuary again became obstructed. The townsmen forthwith asked the king for permission to solicit contributions from the country at large for the old familiar purpose. Here we have a concrete example of the difference between pre-Reformation and post-Reformation practice in the matter of "briefs" for charitable objects. I have previously explained how the Church in the reign of Henry VI. both authorised and organised the gathering in of funds, and now two centuries later we find James I. granting by letters patent the petition of the Bailiffs to be allowed to go a-begging, the Church being concerned only in so far as it permitted an appeal to be read during morning prayer. We are indebted to the methodical habits of a Jacobean vicar for a reference to the brief which was distributed broadcast in 1618-19:

Preshute parish register.

A collection for ye towne of Bridport in ye county of Dorset for ye repaying of a haven nere adjoyning to ye said towne called Bridport Mouth w'ch was ye only means yt enriched ye said towne.

(Wiltshire Arch. Mag., Vol. 30, p. 113.)

The words probably followed those of the original document, and may be regarded as leaning towards exaggeration in thus describing the plight of the borough; due allowance should be made for the desire to excite sympathy among strangers.

It so happened that in the year following the issue of the brief the townspeople had obtained a confirmation of their old charter and liberties, with certain additions expressed to be for their "better government." (Signet Bill, Oct., 1619.) The changes so introduced aroused bitter opposition, and resulted in a suit before the Barons of the Exchequer, in which ten of the chief inhabitants were plaintiffs and sixteen were defendants, their names forming quite a small directory.*

This protracted litigation as to the "privileges" of the borough is worthy of a little notice on account of the repeated allegation by the plaintiffs that the sums contributed for the harbour were improperly used for obtaining the amended charter, thereby benefiting the defendants, who had promoted the application for new powers. During the progress of the suit the scheme for circulating the briefs was fully set out and is now of some historical value, as the procedure in Stuart times was very rarely explained at all; no other contemporary description has been printed, as far as I am aware.

Thomas Meryfield, a defendant, pleads in his answer that he had been a collector for the haven through eight counties, and that an honest return had been made of the moneys received. The briefs (which were copies of the letters patent)

* The plaintiffs were John Abbott, Wm. Somers, John Lacke, Anth. Fulbrooke, Anth. Mathew, John Russell, Henry Dyme, Barth. Larkins, John Fulbrooke, and Wm. Maries. The defendants, Thos. Meryfield, Robert Miller, Stephen Colfox, Wm. Whettam, Chris. Balston, John Buyshop, Angel Churchill, Walter Bayley, John Pitt, Stephen Moore, Nich. Horsford, Jas. Whettam, Isaac James, John Chard, John Foster, and Zachary Body.

(Exch. B. and A., Jas. I. Dorset 207. Exch. Dep. 3 Chas. I. Mich. Dorset, 48. Misc. Dep. 576.)

were delivered by him to the respective clerks of the peace for distribution to the constables of the Hundreds and Liberties, who in turn passed on the copies to the parochial clergy, with a request that the appeal might be brought before their congregations. The donations were gathered in by the constables, and paid at the next ensuing assize circuits to the clerks of assize, who handed the sums to the collectors, in return for official receipts under a seal provided for each of the six circuits in question. This defendant adds that the amounts he obtained were sufficient only for the charges incurred, and that he was thereby "much discouraged." (I may remark that the expenses were frequently 50 per cent. of the receipts). Oxfordshire is named as an example, in which county only 100 briefs were sent back, out of 280 circulated. Herefordshire, on the other hand, returned the majority of its briefs, but they realised only £11. In a few counties not more than £3 were contributed, by reason of the "multitude of other briefs then abroad," there being in one parish as many as sixteen for publication at one time. The Court was also informed that "charity was so cold" that the total proceeds from all parts were about £61, to meet an estimated expenditure of £3,000 at Bridport Mouth, and that in consequence the collectors were withdrawn.

Meryfield's opponents, in reply to the foregoing plea, allege that he had previously been a poor man, and that it was doubtful if he would have been trusted for a hundred of faggots, whereas after the collection he had rented and furnished an inn at Bridport. This is rather an improbable story, seeing that the accounts were vouched upon oath and passed by two justices from other districts. In the end the harbour received not one farthing; by the King's permission the small fund of £61 was "bestowed in procuring the maintenance of a schoolmaster," and the land so bought is still, I believe, held by the Corporation.

The attempt to raise an adequate sum having thus miscarried, it would appear that nothing further was done during the later portion of Charles I.'s tenure of the throne, when the

burgesses would have been engaged in watching the fortunes of the civil war. There is, however, one subsequent echo of the discontent which gave rise to the law suit under James I. and Charles I. The Domestic State Papers of the latter king (140, 47) contain a letter dated 1629 from a certain John Raymond of our town, the writer of which should, I think, be identified with a witness in the proceedings who held and expressed very strong views thereon. He tells his correspondent, who is addressed as "Right Honble," that the magistrates, by their "neglect of this great business of the harbour," had caused the undertaking to be "left hopeless," and that the town was "miserably distressed." This gloomy picture was no doubt partly attributable to a second visitation of the Plague, which had moved the authorities to ask for a postponement of taxation, but, even so, there was not an entire suspension of sea-borne trade, because I find that in 1630 Richard Nossiter was the master of a "little barke" called the *Amity*, of Bridport, and was then engaged in carrying merchandise to and from Channel ports; there are also other, but indefinite, references to shipping about that date.

After the Restoration the clouds lighten, and the borough receives a more or less specific grant of land upon which to rebuild. Charles II., in response to a petition from Sir Roger Cuttance on behalf of the Bailiffs, referred the question to the farmers of the customs to enquire whether the head port of Poole would suffer in revenue if the prayer was complied with and the haven promoted to be a technical "port." The farmers replied favourably in June, 1670, whereupon formal permission to repair, etc., was given, by warrant of the Attorney General, in these words :

"Augt. 1670. His Maj. graciously pleased to graunt unto the Bayliffes Burgesses and Comonalty of the burrough of Bridport in the county of Dorsett and their successors, full power to repaire the antient harbour, walls, peeres and sluces thereunto belonging, as shalbee found convenient for the recov'ing the said antient harbour, or for erecting such a new harbour att, in or before the said burrough of Bridport as may

“bee fitt to receive shippes and wherein shippes may ride with
 “safty. Together with the ground and soyle adjoining to the
 “said burrough whereupon any peeres, walls or sluces have been
 “or shalbee erected. To hold the same to them and their
 “successors for ever, under the yearely rent of 6s. 8d. payable
 “into the Excheqr. att Micha’s yearely.”

(S.P. Dom. Chas. II. docquet. 24, 215.)

It is noticeable that this grant mentions walls and piers as if they had been already in existence; if that was so, they must have been built at a date between the reigns of Elizabeth and Charles II., as it will be recollected that the piracy commissioners of 1565 reported that there was then no “harbour,” and that vessels were hauled up on the shingle. The phrasing is also remarkable in another respect, viz., in the suggestion that either the old haven had been, or the new one was to be, close to the town. In the absence of any corroborative evidence that the proposed works of 1670 were to be “at, in, or before” the borough, I am inclined to think that the warrant was drawn by an official who naturally assumed that Bridport was a town upon the coast. But I may be quite wrong, and the words may mean what they appear to imply, viz., that there was a serious intention to form a port one mile or so inland from the sea. At all events no proof is yet available to show that important steps of any kind were taken in pursuance of this grant by Charles II.

THE EIGHTEENTH CENTURY HARBOUR.

The undertaking next comes into the foreground at the end of William III.’s reign (1701), when the governing body decided to adhere no longer to the former policy of asking for concessions from the Crown, and to strike out a new path by applying for an Act which would establish their position. There was in consequence some Parliamentary skirmishing with respect to the petition by the Bailiffs for leave to bring in a Bill to raise money for the haven, the mouth of which had for some years past been choked by alterations of the tides,

and the piers ruined ; they also said that, owing to the lack of "fitting encouragement," lenders were not willing to make loans for reconstruction, which was not at all surprising in the light of earlier history. Eventually this Bill was thrown out and nothing more was heard of the project for twenty years, when the town made another attempt in 1721 and again went to Parliament for statutory approval of a scheme. (Commons Journal. vols 13 and 19.) On this occasion the promoters were rewarded by success, and Bridport was for the first time empowered to buy the necessary land, the site of which was described with satisfactory precision. The Bill, which became an Act in February, 1721-2 (8 George I., cap. 2), authorised the raising of the necessary capital by means of loans to the burgesses, repayment being secured by tolls to be levied on ships and cargoes using the haven. Among other provisions the Act kept alive the ancient manorial rights to take wreck of the sea on the shore east and west of the river mouth. It is also recited that the "ancient harbour" was on the level ground between the cliffs, but its position is not otherwise defined. So far all was well, but, for an unexplained reason, which was possibly financial, a second period of nearly twenty years elapsed before the long-desired statute was put into operation.

At the beginning of the year 1740 the Bailiffs saw their way clear to make use of the powers which had been lying dormant, and accordingly engaged the services of a civil engineer to design and build the new haven which was to restore commercial prosperity to the town. The municipal records do not, as I am informed, contain any minutes relative to the preliminary steps, or, indeed, any comment on what was done at that time. In these circumstances a group of documents which were kindly presented to me a few years ago by my friend, Mr. E. A. Fry, are of considerable importance, as they supply all the *data* essential to a full knowledge of the alterations then contemplated. The deeds in question are three in number, consisting of two agreements as to the construction of a harbour and a sluice, and an indenture which

deals with the provision of the funds to be expended upon the enterprise. I have brought the writings for inspection by our members, and it will therefore suffice to extract very briefly the more material portions of their contents:—

- (1) 19 Jan. 1740. Articles of agreement between John Reynolds of Chester, engineer, and William, Earl of Coventry and Thomas Brodrepp of Melplash, whereby the engineer in consideration of £3500 undertakes (1) to erect two piers with foot wharves (in accordance with a “draught or scheme” which is now lost) at a place called Bridport Mouth, extending from the river to low water mark of the sea. (2) to “turn the course of the said river “running from Bridport aforesaid to the sea, so as the same “shall in future run in through and between the said footwharfs “and piers.” (3) to make a harbour between the piers, etc., so that the “land water” shall run out between them. And it is further agreed that whenever a sluice of forty feet in breadth, with ten gates, shall be placed across the river, the haven shall be then so cleared from sand as to be fit to receive vessels of 150 tons burden. The work is to be finished within two years of its commencement.
- (2) 14 Dec. 1741. Indenture between the Bailiffs etc. of Bridport and the Earl of Coventry and Thomas Brodrepp, reciting that £1000 had been advanced by the two last named parties and charging the harbour dues with repayment of that amount, subject to an earlier charge in favour of John Reynolds for a loan of £500.
- (3) 15 April 1743. Articles of agreement between John Reynolds, then residing at the new haven of Bridport, and the Bailiffs etc., whereby the engineer binds himself to erect (in consideration of £500) at the north end of the piers then recently built, a sluice forty feet in breadth and thirty feet in length, with seven draw-gates, and a pair of navigable gates thirteen feet in breadth for small vessels to go up the river. After completion the harbour shall be so scoured by the pent-up water that at least eleven feet of water shall be between the piers at all springtides, so that vessels of 100 tons shall safely enter or leave the harbour at such times without hindrance from any bar of sand.

It will be useful to trace the acquisition of the land upon which the foregoing works were to be constructed. Among the papers relating to Quarter Sessions business, now in the custody

of the County Council of Dorset, is the jury's award, dated 15 Sept., 1740, which fixed the compensation to be paid by the borough to the owners and occupiers of the 8a. 3r. 30p. (chiefly a sandy waste) lying between the east and west cliffs and extending northward to a point known as Irepool, under the compulsory purchase clause of the Act of 1721-2 (see also Boswell's *Civil Division* 1795, p. 88).

There is also among the archives at Dorchester a vellum book of account, in excellent condition, which forms a complete narrative of events from the date when the haven was finished, down to the year 1819. The first entry shows that the total sum expended under all headings was £4,231, which figures were allowed and confirmed at Quarter Sessions held at Bridport on 2 Oct., 1744. In the same account the words "building the piers there and digging the channel" occur in a description of the work done by the engineer, thus indicating the change of site which necessitated the diversion of the river, as to which I shall have more to say presently. A few later extracts from this MS. book will not, I think, be out of place. The receipts from shipping dues were at first very small, as might be expected after a dislocation of the coasting trade for about three years; from Oct., 1743, to Oct, 1744, they were £18 ls. 11d. only, and from 1744 to '45, £22 16s. 10d. Afterwards the dues slowly but steadily increased until 1817, when £808 were paid by shipowners and others during the twelvemonths. Shortly after the reopening of the port the west foot wharf was "greatly damaged by a storm," a somewhat unlucky beginning, which resulted in an expenditure for driving new piles in 1744. Hutchins, on p. 17, says that certain alterations were carried out in 1756; probably he refers to an outlay of £21 on "building the wall round the bason," which represents the first attempt to excavate a dock or basin, as the engineer's agreement contained no provision for such accommodation, and did not include any masonry work. The names of those who collected the tolls and "looked after the harbour" were

Lionel Browne, 1743 Nicholas Bools, 1794.

Joseph Browne, 1746 Thos. Swaine, 1799.

Andrew Warren, 1778 John Raddon, 1803.

for which services they received ten pounds yearly. The building known as the Crane House was let by auction in 1806 for £27 10s. 0d. per annum, a considerable rental if it merely conferred a right to "farm" the lifting apparatus on the quays, with perhaps an adjoining cottage. In the early years of the nineteenth century it becomes evident from entries in the same book that the piers of 1740 were insufficient both as regards length and stability, and large sums had to be expended in renewing these wooden structures, as the appended items show:—

1807-8, for carrying east pier head 100 feet south, £630.

1814-15, extending east pier head and erecting breakwater, £529.

1815-16, rebuilding east pier head, £385.

1816-17, for repairing west pier head, £530.

1817-18, repairing pier head and erecting breakwater on west side, £626.

(It is to be feared that this expenditure was partly thrown away in consequence of the rebuilding on a more elaborate scale under the Act of 1823.)

In spite of these deficiencies John Reynolds's haven no doubt served a useful purpose, as to which I can quote the contemporary writer of *England's Gazetteer*, dated 1751, who remarks that "it has long been barred up by the tides with sand, but after many fruitless attempts to restore it, here is a safe port where may ride about 40 sail."

I have previously mentioned that the contractor's working sketch has been lost, and no longer accompanies the documents which were founded upon it; this is regrettable, as a verbal description of an engineering scheme which no longer exists, save only the "channel," is rather unsatisfying to the student. Under these circumstances I was fortunate in being able to provide an illustration from the hydrographic department of the Admiralty, after many searches elsewhere for a pictorial representation of the scene. On the margin of a chart of

the coast from Abbotsbury to Sidmouth is an inset plan of our harbour as it was when Lieut. Murdoch Mackenzie R.N., then chief maritime surveyor to the Admiralty, charted the district in the year 1787. The Hydrographer also kindly permitted me to examine the original pen and ink and water colour drawing from which the naval charts were printed, and a photograph of the plan upon the survey of 1787 is here reproduced on a slightly smaller scale. This plan is especially desirable in that it affords a view of the 1740 undertaking before it was altered by the lengthening of the east pier in 1807-16.

Among the archives at Bridport is a small book containing memoranda as to the lands owned by the bailiffs and burgesses between 1758 and 1784, and, as might be anticipated, the entries occasionally refer to the newly acquired property at the harbour. Some extracts are appended ;

1766. The Corporation agreed to build a chamber over the south cellar, and a stable at the end thereof for twelve horses, at the Sea House. A lease to John Jacobs for seven years at £9 p. a., the tenant paying window tax.
1775. The rent of Sea House to be £13 p. a.
Andrew Warren being appointed Harbour Master it is agreed that rules shall be drawn up and signed by the gentlemen of the Corporation for the better management of the business of the harbour.
1778. Agreed that the west pier be planked, and the piles of the east pier driven and planked.
Agreed that proper regulations be thought of at some future meeting respecting the vessels coming in and going out. It is the opinion of the gentlemen now present that the intended warehouse at the harbour ought to be built with Banton stone, and that the dimensions be 70 by 30 ; the roof to be double and covered with Banton or Purbeck stone.
1780. Agreed that Thos. Swaine shall have the offer of the house at the sea for £21 p. a., he undertaking the drawing of the hatches, for which he is to be allowed 5 guineas p. a.
1781. Thos. Swayne shall give a bond for the due execution of his office, and to let no person go out of the harbour without paying customary dues.

1783. It was agreed that Mr. Bools should lodge his timber on the ground belonging to the Corporation at the harbour, he paying £4 4s. 0d. p. a.

I propose now to discuss the suggested change in the course of the river, to which passing allusions have been made in the foregoing pages. The case can be conveniently stated in interrogative form.

(1) Is the hand of man responsible for the existing channel through which the river enters the sea, and, as a consequence, for the present site of the harbour ?

(2) If the first question be answered in the affirmative, where must we look for the natural estuary of the stream and for the presumed, but rather doubtful, site of the haven before the 18th century ?

I imagine that a consideration of the clause quoted from the agreement of 19 Jan., 1740, and of the words used in the MS. book now in the keeping of the County Council, will remove question (1) from the area of controversy, and establish my contention that there was in fact a diversion of the river. As regards question (2) I am not without hope that the undermentioned circumstances will indicate with sufficient clearness the position of Bridport Mouth in early days :—

(a) The historical evidence that the Plantagenet abbots of Cerne did not claim any tolls in the river estuary, which, if it had then occupied its present situation, would have been within their manor of Symondsbury.

(b) The fact that the land abutting on the east cliff is the lowest portion of the open ground, and that therefore the stream would seek an outlet at that point. It may be added that the Axe at Axmouth and the Bredy at Burton Freshwater follow a similar course, and flow out close to their respective eastern cliffs.

(c) Information from Mr. Edward S. Prior, F.S.A., to the effect that about twenty-seven years ago, when trial holes were dug to test the foundations for building behind the foreshore and near to the east cliff, it was found that the

subsoil consisted of loose sand, which is just as might be expected if the river originally joined the sea at that spot.

(d) That the boundary line of Symondsburry parish follows the bed of the river from the town until it reaches the existing harbour, where the line quits the stream and turns eastward to the sea near the east cliff.

During the last decade of the 18th century the safeguarding of the coast and the undefended ports again became a cause of anxiety, and it is in this connection that I would recall from an undeserved obscurity a branch of our defensive forces which has been rather neglected by writers on kindred topics. Of the earliest Yeomanry and Volunteer corps we have many details, but the companies of Sea Fencibles appear to have escaped observation as far as Dorset is concerned. These Fencibles comprised fishermen and others engaged on the coast who were not liable to seizure by a press gang; they were enrolled for service either ashore or afloat, and between 1798 and 1810 their organisation formed a chain round the seaboard of the United Kingdom. Among the records of the Admiralty are the papers (dated 1798-1805) relating to Bridport, where a company of these auxiliaries was raised in conjunction with Burton, Swyre, and the district. In 1798 the town and harbour sent 53 men to serve with the Sea Fencibles under Nicholas Ingram, their names being set out in the return, together with the number of their attendances. They mustered once a week for drill, receiving 1s. per muster, and were armed with pikes; small sums appear in the accounts for the carriage of these weapons to the harbour, where a room had been hired as an armoury and office. In 1799 the contingent increased to 77 men and remained about that strength until 1805, when the Bridport returns come to an end. Two signal towers were established in the neighbourhood, one to the east on Puncknoll hill under the charge of Lieut. Henry Rosher, R.N., the other to the west on Golden Cap under Lieut. John Twisden, R.N. The names of other officers were Captains Richard Prater and Richard Turner Hancock,

who had apparently enrolled the various companies along the coast. The officers at our harbour, in addition to the one already mentioned, were Owen Williams, Lieut. R.N., Benjamin Williams, a midshipman, and William Vosper, Lieut. R.N. (*cf.* Admiralty. accountant gen. registers. fencibles No. 67). The "Western Flying Post" newspaper described in April, 1799, the assembly of all the local forces in consequence of an alarm, unfounded as it proved to be, that a hostile landing was imminent; on that occasion the Sea Fencibles manned the batteries, which suggests that the men were also trained as gunners for the defence of the opening between the cliffs.

THE NINETEENTH CENTURY PORT.

The harbour, as we know it to-day, although venerable in appearance, is not so in fact; it was constructed for the most part between the years 1823-5, additions being made from time to time until 1840, when it may be said to have been finished. A not unkindly critic has remarked that "as an irresponsible haven for shipping it is pleasant enough," but, even so, I am one of those who would be sorry to see the place materially altered and its peculiar charm destroyed.

Resuming my narrative, the burgesses found that the arrangements which sufficed for the commerce of their grandfathers had become inadequate about 1820, more particularly with regard to mooring accommodation for vessels, so they applied to Parliament for power to enlarge the harbour upon the land previously acquired, and to levy such increased tolls as would enable them to keep the works in proper repair and discharge the interest upon the debt. A Bill giving effect to these proposals received the royal assent in 1823 (4 George IV., cap. 19), and this Act forms the charter under which the business is now conducted. The old Act of 1722 was at the same time repealed, and the Bailiffs and burgesses, who had been the sole trustees of the undertaking, were merged in a body of statutory commissioners, of which the present writer is a member.

During the year 1824 the engineer, Francis Giles, employed 200 men in carrying out his scheme, as we are told in a west country journal of that date. The rebuilding took place upon the site of the 1740 harbour, the chief improvement being the excavation of a basin east and west of the river sluice, which was itself renewed, but without the former "navigable gates." Wooden piles were still used for the two piers until 1866, when Sir John Coode, who had been engaged in building Portland Breakwater, advised that the interior cavities should be filled with rubble concrete and stone, which was done.

The means of communication shared in the remodelling; an Act had been obtained in 1819 for connecting the harbour and the town by a direct and more level road through the river valley, in place of the longer route which had branched from the highway to Burton Bradstock. This alteration avoided the old gradients and greatly helped the working of traffic to and from the shore. The new enterprise had a welcome effect upon the volume of trade, as may be learned from the official figures showing the number of vessels which entered the channel before and after the enlargement. In 1820 there were 256; in 1825, 448; in 1830, 528. The expenditure incurred would, therefore, appear to have been fully warranted by the result. Indeed, about that time a project had been entertained for converting the river into a ship canal as far as the town, the fall being only eleven inches, but the idea did not get beyond the stage of discussion. Bridport did, however, obtain in 1832 fulfilment of her ambition to become a "bond-port," having previously been a "creek" under the Custom House at Lyme. (It will be remembered that Charles II. agreed to this advancement in 1670, but the promise did not materialise.) The formalities preliminary to and after the setting up of the Custom House are of sufficient local interest to justify an abstract of the Exchequer documents relating to the subject:

31 Jan. 2 William IV. (1832). A commission directs certain persons to assign and appoint an open place at the harbour of Bridport for the shipping and landing of goods. A certificate and

plan were returned, the latter showing those parts of the quays which could be so used. The line ran from the crane house, round the eastern end of the basin, to a point near the sluice. Under a second commission at a later date, the limits of the port for customs purposes were fixed as being from the neck of land called Portland Bill to the western bank of the river Char, and within a distance of three leagues from the shore. The total length of lawful quays inside the harbour, where vessels might load or unload, was fixed at 755 feet, as marked upon the plan.

Under a third commission of 1846 it was ordered that the boundaries should be defined and set out anew. The lawful quays were extended to 1,346 feet; the port was defined as beginning on the east at the hedge by the stream which divided Burton from Swyre, known as Burton Gyle, and thence to the western bank of the river Char, and within three miles seawards from low water mark. The plan shows a gate attached to the most northern of the three jetties, in order to close the entrance to the basin against heavy seas.

(*cf.* Exchequer Commissions 7002.)

After the establishment of the Custom House the trade of the port flourished for a quarter of a century, during which the summit of prosperity was reached, but the growth of the railway system, coupled with the opening of a branch line to Bridport in Nov. 1857, so affected the receipts from dues that the Board of Customs was compelled to deprive the hamlet of its dignity as a bond-port. Accordingly in 1881 it was reduced to the former status of a creek, and was placed under Weymouth, which is its position at the present time.

By an Act of the year 1832 the boundaries of the town for Parliamentary voting purposes were extended to the coast, and in 1835 another Act provided that the municipal area should be similarly enlarged; thus, and at last, the harbour was joined in law, as it had been in sentiment, to the borough which had guided its fortunes since the day when Alvredus of Frampton taxed the pathway of the river.

THE SHIPBUILDING INDUSTRY.

I have hitherto refrained from comment upon the ship yard, which occupied a position at the western end of the

haven during a period of about one hundred years, for the reason that it was more convenient to deal with the subject in a separate chapter ; the yard, being a private venture, did not directly concern the Bailiffs or their successors the Commissioners, except in so far as the launching of a vessel of more than ten tons upon the waters of the basin brought grist to their mill in the shape of tolls.

As there is no evidence, direct or indirect, that any vessel was built here before the second half of the eighteenth century we can, I think, assume that the industry was started at a date subsequent to the completion of the harbour of 1740 ; this view is confirmed by the fact that the building slips opened on to the land purchased by the town, the yard itself and the adjoining rope walk being the property of another owner. The earliest ship which I have been able to trace is a brig named *Adventurer*, of 270 tons burden, built here in 1779 ; she was registered at Lloyd's in 1785, the owner being one Le Mesurier. Another vessel fitted out in 1779 was the privateer cutter *Resolution* of 280 tons, but as she was not registered it is difficult to say whether she was also built at Bridport. At that time registration was an optional formality, until the Shipping Act of 1786 made it obligatory for the British merchant service.

If the plate of the naval survey be examined, four building slips will be noticed as existing in the year 1787, and this number was increased to six before 1823, as may be seen on an alternative design for the harbour of that year which is in the library of the House of Lords.

The first ship builder who can be identified was Nicholas Bowles in 1784 ; six years later I find a variant of his name as " Nicholas Bools," then a freeman of the borough.* His successors were as undermentioned, the dates being approximate only :—

* Between 1774 and 1795 he, or a namesake, is mentioned more than once in the list of Bailiffs.

Bools and Good, 1804-08.	Ephraim Matthews, 1830-42.
William Good, 1809-16.	John Cox, 1842-52.
John Bools Good, 1823.	Elias Cox, 1855-79, the date of the last launch.

The type of vessel known as a Leith smack was frequently built, together with Revenue cutters, and sailings were maintained at regular intervals to the Thames, Plymouth, and the Channel Islands; two, at least, of these coasting ships were named *Bridport*, which hints at a local origin. The pressure on the Royal dockyards during the wars with France resulted in many of the smaller craft being laid down elsewhere, and the harbour obtained a fair proportion of the contracts for the navy. The records of the Admiralty again help us by furnishing a list of "ships built in merchants' yards after 1st Jan., 1801," among which are included

<i>Builders.</i>			Bill passed	Jan.	1805
Bools and Good.	<i>Attentive</i> , g.v.				
" "	<i>Cheerly</i> , g.v.	"	"	"	"
" "	<i>Fly</i> , brig.	"	Mar.		1806
" "	<i>Inveterate</i> , g.v.	"	"	"	"
" "	<i>Indignant</i> , g.v.	"	"	"	"
" "	<i>Intelligent</i> , g.v.	"	"	"	"
" "	<i>Laurel</i> , F.	"	Aug.		1806
" "	<i>Philomel</i> , brig.	"	Dec.		1806
" "	<i>Frolick</i> , brigantine	"	May		1807
" "	<i>Egeria</i>	"	Oct.		1808
William Good	<i>Tower</i> , tender	"	June		1809
" "	<i>Saracen</i>	"	Aug.		1812
" "	<i>Conflict</i>	"	Dec.		"
" "	<i>Contest</i>	"	"		"
" "	<i>Swinger</i>	"	Aug.		1813
" "	<i>Plumper</i>	"	May		1814

(Admir. Acct. gen. Misc. various No. 102).

Unfortunately the tonnage, and in some cases the class, of these ships is not stated. The *Laurel* was a sixth rater, or small frigate, carrying 22 guns, and she was probably the heaviest of the local additions to the fleet. During their

construction sixteen shipwrights were employed in the yard, and an Admiralty overseer lived at the harbour.

I find that at all events one vessel in the navy was known as the *Bridport*; her name appears on the muster books between 1776 and 1783 as a brig, under the command of Lieut. James Lawson. In this instance, also, it is not improbable that she was built in the local yard, but the available sources of information do not cover the years previous to 1776.

Simultaneously with the opening of the Custom House in 1832 a Government registry of shipping was set up, and although it will not be practicable within the limits of this paper to transcribe all the names, the first few entries in the books will serve as an illustration.

1832. *Fly*, schooner, 141 tons, built at Bridport, 1799; length 76 feet.

1832. *Nepean*, schooner, 116 tons, built at Bridport, 1800; length 70 feet.

1832. *Alert*, schooner, 142 tons, built at Bridport, 1799.

These three vessels had been previously registered at Lyme.

I will close this brief sketch of the shipyard and its output by adding some particulars, derived from Lloyd's register, as to the larger vessels built there, in order to prove that the harbour was capable of turning out an ocean liner as well as a coasting barge.

1853. *Alfred the Great*, 579 tons, A1, built 1850. Liverpool to Calcutta.

1856. *Speedy*, 1002 tons, A1, built 1853. London to Australia.

1859. *Nourmahal*, 846 tons, A1, built 1856. London to New Zealand.

As the century grew old, however, the passing of the wooden sailing ship and the coming of the iron steamer produced the inevitable result in this, as in the other small yards

which were unable to adapt themselves to the altered conditions. Those who were at the harbour on 18 Sept. 1879, might have witnessed the launch of the *Lilian* (80 tons) the last new vessel which left the slipways; in 1885 the commissioners built up the grey stone wall which now forms the western extremity of the basin, thus finally disconnecting the shipyard from the harbour.

I have alluded to certain economic forces which sapped the vitality of the harbour's trade and extinguished altogether the shipyard's life, but there is now a threatened severance of another link with the past. Bridport harbour is in a fair way to lose its distinctive title and ancient name, in exchange for a somewhat unmeaning appellation introduced by a railway company in 1884 and afterwards approved by the Municipal Authority, whose predecessors, through many generations, had worked successfully to preserve the time-honoured traditions of the place.



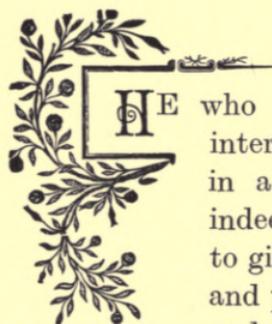


The Natural History of Bhompston Pond, near Dorchester.

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FIRST-CLASS HONOURS IN NATURAL SCIENCES TRIPOS.

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HE who could explain but a few of the more interesting and intricate problems presented in a drop of water from a pond would be indeed a great scientist. Even to attempt to give a very brief account of the morphology and physiology of a few of the more wonderful and instructive organisms which one finds in one part of the pond is no mean task, and this is greatly increased when we consider the various parts under the influence of the several seasons and other conditions.

The pond selected for investigation is situated two and a-half miles from Dorchester, a few yards north of the Tincteton road, and is known as Bhompston Pond; here indeed is a wealth of plant and animal life. What complex structures, what intricate movements and exhibitions of beauty are here displayed! In the water among the algæ and other

aquatic plants minute organisms disport themselves, swimming most gracefully, or darting hither and thither in all directions in countless myriads, while in the sediment, or on submerged supports, others, in even greater number and variety, can easily be detected hunting for their food.

In this essay a brief description of the simpler forms leads on to that of the most complex ; those forms whose structure or functions seem especially interesting or instructive are dealt with as fully as space permits, while the closely allied forms are briefly noticed. Only those forms of life are mentioned which are *now* living in the pond (Part 1), or in the immediate vicinity (Part 2).

PART 1.

ZOOLOGY.

The vast majority of the tiny specks of animal life which the microscope reveals are unicellular, their protoplasm being either free to form pseudopodia (*Gymnomyxa*), or is contained in a limiting membrane, the cuticle, giving the animal a definite shape (*Corticata*).

Arcella (Plate 1, fig. 1) is the most plentiful representative of the former class and is to be found chiefly on the mud. By accurate focussing with a $\frac{1}{6}$ lens the movements of the pseudopodia and even the ingestion of diatoms were distinctly observed (fig. 1, a). The animal consists of a protoplasmic cell containing nuclei, food vacuoles (b), contractile vacuoles, and often a gas vacuole acting as a hydrostatic balance, the whole cell being practically enclosed in a brownish hemispherical chitinous shell (c), convex above, flat and perforated with a single aperture (d), for the egress of the pseudopodia below. This animal moves extremely slowly in the direction of the most protruding pseudopodia (e), about three of which usually project beyond the edge of the shell.

Actinosphaerium Echhornii (fig. 2) occurs fairly plentifully floating amongst the vegetation. Its spherical body (clearly divisible into endoplasm (a) and ectoplasm (b) is of a beautiful glassy appearance and gives rise to an abundance of hair-like pseudopodia (c). The endoplasm contains about two hundred nuclei and usually several food vacuoles (d), while in the vacuolated ectoplasm, the bases of the axes and several contractile vacuoles (e) can be watched even with a low power. Food is taken in, and the indigestible residue cast out, at any part of the body. When an organism touches the outstretched pseudopodia, the latter bend over it (f), and, gradually diminishing in length, finally bring it to the body, in which it is gradually embedded, but at last, as if with a final effort of the pseudopodia, it is somewhat suddenly engulfed. During an observation of forty minutes the writer saw a single *Actinosphaerium* thus ingest two rotifers and a diatom, while other pseudopodia were engaged in combat with a relatively large water-flea (*Chydorus sphaericus*), which, however, succeeded in escaping after a struggle lasting one hour and twenty minutes!

A few specimens of a closely allied form, *Actinophrys sol*, were found in samples of sediment from the centre of the pond. It differs from the last it being much smaller (1-1000th of an inch in diameter), in having one nucleus only, and relatively fewer pseudopodia.

Corticata is well represented in the pond by a vast variety of organisms, which agree, however, in having the protoplasm differentiated into a central fluid portion and a firmer cortical layer, and further by possessing cilia (Ciliata). Ciliary action is, perhaps, the most striking feature exhibited by these organisms. The quickly repeated rhythmical movement of bending down and regaining the original position of each cilium gives the appearance of ripples comparable with the waves in a cornfield. The cause of ciliary movement is UNKNOWN. Engelmann suggests that one side of the cilium may be contractile and the other side elastic, while Schäfer likens it to amoeboid movement, suggesting that the motion

of the cilium is due to an injection of hyaloplasm from the cell. A typical example of ciliata is *Opalina ranorum* (fig. 3), a parasitic form covered with cilia (a) of equal length (Holotricha). It occurred in hundreds in the intestine of a frog and exhibited ciliary movement more clearly than any other form I have seen. This animal has no mouth, as it absorbs food through any part of the body. Fixing and staining revealed a large number of nuclei (b). A common free-living form is *Paramœcium* (fig. 4), an ovate oblong form, covered with cilia of equal length excepting in the pharynx, where they are longer. In the ectosarc (a) is a layer of oval trichocysts, the occasionally discharged threads (f) of which can be detected with the high power; after fixing and staining, a micronucleus as well as a meganucleus (g) can be detected. Towards the anterior and posterior ends of the body one can observe the changes associated with the contractile vacuoles. If watched, the spherical vacuole (b) suddenly vanishes from view, and shortly after its place is occupied by five or six isolated drops, each with a minute streak passing into it (c). At first the drops have a star-like arrangement, but on increasing in size they coalesce to form the contractile vacuole. When a little Indian ink was irrigated under the cover-glass, not only were the ciliary movements more clearly seen, but the process of food ingestion accurately observed. The minute particles of the ink are collected at the end of the pharynx (d), and when a sufficient quantity has accumulated the little mass is ingested, together with a small quantity of water forming a food-vacuole (e), which can be seen to pass through the body, the residue being ejected at a definite spot. *Paramœcium* occurs plentifully in most parts of the pond.

An allied animal, *Trachelocerca* ("Swan-neck animalcule") (fig. 5), seems scarce in this pond, only a few specimens being met with in hundreds of pond samples. It is a most curious fact that these animals, microscopic as they are, frequently hunt for their food in pairs. The ciliated transparent body (a) tapers to a short tail (b) at one end, and at the other is continued as the long slender, so-called neck (c), which

terminates in a slightly swollen end, containing the ciliated mouth (d). Two contractile vacuoles are present, one at the base of the neck (e) and the other near the posterior end (f). This animal performs the most graceful movements as it wreathes its way through the little masses of algæ, at one moment stretching forward its long neck, and at another twisting it or jerking it out in various directions as if testing the ground.

In *Amphileptus* (fig. 6) the ventral mouth (a) is situated between the neck-like process or proboscis (b) and the body. It was present in a sample from the centre of the pond, but does not appear to be plentiful.

A still more elongated form is *Spirostomum* (fig. 7), which seems more plentiful than the last example, and is characterised by having an adoral zone of cilia in addition to the body being covered with cilia (Heterotricha). The cilia are arranged spirally on the surface striæ (a), and are equal in length, except those above the laterally placed mouth (b), which are longer. Anteriorly the long and flexible body ends obtusely without a neck, posteriorly it is truncate. *Spirostomum* is to be found amongst the sediment and *débris* of the pond.

Living parasitically within the small intestine and rectum of the larvæ of the newt, the writer found *Balantidium entozoon* (fig. 8), another heterotrichous form. When these parasites were fixed and then stained with picrocarmine, the large single nucleus (a) was clearly displayed. The body contains one or two contractile vacuoles (b) and usually many food vacuoles (c), as this parasite ingests solid food taken in through the peristomial opening (d), situated at the somewhat pointed anterior end of the body. They swim very slowly through the contents of the alimentary canal of the host; and are found in quite young larvæ as well as in the more mature.

Nyctotherus cordiformis (fig. 9) was found in association with *Opalina* living parasitically within the intestine of the frog. It differs from *Balantidium* in having a permanent anus, but resembles it in having a definite pharynx (a), a

contractile vacuole (b), and a single large nucleus (c). It is usually less frequently met with than *Opalina*.

Among the largest and most beautiful of all the Infusoria is *Stentor* (fig. 10), a conical or trumpet-shaped ciliated form about 1-25th in. in length. It has a peristomial space (a), surrounded by a marginal ring of longer cilia (b), a row also extending to the mouth (c). *Stentor* is usually found attached by its narrow aboral end (d) to some algæ, and assuming various forms, sometimes becoming ovate or nearly spherical. A comparatively few specimens were met with in this pond.

On the contrary *Oxytricha* (fig. 11 side view) is very abundant in the pond. It is a form without cilia on the dorsal convex surface (a), but with a flat or slightly concave ventral surface, bearing cilia and non-vibratile setæ (b) (*Hypotricha*), the chief organs of locomotion. There are no uncini or styles. It is usually found crawling and climbing by means of the ventral cilia and bristles over the remains of aquatic plants (c).

Somewhat similar in general appearance is *Stylonichia* (fig. 12), an animal found hunting amongst the decaying matter in the most stagnant parts of the pond. It differs from the last form in possessing both hooks (a) and styles (b), which are movable but not vibratile. The body is soft, flattened, oval, and flexible, with a ventral mouth fringed with long cilia (c), which cause the occasional darting movement. When swimming freely it usually presents its ventral surface uppermost. The rapid and powerful movements of these interesting creatures are most spasmodic, now going forwards, now turning to one side, or rapidly twisting round in a circle for no apparent cause.

Even more plentiful is *Euplotes* (fig. 13), a smaller type about 1-200th in. in length, the distinctive feature of which is the inflexible cuticular protective plate or carapace (a), which is spread over the dorsal aspect of the body only. The ventral oral groove (b) is fringed with long cilia (c), which extend in front; the hypotrichous processes (d) consist of uncini anteriorly and styles posteriorly. The extraordinary rapidity

with which these tiny processes are moved affords an astonishing sight. The somewhat oval carapace which extends beyond the limits of the body is raised in the centre, and in some species is delicately striated by fine longitudinal ridges, in others, by rows of tiny excrescences. In some species again, four setæ project from the posterior margin of the carapace. When examined under a medium power their characteristic movements can easily be observed. They mostly crawl about the *débris*, and only reluctantly, as it seems to us, will they leave this security and venture forth into the open water, such a departure usually leading to a sudden return by a series of irregular darts.

Passing now to those forms whose bodies bear at least one spiral of cilia, but are otherwise unciliated (*Peritricha*), one is struck with the beauty and profusion of the commonest type, *Vorticella* (fig. 14, 15). Even when its movements are magnified several hundred times, its activity no less deceives one's eye than its sensibility surpasses one's understanding. *Vorticella* is attached to objects by a long delicate stalk (a), the axial part (b) of which acts as a muscle fibre, which, upon stimulation, rapidly draws the body towards the point of attachment, the stalk becoming spirally coiled (c), and the body spherically contracted (d). The slow return to the expanded condition is due to the elasticity of the cuticular covering. The campanulate body terminates in the peristome (e) enclosing the disk (f) and the groove in which the cilia are situated (g). When the animal is irritated, besides the stalk contracting within the cuticular sheath, the peristomial lip and the disk are approximated, the cilia thus becoming efficiently protected in a temporary tube. If Indian ink is irrigated, the vortex produced by the ciliary movements is very obvious, and the minute particles can be watched collecting in the pharynx (h) which leads through the cortical layer and cuticle to open into the groove where the disk is most elevated. The ink in the food vacuoles (i) may be observed to course through the protoplasm, and to be finally ejected at a definite point into the groove. There is a

contractile vacuole (j), and staining reveals a micronucleus as well as the somewhat horse-shoe shaped meganucleus (k). The writer has watched the process of reproduction by fission. At first the disk is cleft, which is followed by a complete division of the body into two parts (fig. 14, l), one of which acquires a posterior set of cilia, while the anterior spiral of cilia disappears. This portion at last breaks away from the stalk and, by means of the posterior set of cilia, swims away to settle and found a new colony elsewhere (m). The other part remains on the old stalk and continues living as before the division.

A colonial form, *Epistylis* (fig. 16), occurs in this pond in dense clusters attached to certain aquatic animals, for instance, on the shell of *Planorbis*, and on *Cyclops*. It chiefly differs from *Vorticella* in that the stalk (a) is branched and non-contractile.

Of all the micro-organisms perhaps *Coleps* (fig. 17) is the most ravenous, dense clusters of them being frequently found eagerly devouring dead infusoria. This isolated form, whose systematic position is not settled, is barrel-shaped, with the carapace plainly marked, with both transverse (a) and longitudinal grooves (b) containing cilia. The anterior end terminates in dentate projections (c), while posteriorly the carapace is furnished with three short terminal spines (d). In swimming they revolve on the long axes of their bodies, and quickly collect around and devour a crushed infusorian.

Euglena viridis (fig. 18) may be considered as standing between the animal and plant kingdom, being claimed alike by zoologists and botanists. On the one hand the cell seems to be enclosed in a flexible cuticle (not a cellulose covering), and it ingests *solid* food, on the other hand the cell contains a mass of bright green chlorophyll granules, which it uses for the photosynthetic formation of carbohydrates, grains of paramylum being found in the protoplast. The latest researches show that this organism has the power of constructing its own chlorophyll. The spindle-shaped body

terminates anteriorly in a collar-less tractellum (a) (*Lissoflagellata*), which arises from the pharyngeal wall (b). Behind the pharynx is the contractile vacuole (c) and a bright red pigment spot (d), which is possibly sensitive to light. Staining reveals a single central nucleus (e). Multiplication by longitudinal fission can sometimes be observed. The cell exhibits characteristic rhythmical changes in shape known as Euglenoid movement. The elongated body shortens and thickens anteriorly (fig. 19), then the enlarged part, gradually lessening, appears to pass towards the posterior end, where it becomes lost to view. These changes of form are then repeated.

In marked contrast to this species is *Euglena longicauda* (fig. 20), with a flattened oval body, green with longitudinal striations and a long colourless tail as long as the body.

A third species was also found in the pond, namely, *Euglena pleuronectes* (fig. 21), which differs from the last in having a tail only about $\frac{1}{4}$ the length of the body. The striations are less marked and the green body is more circular. It is about 1-600th in. in length. The last two species do not exhibit Euglenoid movement.

Those extraordinary living forms known as Rotifers or Wheel Animalcules (*Rotifera*) are very abundant both in numbers and species; some swim by the action of the retractile ciliated disk, the trochus, which gives the well-known wheel effect, the foot then acting as a rudder. Others move in a leech-like fashion by attaching the ciliated end of the body and then drawing up the foot, which in many species is telescopically retractile and furnished with a forked extremity (toes). The body is covered with a firm integument and often with a chitinous shield, the lorica. When the animal is fixed the currents set up by the trochus wash food particles into the mouth which leads through the ciliated oesophagus to the so-called mastax (fig. 22, d) containing the trophi (two mallei and an incus), the extraordinary movements of which can easily be watched under a high power. Perhaps the most striking example is *Noteus quadricornis* (fig. 22), a form whose internal structure can be seen through the

PLATE I.

- Fig. 1. Arcella.
,, 2. Actinosphaerium Echhornii.
,, 3. Opalina ranorum.
,, 4. Paramœcium.
,, 5. Trachelocerca.
,, 6. Amphileptus.
,, 7. Spirostomum.
,, 8. Balantidium entozoon.
,, 9. Nyctotherus cordiformis.
,, 10. Stentor.
,, 11. Oxytricha.
,, 12. Stylonichia.
,, 13. Euplotes.
,, 14. Vorticella.
,, 15. ,, (portion more highly magnified).
,, 16. Epistylis.
,, 17. Coleps.
,, 18. Euglena viridis.
,, 19. ,, ,, (showing another stage of movement).
,, 20. Euglena longicauda.
,, 21. Euglena pleuronectis.
,, 22. Noteus quadricornis.
,, 23. Brachionus.
,, 24. Anuræa.
,, 25. Mastigocerca.
,, 26. Euchlanis.
,, 27. Lepadella.
,, 28. Salpina.
,, 29. Rotifer vulgaris.
,, 30. Chaetonotus.
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(N.B.—During the process of reproduction the figures have been reduced by 1-20th.)





roughened areolated carapace (a), which is very transparent and flattened, bearing four spines anteriorly and two posteriorly. It is about 1-100th in. in length ; it has no eye spots, but possesses a very mobile foot terminating in two toes (b). It is found chiefly in the sediment in most parts of the pond, together with two others of this family—*Brachionus* (fig. 23), with a single eye spot (a) and smooth carapace (b), and *Anuraea* (fig. 24), with a single eye spot (a), but no foot. The curious little rotifer known as *Mastigocerca* (fig. 25) is noteworthy on account of its asymmetry. The lorica bears an asymmetrical dorsal crest (a), and the foot is represented by one of the toes, which is as long as the rest of the body (b), while the other toe is extremely small (c). Even the masticatory organs display a want of symmetry, the left part being more developed than the right. The mastax (d) is very elongated, and there is a single eye spot (e). *Euchlanis* (fig. 26), a form with a large lorica, which is open on the ventral surface, occurs sparingly in some parts of the pond. More frequent, however, is an allied species of *Lepadella* (fig. 27), with a somewhat flattened carapace and a foot ending in two toes. *Lepadella* is a very small rotifer, its total length being only about 1-500th in. Another member of this family, *Salpina* (fig. 28), differs from the last, in that it possesses a three-sided carapace, closed below and terminating posteriorly in spines (a). The foot is forked and a single cervical eye spot is present. *Rotifer vulgaris* (fig. 29) is common in most parts of the pond. Its general form, its leech-like and rotating movements, are too well known to need description.

Isolated from the Rotifera is a small group of allied animals (Gastrotricha) well represented by *Chaetonotus* (fig. 30). The body is elongated, the convex upper surface bears curved hairs (a) and the flat ventral surface is covered with cilia. The mouth is situated at the rounded anterior end, while it has a characteristic bifurcated extremity (b) at the opposite end. The direction of the undulating swimming movements are regulated partly by flexion at the neck.

Hydra viridis (plate 2, fig. 31) is the only example of the Cœlenterata which seems to be present in the pond. Its sac-like form is attached (frequently to the root of Duckweed) by an adhesive foot (a); the other end, which terminates in an oral cone (b) and tentacles sways freely in the water. Usually it is stretched into a most elongated form, but on stimulation is able to suddenly contract (c). The animal feeds on water-fleas and allied crustaceans, captured by means of its stinging tentacles (fig. 32). If it is killed with corrosive sublimate before it has even had time to contract, then fixed, stained, and cast in wax, a sufficiently thin section (about 1-1000th in. in thickness) may be cut, which will display the minute structure of the body wall (fig. 33, a), enclosing a single space, the cœlenteron (b) open to the exterior only at the mouth. The ectoderm (fig. 34, a), a thin single layer of epithelial cells, is separated from the endoderm (b) by the structureless mesogloea (c), in which are fixed both the longitudinally arranged muscular tails of the ectoderm cells, and those of the endoderm cells placed transversely. The shortening and lengthening of the animal is due to the action of this musculature. Near the mesogloea, closely packed in between the bases of the ectoderm cells, are the interstitial cells (d), whose function seems threefold. Some may accumulate to form the reproductive organs; or to pass to the exterior and become cnidoblasts (stinging cells) (e), each of which contains a nematocyst (thread cell) (f) and a cnidocil (g), the simplest known sense-hair which transmits a stimulus, bringing about the expulsion of the thread (fig. 35 shows an exploded nematocyst which the writer found adhering to an attacked nauplius), or finally they may pass outwards and develop into ordinary ectoderm cells. The endoderm cells are large, and contain a number of symbiotic algæ (fig. 34, h), giving the animal its green colour. Some of these cells are produced into pseudopodia (i) or flagella, while others are granular and secrete a digestive fluid. The parts of the prey not digested in the coelenteron are bodily ingested by the pseudopodia, and digested in food vacuoles in the endoderm cells, the

indigestible residue being cast out at the mouth. Besides, sexually, Hydra reproduces by germination, *i.e.*, a bud grows out at the side of the body (fig. 31, d) and finally becomes a complete and separate individual. Reproduction by fission occurs rarely in the natural state.

A number of *Cercariae* (fig. 36), curious little larval forms of the parasitic Distomea, occurred in two of the pond water samples. The specimens had perhaps left an aquatic mollusc (*e.g.* *Planorbis*), and were swimming freely before their second host had been found for their encystment. The cercaria larva at this stage possesses a somewhat leech-like body and an extremely motile tail (a). The anterior sucker (b) bears a boring spine (c), which is probably used in effecting an entry into the host; the alimentary canal and excretory system were more difficult to discern.

Living parasitically within the lungs of a young frog taken from the pond, the writer found several specimens of a trematode (fig. 37) [probably *Amphistomum* (*Diplodiscus*) *subclavatus*]. The anterior sucker (a) surrounds the mouth, which leads to a dilated portion (c) of the alimentary canal. This bifurcates into two lateral portions (d, d.), each of which seems to end blindly without opening to the exterior. About the centre of the body a posterior sucker (b) is seen. Since one has reason to believe the cercariae (described above) had recently left a *Planorbis*, and were perhaps swimming about in search of an insect larva in which to encyst, it seems possible, if not probable, that the parasites now under consideration and the cercariae are stages in the life circle of the same genus of trematode.

Nemathelminthes (round worms) are represented by parasitic Nematoda, both in the intestine of the larva of the newt and in the alimentary canal of the frog. Among the aquatic plants, and especially in the mud, there is a plentiful supply of free living *Nematoda* (fig. 38).

Nais proboscidea (fig. 39), one of the Chaetopoda, is extremely common, being found among the decomposing

stems of plants, or even swimming freely. The body is segmented (Annelida) and furnished with small groups of about eight hooked ventral setæ and, excepting the first four segments, with pairs of long hair-like setæ (a) (Oligochaeta). The muscles attached to the setigerous sacs are clearly distinguishable through the thin delicate skin of the living worm. The head bears two black eyes (b), and the praestomium is elongated into a proboscis (c). A large pharynx is situated in the first four segments, while the narrow oesophagus (d), situated in the three following segments, leads into the dilated crop (e). The rest of the alimentary canal is continued as the intestine (f), which is thrown into many folds. The dorsal vessel contains clear and almost colourless blood; the body cavity septa usually show very distinctly. The nephridia (not present in the first six segments) are easy to detect, but the movement of the cilia within requires a sixth lens. Many of the specimens exhibit a zone of fission (g), marking the point at which the worm divides into two portions. The new head, eyes, and even proboscis (h) (formed from the posterior half of the zone) are visible before the division takes place. The anterior half of the zone gives rise to the tail segments of the other animal. Sexual reproduction is also present, and the organs can sometimes be seen in the fifth and few following segments.

Tubifex rivulorum (fig. 40), an allied worm with a long slender reddish body, is almost as common as the last. Several specimens are usually found together, vigorously waving in the water, with the posterior ends of their bodies (a) protruding from the burrows in which they live (b). At the least alarm the worms suddenly withdraw into their tubes and vanish from view. The peristaltic movements of the ciliated alimentary canal, and the movements of the large blood vessel bathed in nutritive fluid, are plainly visible through the transparent body. There are two dorsal and two ventral rows of chaetæ.

Of the leeches, one of the Rhynchobdellæ, namely *Glossiphonia* (*Clepsine*) (fig. 41) is quite numerous on the

floating pond-weed. Unlike many leeches it constructs no cocoon for its eggs, but instead it carries them on the under surface of its body, to which the newly-hatched young adhere by their posterior suckers. Its internal structure is most easily examined by embedding in wax, after staining, &c., and cutting transverse sections at various levels. The crop, with its diverticula, its musculature, and other organs, can then be studied with advantage.

Passing now to the Mollusca, the Lamellibranchiata, characterised by having four plate-like gills, is represented in this pond by at least two genera, namely, *Sphaerium* and *Pisidium*. In the former (fig. 42) the oval shell has two equal valves, and the external ligament is posterior to the hinge. The latter is distinguished by its smaller size, and by the shell being less equilateral, with the backs towards the anterior end.

Among the Gasteropoda, *Limnaea palustris* (fig. 43), with a long spiral brownish horn-coloured shell and a dark grey body, bearing two pointed contractile tentacles (a), is extremely common on the floating pond-weed (*Potamogeton*). The foot is notched in front (b) and rounded behind, and the black eyes are situated on small tubercles (c). The respiratory orifice, placed on the right side, is clearly visible to the naked eye when the animal comes to the surface to breathe. There are two generative orifices on the right side. If the animal is first killed, and then immersed in caustic potash, the odontophore (lingual ribbon) is easily separated from the rest of the body, and can be stained with picric acid. If then examined under a high power, it will be seen to consist of thousands of teeth arranged in rows. When the front teeth are worn away they are replaced by others from behind. *Limnaea* deposits its eggs in a cylindrical capsule containing about sixty in number (fig. 44).

A small form, *Ancylus* (fig. 45) is found adhering like a limpet to pieces of wood, &c. The body is grey, the foot brownish and rounded in front and widened at the sides. The limpet-shaped shell is of a pale horn colour.

In *Planorbis* (fig. 46), another extremely common Gasteropod, the foot is oval and rounded both in front and behind. It is joined to the body by a long stalk, and bears on the left both the respiratory and the generative orifices. The shell is flattened, quoit-shaped, and sufficiently transparent to enable one to watch the beating heart (a) with a simple lens. The odontophore can be prepared for examination as in the case of *Limnæa* (above described). The central teeth will be found to bear two points, while the lateral ones are three-pointed. The eggs (fig. 47), about five in number, are laid on aquatic plants, or upon the glass side of the micro-aquarium, where their development can be conveniently watched. Long before the young leave the egg capsules they can be watched constantly revolving within the eggs; they are developed in about twelve days.

The interesting little crustacean known as a water-flea [*Simocephalus vetulus*] (fig. 48) is present in vast numbers, especially at the north end of the pond in the less stagnant water, where this curious little animal is to be seen darting through the water by rapidly repeated lashing movements of its large biramous antennæ (a). When at rest it suspends itself in the water by attaching the endopodites of its antennæ to some fixed submerged support. The diminutive antennules (p), each bearing a single lateral seta, terminate in a few hairs, probably sensory in function. When microscopically examined the body is seen to be enclosed by a ridged bi-valved carapace (b), the cuticle of which is defined from that of the head by a cervical suture. This water-flea differs from other *Daphniidæ* in having no posterior terminal spine of the carapace. The rythmic pulsations of the heart (c) and the constant motion of the thoracic (branchial) appendages may be observed through the transparent carapace. On more careful examination the blood, containing amœboid corpuscles, can be followed as it leaves the heart, enclosed in its pericardium, by an anterior opening and flows through definite channels to the various parts of the body and carapace. In the head the alimentary canal (e) (easily distinguished by the

food it contains) gives rise to two diverticula (f), and, passing through the body, ends at the telson (g). This terminal part of the abdomen bears no appendages, but is furnished with two long tactile setæ (h), and ends with two styles (i) representative of the caudal fork. Within the carapace is a coiled tube—the shell-gland (j), or typical nitrogenous excreting organ of the Entomostraca, opening to the exterior near the second maxilla. The large spherical compound eye (k), usually seen in a constant state of trembling, consists of a relatively small number of retinulæ, readily recognised even under a low power. It is formed by the fusion of two originally distinct lateral eyes ; these can only be seen separate in the young (l).

In the female there is a brood-pouch (m) between the carapace and the dorsal surface of the body, in which the summer (parthenogenetic) eggs develop. The layer of winter eggs, protected by the ephippium (a modification of the brood-pouch), are thrown off at the following ecdysis, and, floating away, are able to survive the winter and re-establish the species the following year. The eggs or young, plainly visible through the carapace, are retained in the brood-pouch by prominences on the shell and abdomen (n, n). The males are recognised by their longer antennules and absence of a brood-pouch ; they are smaller and rarer than the females, but become more numerous in autumn or when the environment becomes unfavourable.

About one-half of the size of the water-flea is the closely allied *Ceriodaphnia reticulata* (fig. 49). In this animal the ridges on the carapace are arranged so as to form a large number of polygonal areas, giving the whole a net-like appearance. Behind the head there is a dorsal depression of the carapace (a), while posteriorly there is a medial dorsal pit (b), perhaps corresponding to the “dorsal organ” of some species of *Daphnia*—an organ used for fixing the resting animal to weeds, &c. The antennules are short and movable in the female ; the antennæ (c) are relatively smaller than those of *Simocephalus*, and the carapace terminates posteriorly in a

slight spine (d). In other respects, such as the two diverticula of the alimentary canal and the five pairs of thoracic feet, &c., there is a marked resemblance to that genus.

Chydorus sphaericus (fig. 50) occurs sparingly in places, chiefly on the eastern side of the pond. The body, bearing two very short antennæ (a) and a compound eye, is protected by a smooth, almost spherical carapace, produced anteriorly into a long, pointed, and curved beak (b). There is no indication of a groove between the head and the thorax, the latter bearing five pairs of limbs. The alimentary canal is clearly looped (c), but does not give rise to diverticula. The brood-pouch of the female usually contains one, or at the most two, summer eggs (d). The mode of swimming is less jerky than that of the Daphniidæ, and its habitat seems more like that of the Ostracoda.

Yet another species of these little Entomostraca [*Alona quadrangularis*] (fig. 51) is to be found by carefully examining the *débris* of the pond. The body is more oval than that of *Chydorus*, but resembles it in the number of appendages, its alimentary canal (a), and the number of its parthenogenetic eggs or young (b).

The order Ostracoda is represented by numerous minute carnivorous forms to be found in the sediment. The genus *Cypris* (fig. 52) is found in plenty, and is characteristic of the group. The unsegmented body is completely enclosed in a bi-valve shell, the two halves of which can be either opened by an elastic ligament, or closed by an adductor muscle, which passes across between the valves. The members of this order have few appendages; besides antennules (a), antennæ (b), mandibles, and two pairs of maxillæ, there are only two pairs of stout cylindrical legs, the abdomen being vestigial. The animal moves by lashing the water with its most gracefully pencilled antennules, assisted by movements of the antennæ and first pair of legs (c), the second pair of legs being employed to sustain the generative organs, which, however, partly project between, and are supported by, the lamellæ of the shell. It is note-

worthy that the antennules and the antennæ are unbranched, differing in this respect from the Phyllopoda. Under certain conditions it is possible to observe the small median eye (d) shining with a brilliant light like some microscopic sparkling gem. Respiration is performed over the whole surface of the body, over which a continuous current of water is washed by the setose branchial appendages. The eggs are attached to water plants, and the larvæ, possessing three appendages, are laterally compressed, and enclosed in a thin bi-valve shell. These tiny crustaceans can readily be examined in a watch-glass, under a microscope, and their varied and wonderful movements watched as they feed upon the animal *débris* of the pond sediment.

The third order of Entomostraca, namely, Copepoda, is represented in this pond, particularly where the vegetation is luxuriant and the water clear, by the common but no less interesting and instructive form known as *Cyclops* (fig. 53). On account of its median eye (a), which shines with a ruby brilliance, this little crustacean was thus named after the giant of Greek mythology. It has no carapace or shell, so characteristic of the previous orders. The head is large and round, but is not separated from the trunk; it bears antennules (b), antennæ (c), mandibles, two pairs of maxillæ, and a pair of maxillipeds (d). The thorax bears four pairs of biramous appendages, each consisting of a basal protopodite (e), ending in a three-jointed setose exopodite (f) and an endopodite (g). A copula (h) insures the simultaneous action of each pair of these appendages, and assists the animal to dart through the water in its characteristic manner. While feeding it is sometimes noticed to glide more slowly and smoothly through the water by movements of its antennæ, but, being more easily alarmed than the last animal, it is less easy to observe its normal movements on the stage. The first abdominal segment (i) bears a rudimentary fifth pair of appendages, which are two-jointed in the female and three-jointed in the male. The abdomen terminates in a caudal fork (j). The adult females have a very characteristic

appearance ; the two external egg-sacs (k), each containing some fifty or sixty eggs, can be distinguished even with the naked eye. The males have no egg-sacs, but the antennules are hinged, and act as prehensile organs. Several larval stages are often taken together with the adult forms. The nauplius (figs. 54, 55), larval (youngest) stage, possesses a single eye (a) and three pairs of appendages ; the first pair (b) develops into the antennules of the adult, the second pair (c) is biramous and becomes the antennæ, while the third pair (d), also biramous, becomes the mandibles of the adult. The relatively short body terminates in two setæ. A fourth pair of appendages soon appear, the future maxillæ, and later on three other pairs develop, the larva being known at this stage as a metanauplius. As development proceeds the remaining appendages appear, and the adult form is gradually acquired.

Canthocamptus minutus (fig. 56), an elongated reddish copepod, in which the cephalothorax (a) gradually merges into the abdomen (b), is closely related to Cyclops. It has a single median eye, but has no heart. The female has a single ventral egg-sac (c) and eight-jointed antennules, while the male has no egg-sac, and antennules of only seven joints, which it uses together with the antennæ for holding the female.

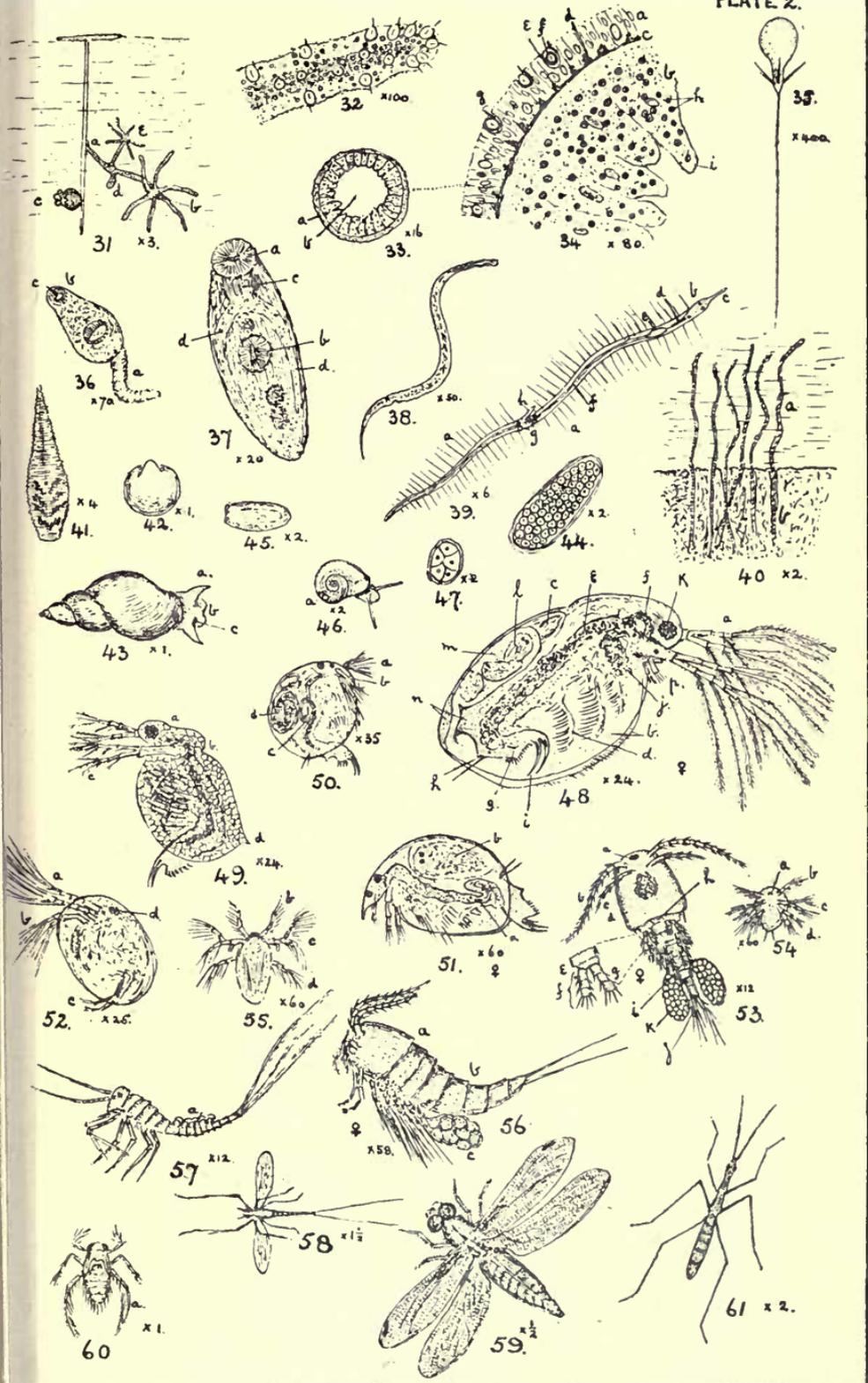
In insects the respiratory air is conveyed directly to the tissues through invaginations of the chitinous covering of the body in the form of finely branched tubes called tracheæ, which usually open to the exterior by stigmata (spiracles), Plate 4, fig. 1, is a photomicrograph of a portion of a trachea dissected from the abdomen of the larva of *Dytiscus* (fig. 64. c), a carnivorous water-beetle. The photograph shows the somewhat spiral cuticular thickenings of the wall of the trachea, which prevent it from collapsing when slightly compressed.

The larva of *Cloeon* (a May fly) (fig. 57), with long antennæ, which occurs in the mud at the bottom of the pond, affords an interesting exception ; here the tracheæ do not open to the exterior, but they take up oxygen from the water through six pairs of double tracheal gills (a). These lateral respiratory processes of the anterior six abdominal segments are

PLATE 2.

- Fig. 31. *Hydra viridis*.
,, 32. ,, ,, (end of a tentacle).
,, 33. ,, ,, (transverse section of the body).
,, 34. ,, ,, (ditto, more highly magnified).
,, 35. ,, ,, (an exploded nematocyst).
,, 36. Cercaria, a larva of a Distomea.
,, 37. Amphistomum (*Diplodiscus*) *subclavatus*.
,, 38. A Nematode.
,, 39. *Nais proboscidea*.
,, 40. *Tubifex rivulorum*.
,, 41. *Glossiphonia* (Clepsine).
,, 42. *Sphaerium*.
,, 43. *Limnaea palustris*.
,, 44. ,, ,, (egg capsule).
,, 45. *Ancylus*.
,, 46. *Planorbis*.
,, 47. ,, (egg capsule).
,, 48. *Simocephalus vetulus*.
,, 49. *Ceriodaphnia reticulata*.
,, 50. *Chydorus sphaericus*.
,, 51. *Alona quadrangularis*.
,, 52. *Cypris*.
,, 53. *Cyclops*.
,, 54. *Nauplius* larva.
,, 55. ,, ,, (older stage).
,, 56. *Canthocamptus minutus*.
,, 57. *Cloeon* (larva).
,, 58. *Cloeon* (imago).
,, 59. *Libellula depressa*.
,, 60. *Corixa Geoffroyi*.
,, 61. *Hydrometra stagnorum*.
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(N.B.—During the process of reproduction the figures have been reduced by 1-20th.)



periodically vibrated—structures and movements which suggest the origin of insects' wings.

The well-known *Corixa Geoffroyi* (fig. 60), the largest and commonest species of the genus, is present in all parts of the pond, rapidly swimming with its oar-like posterior pair of legs (a), the tibiæ and tarsi of which are profusely furnished with setæ. Stiff hairs are also present on the anterior pair of legs, as these appendages are used for swimming as well as for prehension; two slender claws terminate each of the second pair of legs. The gnathites are modified for sucking the juices of the animals on which it lives. The mandibles and first maxillæ are represented by slender piercing styles enclosed within the tubular rostrum (labium). The head is yellowish and bears two large blackish eyes. The thorax is transversely marked with black and yellow and the scutellum is covered by the protothorax. Except at the extremities the elytra are horny and yellowish with black markings, while the delicate hind wings are transparent and iridescent. This insect is almost flat and not keeled, and swims with its dorsal surface uppermost. When it wishes to take a fresh supply of air it rises to the surface until its head and thorax is just above the film, the air then passes round the neck region and communicates with the stigmata, which are situated just above the junction of thorax and legs.

The larva of *Phryganea* (plate 3, fig. 62), well-known as the "caddis-worm," is also present, and, like the ephemeral larva, possesses tracheal gills. It lives in a tubular case covered with sand, &c., from which it can protrude its head and thorax, and by means of its six legs crawls about the bottom of the pond in search of food. When mature the larva, bars the entrance to the case with strong silk, which, however, allows the entrance of water for respiration. The pupa, when mature, gnaws through the obstruction and leaves the water.

Another larva to be found in the pond is that of *Dytiscus* (fig. 64). In this insect the stigmata, two in number, occur on the terminal (eleventh) segment (a) of its brownish body,

which also bears two hairy appendages (b), enabling the larva to suspend itself from the surface film, thus keeping its tracheal system in communication with the air. The head of this larva is shown in fig. 63; it has no mouth, but instead it possesses two sharp sickle-shaped tubular mandibles (a), by means of which it can imbibe the juices of prey. Near the eyes (b) arise the antennæ (c), while in front between the mandibles are the maxillæ (d), with their maxillary palps (e) and the labial palps (f).

Colymbetes fuscus (fig. 65) was also taken together with a much commoner beetle (*Ilybius ater*). The tracheæ of these beetles open into an air space between the abdomen and the elytra, an arrangement which enables them to remain some time under water. When the air in this chamber is exhausted they rise to the surface and, lifting their wing cases above water, they take in a fresh supply of air. These insects are carnivorous, readily attacking even the newt larvæ of the pond. To enable the male to hold on smooth surfaces, the three basal joints of the first tarsi are expanded into adhesive disks, and those of the second pair of legs are also modified. In the latter of the above mentioned beetles the three proximal segments of the anterior tarsi bear adhesive hair-like structures (fig. 66) in the case of the males. The third pair of legs in both sexes are flattened and are furnished with setæ for the purpose of swimming. The gnathites are adapted for biting. The labrum (fig. 67) is simple and transverse, the mandibles (fig. 68) are short, thick, and strongly toothed. The basal part of the first maxilla (fig. 69) is the protopodite, *i.e.*, the stipes (a) and cardo (b). The endopodite consists of the lacinia (c), bearing a masticatory fringe (d), and the galea (e) and the exopodite is represented by the maxillary palp (f). In the labium (second maxillæ (fig. 70) the endopodites (b) and the protopodites (c) are fused together, but the exopodites are represented by the three-jointed labial palps (a).

As might be expected the "Bloodworm" is present in the pond. This insect, the larva of *Chironomus*, forms

burrows in the mud lined with a silky secretion and open at each end. Having left their burrows perhaps through insufficient aeration, these larvæ are frequently seen near the surface of the pond, swimming by very forcibly bending and straightening themselves alternately. Close together beneath the head there are two hooked appendages, and at the extremity of the body two hooked foot-like organs used in grasping the inside of the burrow. On the penultimate segment are four blood gills, and four shorter and thicker ones in the last segment of the body. Another very interesting dipterous larva was found in the most stagnant parts of the pond, though not very frequently. It is the larva of *Eristalis tenax*, a most clumsy grey-coloured creature with seven pairs of very short retractile hooked legs used in burrowing in the mud, in which the animal lives. The posterior end of the body is prolonged into a slender retractile tube containing a structure that telescopes into it. Two tracheal tubes pass through the entire length of this tail, by means of which the larva is able to keep into communication with the air while burrowing in the mud at variable depths. When the tail is retracted the tracheal tubes can be seen coiled in the posterior part of the body. This larva lives on the decomposing matter of the sediment.

Perhaps the most beautiful larva is that of *Culex* (fig. 72). The insect, at this stage of its existence, suspends itself beneath the surface of the water, though when disturbed it quickly sinks, but returns to the surface by a series of jerks of the abdomen; when stranded it wriggles away sideways in a very curious manner. It is an astonishing sight to see the movements of the mouth appendages as they sweep food (vegetable organisms, &c.) into the mouth. The long, narrow abdomen, consisting of ten segments bearing bundles of elegant hairs, terminates in four plates (a), and with many long setæ. The eighth segment bears the respiratory tube (b), at the end of which the tracheal system opens to the air by two stigmata. In the pupa (fig. 73) the abdomen ends in two swimming organs, and curves beneath the large thorax, the

latter now bearing the two respiratory tubes (a), and consequently being uppermost. The future legs, wings, and antennæ are clearly visible on the sides of the pupa. The eye-spots are now replaced by the compound eye of the adult (b); the minute lenses of the retinulæ being already formed.

The larva of another gnat, *Anopheles*, was found resting horizontally immediately beneath the surface of the water, a position which at once distinguishes it from the larva of *Culex* (fig. 72), since the latter hangs nearly perpendicularly from the surface film. Plate 4, fig. 2, is a photomicrograph of the head and thorax of the *Anopheles* larva. It shows the head with its two eye spots and beautiful brush-like mouth parts. When feeding, the head, which seems peculiarly movable, is turned round until the mouth parts come into contact with the surface, and then by their movements quantities of organisms are rapidly swept into the mouth.

Limnochares holosericeus (fig. 75) occurs plentifully, walking on the aquatic plants rather than swimming. The reddish body is smooth, but the legs bear a few hairs. Finely branching tracheæ can be seen in the unsegmented abdomen, which is fused with the cephalothorax. There are several other species of water mites in the pond, for instance, *Arrenurus globator* (fig. 76). The body is truncate behind, and covered with a hard integument set with protuberances. The two eyes are black and placed some distance apart.

Considering now the vertebrates, there appear to be no fish. Members of both orders of Amphibia were present in the pond in June, 1911; but apparently the hundreds of *Molge* (larvæ) perished in the July drought, when the pond was dried up. This larva (fig. 78), with its external gills (a) and well developed tail (Urodela), differs from the tadpole of the frog in acquiring the front legs before the hind legs; the former appear with two toes, the third one developing later. Then gill-clefts appear, the hind legs develop as buds (b), which later acquire five toes, and a fourth toe is added to the front limb. The adult form is reached after the disappearance of the gill-clefts and the external gills. The circulation of the blood can be

watched in the tail of a living specimen. These active little creatures feed on entomostraca, &c. ; the writer found one hundred and ten water-fleas in the stomach of a single larva. Water beetles, in turn, prey upon these larvæ.

The Frog (*Rana temporaria*) was comparatively scarce at the pond during the summer months, only a few specimens being obtainable. The internal structure differs from that of the newt in several important points, such as the skeleton, heart, lungs, reproductive organs, arterial arches, and venous systems ; while the absence of tail (*Anura*) and other external differences are obvious enough. The tongue, being free behind, is attached anteriorly to the floor of the mouth, an arrangement which enables it to jerk out its tongue and catch insects at some distance. The markings in the skin are due to dark branched pigment cells (fig. 77). The frog is a host of many parasites. In the lungs of one small frog there were ten trematodes (see above), while in its intestine a nematode and several hundred *Opalina*, *Nyctotherus*, and *Balantidium* were found.

BOTANY.

There are fewer plants than animals actually in the pond, though the pond-side abounds with vegetation. A few specimens of *Nostoc* (fig. 79) were discovered, the cells of which form a filament surrounded by a colourless gelatinous sheath secreted by the cell wall. These plants are closely allied to Bacteria, but the absence of cilia and of endospores are distinguishing features. Reproduction takes place by cell division ; the filament breaks across at one of the larger cells known as heterocysts (a), the detached portion or hormogonia then starts a new colony.

Tolypothrix (fig. 80), with its blue-green filament (a), surrounded by a mucilaginous sheath (b), occurs frequently together with the closely allied *Oscillaria* (fig. 81). These plants seem to be constantly moving the end of the filament from side to side.

Peridineæ seems plentiful in most parts of the pond. It is a curious little organism bearing two flagella, one of which is a pulsillum and the other is curved round the cell in a groove, which is clearly visible with a high power. The cell contains a nucleus and brownish chromatophores.

The Desmidiaceæ are living in the pond in great profusion. They are usually unicellular organisms, with a constriction lodging the nucleus in the centre, on either side of which is a bright green chromatophore with pyrenoids. *Closterium moniliferum* (fig. 82), however, has no constriction, and the chromatophore is composed of fused plates with pyrenoids (a). One of the characteristic features of these beautiful yet lowly plants is the tiny vacuoles (fig. 83a), one in each end of the cell. When a healthy specimen of *Closterium* is examined under a high power, these vacuoles are seen to contain about twenty extremely minute bodies (b), probably crystals of calcium sulphate, which are constantly oscillating (Brownian movement). *Closterium lunula*, a handsome moon-shaped species of about 1-50th of an inch in length, is found in the mud in some parts of the pond, but is less common than the straighter and more slender form *Closterium acerosum* (fig. 84). In neither of the latter species is there any constriction between the two segments. Another common form is *Cosmarium tetraophthalmum* (fig. 85), with the semi-circular segments deeply divided and the edges crenate. It is about 1-200th in. in length. Other species are present in the pond. These interesting plants are able to respond to the stimulus of light, and by means of protoplasmic threads they push themselves along.

The filamentous forms of Conjugatæ are to be found in masses in several places. *Mougeotia* (fig. 86) is of special interest, since the chromatophore (a) is plate-like and the cell adjusts its position to its immediate needs; ; thus in very strong light the chloroplast is turned with its thin edge towards the light (b), while in weak light the broad surface is presented (c). It is quite easy to watch them turn over under a low power—the process only taking a few

minutes. Oil bodies and pyrenoids (d) can be detected in the chloroplast. The conjugation of two cells can sometimes be observed; it is accomplished by the approximation of the convex sides of two bent cells. The wall between is then absorbed, and the protoplasmic contents of the two cells fuses and a zygospore is formed *between* the two filaments. Another member of this order, *Spirogyra* (fig. 87), is composed of a single row of cells, each of which contains a spiral band-like chloroplast (a), studded with pyrenoids (b) encircled by starch granules. (The later are best demonstrated by irrigating a little iodine.) The nucleus (c) is suspended between the vacuoles (d) by protoplasmic strands from the primordial utricle (e). Conjugating filaments (fig. 88) are often found. Two opposite cells are each seen to develop a process both of which finally meet and fuse (scalariform), at the same time the cell contents of each become rounded up. The contents of one (the male) then pass over and fuse with the contents of the other (the female), forming a zygospore (a), which then acquires a thick wall to resist cold and drought. An allied plant, *Zygnema* (fig. 89), is another pretty little filamentous form. It chiefly differs from *Spirogyra* in having two stellate chromatophores (a) with the nucleus (b) between. It is found growing in association with *Spirogyra*, &c.

The Diatomeæ occur in large numbers, partly on the stems of the aquatic plants, but perhaps more profusely in the bottom, where they move along very slowly by means of protoplasmic processes. The cell-wall is of extreme interest, not only on account of the great diversity and fineness of its markings, but also because of its great durability. The cell wall consists of two valves, which fit together like a box and its lid; it contains so much silica that neither heat nor acid will destroy its shape or markings. The chromatophores are brownish and there is a single central nucleus. *Pinnularia oblonga* (fig. 90) and many other species are to be found.

Pandorina (fig. 91), a small colonial form, consisting of sixteen bi-ciliated protoplasts (a) embedded in a colourless gelatinous matrix (b). The colony swims by the combined

action of the several cilia. Comparatively few specimens of this plant were taken.

The well known *Volvox globator* (fig. 92) was living in the pond in July, 1911; but its whereabouts cannot be depended upon, nor can it be easily kept in a micro-aquarium. It is a hollow spherical colonial form of about 1-50th in. in diameter, the individual protoplasts of which are seen to possess an eyespot and two flagella each (fig. 93). The protoplasts are joined together by exceedingly fine protoplasmic threads. The sphere revolves as it slowly swims along by the united efforts of the very numerous flagella. The large green non-motile egg-cells arise from single cells, while other single colonial cells give rise to yellow ciliated spermatozoids. Often the colonies are seen to contain smaller parthenogenetic colonies (fig. 92a) revolving within the large sphere.

Pediastrum, another pretty little colonial form (fig. 94), was found in the clear water. It is a green plate of cells, the component parts of which are arranged around a central cell in two concentric circles. The peripheral cells each bear two processes, giving the whole a stellate appearance. The entire cell colony is about 1-250th in. in diameter.

Oedogonium (fig. 95) consists of a filament of cells, each of which contains a large single chloroplast (a) with pyrenoids. The filament exhibits intercalary growth (b). The protoplasm of a cell is sometimes seen to have rounded up and formed a zoospore provided with a crown of cilia. After swimming for a while it settles down, and, losing its cilia, it forms a cell wall and grows into a filament. Stages of the sexual reproduction may be met with, e.g., oogonia (c).

Coleochaete (fig. 96) is a small disk-shaped green alga, composed of rows of radiating cells occasionally branching dichotomously (fig. 97). These rows of cells are joined with one another laterally to form the plate. This thallus gives rise to a flask-shaped oogonium, which, after fertilisation, produces a spherical zygospore (fig. 96a) enclosed in enveloping cells, the pseudo-parenchyma. The zygospore divides into sixteen cells, each of which produces a swarm-spore.

Another alga is *Vaucheria* (fig. 98), a branched filamentous but non-cellular form. It contains very numerous chlorophyll granules, and the nuclei increase by division as the filament grows apically. It reproduces asexually by the formation of a zoosporangium (a) at the end of the filament ; the contained ciliated zoospore (a compound of a number of small bi-ciliated zoospores) escapes, giving rise to a new filament with a colourless rhizoid. Sexual reproduction also occurs, spherical oogonia and tubular antheridia sometimes being found.

PART 2.

ZOOLOGY.

The foregoing account deals only with those forms of life found entirely *submersed*. But for many the damp and muddy pond-side is the natural habitat ; for some, however, the surface of the water provides a more suitable environment, while others prefer to flit above the pond. The most typical of these, together with some partly submerged plants, must now be briefly mentioned, as their presence, or very existence, more or less depends on the pond.

The well-known *Hydrometra stagnorum* (Fig. 61) is found actively running on the surface of the water by means of its long and slender legs. The head and thorax are very elongated the former bearing a pair of rather long antennæ ; and a pair of small but distinct eyes.

Close at hand was found a group of whirligig beetles (*Gyrinidæ*) darting about very rapidly on the surface of the water, their tiny glossy wing-cases shining in the sunlight. On closer examination each eye was found to be divided into two parts, so that the beetle appeared to have four eyes ; the antennæ had a fusiform clubbed extremity. A host of other beetles occur around the pond, a characteristic species being *Elaphrus uliginosus* (fig. 71), a little carnivorous ground

beetle with eye spots on the elytra and violet-coloured tibiæ.

There are insects flying above the pond in great variety and countless numbers, far beyond the writer's powers of discrimination. Early in July there were a few specimens of *Cloeon* (fig. 58), which differs from *Ephemera* in having only two wings and two abdominal setæ. Though the preparatory stages occupy two years, the imago only lives about a single day, which explains to some extent the vestigial condition of the mouth parts. The glistening wings are divided into tiny meshes by minute brownish veins.

Dragon-flies (Paraneuroptera) e.g. *Libellula depressa* (fig. 59), are to be seen swiftly flying through the air or hovering over the water, where these most rapacious insects hunt their prey. The four powerful wings, almost equal in size, are divided into very small areas by numerous slender black veins, with a reddish patch at the base. The head is very movable and bears two large compound eyes and short antennæ; the six slender legs are set far forwards on the thorax. The abdomen is rather large and flat, and yellowish with darker markings, and is glaucous in the case of the male.

Culex (Gnat) (fig. 74) is another interesting insect found hovering above the water, particularly in the evening. There is some satisfaction in knowing that only the female is guilty of the well-known blood sucking habit, for the male, which is distinguished by its plumose antennæ, feeds on nectar. The gnathites are modified for piercing and sucking. The fused second maxillæ form the proboscis, which, when covered by the labrum, forms the sheath and acts as a guide to the contained styles, i.e., the two mandibles, two first maxillæ and hypopharynx.

Passing now to the higher animals, the moorhen (*Gallinula chloropus*) seems to be the only other aquatic vertebrate constantly present. These birds habitually build here, constructing a nest, chiefly composed of the leaves of the Great Water-Plantain (*Alisma Plantago-aquatica*), in which the young are reared.

BOTANY.

If we now turn our attention to plant life, we find *Ranunculus aquatilis* (water crowfoot), with its small white flowers and leaves deeply cut into slender filaments, a form of leaf often found in aquatic plants. The closely allied *R. flammula* (Lesser Spearwort) and the curious little *Hydrocotyle vulgaris* (Marsh Pennywort) grow in the shallower water. A transverse section of the petiole of the latter shows three vascular bundles (one of which is shown in fig. 99) surrounded by cortex (a) and epidermis. The xylem vessels (b) are grouped in four sets surrounded by xylem parenchyma (c) and are partly encircled by the phloem (d).

Myosotis palustris (Forget-me-not) is common on the western side of the pond, but still more so is *Menyanthes trifoliata* (Marsh Trefoil). On this side of the pond are *Epilobium hirsutum* (Great Willow Herb) and *E. parviflorum* (Small-flowered Hairy Willow Herb); a transverse section of the root of the latter shows the endogenous origin of the lateral roots. The vascular bundles can be seen to have fused together, forming a ring enclosing the pith. By the activity of the phellogen in the pericycle the cortex and epidermis is already almost cut off from the stele by a ring of phellem.

Here, as in most ponds, *Lemna minor* (Lesser Duckweed) is extremely plentiful, and supplies an example of a root-pocket, which functions as a calyptra (root-cap). Spread over the surface of the southern part of the pond is *Potamogeton natans* (Floating Pond-weed), with smooth elliptical leaves and spike inflorescences. Clusters of *Alisma Plantago-aquatica* (Great Water-Plantain) occur amongst the Pond-weed, the delicate white flowers of which are arranged in a panicle some three feet above the water.

The well known brown spikes of pistillate flowers of *Typha latifolia* (Great Reed-Mace) are to be found on the eastern side of the pond. The slender extremity of the spike consists of

staminate flowers. But perhaps more plentiful is *Sparganium ramosum* (Branched Bur-reed). The flowers consist of the more numerous and upper small staminate heads and the lower and larger pistillate heads. A portion of the peripheral part of a transverse section of the stem of *Juncus* (Rush) is shown in fig. 100. The single row of epidermal cells (a) have their external cell walls greatly thickened, which, together with the columns of stereome (b) and the sclerenchymatous tissue (c) around the vascular bundle, all assist in giving the plant its characteristic toughness and rigidity. A stoma (d), bounded by two guard cells, allows air to pass into the intercellular spaces between the cells of the assimilating tissue (e). The vascular bundle containing the xylem (f) and phloem (g), with its supporting sclerenchymatous ring, is surrounded by a ring of much larger cells (h). The pith (i) consists of very characteristic stellate cells, the rays of which either join with others of the same level or with others of a higher or lower level, giving a very beautiful effect.

Such observations as this essay contains seem to remind one that here indeed is a struggle for existence. To a casual observer this might be overlooked, as it requires much time and patience to study, for instance, the tussles that occur between the sun animalcule and a water-flea. It is, however, a comparatively easy matter to examine the forms of life to be found in the stomach of a newt larva, or to watch the *Dytiscus* larva and its prey; while the struggles of *Hydra* with one or other of the *Entomostraca* are common observations.

In this connection it is important to notice the designs and devices the animals and plants possess for their protection, while many exhibit very obvious weapons of offence to still further assist them in this struggle for life. Besides the use of the plants in affording food material, protection, nesting material, &c., for animals, there are other instances of the inter-relationship between plant and animal life, such as the symbiotic algæ in *Hydra*.

PLATE 3.

- „ 62. *Phryganea* (larva).
- „ 63. *Dytiscus* (head of larva).
- „ 64. „ (larva).
- „ 65. *Colymbetes fuscus*.
- „ 66. *Ilybius ater* (hairs on anterior tarsi).
- „ 67. „ „ (labrum).
- „ 68. „ „ (mandible).
- „ 69. „ „ (first maxilla).
- „ 70. „ „ (labium, or second maxillæ).
- „ 71. *Elaphrus uliginosus*.
- „ 72. *Culex* (larva).
- „ 73. „ (pupa).
- „ 74. „ (imago).
- „ 75. *Limnochares holosericeus*.
- „ 76. *Arrenurus globator*.
- „ 77. *Rana temporaria* (pigment cells from skin).
- „ 78. *Molge* (larva).
- „ 79. *Nostoc*.
- „ 80. *Tolypothrix*.
- „ 81. *Oscillaria*.
- „ 82. *Closterium moniliferum*.
- „ 83. „ „ (vacuole).
- „ 84. *Closterium acerosum*.
- „ 85. *Cosmarium tetraophthalmum*.
- „ 86. *Mougeotia*.
- „ 87. *Spirogyra*.
- „ 88. „ (conjugating filaments).
- „ 89. *Zygnema*.
- „ 90. *Pinnularia oblonga*.
- „ 91. *Pandorina*.
- „ 92. *Volvox globator*.
- „ 93. „ „ (portion more highly magnified).
- „ 94. *Pediastrum*.
- „ 95. *Oedogonium*.
- „ 96. *Coleochaete*.
- „ 97. „ (portion more highly magnified).
- „ 98. *Vaucheria*.
- „ 99. *Hydrocotyle vulgaris* (transverse section of petiole, portion of).
- „ 100. *Juncus* (transverse section of stem, portion of).

(N.B.—During the process of reproduction the figures have been reduced by 1-20th.)

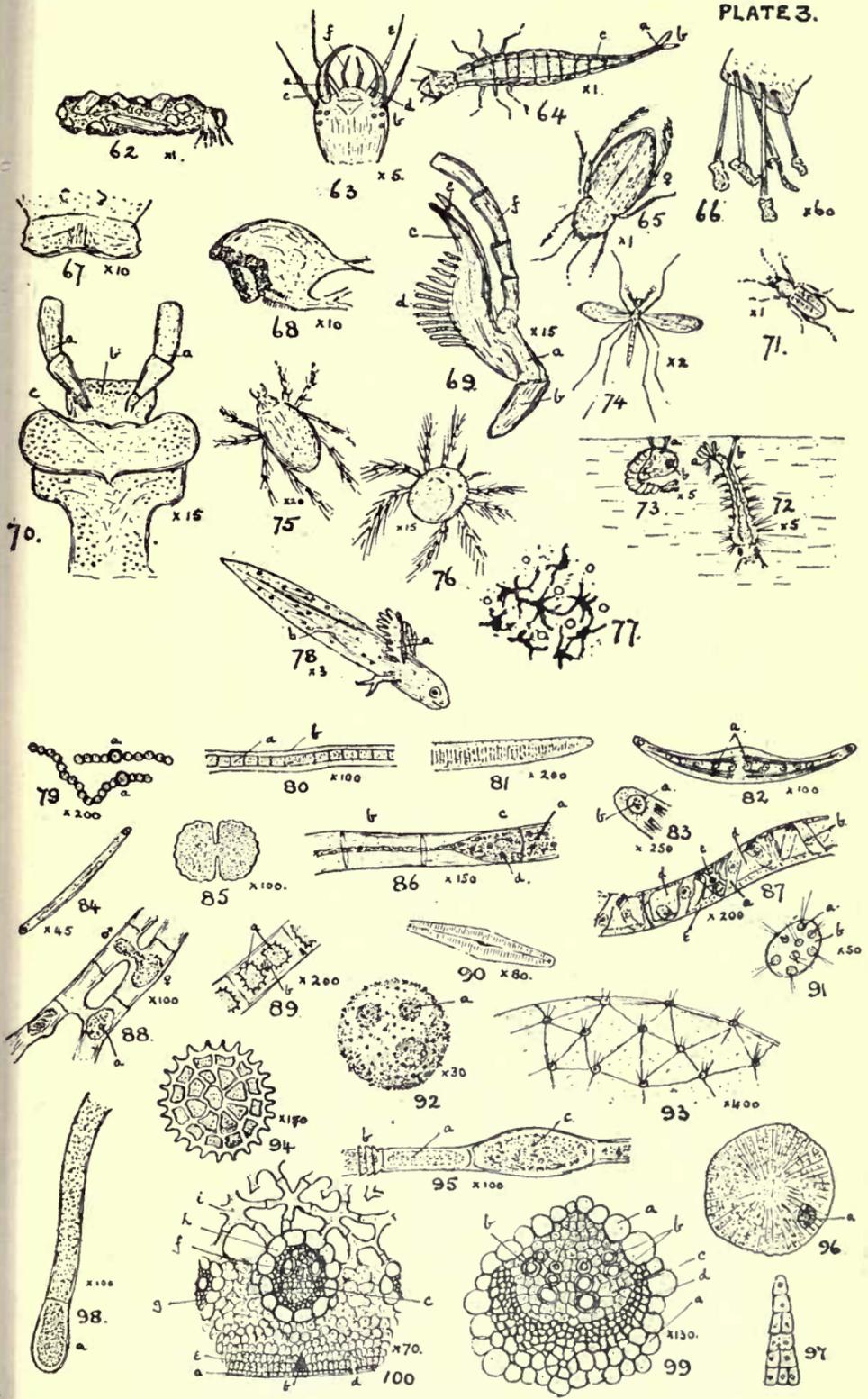






PLATE 4.

- Fig. 1. *Dytiscus* (portion of trachea from abdomen of larva).
,, 2. *Anopheles* (head and thorax of larva).

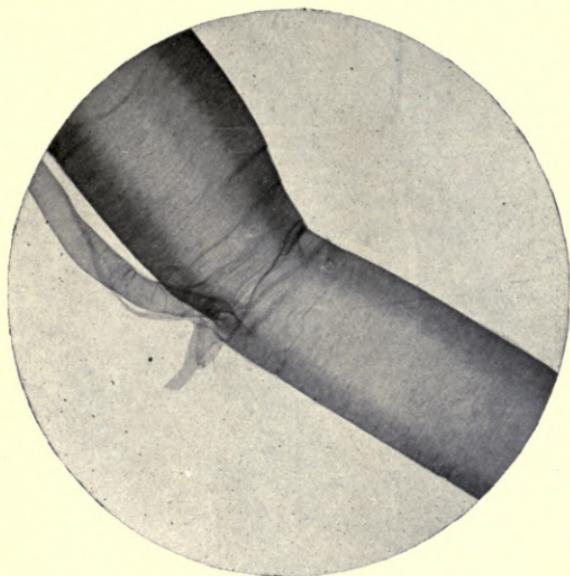


FIG. 1.

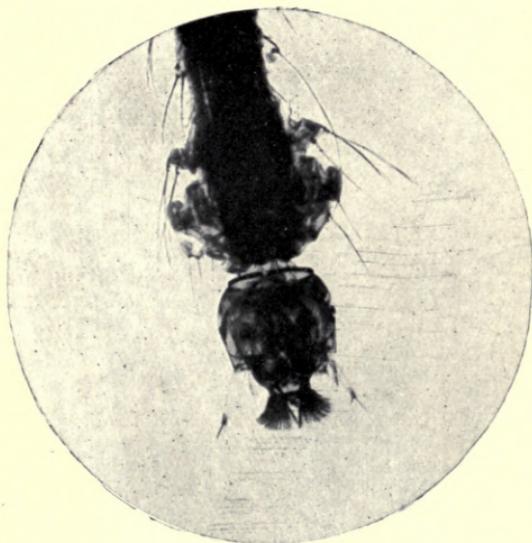


FIG. 2.

When thus considering these problems of life in this most interesting and productive pond, one is particularly impressed by Tennyson's words :—

“Come forth into the light of things,
Let Nature be your teacher.”

The writer wishes to express his indebtedness to Mr. Cecil Warburton (Cambridge University) and to Mr. N. D. F. Pearce (Cambridge University) for the identification of *Alona quadrangularis*, *Simocephalus vetulus*, and *Amphistomum subclavatum*; also to Mr. C. J. Gahan (Natural History Museum, South Kensington) for the identification of *Ilybius ater*.





Phenological Report on First
Appearances of Birds, Insects, &c., and
First Flowering of Plants

IN DORSET DURING 1911.

By NELSON M. RICHARDSON, B.A.



THE names of those who have this year sent in returns are as follows; they are denoted in the Reports by initials:—

- (N. M. R.) Nelson M. Richardson, Montevideo, near Weymouth.
- (E. S. R.) E. S. Rodd, Chardstock House, Chard.
- (W. H. D.) Rev. W. Hughes D'Aeth, Buckhorn Weston Rectory, Wincanton.
- (J. R.) Rev. J. Ridley, Pulham Rectory, Dorchester.
- (S. E. V. F.) Rev. S. E. V. Filleul, All Saints' Rectory, Dorchester.
- (E. F. L.) Rev. E. F. Linton, Edmondsham Rectory, Salisbury.

- (J. M. J. F.) Rev. J. M. J. Fletcher, The Vicarage, Wimborne Minster.
- (E. E. W.) Miss Ellen E. Woodhouse, Chilmore, Ansty, Dorchester.
- (G. R. P.) G. R. Peck, Muston Manor, Puddletown, Dorchester.

Single notes from other observers will be acknowledged under their records. Rev. A. E. Eaton, who contributed observations last year, has left Dorset. Any information from observers as to authentic records of birds, insects, plants, &c., which are either rare or new to Dorset, of which they may read or hear, as well as those facts observed by themselves, will be acceptable. If unable to record more than even one observation in a division, it would be desirable to insert it, *e.g.*, the sole record of a viper for 1911 is made by an observer who records nothing else in that division of insects, &c.

When early butterflies are recorded from greenhouses, it usually means that the larva has spun up in the greenhouse and the pupa has been forced by the warmth into an early appearance. In such a case it would be well also to record the first natural out-of-doors appearance of the species, which can be compared with other records. It is of course also most important that the species of bird, butterfly, plant, &c., should be correctly identified. If the observer is not certain and cannot obtain confirmation, he should state this, or omit the record.

NOTES ON RARE AND OTHER BIRDS IN 1911.

HAWK (*sp. inc.*).—On Jan. 30 a hawk carried off a blue tit feeding from a cocoanut at my window at Pulham. (J. R.)

BARN OWL (*Aluco flammeus*, L.).—This is getting more plentiful at Chardstock. (E. S. R.)

CUCKOO (*Cuculus canorus*, L.).—A young cuckoo, reared by robins, was observed by Mrs. Bosworth Smith at Bingham's

Melcombe to be calling to its foster parents with a robin's notes, and not those of a cuckoo. (E. E. W.)

LESSER SPOTTED WOODPECKER (*Dendrocopus minor*, L.).—One seen at Pulham on Mar. 12. (J. R.)

HERRING GULL (*Larus argentatus*, Gmelin.).—Herring Gulls are much more frequently seen inland all the year round than formerly. (E. S. R., Chardstock.)

GREY-LAG GOOSE (*Anser cinereus*, Meyer) or PINK-FOOTED GOOSE (*Anser brachyrhynchus*, Baillon).—While fishing on the Upper Water of the Dorchester Club on the morning of June 7th, 1911, I saw flying fairly low over Charminster five grey geese. I borrowed the keepers' glasses, but could not make out for certain whether they were grey-lag or pink-footed. They were flying about E. It is very unusual to see grey geese in the South of England in the summer. They may have escaped from some preserve, but in my opinion they were wild birds. I shoot a good many in Holland and see thousands there in the winter. (G. R. P.)

The following birds were observed in the early part of 1912 and will be mentioned again in the report for that year. They are alluded to now on account of the delay which must necessarily arise before the publication of the latter. Amongst them is the Lapland Bunting, which is of great interest as being not only a rare British species, but also one of which the occurrence in this country has never before been recorded.

GRASSHOPPER WARBLER (*Acrocephalus nævius*, Bodd.) seen and heard by Colonel F. G. Mainwaring in his garden at Upwey, April 22nd, 1912.

LAPLAND BUNTING (*Plectrophanes lapponica*, Selby).—A bird of this species, which does not appear to have been hitherto observed in Dorset, was seen in a rough field adjoining one of the heaths at Wareham, quite close on the ground, by Rev. S. E. V. Filleul and a gamekeeper on Jan. 30, 1912, and identified by the former as the above rare visitor. A further account will be given in the report for 1912.

LITTLE AUK (*Mergulus alle*, L.).—A live specimen was picked up near Gillingham on February 2, 1912, but died

during the night, and was given to Mr. B. Edmund Freame, of The Chantry, Gillingham.

BOTANICAL NOTES.

Rev. C. W. H. Dicker sent the following note:—On April 3 I happened to be passing “ Weatherbury Castle ” and went up to the top. I found the S. face of the brick obelisk (to a height of some 30ft.) bearing a luxuriant growth of the white violet ; no other plant was visible on it.

Rev. James Cross, of Baillie House, Wimborne, sends a note (here reprinted) in continuation of one on p. 183 of Proc. D.F.C., Vol. XXIV. :—The sheaths of the sycamore buds of a tree opposite to my front door began to fall

In 1900 on Ap. 25	1907 on Ap. 19
1901 „ May 1	1908 „ Ap. 28
1902 „ Ap. 12	1909 „ May 1
1903 „ Ap. 10	1910 „ May 2
1904 „ Ap. 21	1911 „ Ap. 19
1905 „ Ap. 15	1912 „ Ap. 1
1906 „ Ap. 17	

On April 19, 1911, there were only a few sheaths, but on Ap. 1, 1912, the earliest date since the commencement of the record, there were quantities.

GENERAL NOTES.

From (N. M. R.) Weymouth. An exceptionally hot and dry summer, with persistent rain in the latter part of the year, there having been a measurable quantity on each of the last 5 days of November and on every day in December, making 36 successive rainy days. A mild winter to the end of the year, when there were still geraniums, a few sweet peas, &c., in flower in the open garden.

From Rev. C. W. H. Dicker, Pydeltrentside Vicarage.—I saw a beautiful pair of “mock suns” on Mar. 2 from Rawlsbury Rings, each of them was coloured like a short segment of a rainbow, but so bright that the eye could only rest on it a moment.

From (J.R.) Pulham.—Snow fell on Feb. 9 (slight), Mar. 13, Ap. 6 (slight). The first fortnight in April was very cold, more than once there were 10 degrees of frost. Thunder on Mar. 22 (heavy with rain), May 1 (distant), May 26 (heavy, hail and rain), June 4 (distant), June 5 (heavy), Aug. 21 (distant), Aug. 25 (a little), Oct. 7 (a little).

Rain July 29 (first rain for 29 days), Aug. 24. There was practically no rain for 54 days up to this date. The leaves of trees were falling as in autumn, shrivelled and yellowed. Ponds never known dry before were now quite dry.

From (E.S.R.) Chard.—January 10th, 13th, 14th, and 15th were perfect winter days. Jan. 10th brilliant sun, mild and still. Jan. 13th, 14th, 15th, sharp frost from 8 to 10 dgs., and more in places, and brilliant sunshine and still. We were just able to hunt, and scent on Jan. 13th was holding and good. Riding home on Saturday, January 14th, from Buckland Ripers to Chardstock after hunting with the Cattistock I noticed, just after the very lovely sunset, the beautiful phenomenon of a sun pillar, which presented itself very clearly as I rode home to Chardstock over the lovely Downs from Abbotsbury to Burton Bradstock. The moon was at the full, and the scene was one of indescribable loveliness. A fine dry February, remarkable for absence of frost. April 1st to 20th, very cold. A more beautiful May, June, and July, Spring and Summer, could not possibly be conceived. There were two considerable droughts, and from June 16th to June 25th we had unsettled weather, and “catchy” for the hay harvest. Hundreds of acres of the most beautiful hay however were carted before June 16th, as it was an early hay harvest, and thousands of acres of most beautiful hay were carted after June 25th, and we were among the fortunate ones at Chardstock House, Home Farm, and on the Estate.

Crops light generally. By July 10th the second drought was beginning to be very much felt throughout England and elsewhere. By July 18th the drought had become serious indeed, and the fly had stripped the turnips, though the mangold were looking well, so was the corn everywhere ; but we wanted rain to swell the grain. Corn harvest began about here on July 16th. The autumn continued with remarkably hot and dry weather till November. Such a dry summer and autumn has not been experienced by me since 1870, when residing in North Hampshire on the Chalk Hills between Basingstoke and Alton, preceding my 40 years residence in Dorset from 1872. November and December were very unsettled ; two wet months. The year ended in quite mild weather. (E. S. R.).

Lists of the dates of First Appearances and First Flowerings are appended. Particulars of prize exhibits of barley and wheat for 1911, furnished by Rev. James Cross, of Sturminster Marshall, will be found on page 248 of the last Volume (XXXII.) of Proceedings.

EARLIEST DORSET RECORDS OF PLANTS IN FLOWER IN 1911—(continued).

	Dorset.	N. M. R. Weymouth.	E. S. R. Chard.	W. H. D. Buckhorn Weston.	J. R. Pulham.	E. F. L. Edmond- sham.	J. M. J. F. Wimborne.	E. E. W. Ansty.
Yarrow	June 6	June 10 1)	..	June 8	.. 27	June 8	June 6	June 30
Ox-eye Daisy	May 15	..	..	May 26	May 27	May 15	Ap. 27	May 21
Mouse-ear Hawkweed	May 27	..	..	May 27	(6)	..	..	June 1
Harebell	June 27	..	..	..	..	July 17	June 27	July 7
Greater Bindweed	June 6	July 15	..	June 11	..	June 15	June 6	June 30
Water Mint	July 6	..	..	July 21	..	..	July 6	July 14
Ground Ivy	Mar. 6(4)	..	..	Mar. 23	..	..	Mar. 27	Mar. 19
Hazel (female flowers)	Feb. 8	Feb. 23	..	Feb. 8	.. 17(7)	..	Feb. 12	Feb. 28
Cowslip	Feb. 27	Ap. 2	May 1	Mar. 28	Feb. 27	Mar. 27	Mar. 6	Mar. 27
Bluebell	Ap. 10	Ap. 23	May 1	Ap. 12	Ap. 12	Ap. 10	Ap. 15	Ap. 12

L. First leaf. F. First flower.

(1) Had been out a few days. (2) Great blossom year for hawthorn. (3) Lesser Celandine shown to Headmistress and recorded in flower on Jan. 12 by Edmondsham school observers (E. F. L.). (4) Ground Ivy recorded in flower on Mar. 6 by Edmondsham school (E. F. L.). (5) No flower of Lesser Celandine seen again until Feb. 12 (J. M. J. F.). (6) Harebell not found at Pulham (J. R.). (7) Hazel female flowers out also on Dec. 19 at Pulham (J. R.).
 NOTES.—CHARD—Snowdrops out at Chardstock House, 500ft. above sea-level, on Jan. 15; also dandelion (E. S. R.). BUCKHORN WESTON—*Orchis maculata* in flower June 1 (W. H. D.). PULHAM—Date of first flowering of the following plants: Great Sallow, Mar. 1; Butterfly Orchis, May 30; Guelder Rose, June 5; Milkwort (blue and pink), June 14 (J. R.).

FIRST APPEARANCES OF BIRDS IN DORSET IN 1911—(continued).

	Dorset.	N. M. R. Weymouth.	E. S. R. Chard.	W. H. D. Buckhorn Weston.	J. R. Pulham.	S. E. V. F. Dorchester.	E. F. L. Edmondsham.	E. E. W. Ansty.	G. R. P. Puddle-town.
Cuckoo ..	{ F. 24 S. Ap. 13 L. June 27	.. 26 Ap. ..	.. 18 (2) Ap. ..	.. 22 Ap. ..	.. 13 Ap. June 27	.. (4) ..	.. 16 Ap. ..	Ap. 24 (7) Ap. 24	Ap. 26
Swallow ..	{ F. Ap. 1 (11) L. Nov. 23 (1) Ap. 18	.. 22 Ap. .. Nov. 22 (1)	.. .. .. .. .. ..	.. 20 Ap. .. Oct. 29	Ap. 23 Ap. Oct. 13 (10)	Ap. 18 (5)	Ap. 15 Early May .. 16	Ap. 18 (7) Ap. .. Ap. 23	Ap. 4 Ap. 18
House Martin	{ F. May 16 N. Oct. 8 L. Ap. 17	.. 8 Oct. .. May .. 10	.. .. .. .. .. ..	.. 8 May .. Aug. 23	.. .. .. .. Ap. 26	.. .. .. .. .. ..	.. .. .. .. .. ..	.. .. .. .. .. ..	Ap. 17 May 5
Sand Martin	{ F. Ap. 26 S. Ap. 23	.. .. .. ..	.. .. .. ..	.. .. .. ..	.. .. .. ..	.. .. .. ..	.. .. .. ..	.. .. .. ..	May 12
Swift ..	{ F. May 12 L. May 12 S. Sept. 29	.. 29 Sept. ..	.. (8) .. ..	.. .. .. ..	.. .. .. ..	.. .. .. ..	.. .. .. ..	.. .. .. ..	May 5
Nightjar ..	{ F. Ap. 13 S. May 16	.. .. .. ..	.. 16 May .. (3)	Ap. 13 .. ..	.. .. .. ..	.. .. .. ..	.. .. .. ..	.. .. .. ..	May 8
Turtle Dove	{ F. May 1 S. May 20	.. 1 May ..	.. 9 June ..	.. .. .. ..	.. .. .. ..	.. .. .. ..	.. .. .. ..	.. .. .. ..	May 12
Corncrake ..	{ S. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	May 8

F. First seen. S. Song first heard. N. Nesting. E. First Egg. V. Young heard. L. Last seen.
 (1) A young swallow, in a rather exhausted condition, flew into the house on Nov. 22. After being for some time in a basket and having a little meat and the only procurable fly put down its throat, it flew away feebly. I do not think it could have been strong enough to migrate (N. M. R.). (2) Very common. (3) Corncrakes are almost extinct on these chalk hills and may be classed with our vanishing birds (E. S. R.). (4) Cuckoo heard at Upwey Ap. 17 (S. E. V. F.). (5) Swallow seen Nov. 9 at Wareham (S. E. V. F.). (6) Flycatcher's nest completed May 30, first egg June 4 (E. F. L.). (7) Observations of gamekeeper at Ansty (per E. E. W.). (8) Night Jars increasing perceptibly in Chardstock Parish, &c. (E. S. R.). Wood pigeons first heard Mar. 5, a beautiful mild Spring day (E. S. R.). (9) A large flock of Fieldfares Dec. 17 (J. R.). (10) Saw swallows at Poole Oct. 31 (J. R.). (11) A swallow seen at Sturminster Marshall, Wimborne, on Ap. 1 (Rev. James Cross, Baillie House, Wimborne).
 NOTES.—PUDDLETOWN—3 nests of Green Plover of one egg each on April 14 (G. R. P.). EDMONDSSHAM—Wryneck seen May 11. (E. F. L.). BINGHAM'S MELCOMBE—Magpie's nest with eggs, Feb. 11 (E. E. W.). CHARDSTOCK—April 5 and 6 very cold, snowstorms. Starlings still in flocks in the fields. Woodpigeons first heard Mar. 5, a beautiful mild Spring day (E. S. R.). PYDELTRENTIDE—Two thrushes with eggs on Mar. 12 (Rev. C. W. Dicker). PULHAM—Stock doves cooing Mar. 1. Brood of Nuthatches out July 28. Thrushes singing merrily for hours Dec. 30. (J. R.).

FIRST APPEARANCES OF INSECTS, &C., IN DORSET IN 1911.

	Dorset.	N. M. R. Weymouth.	W. H. D. Buckhorn Weston.	J. R. Pulham.	S. E. V. F. Dorchester.	E. F. L. Edmond- sham.	E. E. W. Ansty.
Cock-chaffer	May 14	May 14	.. ..	May 27	.. ..	.. ..	Jan. 28
Glow-worm	June 16	Feb. 20	Mar. 8	June 16	.. ..	.. ..	June 6
Common Hive Bee (<i>h</i>)	Jan. 28	Nov. 4	Ap. 16	Jan. 28	.. ..	.. ..	.. ..
Wasp (<i>h</i>)	Ap. 16	Nov. 7 (1)	.. ..	May 5	.. ..	(2)	.. ..
Small White Butterfly	Nov. 7	Ap. 15 (1)	Ap. 14	Oct. 23 (6)	.. ..	.. ..	.. ..
Orange-tip Butterfly	Ap. 14	May 13	Ap. 14	.. ..	.. ..	.. ..	May 12
Meadow-brown Butterfly	May 6	June 11	June 9	.. ..	.. ..	.. ..	May 6
Wall Butterfly	May 13	May 13	June 2	.. ..	.. ..	.. ..	.. ..
Brimstone Butterfly (<i>h</i>)	Mar. 21	.. ..	Mar. 31	.. ..	.. ..	.. ..	.. ..
Peacock Butterfly (<i>h</i>)	Sept. 14	.. ..	.. ..	Ap. 24	.. ..	.. ..	Mar. 21
Red Admiral	June 9	June 9	.. ..	May 12	.. ..	.. ..	Mar. 25
Painted Lady (<i>h</i>)	Oct. 11	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
Cinnabar Moth	No record	not seen	.. ..	.. ..	.. ..	.. ..	.. ..
Currant Moth	May 15	May 15	May 17	.. ..	.. ..	.. ..	.. ..
Viper (<i>h</i>)	July 15	July 15	July 19	.. ..	.. ..	.. ..	.. ..
Frog Spawn	Mar. 5 (5)	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
	Feb. 1	.. ..	.. ..	Feb. 25	Feb. 1	.. ..	.. ..

h. hibernated.

(1) Unusually abundant. (2) Wasps very abundant, 84 nests taken by one man on the Edmondsham Estate (E.F.L.). (3) Abundant during May and early June (E. F. L.). (4) Small White Butterfly in greenhouse (probably forced by heat and not suitable for comparison with out of door specimens Mar. 22 (E. E. W.)). (5) On Mar. 5 my son killed an Adder here 15in. long and fat (Rev. C. W. Dicker, Pytelrethide). (6) Exceedingly numerous (J. R.).

NOTES.—WEYMOUTH—Large White and Small White both swarmed this year (N. M. R.). CHARPSTOCK—Wasps plentiful. A remarkable absence of common house and field flies here and everywhere all through the hot weather in the months May, June, and July (E. S. R.) PULHAM—Humming Bird Moth seen Sept. 3 (J. R.).

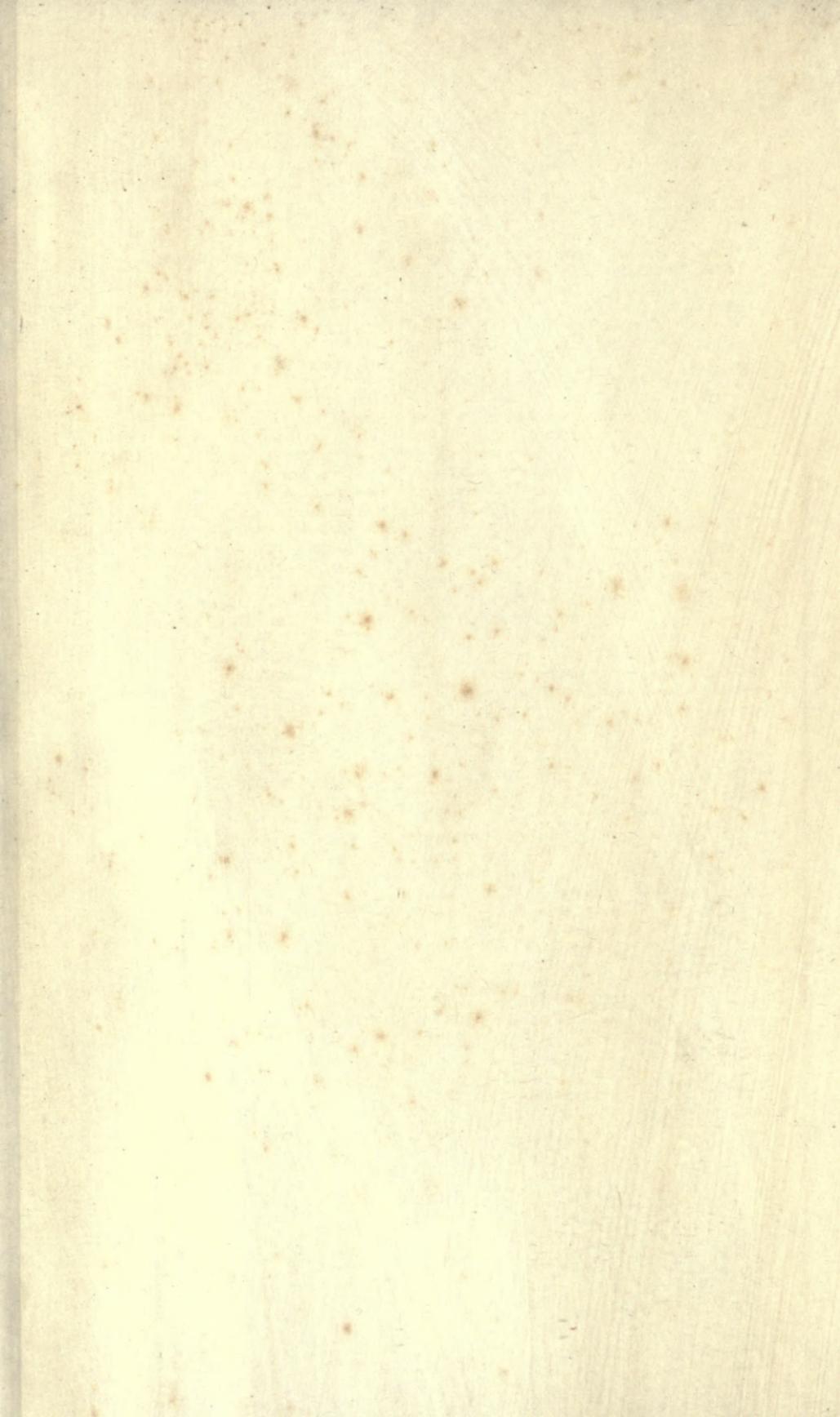
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