





142095
Print
Journal of the
Royal Institution of Cornwall
With
THE

FIFTY-SEVENTH ANNUAL REPORT

OF THE

ROYAL INSTITUTION

OF

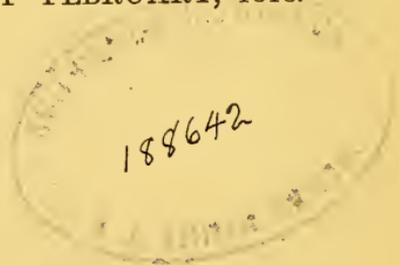
CORNWALL.

=====
INSTITUTED ON THE FIFTH OF FEBRUARY, 1818.
=====

TRURO:

JAMES R. NETHERTON, 7, LEMON STREET

1875.



ROYAL INSTITUTION OF CORNWALL.

FOUNDED 1818.

Patron:
THE QUEEN.

Vice-Patron:
H.R.H. THE PRINCE OF WALES, DUKE OF CORNWALL, &c., &c.

Trustees:
LORD ROBARTES.
SIR C. B. GRAVES SAWLE, BART.
F. G. ENYS.
LIEUT.-COL. TREMAYNE.

Council for the Year 1874-5.

President:
J. JAGO, M.D., (OXON.), F.R.S.

Vice-Presidents:
MR. A. PENDARVES VIVIAN, M.P. | MR. TWEEDY.
MR. JONATHAN RASHLEIGH. | MR. FREETH.
SIR J. ST. AUBYN, BART., M.P. |

Treasurer:
MR. W. TWEEDY.

Secretaries:
MR. WHITLEY, F.M.S., C. LE NEVE FOSTER, D.Sc., F.G.S.,
J. H. COLLINS, F.G.S.

Other Members:
C. BARHAM, M.D., CANTAB., | MR. H. S. LEVERTON,
MR. W. COPELAND BORLASE, | REV. ALLEN PAGE MOOR,
F.S.A., | MR. A. PAULL,
J. H. COLLINS, F.G.S., | MR. W. J. RAWLINGS,
REV. W. IAGO, A.B., CANTAB., L.S. | MR. H. O. REMFRY,
SOC. ANT. LOND. | MR. J. D. TYERMAN,

And THE MAYOR OF TRURO.

Local Secretaries:
TRURO:—MR. ALEXANDER PAULL.
LONDON:—MR. H. M. WHITLEY, F.G.S.

Librarian and Curator of Museum:—MR. W. NEWCOMBE, TRURO.

Honorary Members :

Wm. von Haidinger, F.R.S.E., &c., <i>Vienna.</i>	Rev. E. L. Barnwell, M.A., <i>Ruthin,</i> <i>Denbighshire.</i>
Thomas Hawkins, F.G.S., &c., <i>Hermitage,</i> <i>Whitwell, Isle of Wight.</i>	W. L. Banks, F.S.A., <i>Brecon, South</i> <i>Wales.</i>
Rev. T. G. Hall, M.A., F.R.S., <i>Prof.</i> <i>Math., King's College, London.</i>	Warrington Wilkinson Smyth, M.A., F.R.S., F.G.S., &c., <i>London.</i>
J. E. Gray, F.R.S. and F.L.S., <i>British</i> <i>Museum.</i>	Major Gen. Sir H. James, R.E., F.R.S., M.R.I.A., &c., <i>Southampton.</i>
Sir Gardner Wilkinson, D.C.L., F.R.S., &c.	W. Pengelly, F.R.S., F.G.S., <i>Lamorna,</i> <i>Torquay.</i>
Chas. Cardale Babington, M.A., F.R.S., &c., <i>Prof. of Botany, Cambridge.</i>	Sir John Maclean, F.S.A., <i>Pallingswick</i> <i>Lodge, Hammersmith.</i>
M. Moissenet, <i>Paris.</i>	

Corresponding Members :

Edward Blyth, <i>Calcutta.</i>	Major Gen. Lambrick, <i>Royal Marines.</i>
W. P. Cocks, <i>Falmouth.</i>	Henry Mc. Lauchlan, F.G.S., <i>London.</i>
John Hockin, <i>London</i>	Capt. Napleton, <i>Bengal.</i>
Robert Hunt, F.R.S., <i>Keeper of Min-</i> <i>ing Records, School of Practical</i> <i>Geology, &c.</i>	S. R. Pattison, F.G.S., <i>London.</i>
Rev. R. Lethbridge King, <i>Sydney,</i> <i>Australia.</i>	C. W. Peach, <i>Edinburgh.</i>
	W. H. Tregellas, <i>Holly Cottage, Brom-</i> <i>ley, Kent.</i>
	R. N. Worth, F.G.S. <i>Plymouth.</i>

Associates :

J. T. Blight, F.S.A., <i>Penzance.</i>	Edward Hookham, <i>London.</i>
W. Carkeet, <i>Sydney.</i>	Thomas Lobb, <i>Perranwharf.</i>
J. H. Collins, F.G.S., <i>Truro.</i>	W. Loughrin, <i>Polperro.</i>
George Copeland, <i>Hayle.</i>	S. H. Michell, <i>Swansea.</i>
W. Dawe, <i>Delhi, East Indies.</i>	R. Pearce, jun., F.G.S., <i>Colorado.</i>
Joseph Dickinson, H.M. Inspector of <i>Coal Mines, Manchester.</i>	Capt. Josiah Thomas, <i>Dolcoath.</i>
N. Hare, jun., <i>Liskeard.</i>	Capt. Williams, <i>Charlestown Mines.</i>

Proprietors :

Viscount Falmouth.	Leverton, H. Spry, L.R.C.P. <i>Ed.</i>
Lord Clinton.	Michell, Edward.
Lord Churston.	Michell, W., Reps. of.
Lord Robartes.	Michell, W. E.
Sir T. D. Acland, Bart., M.P.	Nankivell, J. T., Reps. of.
Sir Charles Lemon, Bart., F.R.S., Representatives of.	Nankivell, J. T., <i>Melbourne.</i>
Sir John Lubbock, Bart., F.R.S.	Paddon, W. H.
Sir C. B. Graves Sawle, Bart.	Parkyn, Major, D.C.R.V.
Sir R. R. Vyvyan, Bart., F.R.S., F.G.S.	Potts, Miss, <i>Brighton.</i>
Sir Wm. Williams, Bart., Reps. of.	Roberts, Joseph, <i>Southleigh.</i>
Sir S. T. Spry, Reps. of.	Rogers, W., <i>Falmouth.</i>
Andrew, Henry, F.R.C.S.	Rogers, F., <i>Plymouth.</i>
Baynard, William.	Rogers, Rev. St. Aubyn.
Boase, H. S., M.D., F.R.S., F.G.S., <i>Dundee.</i>	Rogers, Rev. R. Basset, <i>Budock.</i>
Buller, J. H., <i>Downes.</i>	Rogers, J. Jope, <i>Penrose.</i>
Carlyon, E. T.	Rogers, Rev. W., <i>Maunan.</i>
Carpenter, John, Reps. of.	Rogers, Reginald, <i>Carwinion.</i>
Chilcott, J. G.	Sambell, Philip, jun., <i>Falmouth</i> , Reps of
Clyma, W. J.	Spry, E. G.
Edwards, Miss, <i>Newquay.</i>	Spry, Mrs.
Enys, J. S., F.G.S., <i>Enys</i> , Reps. of.	Stokes, H. S., <i>Bodmin.</i>
Fox, Charles, <i>Trebah.</i>	Tweedy, Robert, <i>Tregolls.</i>
Fox, R. W., F.G.S., <i>Penjerrick.</i>	Tweedy, E. B.
Gregor, F. G., <i>Trewarthenick.</i>	Tweedy, W.
Hartley, W. H. H., <i>Rosewarne.</i>	Tweedy, R. M., <i>Falmouth.</i>
Hawkins, J. H., F.R.S., F.G.S., <i>Bignor</i> <i>Park.</i>	Tweedy, Charles, <i>Redruth.</i>
Hawkins, C. H. T., <i>Trewithen.</i>	Tweedy, Miss.
Hendy, James.	Tweedy, Miss C.
Hogg, John, M.D., <i>London.</i>	Vivian, John Ennis, Reps. of.
Hogg, Mrs.	Whitford, Miss.
Jenkins, Rev. D., <i>St. Goran</i> , Reps. of.	Wightman, Lieut.-Col. George, Reps. of
	Williams, R. H., M.R.C.S.
	Willyams, H. <i>Carnanton</i> , Reps. of.
	Willyams, A. C.

Life Members :

Right Rev. Lord Bishop of Fredericton.	Martin, J. N., C.E., <i>Assam.</i>
Coulson, W., <i>London.</i>	Rogers, Capt. F., R.N., <i>Totness.</i>
James, John.	

Annual Subscribers :

	£	s.	d.		£	s.	d.
THE PRINCE OF WALES ..	20	0	0	Freeman, W. G., <i>Penryn</i>	1	1	0
The Town Council of Truro	20	0	0	Freeh, G., <i>Duporth</i>	1	1	0
Ball, A. W. <i>St. Austell</i> ..	1	1	0	Gilbert, Hon. Mrs., <i>Tre-</i>	1	1	0
Bannister, Rev. Dr., <i>St. Day</i>	1	1	0	<i>lissick</i> }	1	1	0
Barham, C., M.D., (<i>Cantab</i>)	1	1	0	Heard, E. G. }	1	1	0
Basset, G. L., <i>Tehidy</i> ..	1	1	0	Henderson, J., <i>Newham</i> ..	0	10	0
Beauchamp, E. B., <i>Trevince</i>	1	1	0	Henwood, W. J., F.R.S., }	1	1	0
Boger, Deeble, <i>Wolsdon</i> ..	1	1	0	F.G.S., <i>Penzance</i> .. }	1	1	0
Bolden, J. L. }	1	1	0	Hingeston-Randolph, Rev. }	1	1	0
Bolitho, Richard Foster, }	1	1	0	F. C., M.A., (<i>Oxon.</i>), }	1	1	0
<i>Ponsandane</i> }	1	1	0	<i>Ringmore</i> }	1	1	0
Bond, F. Walter, <i>London</i>	1	1	0	Hockin, Williams }	1	1	0
Borlase, Wm. Copeland, }	1	1	0	Hocking, Samuel, <i>Rosewarne</i>	1	1	0
F.S.A., <i>Castle Horneck</i> }	1	1	0	Hogg, Lieut.-Col., Sir }	1	1	0
Budd, J. Palmer, <i>Ystalyfera</i>	1	1	0	James, M.P., <i>London</i> }	1	1	0
Budge, F. V. }	1	1	0	Hosken, James, <i>Ellen-</i>	1	1	0
Cragoe, Thos., <i>Woodbury</i> }	1	1	0	<i>glase, Cubert</i> }	1	1	0
<i>Cottage</i> }	1	1	0	Hudson, R. S., M.D., and }	1	1	0
Carew, W. H. P., <i>Antony</i>	1	1	0	C.M., Qu. Univ. <i>Irel.</i> }	1	1	0
Carlyon, Edmund, <i>St. Austell</i>	1	1	0	Hughan, W. J. }	0	5	0
Carlyon, Major, <i>Tregrehan</i>	1	1	0	Iago, Rev. W., B.A., <i>West-</i>	1	1	0
Carne, Miss, <i>Penzance</i> ..	1	1	0	<i>heath, Bodmin</i> .. }	1	1	0
Carne, W. N., <i>Rosemundy</i>	0	10	0	Jago, James, M.D., (<i>Oxon.</i>); }	1	1	0
Carter, R. H. }	1	1	0	A.B., (<i>Cantab</i>), F.R.S. }	1	1	0
Carus-Wilson, E.S., <i>Penmount</i>	1	1	0	James, Hamilton }	1	1	0
Christoe, W. H. }	1	1	0	+James, John B. }	1	1	0
Collins, Rev. C. M. Edward, }	1	1	0	Jenkins, W. H. }	0	10	0
<i>Trewardale</i> }	1	1	0	King, F., M.R.C.S. }	1	1	0
Collins, J. H., F.G.S. ..	1	1	0	Leverton, H.S., L.R.C.P. <i>Ed.</i>	1	1	0
Coode, T., <i>Pond-dhu</i> ..	1	1	0	Liddell, W., M.D., R.N. ..	1	1	0
Coode, Edward, <i>Polapit</i>	1	1	0	Mount Edgecumbe, The }	1	1	0
<i>Tamar, Launceston.</i> }	1	1	0	Earl of }	1	1	0
Cornish, Rev. J. R., M.A. ..	1	1	0	Marshall, F. }	1	1	0
Criddle, W. J. }	1	1	0	Moor, Rev. Allen Page, <i>St.</i> }	1	1	0
Cummings, Rev. W. H. ..	1	1	0	<i>Clements</i> }	1	1	0
Dix, W. G. }	1	1	0	Netherton, J. R. }	1	1	0
Doidge, J. }	1	1	0	Nix, Arthur P. }	1	1	0
Dumbleton, Rev. E. N., <i>Exeter</i>	1	1	0	Oliver, Capt. S. P., R.A., }	1	1	0
Dymond, W. P., F.M.S., }	1	1	0	<i>Falmouth</i> }	1	1	0
<i>Falmouth</i> }	1	1	0	Olver, Jacob, <i>Falmouth</i> ..	0	10	0
*Enys, F. G., <i>Enys</i>	1	1	0	Parkyn, Major }	1	1	0
Falmouth, Viscount	2	2	0	Pascoe, S. }	1	1	0
Fortescue, Honble. G. M., }	2	2	0	Paull, A., M.R.C.S. }	1	1	0
<i>Boconnoc</i> }	2	2	0	Paull, J. R., <i>Bosvigo</i>	1	1	0
Ferguson, Henry T.	1	1	0	Pearce, R., jun., <i>Colorado</i>	1	1	0
Ferris T. }	0	10	0	Phillips, W., <i>Falmouth</i> ..	0	10	0
Fisher, Herbert W., V.W., }	1	1	0	Phillipotts, Rev. T., <i>Porth</i>	1	1	0
<i>London</i> }	1	1	0	<i>gwidden</i> }	1	1	0
Ford, Rev. J., <i>Bath</i>	1	1	0	Rashleigh, Jonathan, <i>Mena-</i>	1	1	0
Foster, R., <i>Lanwithan</i> ..	1	1	0	<i>billy</i> }	1	1	0
*Fox, C., <i>Trebah</i> }	1	1	0	Rashleigh, Capt. Battie ..	1	1	0
*Fox, R. W., F.R.S., <i>Pen-</i>	1	1	0	Rawlings, W. J., <i>Downes,</i>	1	1	0
<i>jerrick</i> }	1	1	0	<i>Hayle</i> }	1	1	0
Freeman, J. D., <i>Falmouth</i>	1	1	0	Remfry, G. F., <i>Torquay</i> ..	1	1	0

	£	s.	d.		£	s.	d.
Remfry, H. O.	1	1	0	Teague, W., <i>Pencalenick</i> ..	1	1	0
*Roberts, Joseph	1	1	0	Treffry, Rev. Dr., <i>Place,</i>	} 1	1	0
Roberts, Mrs.	0	10	0	<i>Fowey</i>			
Rodd, E. H., <i>Penzance</i> . .	0	10	0	Trelawny, Sir J. Salus-	} 1	1	0
Roebuck, W. R., <i>Trevarthian</i>	1	1	0	<i>bury, Bart.</i>			
*Rogers, J. J., <i>Penrose</i> . .	1	1	0	Tremayne, J., M.P., <i>Heligan</i>	2	2	0
*Rogers, Reg., <i>Carwinion</i>	1	1	0	Tremayne, Lieut.-Col.,	} 1	1	0
Rogers, Rev. W., <i>Mawnan</i>	1	1	0	<i>Carclew</i>			
St. Aubyn, Sir J., Bart., }	1	1	0	Tremenheere, H. Seymour, }	1	1	0
M.P., <i>Trevethoe</i> .. }				C.B., <i>London</i> }			
Salmon, W. W.	0	5	0	Tripp, C. U.	0	10	0
Sawle, Sir C. B. Graves, }	1	1	0	Tweedy, Mrs., <i>Alverton</i> . .	1	1	0
Bart., <i>Penrice</i> }				*Tweedy, R.	1	1	0
Sharp, Edward, jun., M.R.C.S.	1	1	0	*Tweedy, W.	0	10	0
Sheriff, J. D., <i>Truro</i> . . .	1	1	0	Tyerman, J. D., <i>Tregony</i> ..	1	1	0
Slight, Rev. H. S., <i>Ruan-</i>	} 1	1	0	Vautier, Rev. R., <i>Kenwyn</i>	1	1	0
<i>lanihorne</i> }				Vivian, Hon. J. C.	1	1	0
Smirke, Sir E., <i>London</i> . .	1	1	0	Vivian, Arthur Pendarves, }	1	1	0
Smith, Rt. Hon. Sir }	1	1	0	M.P., <i>Glenafon</i> . . . }			
Montague, <i>London</i> }	1	1	0	Vivian, H. H., M.P., <i>Park-</i>	} 1	1	0
Smith, P. P., <i>Tremorvah</i> ..	1	1	0	<i>Wern</i> }			
Smith, W. Bickford, <i>Red-</i>	} 1	1	0	*Vyvyan, Sir R. R., Bart.	1	1	0
<i>brook, Camborne</i> . . . }				Whitley, N., F.M.S.	1	1	0
Snell, J.	0	5	0	Whitley, H. M., F.G.S. . .	0	10	0
Solomon, T.	1	1	0	Williams, Sir F. M., Bart., }	1	1	0
Stackhouse, Miss L. . . .	1	1	0	M.P., <i>Goonvrea</i> . . . }			
Sullivan, Capt. G. L., R.N., }	1	1	0	Wilkinson, Rev. J. J., }	1	1	0
<i>Flushing</i> }				M.A., (<i>Oxon.</i>), <i>Lante-</i>			
Tannahill, J.	0	5	0	<i>glos by Camelford</i> . . }			
Taylor, R., F.G.S. &c., }	1	1	0	Williams, J. M., <i>Caerhays</i> }	1	1	0
<i>Langdon Court, Ply-</i>				<i>mouth</i> }			

Those marked with * are Proprietors ; with † are Life Members.

Subscribers to the Illustration Fund :

	£	s.	d.		£	s.	d.
Barham, C., M.D.	0	5	0	Roberts, J.	0	5	0
Boger, Deeble, <i>Wolsdon</i> . .	0	5	0	Rogers, J. J., <i>Penrose</i> . .	0	5	0
Broad, R. R., <i>Falmouth</i> . .	0	5	0	Ditto (Donation)	1	1	0
Carew, W. H. P., <i>Antony</i>	0	5	0	Rogers, Rev. W., <i>Mawnan</i>	0	5	0
Carus-Wilson, E. S., <i>Penmount</i>	0	5	0	St. Aubyn, Sir J., Bart., }	0	5	0
Chilcott, J. G.	0	5	0	M.P., <i>Pendrea</i> . . . }			
Coode, E., <i>Polapit Tamar,</i>	} 0	5	0	Smirke, Sir E.	0	5	0
<i>Launceston</i> }				Smith, P. P.	0	5	0
Ferguson, Henry T.	0	5	0	Tremenheere, H. Sey- }	0	5	0
Fox, Charles, <i>Trebah</i> . . .	0	5	0	<i>mour, C. B., London</i> }			
Gilbert, Hon. Mrs., <i>Trelissick</i>	0	5	0	Tucker, C., <i>Exeter</i>	0	5	0
Glencross, Rev. J., <i>Lux-</i>	} 0	5	0	Tweedy, R.	0	5	0
<i>stowe, Liskeard</i> . . . }				Tweedy, W.	0	5	0
Henwood, W. J., F.R.S. }	} 0	5	0	Whitley, N.	0	5	0
<i>Penzance</i> }				Whitley, H. M., F.G.S. . .	0	5	0
Jago, James, M.D., F.R.S.	0	5	0	Williams, Sir F. M., Bart., }	0	5	0
Nix, Arthur P.	0	5	0	M.P., <i>Goonvrea</i> .. }			
Paull, A.	0	5	0	Willyams, A. C., <i>Bodrean</i>	0	5	0
Remfry, G. F., <i>Torquay</i> . .	0	5	0				

The MUSEUM is open to Members and their families every day, except Sundays, between the hours of Ten and Four o'clock during the Winter, and between Nine and Six o'clock in the Summer.

The Museum is open to the public, free of charge, on the Afternoons of MONDAYS, WEDNESDAYS, and SATURDAYS, from Noon until dusk, during the Winter months, and until Six o'clock in the Summer months. On other days, and previous to Twelve o'clock on the above days, an admission fee of Sixpence is required.

An Annual Subscription of Five Shillings entitles the Subscriber to admission to the Museum on Mondays, Wednesdays, and Saturdays, and to attend all the Meetings of the Society.

A Subscription of Ten Shillings further entitles the Subscriber to introduce to the Museum and meetings all the *bonâ fide* resident members of his family.

A Subscription of One Guinea entitles the Subscriber to all the publications issued by the Institution, to admission to the Museum, for himself and family, on every day in the week, and to the meetings of the Society: and to ten transferable tickets of admission to the Museum whenever open.

The "JOURNAL OF THE ROYAL INSTITUTION OF CORNWALL" will be forwarded free of charge to the members subscribing One Guinea Annually. To others it will be supplied on payment, in advance, of Three Shillings a year; or the several numbers may be obtained from the Curator, or from a Bookseller, at Four Shillings each.

FIFTY-SIXTH ANNUAL GENERAL MEETING

OF THE

ROYAL INSTITUTION OF CORNWALL,

Held on Tuesday, 24th November, 1874.

The Meeting was held in the Lecture-Room of the Institution, and there were present:—Dr. Jago, F.R.S., President; Dr. Barham, Mr. Tweedy, Major Parkyn, the Revs. W. Iago, H. S. Slight, A. P. Moor, Messrs. Remfry, W. Tweedy, R. N. Worth, A. W. Ball and T. Cragoe; and Mr. N. Whitley, F.M.S., and Dr. C. Le Neve Foster, F.G.S., Secretaries.

REPORT OF THE COUNCIL.

In presenting their Annual Report, the Council have much pleasure in congratulating the Members on the prosperous state of the funds of the Society. The Treasurer's accounts are very satisfactory, the balance in his hands having increased from £24. 15s. 3d. to £60. 14s. 6d.; in other words the income for the year exceeded the expenditure by £35. 19s. 3d. The expenditure in several items was below that of last year and the receipts larger; but this is not likely to be permanent, as, during this year, several arrears of some years standing have been received as well as a payment for life membership. An extra expenditure will be required during this year for external repairs to the building, both as regards the wall and painting the wood work. However, some expense will be avoided under the head of editing.

It is now eleven years since the old Annual Report of this Society was superseded by the present Journal with a view to affording more scope for the literary productions of our members and friends, and the late Mr. Chorley appointed its editor. Not only was he distinguished for assiduity and conscientiousness in the fulfilment of every duty he undertook, but his lengthened experience as a reporter for the press, his scholarship—he was versed in the classics and several modern languages—his varied reading and skill in literary composition rendered him peculiarly eligible for the task. The Council in referring to his unexpected death shortly after the last Spring Meeting of this Institution cannot do so without recording their deep esteem for his memory and their sense of the high value of his services to the Society as Editor of the Journal.

The responsibility of editing our publications has now devolved on the officers of the Institution, and, aided as they will be by the writers of papers, the duty will doubtless be well performed; but the practised skill and literary acquirements of Mr. Chorley will not fail to be often missed. It is to be hoped that the valuable summary prepared by him for the Journal for a good many years past under the title of "Chronological Notes" will be continued by some of our members who may be able to devote a portion of their leisure to this purpose.

The Journal which has been issued since the last meeting contains a number of papers of Antiquarian, Mineralogical and general interest and fully maintains its character of usefulness. It is to be hoped that mine-surgeons will follow the example set by Dr. Hudson of Redruth and furnish the Institution with further observations "On Dynamite in its Sanitary Aspect." The value of dynamite as an explosive cannot be overrated; but at the same time it is important to ascertain from mine-surgeons whether or not the constant use of it is in any way injurious to the health of the miners.

The new volume of the Journal now in the press will soon be completed and sent out to the subscribers.

The series of Annual Excursions, which was interrupted last year in consideration of the Meeting of the Archæological Institution at Exeter, was resumed in September by a visit to the old towns of Lostwithiel and Fowey and points of interest in their neighbourhood. The season was unavoidably later than is in itself desirable, but the weather was fine and the day was most enjoyable, as well as full of antiquarian instruction. The reception of the representatives of the Institution in this its first corporate introduction to these ancient boroughs, which occupy a conspicuous place in our national as well as our Cornish history, was most cordial; and the advantages derivable from these excursions in directing general attention to what is of already ascertained but often forgotten interest in each locality, and exciting the spirit of discovery and research, have on no former occasion been better shown; whilst the claims of this Society as the most appropriate centre, as regards this County, for the collection as well as diffusion of such knowledge, were equally recognized. As illustrative of this it is due to Mr. Deeble Boger and to Mr. Freeth to mention that documents of very great importance to the records of Restormel Castle and Lostwithiel were communicated by them to the public for the first time during this excursion.

Numerous donations to the Museum and Library were noticed at the Spring Meeting and several have been received since from

Mr. John Michael Williams, Mr. Nicholas, and Mr. W. P. Cocks and others as will be seen in the list of presents.

The number of visitors to the Museum during the year has been as follows:—

Admitted free.....	4177
„ by tickets	150
„ by payment of 6d. each	116
	<hr/>
Total	<u>4443</u>

These figures show that real good is being done by the Museum, for although many of the visitors come simply to gratify an idle curiosity they are sure to pick up new and valuable ideas while going through the Collections.

The Meteorological Observations have been recorded and tabulated by Mr. Newcombe with much care. In addition to the the returns heretofore made to the Registrar General, a bi-monthly statement of results has been for some time furnished to the Meteorological Office, for use at home and transmission to the corresponding Department of the United States at Washington, whence our Library has been supplied with their daily sheets. The thermometers also have been turned to account for the inquiry into the effects of shelter on surface temperature, the results of which will appear in the next number of the Journal.

At the Spring Meeting one of your Secretaries called particular attention to M. Moissenet's book on the Rich Parts of Lodes, and the Council gladly embrace this first opportunity of expressing their recognition of the value of M. Moissenet's labours by recommending the Society to elect him an Honorary Member. The Council are glad to learn that Mr. J. H. Collins is making a translation of the most important parts of M. Moissenet's work which will appear in the next Annual Report of the Miners' Association and thus become available to those who are not acquainted with the French language.

Though regretting the loss of Mr. F. V. Budge by removal from Truro, the Council are glad to announce to the Society that they have secured the services of Dr. Le Neve Foster and Mr. J. H. Collins for Secretaries as colleagues of Mr. Whitley. The Laboratory of the Royal Institution is now made use of by Mr. Collins in his capacity as Public Analyst, and, no doubt, many useful chemical investigations will be carried on there.

The Report of the Council having been read by Dr. C. Le Neve Foster, Mr. William Tweedy, the Treasurer, presented the following Statement of Accounts:—

Dr. Cr.
William Tweedy in account with the Royal Institution of Cornwall.

	£	s.	d.		£	s.	d.
1874.							
July 31. To Balance from last Account	24	15	3	By Taxes and Fire Insurance	5	15	0
Annual Subscriptions	123	1	6	Repairs	3	8	7
Ditto H. R. H. the Prince of Wales..	20	0	0	Curator's Salary	45	0	0
Ditto Truro Town Council	20	0	0	Museum Expenses	8	18	4
Visitors' Fees	2	13	0	Printing and Stationery	6	14	9
Sale of Journal	12	9	9	Postages and Carriage of Parcels ..	3	3	6
Illustration Fund	8	5	0	Printing and Editing Journal and } Report	63	8	6
Profit on Excursion	3	3	2	Illustrations for Report	6	4	6
Transfer Fee	1	1	0	Sundries	0	16	10
Life Member, Dr. Foster	5	5	0	Ray Society	1	1	0
				Palaeontographical Society	1	1	0
				British Meteorological Society ...	1	0	0
				Royal Horticultural Society	2	2	0
				Scientific Journals	1	14	8
				Interest on Mortgage Debt, one } year and a half	8	12	11
				Expenses Conversazione	0	17	7
				Balance	60	14	6
					<u>£220</u>	<u>13</u>	<u>8</u>
1874. Balance	£60	14	6				

WILL. TWEEDY, TREASURER.

The Rev. H. S. SLIGHT moved the following Resolution :—

That the Report of the Council be received, adopted, and printed, and that M. Moissenet be elected an Honorary Member.

He congratulated the Meeting upon the very satisfactory position of the Society, and expressed the deep personal regret which he felt at the death of Mr. Chorley. He believed the Institution was calculated to do good work. It diffused strict science and corrected the false ideas which had been entertained in even high scientific quarters.

The Rev. A. P. MOOR seconded, and spoke very highly of the gain to the Society which would accrue from the accession to the Secretaryship of Dr. Le Neve Foster and Mr. Collins.

The PRESIDENT in putting the motion, which was duly carried, said it was little known that Mr. Chorley was an author of considerable merit, as he had never, as far as he could call to mind, suffered his name to be attached as author to any published compositions in prose or verse. Yet there had been printed at his own cost, with C. C. on the title page, several original poems and translations into English verse from the Hebrew, Greek and Latin (often in the original Latin metres); also from the French, Italian, Spanish and German (the whole of Schiller's Marie Stuart for instance), none of the few copies printed in each case being ever parted with except as gifts to such friends as he deemed worthy of his confidence. He had no doubt that all of the recipients would join him in hoping that his executors may eventually publish these chaste and elegant productions that justice may be done to his literary memory.

Dr. BARHAM explained that if there was a balance in hand it should be recollected that there was a mortgage debt of £150. However, since he had been connected with the Institution he had seen the mortgage reduced by £1,400 or £1,500, so that he hoped it would soon be paid off.

The following Papers were then read :—

Chronicles of Cornish Saints.—Saint Gunwallo.—By the Rev. J. Adams.

Note on some Play-bills found at Launceston.—By Dr. C. Le Neve Foster.

Description of an Ancient Lamp called in the Meneage District a Chil.—By Robert Blight.

Note on Cornish Wavellite.—By J. H. Collins, F.G.S.

Note on a Signet Ring found near Penryn.—By W. H. Tregellas.

The Will of William Treffry of Fowey, 1504.—By Sir John Maclean, F.S.A.

Dr. C. LE NEVE FOSTER then read the lists of Donations to the Museum and Library:—

DONATIONS TO THE MUSEUM.

	PRESENTED BY
Specimens of Copper Ore from the Cape of Good Hope.....	Mr. J. M. Williams.
Specimens of Stream Tin from Victoria, Queensland, &c.	Mr. Wm. Nicholas.
Specimen of Topaz from Victoria.....	Ditto.
Specimen of Crystallized Tin Ore from Mt. Bischoff, Tasmania	Ditto.
Stone Hammer from Canada	Mr. H. Tregoning, Trevarth, Gwennap.
Numerous Specimens of Natural History, &c., &c.	Mr. W. P. Cocks, Falmouth.
Collection of Old Copper Tokens and Coins ..	Mr. J. J. Rogers.
Play-bill of Theatre at White Hart Inn, Launceston, in 1772, (Mr. Foote, born in Truro, taking a leading part)	Mr. John T. Pearse.
Impressions of Antique Ring found at Penryn.	Mr. W. H. Tregellas.
Cornish Wavellite	Mr. J. H. Collins.

ADDITIONS TO THE LIBRARY.

Caillé's Travels through Central Africa to Timbuctoo. (2 vols.)	From Mr. W. P. Cocks.
Burnett's Botany. (2 vols.	Ditto.
Magazine of Zoology and Botany. (2 vols.) ..	Ditto.
Stephens's British Entomology	Ditto.
Rudimentary Treatise on Light-houses, by A. Stevenson	Ditto.
Rudimentary Treatise on the Construction of Locks, by C. Tomlinson	Ditto.
Catalogue of British Hymenoptera, by Frederick Smith	Ditto.
Grylls' Windows of St. Neot Church	Ditto.
Histoire des Arts Industriels au Moyen Age. (Premier fascicule)	Ditto.
A Stimulus for the Young, by W. P. Cocks. ..	Ditto.
Histoire de l'ornement Russe.....	Ditto.
On the Muscular Sense and on the Philosophy of Thinking, by Dr. Bastian	Ditto.

On the so called Pacchionian Bodies, by Dr. Bastian	From Mr. W. P. Cocks.
On the Mode of Origin of Secondary Cancerous Growths, by Dr. Bastian.....	Ditto.
On the Structure and Nature of the Dracunculus or Guineaworm, by Dr. Bastian	Ditto.
On the Anatomy and Physiology of the Nematoids, by Dr. Bastian	Ditto.
Monograph on the Anguillulidæ or free Nematoids, by Dr. Bastian	Ditto.
On the Structure, Functions and Homologies of the Manducatory Organs in the Class Rotifera. By Philip Henry Gosse	Ditto.
On the Diœcious Character of the Rotifera, by Philip Henry Gosse	Ditto.
Description of <i>Peachia hastata</i> , by Philip Henry Gosse	Ditto.
First and Second Reports of the Liverpool Compass Committee to the Board of Trade, 1855 and 56	Ditto.
Twenty-eight Pamphlets.....	Ditto.
Principles of Metal Mining, by J. H. Collins, F.G.S.....	From the Author.
Proceedings of the Zoological Society of London. Part 3rd, 1873; 1st, 2nd and 3rd, 1874	From the Society.
Annual Report of the Plymouth Institution ..	From the Institution.
Report of the Devonshire Association	From the Association.
The Journal of the Royal Historical and Archaeological Association of Ireland. Nos. 17 and 18	From the Association.
Proceedings of the Society of Antiquaries of London. Vol. XVI. Nos. II and III	From the Society.
Journal of the Anthropological Institute. Vol. III. No. IV.....	From the Institute.
Transactions of the Geological Society of Glasgow. Vol. IV. Part III	From the Society.
Transactions of the Manchester Geological Society. Vol. XIII. Part IV	Ditto.
Report of the Leeds Philosophical and Literary Society	Ditto.
Proceedings of the Philosophical Society of Glasgow	Ditto.
Proceedings of the Bath Natural History and Antiquarian Field Club. Vol. III. No. I ..	From the Club.
Brief Sketches of the parishes of Booterstown and Donnybrook, in the County of Dublin. Part III	From the Rev. H. Blacker, M.A.

The Mining Industries of Nova-Scotia, by A. Heatherington	Presented by Mr. W. J. Henwood, F.R.S., &c.
Remarques sur le Minerai d'étain détritique du Cornwall. Par W. J. Henwood, F.R.S.	
Traduction par M. Zeiller	Ditto.

It was proposed by Mr. W. TWEEDY and seconded by Mr. CRAGOE and carried unanimously.—That the thanks of the Royal Institution of Cornwall be given to the authors of Papers and donors to the Museum and Library.

On the motion of Mr. BALL, seconded by MAJOR PARKYN, the following Resolution was passed :—

That the thanks of the Society be given to the Officers and Council for their services during the past year; and that the following persons constitute the Council for the ensuing year :—

President, JAMES JAGO, M.D. OXON., F.R.S.

Vice-Presidents.

MR. A. PENDARVES VIVIAN, M.P.,	|	MR. TWEEDY,
MR. JONATHAN RASHLEIGH,		MR. FREETH.
SIR JOHN ST. AUBYN, BART., M.P.,		

Treasurer, MR. WILLIAM TWEEDY.

Secretaries: MR. WHITLEY, F.M.S., DR. C. LE NEVE FOSTER, F.G.S.,
MR. J. H. COLLINS, F.G.S.

Other Members:

C. BARHAM, M.D., CANTAB.,	|	MR. W. J. RAWLINGS,
MR. W. COPELAND BORLASE, F.S.A.,		MR. H. O. REMFRY,
REV. W. IAGO, B.A.,		MR. H. SPRY LEVERTON,
MR. A. PAULL,		MR. TYERMAN.

and THE MAYOR OF TRURO.

Local Secretaries. { *Truro*, MR. ALEXANDER PAULL,
 { *London*, MR. H. MICHELL WHITLEY, F.G.S.

A hearty vote of thanks to the President, moved by Dr. BARHAM, and seconded by the Rev. W. IAGO, concluded the business of the Meeting.

There was a conversazione in the Society's rooms in the evening, when the proceedings were of unusual interest. Dr.

BARHAM, in an agreeable manner, sketched the proceedings at the recent Autumn Excursion of the Institution, his remarks being illustrated by diagrams and a rubbing of an inscribed stone, but the most interesting part of the proceedings, from an historical point of view, was the reading by Dr. Barham of a paper, contributed by Mr. Deeble Boger, founded upon entries discovered by that gentleman in the book of "Minutes of the Duchy (of Cornwall) Council," during the life of Edward the Black Prince, and translated by him from the Norman-French. These "Minutes" were found at Mount Edgcumbe, and Mr. Horwood was sent down to examine them, in 1872, by the Historical Commission, but their contents were not published, and it remained for Mr. Deeble Boger to shed a new light upon the history of the county, it never having been known hitherto that the Black Prince visited Cornwall. It appears, however, from Mr. Boger's paper that he was at Restormel on two occasions.

Mr. BALL, of St. Austell, then read a paper "On the Capitulation of the Parliamentary Forces under General Skippen at Castle Dor."

After a short discussion, Dr. BARHAM proceeded to give an account of the rubbing of an Inscribed Stone taken at the Excursion, and then described Dr. Samuel Ferguson's method of taking paper casts of rubbings. Thick blotting paper is damped and then beaten into the indentations of the stone by means of a clothes' brush; on drying, it gives a perfect cast of the inscription. It has the advantage of giving a true and exact representation, and photographs taken from these paper casts in a certain light exhibit the inscriptions very clearly. The photograph of the paper cast of the Ogham inscription at Tavistock was shown by Dr. Barham.

Mr. T. CORNISH, of Penzance, gave a very able lecture "On the Stalk-eyed Crustacea of Mount's Bay."

This paper gave rise to some discussion; and then on the motion of Mr. TWEEDY, seconded by Mr. REMFRY, the thanks of the Royal Institution of Cornwall were voted to the authors of the papers read.

MAJOR PARKYN proposed that the thanks of the Meeting should be given to Dr. Jago for presiding; the proposition was seconded by Mr. J. HENDERSON, and carried unanimously. This concluded the business of the evening.

TRURO:
JAMES R. NETHERTON,
LEMON STREET.

ROYAL INSTITUTION OF CORNWALL.

SPRING MEETING,

1875.

THIS Meeting was held in the Library of the Institution, on the 21st May, 1875. The President, Dr. Jago, F.R.S., was in the Chair, and there were present, Dr. Barham, *Member of Council*, Messrs. N. Whitley, F.M.S.; C. Le Neve Foster, D.Sc., F.G.S.; and J. H. Collins, F.G.S., *Hon. Secretaries*; Messrs. Cragoe, Criddle, James, and Parkyn; the Rev. J. J. Wilkinson, Messrs. D. Whitley, R. N. Worth, F.G.S., and others, besides several ladies.

The President's Address will be found in the present number of the Journal.

The following Lists of Presents were read by Dr. FOSTER.

DONATIONS TO THE MUSEUM.

Two specimens of Rostra of the Sawfish	Presented by Mr. Hamilton James.
Snake Staff carved by a Negro in Africa	Mr. W. P. Cocks.
Specimen of Rich Tin Ore with a little <i>Andrewsite</i> , from West Phoenix Mine, Liskeard.....	Capt. Jos. Hosking.
<i>Pistacite</i> from near the old cross and close to the Church in the Sands, Perranzabuloe	Dr. C. Le Neve Foster.
Neolithic Celts from near Birling Gap, East- bourne	Mr. Davies Gilbert.
Bronze Ring and Human Bones from a tumulus at Venn's Cross, Cardinham.....	Mr. J. H. Collins

- Pottery from a tumulus on Goonhilly Downs ... Mr. W. J. Boase Smith.
 Specimens of Calamine from the Laurium
 Mines, Greece*..... Mr. A. P. Vivian, M.P.

ADDITIONS TO THE LIBRARY.

- Report on the Gum-Resins, Oleo-Resins, and
 Resinous products in the India Museum, or
 produced in India By Dr. M. C. Cooke.
 Greenwich Magnetical and Meteorological Obser-
 vations, 1872; (Astronomical and Meteorolo-
 gical Observations made at the Royal
 Observatory, Greenwich, in the year 1872) ... Presented by the Authority of
 the Lords Commissioners of
 the Admiralty.
 Parochial and Family History of the Deanery
 of Trigg Minor, 8th and 9th Parts, by Sir
 John Maclean Presented by Mr. W. J. Hen-
 wood.
 Journal of the Anthropological Institute of
 Great Britain and Ireland..... From the Institute.
 Transactions of the Historic Society of Lan-
 cashire and Cheshire 1873-4 From the Society.
 Journal of the Royal Geological Society of
 Ireland 1873-4 Ditto.
 Annual Report of the Royal Cornwall Poly-
 technic Society 1873 Ditto.
 Collections of the Surrey Archæological Society
 1874..... Ditto.
 Transactions of the Manchester Geological
 Society Ditto.
 Proceedings of the Philosophical Society of
 Glasgow Ditto.

*ANALYSES OF SEVEN SAMPLES OF RAW CALAMINE FROM THE
 LAURIUM MINES, GREECE.

	1	2	3	4	5	6	7	8	9
Loss by Calcination	33·20	34·00	35·20	34·20	34·40	35·00	36·00	31·20	32·80
Silica & Gangue ...	2·30	2·88	0·20	1·92	1·65	0·41	0·22	6·57	6·54
Lead	Traces	...	...	...	...	...	...	0·14	0·13
Oxide of Iron ...	} 3·47	2·88	0·62	1·28	1·13	0·64	0·74	7·88	9·81
Oxide of Mangan- ese and Alumina }									
Lime & Magnesia	0·78	1·41	1·00	1·61	1·08	0·80	5·02	4·18	3·98
Zinc	48·00	46·70	50·70	48·80	49·60	50·50	46·60	39·20	37·00
Oxygen in Comb. with Zinc and Lead	} 11·78	11·46	12·44	11·97	12·17	12·39	11·43	9·60	9·09
Oxide of Copper ...									
	0·14	0·14	0·14	0·16	0·16	0·22	0·12	0·62	0·05
	99·67	99·47	100·30	99·94	100·19	99·96	100·13	99·39	99·40

No. 8 is an analysis of a cargo of 373 tons.
 9 " " " 374 "

Pimelepterus Cornubiensis a supposed new Fish at Penzance	Mr. Thomas Cornish.
Memoir of Dr. John Edward Gray, F.R.S.	From the Athenæum.
Presidential Address delivered at the Anniversary Meeting of the Geological Society of London	From Professor Tennant.
Monthly Notices of the Royal Astronomical Society	From the Society.
Pamphlets and Maps	From Mr. W. P. Cocks, Falmouth.
Parcel of Books	From the University of Christiania.
Receipts and Expenses in the Building of Bodmin Church	Rev. J. J. Wilkinson, M.A.
Proceedings of the Literary and Philosophical Society of Liverpool, No. 28	From the Society.

From the Commissioners of Patents :—

Chronological and Descriptive Index of Patents applied for and Patents granted, containing the Abridgments of Provisional and Complete Specifications. Weekly Numbers from September 14 to December 31, 1872.	
Ditto	January 1 to December 31, 1873.
Ditto	January 1 to August 19, 1874.

Abridgments of Specifications :—

Locks, Latches, Bolts, and similar Fastenings.	A.D. 1774—1866.
Cooking, Bread-making, and the preparation of Confectionery.	A.D. 1636—1866.
Air, Gas, and other Motive Power Engines.	A.D. 1635—1866.
Hydraulics.	A.D. 1817—1866.
Drains and Sewers, including the Manufacture of Drains, Tiles, and Pipes.	A.D. 1619—1866.
Masts, Sails, Rigging, and Apparatus for raising and lowering Ships Boats.	A.D. 1625—1866.
Milking, Churning, and Cheese-making.	A.D. 1677—1866.
Mining, Quarrying, Tunnelling, and Well-Sinking.	A.D. 1618—1866.
Metallic Pipes and Tubes.	A.D. 1741—1866.
Relating to Anchors.	A.D. 1796—1866.
Ditto to Wearing Apparel.	A.D. 1637—1866.
Ditto Safes, Strong Rooms, Tiles, and similar Depositories.	A.D. 1801—1866.
Ditto Water Closets, Earth Closets, &c.	A.D. 1775—1866.
Ditto Electricity and Magnetism, their Generation and Applications.	Part 2nd. 1858—1866.

The following Papers were read and discussed :—

On the Periodical appearance of the Grey Mullet.—By John Symons, Jun.

On some habits of the Kingfisher.—By W. J. Henwood, F.R.S.
Ornithological Notes.—By E. H. Rodd.

On the Roman Occupation of Cornwall.—By N. Whitley, F.M.S.
Note on a recently discovered tumulus at Venn's Cross.—By J. H. Collins, F.G.S.

Note on Belowda Hill Mine.—By C. Le Neve Foster, D.Sc., F.G.S.
Note on a new locality for the Mineral Pistacite.—By C. Le Neve Foster, D.Sc., F.G.S.

Meteorological Notes.—By C. Barham, M.D.

On the Building and Ornamental Stones of Cornwall, with Notes on their Archæology.—By R. N. Worth, F.G.S.

These Papers appear in the current number of the Journal.

On the motion of the Rev. J. J. WILKINSON, seconded by Major PARKYN, votes of thanks were given to the authors of papers, and to the donors of books and specimens; and on the motion of Dr. BARHAM, seconded by Mr. CRAGOE, the chairman was thanked for presiding and for his excellent address.

The Members afterwards dined together, as usual, at the Royal Hotel, Truro.

ROYAL INSTITUTION OF CORNWALL,

FOUNDED 1818.

Patron :

THE QUEEN.

Vice-Patron :

H.R.H. THE PRINCE OF WALES, DUKE OF CORNWALL, &c., &c.

Trustees :

LORD ROBARTES.
SIR C. B. GRAVES SAWLE, BART.
F. G. ENYS.
LIEUT.-COL. TREMAYNE.

Council for the Year 1874-5.

President :

J. JAGO, M.D., (OXON.), F.R.S.

Vice-Presidents :

MR. A. PENDARVES VIVIAN, M.P.	|	MR. ROBERT TWEEDY.
MR. J. RASHLEIGH.		MR. GEORGE FREETH.
SIR J. ST. AUBYN, BART., M.P.		

Treasurer :

MR. W. TWEEDY.

Secretaries :

MR. N. WHITLEY, F.M.S., C. LE NEVE FOSTER, B.A., D.Sc., F.G.S.,
MR. J. H. COLLINS, F.G.S.

Other Members :

C. BARHAM, M.D., CANTAB.,	|	MR. H. S. LEVERTON, M.R.C.S.,
MR. W. COPELAND BORLASE,		REV. ALLEN PAGE MOOR, M.A.,
A.B. OXON., F.S.A.,		MR. A. PAULL, M.R.C.S.,
MR. J. H. COLLINS, F.G.S.,		MR. W. J. RAWLINGS,
REV. W. IAGO, A.B., CANTAB.,		MR. H. O. REMFRY,
Loc. Sec. S.A.,		MR. J. D. TYERMAN,

And THE MAYOR OF TRURO.

Local Secretaries :

TRURO:—MR. ALEXANDER PAULL.
LONDON:—MR. H. M. WHITLEY, F.G.S.

Librarian and Curator of Museum:—MR. W. NEWCOMBE, TRURO.

Honorary Members :

Thomas Hawkins, F.G.S., &c., <i>Hermitage, Whitwell, Isle of Wight.</i>	W. L. Banks, F.S.A., <i>Brecon, South Wales.</i>
Sir Gardner Wilkinson, D.C.L., F.R.S., &c.	Warington Wilkinson Smyth, M.A., F.R.S., For. Sec., G.S., &c., <i>London.</i>
Charles Cardale Babington, M.A., F.R.S., &c., <i>Prof. of Botany, Cambridge.</i>	Major Gen. Sir H. James, R.E., F.R.S., M.R.I.A., &c., <i>Southampton.</i>
L. Moissenet, <i>Professeur à l' Ecole des Mines, Paris.</i>	W. Pengelly, F.R.S., F.G.S., <i>Lamorna, Torquay.</i>
Rev. E. L. Barnwell, M.A., <i>Melksham.</i>	Sir John Maclean, F.S.A., <i>Pallingswick Lodge, Hammersmith.</i>

Corresponding Members

W. P. Cocks, <i>Falmouth.</i>	Henry Mc. Lauchlan, F.G.S., <i>London.</i>
John Hockin, <i>London.</i>	Capt. Napleton, <i>Bengal.</i>
Robert Hunt, F.R.S., Keeper of Mining Records, <i>London.</i>	S. R. Pattison, F.G.S., <i>London.</i>
Rev. E. Lethbridge King, <i>Sydney, Australia.</i>	C. W. Peach, A.L.S., <i>Edinburgh.</i>
Major Gen. Lambrick, Royal Marines.	W. H. Tregellas, <i>Holly Cottage, Bromley, Kent.</i>
	R. N. Worth, F.G.S., <i>Plymouth.</i>

Associates :

W. Carkeet, <i>Sydney.</i>	Thomas Lobb.
J. H. Collins, F.G.S., <i>Truro.</i>	W. Loughrin, <i>Polperro.</i>
George Copeland, <i>Hayle.</i>	S. H. Michell, <i>Swansea.</i>
W. Dawe, <i>Delhi, East Indies.</i>	R. Pearce, jun., F.G.S., <i>Colorado.</i>
Joseph Dickenson, H.M. Inspector of Coal Mines, <i>Manchester.</i>	Capt. Josiah Thomas, <i>Dolcoath.</i>
N. Hare, jun., <i>Liskeard.</i>	Capt. R. H. Williams, <i>Charlestown Mines.</i>
Edward Hookham, <i>London.</i>	

Proprietors :

Viscount Falmouth.	Leverton, H. Spry, M.R.C.S.
Lord Clinton.	Michell, Edward.
Lord Churston.	Michell, W., Reps. of.
Lord Robartes.	Michell, W. E.
Sir T. D. Acland, Bart., MP.	Nankivell, J. T., Reps. of.
Sir Charles Lemon, Bart., F.R.S.,	Nankivell, J. T., <i>Melbourne</i> .
Representatives of	Paddon, W. H.
Sir John Lubbock, Bart., F.R.S.	Parkyn, Major, D.C.R.V.
Sir C. B. Graves Sawle, Bart.	Potts, Miss, <i>Brighton</i> .
Sir R. R. Vyvyan, Bart., F.R.S., F.G.S.	Roberts, Joseph, <i>Southleigh</i> .
Sir Wm. Williams, Bart., Reps. of.	Rogers, W., <i>Falmouth</i> .
Sir S. T. Spry, Reps. of.	Rogers, F., <i>Plymouth</i> .
Andrew, Henry, F.R.C.S.	Rogers, Rev. St. Aubyn.
Baynard, William.	Rogers, Rev. R. Basset, B.A.
Boase, H. S. M.D., F.R.S., F.G.S.,	Rogers, J. Jope, <i>Penrose</i> .
<i>Dund. e.</i>	Rogers, Rev. W., M.A., <i>Mawnan</i> .
Buller, J. H., <i>Downes</i> .	Rogers, Reginald, <i>Carwinion</i> .
Carlyon, E. T.	Sambell, Philip, jun., Reps. of.
Carpenter, John, Reps. of.	Spry, E. G.
Chilcott, J. G.	Spry, Mrs.
Clyma, W. J.	Stokes, H. S., <i>Bodmin</i> .
Edwards, Miss, <i>Newquay</i> .	Tweedy, Robert, <i>Tregolls</i> .
Enys, J. S., F.G.S., <i>Enys</i> , Reps. of.	Tweedy, E. B.
Fox, Charles, <i>Trebah</i> .	Tweedy, W.
Fox, R. W., F.R.S., <i>Penjerrick</i> .	Tweedy, R. M., <i>Falmouth</i> .
Gregor, F. G., <i>Trewarthenick</i> .	Tweedy, Charles, <i>Redruth</i> .
Hartley, W. H. H., <i>Rosewarne</i> .	Tweedy, Miss.
Hawkins, J. H., F.R.S., F.G.S., <i>Bignor</i>	Tweedy, Miss C.
<i>Park</i> .	Vivian, John Ennis, Reps. of.
Hawkins, C. H. T., <i>Trewithen</i> .	Whitford, Miss.
Hendy, James.	Wightman, Lieut.-Col. George, Reps. of.
Hogg, John, M.D., <i>London</i> .	Williams, R. H., M R.C.S.
Hogg, Mrs.	Willyams, H., <i>Carnanton</i> , Reps. of.
Jenkins, Rev. D., <i>St. Goran</i> , Reps. of.	Willyams, A. C.

Life Members :

Right Rev. Lord Bishop of Fredericton,	Martin, J. N., C. E., <i>Assam</i> .
D.D.	Foster, C. Le Neve, D. Sc., F.G.S.
Coulson, W., <i>London</i> .	

Annual Subscribers :

	£	s.	d.		£	s.	d.
THE PRINCE OF WALES ...	20	0	0	Henwood, W. J., F.R.S., <i>Penzance</i>	1	1	0
The Town Council of Truro	20	0	0	Hingeston-Randolph, Rev. F. C., M.A., (<i>Oxon.</i>), <i>Ringmore</i>	1	1	0
Ball, A. W., <i>St. Austell</i> ...	1	1	0	Hocking, Samuel, <i>Rosewarne</i>	1	1	0
Barham, C., M.D., (<i>Cantab</i>)	1	1	0	Hogg, Lieut.-Col., Sir Jas. K.C.B., M.P., <i>London</i> ...	1	1	0
Basset, G. L., <i>Tehidy</i> ...	1	1	0	Hosken, James, <i>Ellen- glaze, Cubert</i>	1	1	0
Beauchamp, E. B., <i>Trevince</i>	1	1	0	Hudson, R. S., M.D., and C.M., Qu. Univ. Irel. ...	1	1	0
Boger, Decble, <i>Wolsdon</i> ...	1	1	0	Hughan, W. J.	0	5	0
Bolden, J. L.	1	1	0	Iago, Rev. W., B.A., <i>West- heath, Bodmin</i>	1	1	0
Bolitho, Richard Foster, <i>Ponsandane</i>	1	1	0	Jago, James, M.D., (<i>Oxon</i>); A.B., (<i>Cantab</i>), F.R.S. ...	1	1	0
Bond, F. Walter, <i>London</i> ...	1	1	0	James, Hamilton	1	1	0
Borlase, Wm. Copeland, A.B., F.S.A., <i>Castle Horneck</i>	1	1	0	James, John B.	1	1	0
Budd, J Palmer, <i>Ystalyfera</i>	1	1	0	Jenkins, W. H.	0	10	0
Cragoe, Thos. Adolphus, <i>Woodbury Cottage</i> ...	1	1	0	King, F., M.R.C.S.	1	1	0
Carew, W. H. P., <i>Antony</i> ...	1	1	0	Lake, W.	1	1	0
Carlyon, Edmund, <i>St. Austell</i>	1	1	0	Leverson, H.S., L.R.C.P. <i>Ed.</i>	1	1	0
Carlyon, Major, <i>Tregrehan</i>	1	1	0	Liddell, W., M.D., R.N., ...	1	1	0
Carne, Miss, <i>Penzance</i> ...	1	1	0	Mount Edgecombe, The Earl of	1	1	0
Carne, W. N., <i>Rosemundy</i> ...	0	10	0	Marshall, F.	1	1	0
Carter, R. H.	1	1	0	Moor, Rev. Allen Page, M.A. F.R.G.S., <i>St. Clements</i> ...	1	1	0
Carus-Wilson, E.S., <i>Penmount</i>	1	1	0	Netherton, J. R.	1	1	0
Christoe, W. H.	1	1	0	Nix, Arthur P.	1	1	0
Collins, Rev. C. M. Edward, <i>Trewardale</i>	1	1	0	Oliver, Capt. S. P., R.A., <i>Falmouth</i>	1	1	0
Collins, J. H., F.G.S.	1	1	0	Parkyn, Major	1	1	0
Coode, T., <i>Pond-dhu</i>	1	1	0	Pascoe, S.	1	1	0
Coode, Edward, <i>Polapit Tamar, Launceston.</i> ...	1	1	0	Paull, A., M.R.C.S.	1	1	0
Cornish, Rev. J. R., M.A. <i>Veryan</i>	1	1	0	Paull, J. E., <i>Bosvigo</i>	1	1	0
Criddle, W. J.	1	1	0	Pearce, R., jun., F.G.S., <i>Colorado</i>	1	1	0
Cummings, Rev. A. H. ...	1	1	0	Phillips, W., <i>Falmouth</i> ...	0	10	0
Dix, W. G.	1	1	0	Phillpotts, Rev. T., M.A., <i>Porthgwidde</i>	1	1	0
Doidge, J.	1	1	0	Rashleigh, Jonathan, <i>Mena- billy</i>	1	1	0
Dumbleton, Rev. E. N., M.A., <i>Exeter</i>	1	1	0	Rashleigh, Capt. Battie ...	1	1	0
Dymond, W. P., F.M.S., <i>Falmouth</i>	1	1	0	Rawlings, W. J., <i>Downes, Hayle</i>	1	1	0
*Enys, F. G., <i>Enys</i>	1	1	0	Remfry, G. F., <i>Torquay</i> ...	1	1	0
Falmouth, Viscount	2	2	0	Remfry, H. O.	1	1	0
Fortescue, Honble. G. M., <i>Boconnoc</i>	2	2	0	*Roberts, Joseph	1	1	0
Ferguson, Henry T.	1	1	0	Roberts, Mrs.	0	10	0
Ferris, T.	0	10	0	Rodd, E. H., <i>Penzance</i> ...	0	10	0
Fisher, Herbert W., V.W., <i>London</i>	1	1	0	Roebuck, W. R., <i>Trevarthian</i>	1	1	0
Ford, Rev. J., <i>Bath</i>	1	1	0	*Rogers, J. J., <i>Penrose</i> ...	1	1	0
Foster, R., <i>Lanwithan</i> ...	1	1	0	*Rogers, Reg., <i>Carvinion</i> .	1	1	0
*Fox, C., <i>Trebah</i>	1	1	0	Rogers, Rev. W., M.A., <i>Mawnan</i>	1	1	0
*Fox, R. W., F.R.S., <i>Penjerrick</i>	1	1	0	St. Aubyn, Sir J., Bart., M.P., <i>Trevehoe</i>	1	1	0
Freeman, J. D., <i>Falmouth</i>	1	1	0				
Freeman, W. G., <i>Penryn</i> ...	1	1	0				
Freeth, G., <i>Duporth</i>	1	1	0				
Gilbert, Hon. Mrs, <i>Trelissick</i>	1	1	0				
Heard, E. G.	1	1	0				
Henderson, J., <i>Newham</i> ...	0	10	0				

	£	s.	d.		£	s.	d.
Salmon, W. W.	0	5	0	Tremayne, Lieut.-Col., <i>Carclew</i>	1	1	0
Sawle, Sir C. B. Graves, Bart., <i>Penrice</i>	1	1	0	Tremenheere, H. Seymour, C.B., M.A., F.G.S., <i>London</i>	1	1	0
Sharp, Edward, jun., M.R.C.S.	1	1	0	Tripp, C. U.	0	10	0
Sheriff, J. D., <i>Truro</i>	1	1	0	Tweedy, Mrs., <i>Alverton</i> ...	1	1	0
Slight, Rev. H. S., B.D., <i>Ruanlanihorne</i>	1	1	0	*Tweedy, R.	1	1	0
Smith, Rt Hon. Sir Montague, <i>London</i>	1	1	0	*Tweedy, W.	1	1	0
Smith, P. P., <i>Tremorvah</i> ...	1	1	0	Tyerman, J. D., <i>Tregony</i> ...	1	1	0
Smith, W. Bickford, <i>Red- brook, Camborne</i>	1	1	0	Vautier, Rev. R., M.A., <i>Kenwyn</i>	1	1	0
Snell, J.	0	5	0	Vivian, Hon. J. C.	1	1	0
Solomon, T.	1	1	0	Vivian, Arthur Pendarves, M.P., <i>Glenafon</i>	1	1	0
Stackhouse, Miss L.	1	1	0	Vivian, H. H., M.P., <i>Park- Wern</i>	1	1	0
Sullivan, Capt. G. L., R.N., <i>Flushing</i>	1	1	0	*Vyvyan, Sir R. R., Bart., F.R.S., F.G.S.	1	1	0
Tannahill, J.	0	5	0	Whitley, N., F.M.S.	1	1	0
Taylor, R., F.G.S., &c., <i>Langdon Court, Ply- mouth</i>	1	1	0	Whitley, H. M., F.G.S.	0	10	0
Teague, W., <i>Pencalenick</i> ...	1	1	0	Williams, Sir F. M., Bart., M.P., F.G.S., <i>Goonvrea</i> ...	1	1	0
Treffry, Rev. Dr., D.C.L., <i>Place, Fowey</i>	1	1	0	Wilkinson, Rev. J. J., M.A., (<i>Oxon.</i>), <i>Lanteglos by Camelford</i>	1	1	0
Trelawny, Sir J. Salusbury, Bart.	1	1	0	Williams, J. M., <i>Caerhays Castle</i>	1	1	0
Tremayne, J., M.P., <i>Heligan</i>	2	2	0				

Those marked with * are Proprietors; with † are Life Members.

Subscribers to the Illustration Fund.

	£	s.	d.		£	s.	d.
Barham, C., M.D.	0	5	0	Roberts, J.	0	5	0
Boger, Deeble, <i>Wolsdon</i> ...	0	5	0	Rogers, J. J., <i>Penrose</i> ...	0	5	0
Broad, R. R., <i>Falmouth</i> ...	0	5	0	Ditto (Donation)	1	1	0
Carew, W. H. P., <i>Antony</i> ...	0	5	0	Rogers, Rev. W., M.A., <i>Mawnan</i>	0	5	0
Carus-Wilson, E. S., <i>Penmount</i>	0	5	0	St. Aubyn, Sir J., Bart., M.P., <i>Pendrea</i>	0	5	0
Chilcott, J. G.	0	5	0	Smith, P. P.	0	5	0
Coode, E., <i>Polapit, Tamar, Launceston.</i>	0	5	0	Tremenheere, H. Seymour, C.B., <i>London</i>	0	5	0
Ferguson, Henry T.	0	5	0	Tucker, C., <i>Exeter</i>	0	5	0
Fox, Charles, <i>Trebah</i>	0	5	0	Tweedy, R.	0	5	0
Gilbert, Hon. Mrs., <i>Trelissick</i>	0	5	0	Tweedy, W.	0	5	0
Glencross, Rev. J., M.A., <i>Luastowe, Liskeard</i>	0	5	0	Whitley, N.	0	5	0
Jago, James, M.D., F.R.S. ...	0	5	0	Whitley, H.M., F.G.S. ...	0	5	0
Nix, Arthur P.	0	5	0	Williams, Sir F. M., Bart., M.P., F.G.S., <i>Goonvrea</i> ...	0	5	0
Paull, A.	0	5	0	Willyams, A. C., <i>Bodrean</i> ...	0	5	0
Remfry, G. F., <i>Torquay</i> ...	0	5	0				

The MUSEUM is open to Members and their families every day, except Sundays, between the hours of Ten and Four o'clock during the Winter, and between Nine and Six o'clock in the Summer.

The Museum is open to the public, free of charge, on the Afternoons of MONDAYS, WEDNESDAYS, and SATURDAYS, from Noon until dusk, during the Winter months, and until Six o'clock in the Summer months. On other days, and previous to Twelve o'clock on the above days, an admission fee of Sixpence is required.

An Annual Subscription of Five Shillings entitles the Subscriber to admission to the Museum on Mondays, Wednesdays, and Saturdays, and to attend all the Meetings of the Society.

A Subscription of Ten Shillings further entitles the Subscriber to introduce to the Museum and meetings all the *bonâ fide* resident members of his family.

A Subscription of One Guinea entitles the Subscriber to all the publications issued by the Institution, to admission to the Museum, for himself and family, on every day in the week, and to the meetings of the Society : and to ten transferable tickets of admission to the Museum whenever open.

The "JOURNAL OF THE ROYAL INSTITUTION OF CORNWALL" will be forwarded free of charge to the members subscribing One Guinea Annually. To other members it will be supplied on payment, in advance, of Three Shillings a year; or the several numbers may be obtained from the Curator, or from a Bookseller, at Four Shillings each. No. XVIII, containing the Annual Report and Balance Sheet and the Meteorological Tables for 1875, will be published early in 1876.

ROYAL INSTITUTION OF CORNWALL.

FOUNDED 1818.

Patron :

THE QUEEN.

Vice-Patron :

H.R.H. THE PRINCE OF WALES, DUKE OF CORNWALL, &c., &c.

Trustees :

LORD ROBARTES.

SIR C. B. GRAVES SAWLE, BART.

Mr. F. G. ENYS.

LIEUT.-COL. TREMAYNE.

Council for the Year 1875-76.

President :

MR. JONATHAN RASHLEIGH

Vice-Presidents :

SIR J. ST. AUBYN, BART., M.P.
MR. ROBERT TWEEDY.
MR. GEORGE FREETH.

DR. BARHAM, M.D. (CANTAB.)
DR. JAGO, M.D. (OXON.), F.R.S.

Treasurer :

MR. W. TWEEDY.

Hon-Secs. :

MR. N. WHITLEY, F.M.S.

DR. C. LE NEVE FOSTER, F.G.S.

MR. J. H. COLLINS, F.G.S.

Other Members :

MR. W. COPELAND BORLASE,
F.S.A.
MR. J. H. COLLINS, F.G.S.
REV. W. IAGO, B.A. (CANTAB.),
LOC. SEC S.A.
MR. H. SPRY LEVERTON,
M.R.C.S.

REV. A. P. MOOR, M.A.
MR. A. PAULL, M.R.C.S.
MAJOR PARKYN.
MR. W. J. RAWLINGS.
MR. H. O. REMFRY.
MR. TYERMAN.

Librarian and Curator of Museum : MR. W. NEWCOMBE, TRURO.

Honorary Members :

- | | |
|--|--|
| Thomas Hawkins, F.G.S., &c., <i>Hermitage, Whitwell, Isle of Wight.</i> | W. L. Banks, F.S.A., <i>Brecon, South Wales.</i> |
| Sir Gardner Wilkinson, D.C.L., F.R.S., &c. | Warington Wilkinson Smyth, M.A., F.R.S., For. Sec. G.S., &c., <i>London.</i> |
| Charles Cardale Babington, M.A., F.R.S., &c., <i>Prof. of Botany, Cambridge.</i> | Major-Gen. Sir H. James R.E., F.R.S., M.R.I.A., &c., <i>Southampton.</i> |
| L. Moissenet, <i>Professeur à l' Ecole des Mines, Paris.</i> | W. Pengelly, F.R.S., F.G.S., <i>Lamorna, Torquay.</i> |
| Rev. E. L. Barnwell, M.A., <i>Melksham.</i> | Sir John Maclean, F.S.A., <i>Bicknor Court, Coleford.</i> |

Corresponding Members :

- | | |
|---|---|
| W. P. Cocks, <i>Falmouth.</i> | Henry Mc. Lauchlan, F.G.S., <i>London.</i> |
| John Hockin, <i>London.</i> | Capt. Napleton, <i>Bengal.</i> |
| Robert Hunt, F.R.S., Keeper of Mining Records, <i>London.</i> | S. R. Pattison, F.G.S., <i>London.</i> |
| Rev. R. Lethbridge King, <i>Sydney, Australia.</i> | C. W. Peach, A.L.S., <i>Edinburgh.</i> |
| Major Gen. Lambrick, Royal Marines. | W. H. Tregellas, <i>Morlah Lodge, 16, Tregunter Road, Brompton, London.</i> |
| | R. N. Worth, F.G.S., <i>Plymouth.</i> |

Associates :

- | | |
|--|---|
| W. Carkeet, <i>Sydney.</i> | Thomas Lobb. |
| J. H. Collins, F.G. S., <i>Truro.</i> | W. Loughrin, <i>Polperro.</i> |
| George Copeland, <i>Hayle.</i> | S. H. Michell, <i>Swansea.</i> |
| W. Dawe, <i>Delhi, East Indies.</i> | R. Pearce, jun., F.G.S., <i>Colorado.</i> |
| Joseph Dickenson, H.M. Inspector of Coal Mines, <i>Manchester.</i> | Capt. Josiah Thomas, <i>Dolcoath.</i> |
| N. Hare, jun., <i>Liskeard.</i> | Capt. R. H. Williams, <i>Charlestown Mines.</i> |
| Edward Hookham, <i>London.</i> | |

Proprietors :

Viscount Falmouth.	Michell, Edward.
Lord Clinton.	Michell, W., (Reps. of)
Lord Churston.	Michell, W. E.
Lord Robartes.	Milford, J. J., <i>London.</i>
Sir T. D. Acland, Bart., M.P.	Nankivell, J. T., (Reps. of)
Sir Charles Lemon, Bart., F.R.S., (Representatives of)	Nankivell, J. T., <i>Melbourne.</i>
Sir John Lubbock, Bart., F.R.S.	Paddon, W. H.
Sir C. B. Graves Sawle, Bart.	Parkyn, Major, D.C.R.V.
Sir R. R. Vyvyan, Bart., F.R.S. F.G.S.	Potts, Miss, <i>Brighton.</i>
Sir Wm. Williams, Bart., (Reps. of)	Roberts, Joseph, <i>Southleigh.</i>
Sir S. T. Spry, (Reps. of)	Rogers, W., <i>Falmouth.</i>
Andrew, Henry, F.R.C.S., (Reps. of)	Rogers, F., <i>Plymouth.</i>
Baynard, William.	Rogers, Rev. St. Aubyn.
Boase, H. S., M.D., F.R.S., F.G.S., <i>Dundee.</i>	Rogers' Rev. R. Basset, B.A.
Buller, J. H., <i>Downes</i>	Rogers, J. Jope, <i>Penrose.</i>
Carlyon, E. T.	Rogers, Rev. W., M.A. <i>Mawnan.</i>
Carpenter, John, (Reps. of)	Rogers, Reginald, <i>Carwinion.</i>
Chilcott, J. G.	Sambell, Philip, jun., (Reps. of)
Clyma, W. J.	Spry, E. G.
Edwards, Miss, <i>Newquay.</i>	Spry, Mrs.
Enys, J. S., F.G.S., <i>Enys</i> , (Reps. of)	Stokes, H. S., <i>Bodmin.</i>
Fox, Charles, <i>Trebah.</i>	Tweedy, Robert, <i>Tregolls.</i>
Fox, R. W., F.R.S., <i>Penjerrick.</i>	Tweedy, E. B.
Gregor, F. G., <i>Trewarthenick.</i>	Tweedy, W.
Hartley, W. H. H., <i>Rosewarnc.</i>	Tweedy, R. M., <i>Falmouth.</i>
Hawkins, J. H., F.R.S., F.G.S., <i>Bignor</i> <i>Park.</i>	Tweedy, Charles, <i>Redruth.</i>
Hawkins, C. H. T., <i>Trewithen.</i>	Tweedy, Miss.
Hendy, James, (Reps. of)	Tweedy, Miss C.
Hogg, John, M.D., <i>London.</i>	Vivian, John Ennis, (Reps. of)
Hogg, Mrs.	Whitford, Miss.
Jenkins, Rev. D., <i>St. Goran</i> , (Reps. of)	Wightman, Lieut.-Col. George, (Reps. of)
Leverton, H. Spry, M.R.C.S.	Williams, R. H., M.R.C.S.
	Willyams, H., <i>Carnanton</i> , (Reps. of)
	Willyams, A. C. <i>Bodrean.</i>

Life Members

Right Rev. Lord Bishop of Fredericton, D.D.	Martin, J. N., C.E., <i>Assam.</i>
Coulson, W., <i>London.</i>	Foster, C. Le Neve, D.Sc., F.G.S.

Annual Subscribers :

	£	s.	d.		£	s.	d.
THE PRINCE OF WALES ...	20	0	0	Hingeston-Randolph, Rev,			
Ball, A. W., <i>St. Austell</i> ...	1	1	0	F. C., M.A., (<i>Oxon.</i>),			
Barham, C., M.D., (<i>Cantab</i>)	1	1	0	<i>Ringmore</i>	1	1	0
Basset, G. L., <i>Telivy</i>	1	1	0	Hocking, Samuel, <i>Rosewarne</i>	1	1	0
Beauchamp, E. B., <i>Trevince</i>	1	1	0	Hogg, Lieut-Col., Sir Jas.,			
Bolden, J. L.	1	1	0	K C.B., M P., <i>London</i> ...	1	1	0
Bolitho, Richard Foster,				Hosken, James, <i>Ellenglase,</i>			
<i>Ponsandane</i>	1	1	0	<i>Cubert</i>	1	1	0
Bond, F. Walter, <i>London</i> ...	1	1	0	Hudson, R. S., M.D., and			
Borlase, Wm. Copeland,				C.M., Qu Univ. Irel. ...	1	1	0
A.B., F.S.A., <i>Castle</i>				Hughan, W. J.	0	5	0
<i>Horneck</i>	1	1	0	Iago, Rev. W., B.A., <i>West-</i>			
Brune, C. G. Pridaux,				<i>heath, Bodmin</i>	1	1	0
<i>Prideaux House, Padstow</i>	1	1	0	Jago, James, M.D., (<i>Oxon.</i>);			
Budd, J. Palmer, <i>Ystalyfera</i>	1	1	0	A B., (<i>Cantab</i>), F.R.S. ...	1	1	0
Carew, W. H. P., <i>Antony</i> ...	1	1	0	James, Hamilton	1	1	0
Carlyon, Edmund, <i>St. Austell</i>	1	1	0	James, John B.	1	1	0
Carlyon, Major, <i>Tregrehan</i> ..	1	1	0	Jenkins, W. H.	0	10	0
Carne, Miss, <i>Penzance</i>	1	1	0	King, F., M.R.C.S.	1	1	0
Carne, W. N., <i>Rosemundy</i> ...	0	10	0	Lake, W... ..	1	1	0
Carter, R. H.	1	1	0	Leverton, H. S., L.R.C P. <i>Ed.</i>	1	1	0
Carus-Wilson, E.S., <i>Penmount</i>	1	1	0	Mount Edgecombe, The			
Christoe, W. H.	1	1	0	Earl of	1	1	0
Church, G. L.	1	1	0	Marshall, F.	1	1	0
Collins, Rev. C. M. Edward,				Moor, Rev. Allen Page, M.A.,			
<i>Treardale</i>	1	1	0	F.R.G.S., <i>St. Clements</i> ..	1	1	0
Collins, J. H., F.G.S.	1	1	0	Netherton, J. R.	1	1	0
Coode, Edward, <i>Polapit</i>				Nix, Arthur P.	1	1	0
<i>Tamar, Launceston</i>	1	1	0	(Oliver, Capt. S. P., R.A.,			
Coode, Arthur, <i>St. Austell</i> ...	1	1	0	<i>Falmouth</i>	1	1	0
Cragoe, Thos. Adolphus,				*Parkyn, Major	1	1	0
F.R.G.S., <i>Woodbury</i>				Pascoe, S.	1	1	0
<i>Cottage</i>	0	10	0	Paul, A., M.R.C.S.	1	1	0
Criddle, W. J.	1	1	0	Paul, J. R., <i>Bosvigo</i>	1	1	0
Dix, W. G.	1	1	0	Pearce, R., jun., F.G.S.,			
Doidge, J.	1	1	0	<i>Colorado</i>	1	1	0
Dymond, W. P., F.M.S.,				Peard, Col. J. W., <i>Penquite</i>	1	1	0
<i>Falmouth</i>	1	1	0	Phillips, W., <i>Falmouth</i> ...	0	10	0
*Enys, F. G., <i>Enys</i>	1	1	0	Phillipotts, Rev. T., M.A.,			
Falmouth, Viscount	2	2	0	<i>Porthgwidde</i> n	1	1	0
Fortescue, Honble, G. M.,				Rashleigh, Jonathan, <i>Mena-</i>			
<i>Boconnoc</i>	2	2	0	<i>billy</i>	1	1	0
Ferris, T.	0	10	0	Rashleigh, Capt. Battie,			
Fisher, Herbert W., V.W.,				<i>Falmouth</i>	1	1	0
<i>London</i>	1	1	0	Rawlings, W. J., <i>Downes,</i>			
Ford, Rev. J., <i>Bath</i>	1	1	0	<i>Hayle</i>	1	1	0
Foster, R., <i>Lanwithan</i> ...	1	1	0	Remfry, G. F., <i>Torquay</i> ...	1	1	0
*Fox, C., <i>Trebal</i>	1	1	0	Remfry, H. O.	1	1	0
*Fox, R. W., F.R.S., <i>Penjerrick</i>	1	1	0	*Roberts, Joseph	1	1	0
Freeman, J. D., <i>Falmouth</i> ...	1	1	0	Roberts, Mrs.	0	10	0
Freeman, W. G., <i>Penryn</i> ...	1	1	0	Rodd, E. H., <i>Penzance</i> ...	0	10	0
Freeth, G., <i>Duporth</i>	1	1	0	Roebuck, W. R., <i>Trevarthian</i>	1	1	0
Gilbert, Hon. Mrs., <i>Trelissick</i>	1	1	0	*Rogers, J. J., <i>Penrose</i> ...	1	1	0
Grenfell, H. R., <i>London</i> ...	1	1	0	*Rogers, Reg., <i>Carwinion</i> ...	1	1	0
Harvey, Rev. C. F.	1	1	0	*Rogers, Rev. W., M.A.,			
Heard, E. G.	1	1	0	<i>Mawnan</i>	1	1	0
Henderson, J., <i>Newham</i> ...	0	10	0	St. Aubyn, Sir J., Bart.,			
				M.P., <i>Trevethoe</i>	1	1	0

	£	s.	d.		£	s.	d.
Salmon, W. W.	0	5	0	Tremenheere, H. Seymour,			
Sawle, Sir C. B. Graves, Bart.,				C.B., M.A., F.G.S.,			
<i>Penrice</i>	1	1	0	<i>London</i>	1	1	0
Sharp, Edward, jun., M.R.C.S.	1	1	0	Trevail, Silvanus	1	1	0
Sheriff, J. D., <i>Truro</i>	1	1	0	Tripp, C. U., <i>Burton-on-Trent</i>	0	10	0
Slight, Rev. H. S., B.D.,				Tweedy, Mrs., <i>Alverton</i> ...	1	1	0
<i>Ruanlanihorne</i>	1	1	0	*Tweedy, R.,	1	1	0
Smith, Rt. Hon. Sir Montague,				*Tweedy, W.	1	1	0
<i>London</i>	1	1	0	Tyerman, J. D., <i>Tregony</i> ...	1	1	0
Smith, P. P., <i>Tremorvah</i> ...	1	1	0	Vautier, Rev. R., M.A., <i>Kenwyn</i>	1	1	0
Smith, W. Bickford, <i>Red-</i>				Vivian, Hon. J. C.	1	1	0
<i>brook, Camborne</i>	1	1	0	Vivian, Arthur Pendarves,			
Smith-Dorien, A. S., <i>Tresco</i>				M.P., <i>Glanafon</i>	1	1	0
<i>Abbey, Scilly</i>	1	1	0	Vivian, H. H., M.P., <i>Park-</i>			
Solomon, T.	1	1	0	<i>Wern</i>	1	1	0
Stackhouse, Miss L.	1	1	0	Vivian, Major Q.	1	1	0
Tannahill, J.	0	5	0	*Vyvyan, Sir E. R., Bart.,			
Taylor, R., F.G.S., &c.,				F.R.S., F.G.S., <i>Trelowarren</i>	1	1	0
<i>London</i>	1	1	0	Whitley, N., F.M.S.	1	1	0
Teague, W., <i>Liskes</i>	1	1	0	Whitley, H. M., F.G.S. ...	0	10	0
Treffry, Rev. Dr., D.C.L.,				Williams, Sir F. M., Bart.,			
<i>Place, Fowey</i>	1	1	0	M.P., F.G.S., <i>Goonvrea</i>	1	1	0
Trelawny, Sir J. Salusbury,				Wilkinson, Rev. J. J., M.A.,			
Bart., <i>Trelawn</i>	1	1	0	(<i>Oxon.</i>), <i>Lanteglos by</i>			
Tremayne, J., M.P., <i>Heligan</i>	2	2	0	<i>Camelford</i>	1	1	0
Tremayne, Lieut-Col., <i>Carclew</i>	1	1	0	Williams, J. M., <i>Caerhays</i>			
				<i>Castle</i>	1	1	0

Those marked with * are Proprietors ; with † are Life Members,

Subscribers to the Illustration Fund.

	£	s.	d.		£	s.	d.
Barham, C., M.D.,	0	5	0	Rogers, J. J., <i>Penrose</i>	0	5	0
Broad, R. R., <i>Falmouth</i> ...	0	5	0	Rogers, Rev. W., M.A., <i>Mawnan</i>	0	5	0
Carew, W. H. P., <i>Antony</i> ...	0	5	0	St. Aubyn, Sir J., Bart.,			
Carus-Wilson, E. S., <i>Penmount</i>	0	5	0	M.P.,	0	5	0
Coode, E., <i>Polapit, Tamar,</i>				Smith, P. P.	0	5	0
<i>Launceston</i>	0	5	0	Tremenheere, H. Seymour,			
Fox, Charles, <i>Trebah</i>	0	5	0	C.B., <i>London</i>	0	5	0
Gilbert, Hon. Mrs., <i>Trelissick</i>	0	5	0	Tucker, C., <i>Exeter</i>	0	5	0
Glencross, Rev. J., M.A.,				Tweedy, R.	0	5	0
<i>Luastowe, Liskeard</i> ...	0	5	0	Whitley, N.	0	5	0
Jago, James, M.D., F.R.S. ...	0	5	0	Whitley, H. M., F.G.S. ...	0	5	0
Nix, Arthur P.	0	5	0	Williams, Sir F. M., Bart.,			
Paull, A.	0	5	0	M.P., F.G.S., <i>Goonvrea</i>	0	5	0
Remfry, G. F., <i>Torquay</i> ...	0	5	0	Willyams, A. C., <i>Bodrean</i> ...	0	5	0
Roberts, J.	0	5	0				

The MUSEUM is open to Members and their families every day, except Sundays, between the hours of Ten and Four o'clock during the winter, and between Nine and Six o'clock in the Summer.

The Museum is open to the public, free of charge, on WEDNESDAYS, from Noon until dusk, during the Winter months, and until Six o'clock in the Summer months. On other days, an admission fee of Sixpence is required.

An Annual Subscription of Five Shillings entitles the Subscriber to admission to the Museum on Mondays, and Saturdays, and to attend all the Meetings of the Society.

A Subscription of Ten Shillings further entitles the Subscriber to introduce to the Museum and meetings all the *bonâ fide* resident members of his family.

A Subscription of One Guinea entitles the Subscriber to all the publications issued by the Institution, to admission to the Museum, for himself and family, on every day in the week, and to the meetings of the Society: and to ten transferable tickets of admission to the Museum whenever open.

The "JOURNAL OF THE ROYAL INSTITUTION OF CORNWALL" will be forwarded free of charge to the members subscribing One Guinea Annually. To other members it will be supplied on payment, in advance, of Three Shillings a year; or the several numbers may be obtained from the Curator, or from a Bookseller, at Four Shillings each. The Annual Report and Balance Sheet and the Meteorological Tables for 1876, will be published early in 1877.

ROYAL INSTITUTION OF CORNWALL.

SPRING MEETING, 1876.

THIS Meeting was held in the Library of the Institution on Tuesday, May 23rd, 1876. The President, Jonathan Rashleigh, Esq., was in the Chair, and among those present were Dr. Barham, Mr. Geo. Freeth, and Dr. Jago, F.R.S., (*Vice-Presidents*); W. C. Borlase, Rev. A. P. Moor, Major Parkyn, Messrs. Alexander Paull, W. J. Rawlings, H. O. Remfry, and J. D. Tyerman, (*Members of Council*); Mr. Wm. Tweedy, (*Treasurer*); Messrs. J. H. Collins, F.G.S., C. Le Neve Foster, B.A., D.Sc., and N. Whitley, F.M.S., (*Secretaries*); Mr. J. G. Chilcott, Rev. C. M. Ed. Collins, Messrs. W. Geach, S. Hocking, Hamilton James, B. Kitto, F.G.S., W. Lake, M. Quin, J. J. Rogers, Rev. W. Rogers, Rev. H. S. Slight, Mr. R. Symons, and others, besides several ladies.

The President's Address will be found in the present number of the Journal.

The following Lists of Presents were read by Dr. FOSTER.

DONATIONS TO THE MUSEUM.

Specimen of Aurine	} From Messrs. F. Crace Calvert, and Co., Manchester.
„ Carbolic Acid Disinfecting Powder	
„ Carbolic Acid, Fusing Point 95° F.	
„ Carbolic Acid, Fusing Point 108° F.	
„ Carbolised Tow	
„ Cresylic Acid	
„ Picric Acid Crystals	
„ Picric Acid Paste	
„ Sulphocarbonate of Ammonia	
„ Sulphocarbonate of Zinc	
„ Sulphocarbonate of Soda	
„ Sulphocarbonate of Potash	
Three Series of Rock specimens, illustrating sections in Cornwall.....	From Thomas Clark.
Specimens of Antiquities from Egypt	From the Exors. of the late Mr. C. J. Pocock.

Piece of Oak from submarine forest at Pendower Bay	From Rev. H. S. Slight.
Polyzoa and Corals	From Mr. C. W. Peach.
Specimen of Wood perforated by the Teredo.....	From Mr. J. Jope Rogers.
Bust of the late Mr. W. J. Henwood	From Miss Pooley.
Scorodite from Terras Mine, St. Stephens	From Mr. J. H. Collins.
Otolith Charms	From Mr. W. H. Tregelles.
Limestone from Nare Point	From Rev. W. Rogers.
Spindle Whorls or Fairy Millstones	Ditto.
Flint Flakes, carved Bone Implements	From Exors. of Christy Coll.
Specimen of Manganese Bronze.	From Mr. Jonathan Rashleigh.

ADDITIONS TO THE LIBRARY.

Bulletin of International Meteorological Observations and Monthly Weather Review	From the American Government.
Greenwich Astronomical Magnetical and Meteorological Observations made at the Royal Observatory, Greenwich, in the year 1873	Presented by the Authority of the Lords Commissioners of the Admiralty.
Journal of the Cambrian Archæological Association, 6 vols.	From the Association.
Journal of the Royal Geological Society of Ireland	From the Society.
Monthly Notices of the Royal Astronomical Society.....	Ditto.
Parochial and Family History of Trigg Minor, XI Part, by Sir John Maclean	From the Exors. of late Mr. W. J. Henwood.
Proceedings of the Literary and Philosophical Society of Liverpool.. ..	From the Society.
Proceedings of the Zoological Society of London	Ditto.
Reports of the Mining Surveyors and Registrars for the Quarter ending September, 1875	From the Agent General Victoria.
Transactions of the Manchester Geological Society 1875-6	From the Society.
The Journal of the Anthropological Institute ...	From the Institute.
The Mining Journal, 1875	From Dr. Foster.
The Life and Letters of Florence Mac Carthy Reagh, by Daniel Mac Carthy	From Sir John Maclean.
Drawings of a Flint Celt found at the Lizard ...	From Mr. W. H. Tregelles.
The Journal of the Royal Historical and Archæological Association of Ireland	From the Association.
Rashleigh's Minerals	From Mr. J. Rashleigh.
Report of the Smithsonian Institution	From the Institution.
Relics of Wm. Cookworthy	From Rev. C. M. Collins.
Autograph Letter, E. Boscawen	From Mr. Freeth.
Drawings of Eleanor Crosses	Ditto.
M.S.....	Ditto.
A Serious Fall in the Value of Gold, by W. Stanley Jevons, M.A.	From the Author.

Mr. WHITLEY made a few remarks upon the Otolith Charms presented by Mr. Tregelles, and Mr. COLLINS described the Geological Specimens presented by Mr. Clark.

The following Papers were read and discussed:—

Ornithological Notes.—By E. H. Rodd.

Cornish Polyzoa.—By C. W. Peach.

Cornish Tokens.—By R. N. Worth.

Description of specimens of Carbolic Acid and its Derivatives.—By R. Le Neve Foster.

On some Pleas recorded in the De Banco Rolls.—By Sir John Maclean.

On some Palaeolithic Remains from the Valley of the River Vezere.—By J. J. Rogers.

On a proposal to establish the Manufacture of Porcelain in Cornwall.—By the Rev. C. M. Ed. Collins.

These Papers appear in the present number of the Journal.

At the request of Dr. Barham, the Rev. H. S. SLIGHT explained the circumstances under which specimen of the oak from a submarine forest which he presented to the Museum, was found. It was, he said, a small part of a large tree, of which he had a considerable piece at home. The remains of a forest were found in Pendower Bay some few years ago when there was an extremely low tide, and Lord Falmouth, himself, and others went down to the beach, and with the assistance of three or four horses dragged out a tree of about 12 inches in diameter, of which this was part. Mr. WHITLEY said the inference he drew from this was that theirs was an extremely ancient coast line. How far these forests extended it was impossible to say: it might have extended to and been part of similar remains on the coast of France, and at that time we might have been connected with the continent, and the "streak of silver sea" not in existence.

Dr. BARHAM next advocated the embodiment of county meteorological observations in the journal of the society, in such a form, however, as to allow of its being sold separately. The fauna of the county had been published by the society in a similar manner. He offered to undertake the duties of editor, either alone or conjointly with Mr. Whitley. Giving a short lecture in illustration of his plans, Dr. Barham remarked that from the observations which he had collected, it appeared that we had every reason to be contented with the climate of Cornwall, for

we generally escaped the heavy floods which devastated some other parts of the country in the finest months of the year. We had our rain during the winter, when it did not much matter whether we had a little more or less. He had some elaborate diagrams to illustrate his remarks, compiled from the observations which it is intended to publish. These observations extend with a few slight interruptions over a period of 50 years. One interesting little diagram showed the comparative temperatures of Scilly, Penzance, and Truro. It seems there is an average difference of about ten degrees between each; but in this way: Penzance is ten degrees cooler in summer and ten degrees milder in winter than Truro; and Scilly compared just about the same with Penzance as Penzance does with Truro. Hence the adaptation of its climate to the early production of vegetables. Climate was one of the great factors in home prosperity, and he thought they had better turn more attention to cultivation of the land now mining operations were so depressed.

Mr. Vosper, of Plymouth, exhibited Remington's Type Writer, and shewed its mode of working.

On the motion of Dr. JAGO, which was seconded by Mr. H. O. REMFRY, a vote of thanks was awarded to the authors of papers and the donors of books and specimens.

A vote of thanks to the PRESIDENT for his conduct in the chair, was proposed by Mr. J. JOPE ROGERS, seconded by the Rev. H. S. SLIGHT, and carried unanimously.

The Members afterwards dined together, as usual, at the Red Lion Hotel, Truro.

ROYAL INSTITUTION OF CORNWALL.

FOUNDED 1818.

Patron :

THE QUEEN.

Vice-Patron :

H.R.H. THE PRINCE OF WALES, DUKE OF CORNWALL., &c., &c.

Trustees :

LORD ROBARTES.

SIR C. B. GRAVES SAWLE, BART.

MR. F. G. ENYS.

LIEUT.-COL. TREMAYNE.

COUNCIL FOR THE YEAR 1876-77.

President :

MR. JONATHAN RASHLEIGH.

Vice-Presidents :

MR. ROBERT TWEEDY.

MR. GEORGE FREETH.

MR. C. BARHAM, M.D. (CANTAB).

MR. J. JAGO, M.D. (OXON), F.R.S.

SIR F. M. WILLIAMS, BART., M.P.

Treasurer :

MR. WILLIAM TWEEDY.

H.

MR. N. WHITFIELD.

MR. J. H. COLLINS, F.G.S.

Other Members :

MR. W. COPELAND BORLASE,
F.S.A.

MR. J. H. COLLINS, F.G.S.

REV. W. IAGO, B.A. (CANTAB),
LOC. SEC. S.A.

MR. H. SPRY LEVERTON, M.R.C.S.

REV. A. P. MOOR, M.A.

MR. A. PAULL, M.R.C.S.

MAJOR PARKYN.

MR. W. J. RAWLINGS.

MR. H. O. REMFRY.

MR. TYERMAN.

Librarian and Curator of Museum: MR. W. NEWCOMBE, TRURO.

Honorary Members.

Thomas Hawkins, F.G.S., &c., <i>Hermitage, Whitwell, Isle of Wight.</i>	W. L. Banks, F.S.A., <i>Brecon, South Wales.</i>
Charles Cardale Babington, M.A., F.R.S., &c., <i>Prof. of Botany, Cambridge.</i>	Warington Wilkinson Smyth, M.A., F.R.S., For. Sec. G.S., &c., <i>London.</i>
L. Moissenet, <i>Professeur à l' Ecole des Mines, Paris.</i>	W. Pengelly, F.R.S., F.G.S., <i>Lamorna, Torquay.</i>
Rev. E. L. Barnwell, M.A., <i>Melksham.</i>	Sir John Maclean, F.S.A., <i>Bicknor Court, Coleford.</i>

Corresponding Members.

W. P. Cocks, <i>Falmouth.</i>	Henry Mc. Lanchlan, F.G.S., <i>London.</i>
John Hockin, <i>London.</i>	Capt. Napleton, <i>Bengal.</i>
Robert Hunt, F.R.S., Keeper of Mining Records, <i>London.</i>	S. R. Pattison, F.G.S., <i>London.</i>
Rev. R. Lethbridge King, <i>Sydney, Australia.</i>	C. W. Peach, A.L.S., <i>Edinburgh.</i>
Major-Gen. Lambrick, <i>Royal Marines.</i>	W. H. Tregellas, <i>Morlah Lodge, 16, Tregunter Road, Brompton, London.</i>
	R. N. Worth, F.G.S., <i>Plymouth,</i>

Associates :

W. Carkeet, <i>Sydney.</i>	Thomas Lobb.
J. H. Collins, F.G.S., <i>Truro.</i>	W. Loughrin, <i>Polperro.</i>
George Copeland, <i>Hayle.</i>	S. H. Michell, <i>Swansea.</i>
W. Dawe, <i>Delhi, East Indies.</i>	R. Pearce, jun., F.G.S., <i>Colorado.</i>
Joseph Dickenson, H.M. Inspector of Coal Mines, <i>Manchester.</i>	Capt. Josiah Thomas, <i>Dolcoath.</i>
N. Hare, jun., <i>Liskeard.</i>	Capt. R. H. Williams, <i>Charlestown Mines.</i>
Edward Hookham, <i>London.</i>	

Proprietors :

- Viscount Falmouth.
 Lord Clinton.
 Lord Churston
 Lord Robartes.
 Sir T. D. Acland, Bart., M.P.
 Sir Charles Lemon, Bart., F.R.S.,
 (Representatives of)
 Sir John Lubbock, Bart., F.R.S.
 Sir C. B. Graves Sawle, Bart.
 Sir R. R. Vyvyan, Bart., F.R.S., F.G.S.
 Sir Wm. Williams, Bart., (Reps. of)
 Sir S. T. Spry, (Reps. of)
 Andrew, Henry, F.R.C.S., (Reps. of)
 Baynard, William.
 Boase, G. C., *London*.
 Buller, J. H., *Downes*.
 Carlyon, E. T.
 Carpenter, John, (Reps. of)
 Chilcott, J. G.
 Clyma, W. J.
 Edwards, Miss, *Newquay*.
 Enys, J. S., F.G.S., *Enys* (Reps. of)
 Fox, Charles, *Trebah*
 Fox, R. W., F.R.S., *Penjerrick* (Reps. of)
 Gregor, F. G., *Trewarthenick*.
 Hartley, W. H. H., *Rosewarne*.
 Hawkins, J. H., F.R.S., F.G.S., *Bignor
 Park*.
 Hawkins, C. H. T., *Trewithen*.
 Hendy, James, (Reps. of)
 Hogg, John, M.D., *London*.
 Hogg, Mrs.
 Jenkins, Rev. D., *St. Goran* (Reps. of)
 Leverton, H. Spry, M.R.C.S.
- Michell, Edward.
 Michell, W., (Reps. of)
 Michell, W. E.
 Milford, J. J., *London*.
 Nankivell, J. T., (Reps. of)
 Nankivell, J. T., *Melbourne*.
 Paddon, W. H.
 Parkyn, Major, D.C.R.V.
 Potts, Miss, *Brighton*.
 Roberts, Joseph, *Southleigh* (Reps. of)
 Rogers, W., *Falmouth* (Reps. of)
 Rogers, F., *Plymouth*.
 Rogers, Rev. St. Aubyn.
 Rogers, Rev. R. Basset, B.A.
 Rogers, J. Jope, *Penrose*.
 Rogers, Rev. W., M.A., *Mawnan*.
 Rogers, Reginald, *Carwinion*. (Reps. of)
 Sambell, Philip, jun., (Reps. of)
 Spry, E. G.
 Spry, Mrs.
 Stokes, H. S., *Bodmin*.
 Tweedy, Robert, *Tregolls*.
 Tweedy, E. B.
 Tweedy, W.
 Tweedy, R. M., *Falmouth*.
 Tweedy, Charles, *Redruth*.
 Tweedy, Miss.
 Tweedy, Miss C.
 Vivian, John Ennis, (Reps. of)
 Whitford, Miss.
 Wightman, Lieut.-Col. George, (Reps. of)
 Williams, R. H., M.R.C.S.
 Wilyams, H., *Carnanton*, (Reps. of)
 Wilyams, A. C., *Bodrean*.

Life Members.

- Fredericton, Right Rev. Lord Bishop of,
 D.D.
 Martin, J. N., C.E., *Assam*.
- Foster, C. Le Neve, D.Sc., F.G.S
 Cragoe, T. Adolphus, F.R.G.S.

Annual Subscribers.

	£	s.	d.		£	s.	d.
THE PRINCE OF WALES ...	20	0	0	Hudson, R. S., M.D., and			
Truro, The Lord Bishop of ...	1	1	0	C.M., Queen's Univ. Irel.	1	1	0
Ball, A. W., <i>St. Austell</i> ...	1	1	0	Hughan, W. J. ...	0	5	0
Barham, C., M.D., (<i>Cantab</i>) ...	1	1	0	Iago, Rev. W., B.A., <i>West-</i>			
Basset, G. L., <i>Tehidy</i> ...	1	1	0	<i>heath Bodmin</i> ...	1	1	0
Beauchamp, E. B., <i>Trevince</i>	1	1	0	Jago, James, M.D. (<i>Oxon</i>);			
Bolden, J. L. ...	1	1	0	A.B., (<i>Cantab</i>), F.R.S. ...	1	1	0
Bond, F. Walter, <i>London</i> ...	1	1	0	James, Hamilton ...	1	1	0
Borlase, William Copeland,				James, John B. ...	1	1	0
A.B. (<i>Owon</i>), F.S.A.,				Jenkins, W. H. ...	0	10	0
<i>Lariggan</i> ...	1	1	0	King, F., M.R.C.S. ...	1	1	0
Brune, C. G. Pridaux, <i>Prid-</i>				King, T., <i>Penzance</i> ...	1	1	0
<i>caux House, Padstow</i> ...	1	1	0	Lake, W. ...	1	1	0
Budd, J. Palmer, <i>Ystalyfera</i>	1	1	0	Leverton, H. S., L.R.C.P. Ed.	1	1	0
Carew, W. H. P., <i>Antony</i> ...	1	1	0	Ley, H. H., B.A. (<i>Cantab</i>)...	1	1	0
Carlyon, Edmund, <i>St. Austell</i>	1	1	0	Mount Edgecombe, The Earl			
Carlyon, Major, <i>Tregrehan</i> ...	1	1	0	of ...	1	1	0
Carne, Miss, <i>Penzance</i> ...	1	1	0	Malan, Rev. A. H., <i>Perran-</i>			
Carne, W. N., <i>Rosemundy</i> ...	0	10	0	<i>arworthal</i> ...	1	1	0
Carter, R. H. ...	1	1	0	Marshall, F. ...	1	1	0
Carus-Wilson, E.S., <i>Penmount</i>	1	1	0	Moor, Rev. Allen Page, M.A.,			
Christoe, W. H. ...	1	1	0	F.R.G.S., <i>St. Clements</i> ...	1	1	0
Church, Rev. G. L. ...	1	1	0	Mason, Rev. A. J., M.A.,			
Collins, Rev. C. M. Edward,				(<i>Cantab</i>) ...	1	1	0
<i>Trewardale</i> ...	1	1	0	Netherton, J. R. ...	1	1	0
Collins, J. H., F.G.S. ...	1	1	0	Nix, Arthur P. ...	1	1	0
Coode, Edward, <i>Polapit</i>				*Parkyn, Major ...	1	1	0
<i>Tamar, Launceston</i> ...	1	1	0	Pascoe, S. ...	1	1	0
Coode, Arthur, <i>St. Austell</i> ...	1	1	0	Paul, A., M.R.C.S. ...	1	1	0
Criddle, W. J. ...	1	1	0	Paul, J. R. <i>Bosvigo</i> ...	1	1	0
Doidge, J. ...	1	1	0	Pearce, R., jun., F.G.S.,			
Dymond, W. P., F.M.S.,				<i>Colorado</i>	1	1	0
<i>Falmouth</i> ...	1	1	0	Peard, Col. J. W., <i>Penquite</i>	1	1	0
*Enys, F. G., <i>Enys</i> ...	1	1	0	Pease, J. W., M.P., ...	1	1	0
Enys, John, Davies, F.G.S. ...	1	1	0	Phillpotts, Rev. T., M.A.,			
Falmouth, Viscount ...	2	2	0	<i>Porthgidden</i> ...	1	1	0
Fortescue, Capt. Cyril,				Rashleigh, Jonathan, <i>Mena-</i>			
<i>Boconnoc</i> ...	2	2	0	<i>billey</i> ...	1	1	0
Ferris, T. ...	0	10	0	Rashleigh, Capt. Battie,			
Fisher, Herbert W., V.W.,				<i>Falmouth</i> ...	1	1	0
<i>London</i> ...	1	1	0	Rawlings, W. J., <i>Downes,</i>			
Finnemore, Rev. J. ...	1	1	0	<i>Hayle</i> ...	1	1	0
Foster, R., <i>Lanwithan</i> ...	1	1	0	Reeve, Rev. J. A., M.A., ...	1	1	0
*Fox, C., <i>Trebah</i> ...	1	1	0	Remfry, G. F., <i>Torquay</i> ...	1	1	0
Freeman, J. D., <i>Falmouth</i> ...	1	1	0	Remfry, H. O. ...	1	1	0
Freeman, W. G., <i>Penryn</i> ...	1	1	0	Robartes, Right Hon. Lord ..	2	2	0
Freeth, G., <i>Duporth</i> ...	1	1	0	Rodd, E. H., <i>Penzance</i> ...	0	10	0
Gilbert, Hon. Mrs., <i>Trelissick</i>	1	1	0	Roebuck, W. R., <i>London</i> ...	1	1	0
Gregor, G. Glanville, <i>Tre-</i>				*Rogers, J. J., <i>Penrose</i> ...	1	1	0
<i>warthenick</i> ...	1	1	0	*Rogers, Rev. W., M.A.,			
Grenfell, H. R., <i>London</i> ...	1	1	0	<i>Mawnan</i> ...	1	1	0
Harvey, Rev. C. F., ...	1	1	0	St. Aubyn, Sir J., Bart., M.P.,			
Head, E. G. ...	1	1	0	<i>Trevethoe</i>	1	1	0
Henderson, J., <i>Newham</i> ...	0	10	0	Salmon, W. W. ...	0	5	0
Hogg, Lieut.-Col. Sir Jas.,				Sawle, Sir C. B Graves, Bart.			
K.C.B., M.P., <i>London</i> ...	1	1	0	<i>Penrice</i> ...	1	1	0
Hosken, James, <i>Ellenglaze,</i>				Sharp, Edward, jun., M.R.C.S.	1	1	0
<i>Cubert</i> ...	1	1	0	Sheriff, J. D., <i>Truro</i> ...	1	1	0

	£	s.	d.		£	s.	d.
Slight, Rev. H. S., B.D., <i>Ruan-lanihorne</i>	1	1	0	Tremenheere, H. Seymour, C.B., M.A., F.G.S., <i>London</i>	1	1	0
Smith, Rt. Hon. Sir Montague, <i>London</i>	1	1	0	Tweedy, Mrs., <i>Alverton</i>	1	1	0
Smith, P. P., <i>Tremorvah</i>	1	1	0	*Tweedy, R.	1	1	0
Smith, W. Bickford, <i>Redbrook, Camborne</i>	1	1	0	*Tweedy, W.	1	1	0
Smith-Dorien, A. S., <i>Trescoe Abbey, Scilly</i>	1	1	0	Tyerman, J. D., <i>Tregoney</i>	1	1	0
Stackhouse, Miss L.	1	1	0	Vautier, Rev. R., M.A., <i>Kenwyn</i>	1	1	0
Tannahill, J.	0	5	0	Vivian, Arthur Pendarves, M.P., <i>Glanafon</i>	1	1	0
Taylor, R., F.G.S., &c., <i>London</i>	1	1	0	Vivian, H. H., M.P., <i>Park-Wern</i>	1	1	0
Teague, W., <i>Liskes</i>	1	1	0	Vivian, Major Q.	1	1	0
Treffry, Rev. Dr., D.C.L., <i>Place, Fowey</i>	1	1	0	*Vivian, Sir R. R., Bart., F.R.S., F.G.S., <i>Treloararren</i>	1	1	0
Trelawny, Sir J. Salusbury, Bart., <i>Trelawn</i>	1	1	0	Whitley, H., F.G.S.	1	1	0
Tremayne, J., M.P., <i>Heligan</i>	2	2	0	Whitley, F.M., F.M.S.	0	10	0
Tremayne, Lieut.-Col., <i>Carclew</i>	1	1	0	Williams, Sir F. M., Bart., M.P., F.G.S., <i>Goonvrea</i> ..	1	1	0
Trevail, Silvanus	1	1	0	Williams, J. M., <i>Caerhays Castle</i>	1	1	0
Tripp, C. U., <i>Burton-on-Trent</i>	0	10	0				

Those marked with * are Proprietors : with † are Life Members:

Subscribers to the Illustration Fund.

	£	s.	d.		£	s.	d.
Barham, C., M.D.,	0	5	0	Rogers, J. J., <i>Penrose</i>	0	5	0
Broad, R. R., <i>Falmouth</i>	0	5	0	Rowers, Rev. W., M.A., <i>Mawnan</i>	0	5	0
Carew, W. H. P., <i>Antony</i>	0	5	0	St. Aubyn, Sir J., Bart., M.P.	0	5	0
Carus-Wilson, E.S., <i>Penmount</i>	0	5	0	Smith, P. P.	0	5	0
Coode, E., <i>Polapit, Tamar, Launceston</i>	0	5	0	Tremenheere, H. Seymour, C.B., <i>London</i>	0	5	0
Fox, Charles, <i>Trebah</i>	0	5	0	Tucker, C., <i>Exeter</i>	0	5	0
Gilbert, Hon. Mrs., <i>Trelissick</i>	0	5	0	Tweedy, R.	0	5	0
Glencross, Rev. J., M.A., <i>Lwestowe, Liskeard</i>	0	5	0	Whitley, N.	0	5	0
Jago, James, M.D., F.R.S.	0	5	0	Whitley, H. M., F.G.S.	0	5	0
Nix, Arthur P.	0	5	0	Williams, Sir F. M., Bart., M.P., F.G.S., <i>Goonvrea</i>	0	5	0
Paull, A.	0	5	0	Willyams, A. C., <i>Bodrean</i>	0	5	0
Remfry, G. F., <i>Torquay</i>	0	5	0				

The MUSEUM is open to Members and their families every day, except Sundays, between the hours of Ten and Four o'clock during the winter, and between Nine and Six o'clock in the summer.

The Museum is open to the Public, free of charge, on WEDNESDAYS, from Noon until dusk, during the Winter months, and until Six o'clock in the Summer months. On other days, an admission fee of Sixpence is required.

An *Annual Subscription of Five Shillings* entitles the Subscriber to admission to the Museum on Mondays and Saturdays, and to attend all the Meetings of the Society.

A *Subscription of Ten Shillings* further entitles the Subscriber to introduce to the Museum and Meetings all the *boná fide* resident members of his family.

A *Subscription of One Guinea* entitles the Subscriber to all the publications issued by the Institution, to admission to the Museum, for himself and family, on every day in the week, and to the meetings of the Society; and to ten transferable tickets of admission to the Museum whenever open.

The "JOURNAL OF THE ROYAL INSTITUTION OF CORNWALL" will be forwarded free of charge to the Members subscribing *One Guinea Annually*. To other members it will be supplied on payment, in advance, of *Three Shillings a year*; or the several numbers may be obtained from the Curator, or from a Bookseller, at *Four Shillings each*.

ROYAL INSTITUTION OF CORNWALL.

SPRING MEETING,

1877.

THIS Meeting was held in the Library of the Institution on Friday, May 11th, 1877. The President, Mr. Jonathan Rashleigh, took the Chair at noon, and among those present were the Bishop of Truro, the Mayor of Truro (Mr. J. G. Chilcott); Dr. Barham and Dr. Jago, *Vice-Presidents*; Rev. Wm. Iago, Dr. Le Neve Foster, Messrs. Alexander Paull, H. O. Remfry, Major Parkyn, *Members of Council*; Mr. W. Tweedy, *Treasurer*; Messrs. J. H. Collins and N. Whitley, *Secretaries*; Revs. C. M. Ed. Collins, W. T. Fry, T. Phillpotts, H. S. Slight, G. L. Woolcombe, and P. Woolcombe, Messrs. W. J. Criddle, B. Kitto, P. P. Smith, W. Lake, R. Symons, and others, and a number of ladies.

The President's Address will be found in the present number of the Journal.

The following Lists of Presents were read by Mr. J. H. COLLINS.

ADDITIONS TO THE LIBRARY.

The 43rd Annual Report of the Royal Cornwall Polytechnic Society	From the Society.
Transactions of the Manchester Geological Society	From the Society.
The Journal of the Cambrian Archæological Association.....	From the Association.
Transactions of the Historic Society of Lancashire and Cheshire	From the Society.
Proceedings of the Zoological Society of London	From the Society.
Transactions of the London and Middlesex Archæological Society.....	From the Society.

Proceedings of the Society of Antiquaries of London	From the Society.
The Journal of the Royal Historical and Archæological Association of Ireland	From the Association.
The Journal of the Anthropological Institute of Great Britain and Ireland	From the Institute.
Collections Historical and Archæological relating to Montgomeryshire and its Borders, 10 Nos....	From Powy's Land Club.
Domesday Book of Montgomeryshire	Ditto.
Monthly Notices of the Royal Astronomical Society.....	From the Society.
Proceedings of the Literary and Philosophical Society of Liverpool.....	From the Society.
Parochial and Family History of Trigg Minor, by Sir John Maclean, 12th Part ..	From the Exors. of the late Mr. W. J. Henwood.
A Primæval British Metropolis with some notes of the South Western Peninsula of Britain ...	From Mr. Thos. Kerslake, Bristol.
Experiments on the Maximum Elasticity and Density of Vapours	From the Author, Mr. Alexander Morton, Glasgow.
A Few Pages on the Great Pyramid of Ghizeh, by the Rev. H. B. Wrey, M.A., Barnstaple ...	From the Author.
Assessments in Kent in aid of the expense of Knighting the Black Prince.....	From Sir John Maclean.
Greenwich Astronomical, Magnetical, and Meteorological Observations made at the Royal Observatory, Greenwich, for the year 1874 ...	Presented by the Authority of the Lords Commissioners of the Admiralty.
Parcel of Books from the University of Christiania	From the University.
Mining Journal for 1876	From Dr. Foster.
Annual Report of the Smithsonian Institution...	From the Institution.
Bulletin of International Meteorological Observations	From the American Government.
The Transactions of the Royal Irish Academy, Dublin.....	From the Academy.

FROM MR. W. P. COCKS, FALMOUTH.

Bartlett, J. R.—Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua, 2 vols.
Coleridge, Rev. John—Miscellaneous Dissertations arising from the 17th and 18th chapters of the Book of Judges.
Hales, S.—Vegetable Statics, or an account of some Statical Experiments on the Sap in Vegetables, being an Essay towards a Natural History of Vegetation.
Hare, Rev. J.—A Treatise on the Conduct of God to the Human Species, and on the Divine Mission of Jesus Christ.
Johnston, G.—A History of British Sponges and Lithophytes.
Johnston, C. D.—Memoirs of the Rebellion in 1745 and 1746.
Milton, J.—The Doctrine and Discipline of Divorce.
Macpherson, J.—The Poems of Ossian, 2 vols.
Smith, A.—The Philosophy of Morals, 2 vols.

- Smith, A.—An inquiry into the Nature and Causes of the Wealth of Nations, 3 vols.
 A Treatise on the Internal Policy of Nations.
 Thuckrah, C. S.—The effects of Arts, Trades, and Professions.
 Volney, Mr.—Christianity Vindicated in a series of Letters.
 Young, T.—An Introduction to Medical Literature.

DONATIONS TO THE MUSEUM.

Ancient View of Lostwithiel Palace	Mr. Walter Tregelles.
Portrait of the First Members of the Royal Academy studying the Living Model, after a Picture by Zoffany	Rev. T. Phillpotts.
Specimen of Chalksiderite from West Phoenix Mine	Presented by Capt. Joseph Hosking.
Specimen of Sulphur from Saba, West Indies ...	Mr. J. H. Collins.
„ Enysite from St. Agnes	Mr. B. Kitto.
„ Amianthus or Asbestos from Savoy	The Misses Potts.
„ Native Silver from Chili.....	Mr. R. Tweedy.
„ Silver Ore from Mexico	Ditto.
„ Native Gold from Chili	Ditto.
„ Native Gold from Australia	Ditto.
„ Carved Oak Beams believed to be from the old Glasney College, Penryn.....	Ditto.
Fragment of Statuary from the Old Dominican Priory, Truro.....	Mr. T. Clarke.
Specimen of Slate with Pyritous Markings	Capt. Joseph Jewell.
Specimen of Fossil Ferns in Carboniferous Shale from the South Wales Coal Fields	Mr. J. R. Netherton.
Specimens of Cornish Zoophytes	Mr. C. W. Peach.
Fossil Fish (Macropoma Mantella), from the Chalk, near Lewes	Mr. N. Whitley.
Relics from Old Cardinham Castle	Mr. S. W. Jenkin.
Specimens of Shells and other objects of Fataul History	Mr. W. P. Cocks.

EXHIBITED.

9 Rough Diamonds, one Diamond in the Matrix, and two Photographs of the Kimberley Diamond Fields	Exhibited by Mr. Thos. Cradock.
--	---------------------------------

THE CLIMATE OF CORNWALL.

DR. BARIHAM made some remarks on an extensive series of diagrams, intended to illustrate a portion of the summary of the observations on the climate of Cornwall, which the Institution has proposed to publish. As the subject of rain-

fall had been fully and ably treated by Mr. Michell Whitley in a paper in the last number of the *Journal*, Dr. Barham would only remark, under that head, that the rainfall in December last—10·59 inches—exceeded that in any previous month since their records began in 1838. In November, 1852, 10·51 inches were gauged; but that month had now lost its pre-eminence of wetness. Mr. M. Whitley had presented a very valuable comparative estimate of the amount of rain in a great number of different parts of the county during the last forty years; but the available records commenced in 1728; and the calculated annual results were shown on a diagram for nearly a century and a half—a most important secular period; data for which on other points of climate were also in possession.

Dr. Barham chiefly dwelt on the subject of temperature. He said that a fairly correct general notion of climate might be got by considering the reciprocal relations of the four old elements—fire, air, earth and water: the first, or heat, being of course represented by the sun, the great source of action; the others exhibiting the three forms of matter—solid, liquid, and gaseous,—being acted on by it, so as to produce the great variety of meteorological phenomena. The earth is fixed but air, incumbent on it, runs away, as wind, with its heat or cold to distant regions; and water, the sea, chilled by icebergs, or warmed by the tropical sun, conveys, by its currents, winter or summer to the coasts to which it flows. Thus one of the grandest of these—the Gulf Stream—surrounds our own shores, and brings warmth and moisture, not only to our islands, but to all western Europe. The position of Cornwall—a great promontory in the midst of this warm sea—not only subjects it to the influence of the waters around it, but makes it a meteorological instrument, superior perhaps to any other in the world, for testing on the large scale the mutual influences of sea and land, varying in temperature and elevation; whilst the Isles of Scilly may be regarded almost as a large ship moored in the warm Atlantic.

The registers for the four years 1871-74, of the daily observations made at St. Mary's for the Board of Trade by Mr. W. Thomas, had been kindly lent to Dr. Barham. The effect of this ocean he at in raising the mean temperature in winter

above that of the mainland was clearly shown on the diagrams, as was the influence of the equable relative coolness of the water in summer in reducing the heat of that season, varying in both cases most sensitively with the direction of the wind. Thus the thermometrical curves for Scilly were exhibited passing high above those for Truro and Greenwich in the winter months, falling far below the latter in summer, and nearly blending with them in spring and autumn. But it was pointed out that this action was still more conspicuous and more important in its bearing on the *extremes* of heat and of cold, a matter of much more consequence as regards animal and vegetable life than the *average* temperature. It was shown by a comparison of all the more remarkable periods of hot and of cold weather during the four years, 1871 to 1874, the wind in both cases having been almost always more or less easterly, that while in all the 24 hottest days taken together, the greatest heat in the islands was 71·25, that at Truro being 77·96, or 6·71 degrees higher, the difference in some instances was twice as great, and in one even 15 degrees; and that while the average difference in the 30 coldest days was 11·16 degrees, the mean at Truro being 27·07 degrees, that at Scilly 38·23, the difference on particular days of very severe cold was much greater, sometimes even 20 degrees, having been on Nov. 12th, 1871, 23 degrees at Truro, and 43 degrees at Scilly.

The following illustrations of high and low temperature from the year 1871 may serve as specimens:—

	Truro	Scilly		Truro	Scilly
Aug. 9th	85	70	Jan. 26th	25	34
“ 10th	84	73	“ 27th	27	34
“ 11th	82	74	“ 28th	23	35
“ 12th	83	74	Nov. 11th	28	44
“ 13th	84	73	“ 12th	23	43
Jan. 1st	18	35	“ 13th	26	45

Such is the effect of the temperature of the sea on the air passing over it for thirty miles, and a measure is thus furnished of the influence of the air coming over the land from the same sea. Accurate observations of this sea temperature are now being made at the Seven Stones Lightship, under the direction of the Meteorological Office, and we are indebted to Mr. Dymond for an excellent record for three years off the coast of Falmouth; the highest praise is also due to Mr. Whitley, who many years

ago made on our own coasts, and procured through the steamships of the Cunard Line, from the whole breadth of the Atlantic, an immense body of trustworthy observations, which he had digested and handled with remarkable skill, and had especially applied to the purposes of the farmer in his prize essay, published by the Royal Agricultural Society of England in 1850, and in subsequent communications to the Bath and West of England Society. Dr. Barham had pleasure in quoting in regard to the former paper, the opinion of so competent an authority as Mr. Pusey, that it was "one of the most valuable contributions yet made by science to practical agriculture."

Dr. Barham took the opportunity of correcting a mistake of some importance in the report in the *Journal* of his remarks at the last spring meeting. He is stated to have said that Penzance is on the average ten degrees cooler in summer, and ten degrees warmer in winter than Truro. The statement had reference to *extremes* of heat and cold, not to *means*; and it is well borne out by the fact that in the sixteen years ending with 1875, the mean of the highest temperature reached in the months of May, June, July, August, and September was at Truro 84·6, and at Penzance 75·2; whilst the lowest point reached at Penzance was 23° whilst it was 8° at Truro. A like correction is required for Scilly.

MR. WHITLEY remarked that they were greatly indebted to Dr. Barham for the trouble which he had taken in reference to the meteorological observations for the last 34 years. He had brought into a focus observations which must number at least 100,000. With immense labour he had combined these in the beautiful diagrams which he had presented to them that day. Personally he was greatly indebted to Dr. Barham for the valuable information which he had received from these observations, taken at that institution under his care,

CORNISH ORNITHOLOGY.

Dr. Barham read some extracts from a letter from Mr. E. Hearle Rodd, explaining why he could not, from lack of materials, send any report this year of new events in the bird-history of the west. Dr. Barham remarked that several years ago he had briefly called attention to the gradual establishment of the star-

ling as a permanent dweller in our midst. Of this fact he had noticed proofs more and more numerous from year to year; and having his attention called to it, specially this season, by the domiciliary visit of a pair of the birds who built their nest and reared their brood in the roof of his own conservatory, he was led to ask Mr Rodd what he knew about their adoption of Penzance as a summer residence. He also made inquiry as to their change of plumage, having observed that one of his birds was little darker than the back of a thrush, and was without manifest spottiness. Mr. Rodd's answer ran thus—"There has been a gradual approach of the starling to our western districts in the summer, but I have not exactly detected them here yet. The variety of the plumage of the bird is partly sexual, partly seasonal, and partly according to its age. You may always know an *adult bird* from the colour of the bill, which is yellow; when not adult it is *light brown*. In the summer plumage few spots show themselves in adult birds; there is probably a partial moult in the spring, and the spots assumed in the autumnal moult then wear off, leaving the colour a dark green, with metallic reflections. These spots are sometimes more or less retained by some birds according to the vigour of their frames. The female is more spotted on the under parts than the male. I forgot to say that starlings, before their *first* autumnal moult, are uniformly light brown without spots. The spots are assumed at their first moult."*

Dr. Barham added that the bird he had mentioned as brown and without evident spots was clearly adult, as he observed it carrying food to the nestlings, and heard it several times singing to its mate. The bill was not yellow. These birds, it appears, when they congregate towards winter, roost in large numbers in some plantations near Bodmin, and their "secure hour" is often stolen upon by men with lanthorns, who pick them from off their perches, and consign them to the pie dish.

*Mr. Rodd has since explained that the term during which the first plumage is more or less retained, is occasionally much prolonged; and the Rev. C. M. Edward Collins states that starlings have built their nests in gradually increasing numbers about Trewardale for twenty years or more. "Bird beating," he says, is common in that district.

C. Waterton has warmly defended the starling's moral character from the charge of robbing the dovecot of its eggs—a time-honored calumny.

This gradual progress of permanent bird settlement appears so suggestive of intelligent action in a community, that it may deserve renewed notice.

Mr. WHITLEY exhibited some sections of "raised beaches," and of gravel beds on hill tops, and in the fissures of limestone rocks, for the purpose of showing the relationship which he considered existed between these beds. He was of opinion that the materials of the so-called raised beaches had been washed down from the land and not thrown up by the sea—that the exposed sections were mainly those of the valley deposits cut back by the action of the waves, and that the foreign materials, the flint and basalt which they contained, indicated that the boulders and sand belonged to the period of the northern drift. The gravel bed on the top of the Hoe at Plymouth might be traced down the slope of the hill into the fissures of the limestone rock, and also formed a junction with the gravel bed on the coast-line, often described as a "raised beach," and in which the bones of the mammoth and other extinct animals had been found. At Brixham also similar gravel formed the lowest bed of cavern deposits, a trail of which was found on the hill outside the cavern, with flint splinters like those in the cave; the same trail was also found on the top of Berry-head, and might be traced down the side of the hill to the sea, forming in the cliff section a stratum which had been described as a "raised beach." These facts appeared to him to indicate that the so-called "raised beaches," the upland gravels, and the lowest bed in the caverns, all belonged to the same geological age, viz., the period of the northern drift. It was, however, a subject which further research might either modify or confirm.

Mr. HAMILTON JAMES exhibited and described some specimens of the *Doryphora decem-lineata*. He said that by the rapid course which the Colorado potatoe beetle had made across the continent of North America during the last few years, there was some danger of it being imported into England. They had been seen in pairs on the decks of Atlantic Steamers. It was possible, however, that our damp climate might not agree with them.

“The Tonkin MSS.” were the subject of some interesting remarks from the Rev. C. M. E. COLLINS, of Trewardale, through whom these and some old publications of local historical value were presented to the museum. The Rev. F. W. Pye, Rector of Blisland, and grandson of a former Rector of Truro, presented (through Mr. Collins) four of the parts of the long-missing Tonkin’s History—documents which were left by Tonkin, and which were used subsequently by Davies Gilbert for his history. The story of their preservation, Mr. Collins said, was a very interesting one, but he had to reserve a full account of it for the Journal. Curiously enough, Sir John Maclean was now able to present (also through Mr. Collins) a page of Tonkin’s MS. referring to the parish of Perranzabuloe, a page which Davies Gilbert says was missing.

The following Papers were then read, or taken as read:—

The Last Will and Testament of Thos. Wandsworth, last Prior of Bodmin.—By Sir John Maclean.

The Tomb of Prior Vivian at Bodmin.—By the Rev. Wm. Iago.

Inscribed Stones at Cardinham.—By the Rev. Wm. Iago.

The Inscribed Stone at St. Hilary.—By Dr. Barham.

On Cornish Zoophytes.—By C. W. Peach.

Notes on the Underground Temperature at Dolcoath.—By J. H. Collins.

On the Prices of Provisions and the Cost of Labour at St. Agnes in the Last Century.—By J. H. Collins.

On the Ancient Styles and Titles of the Cornish Boroughs.—By R. N. Worth.

On the proposition of the Rev. H. S. SLIGHT, seconded by the Rev. T. PHILLPOTTS, a vote of thanks was passed to the readers of papers and the donors to the Library and Museum.

The BISHOP OF TRURO, in proposing a vote of thanks to the President, said he believed he was the junior member of that Institution, and he begged to thank the members very much for conferring the honour of proposing this vote upon him. They were indebted to the High Sheriff, not only for filling the chair with dignity, but also for the great ability displayed in his

address. The statistics which he had collected, and the careful observations which he had made were most interesting.

Mr. P. P. SMITH, in seconding the proposition, remarked that whatever interest they might have felt in what they have heard of the dead suffragan at Bodmin, they might congratulate themselves upon having a live Bishop at Truro. (Applause). He hoped, too, it would be long before his Lordship had the feeling of that suffragan, and wished to see them hanged. (Much laughter). Nor, he trusted, would he ever feel it so strongly as to be willing to be the hangman. (Renewed laughter). He (Mr. Smith) trusted the people of Truro would never drive his Lordship to that feeling of desperation.

The PRESIDENT briefly acknowledged the compliment, and the proceedings, which had lasted about three hours and a half, were then concluded, and the members dined together at the Royal Hotel, as usual.

5 complete

U.S.A. Museum

JOURNAL

OF THE

Royal Institution of Cornwall,

WITH THE

FIFTY-SEVENTH ANNUAL REPORT.

No. XVI.

OCTOBER, 1874.

TRURO:

JAMES R. NETHERTON 7, LEMON STREET.

1875.

CONTENTS.

The Papers marked thus () are illustrated.*

SPRING MEETING.

I.—NOTE ON A CHARTER OF PRIVILEGES GRANTED BY KING HENRY THE SECOND OF ENGLAND TO THE MONKS OF ST. MICHAEL'S MOUNT (CIRCA 1154-63).—J. JOPE ROGERS.

II.—THE TOKENS OF CORNWALL.—R. N. WORTH, CORR. MEM.

III.—MINERALOGICAL NOTICES.—J. H. COLLINS, F.G.S.

IV.—*NANGITHA CROSS.—JAMES JAGO, M.D., OXON., F.R.S.

V.—NOTE ON THE ORNITHOLOGY OF CORNWALL FOR THE YEAR 1873-4.—E. H. RODD.

VI.—LIST OF WORKS ON THE GEOLOGY, MINERALOGY, AND PALÆONTOLOGY OF CORNWALL.—WILLIAM WHITAKER, B.A., (LOND.), OF THE GEOLOGICAL SURVEY OF ENGLAND.

*REMARKS ON SURFACE TEMPERATURE AND ON THE EFFECT OF SHELTER.—C. BARHAM, M.D., CANTAB.

ROMAN ROADS IN THE SOUTH OF ENGLAND.—MR. WHITLEY.

VII.—A CALENDAR OF NATURAL PERIODIC PHENOMENA: KEPT AT BODMIN FOR THE YEAR 1874.—THOMAS Q. COUCH, F.S.A.

METEOROLOGICAL NOTES FOR 1874.—C. BARHAM, M.D., CANTAB.

THE AUTUMN EXCURSION.

AUTUMN MEETING WITH REPORT OF THE COUNCIL, 1874.

JOURNAL

OF THE

Royal Institution of Cornwall.

No. XVI.

OCTOBER, 1874.

TRURO:

JAMES R. NETHERTON, 7, LEMON STREET.

1874.

 *The Proceedings at the Annual Meeting in the Autumn, with the Report of the Council, and Lists of Members and Subscribers, will be published separately in the Spring.*

ROYAL INSTITUTION OF CORNWALL.

SPRING MEETING,

1874.

THIS Meeting was held, at noon, on Friday the 22nd of May, in the Library of the Institution. The President, Dr. Jago, F.R.S., presided; and there were also present, (besides ladies):—Mr. Tweedy, Treasurer; Mr. Whitley, F.M.S. and Dr. Le Neve Foster, F.G.S., Secretaries; Dr. Barham and Rev. W. Iago, Members of the Council; Mr. T. A. Cragoe, Mr. S. Hocking (Rosewarne), Mr. B. Kitto, Mr. Pascoe (Pentreve), Mr. G. F. Remfry (Torquay), Mr. E. Sharp, Mr. E. Sharp, junr., Mr. E. G. Spry, Mr. D. G. Whitley, Mr. H. Williams (Colorado), Mr. R. N. Worth, &c.

The PRESIDENT read the following Address:—

LADIES AND GENTLEMEN,

Twenty years ago, when I was admitted a member of this Institution, it was customary for the President to remain in office as long as he were willing to do so, and it was only once a year that he was expected to occupy the chair whilst “literary and scientific” papers communicated to the Society were read to its members and their friends; which was at the conclusion of the Autumnal Meeting fixed by the rules for the choice of the members of the Council for the ensuing year, and the transaction of the general business of the Society. And, inasmuch as a primary object of the meeting was to hear the Report of the Council on the progress and prospects of the Society, the reading of this Report served so aptly to open the proceedings of the day that the President, were he so inclined, could, with a good grace, dispense with preliminary remarks of his own on this or any other subject, and the annual publications of the Society show that he, virtually, availed himself of this privilege.

However, after about eight years of my experience of this system, two important alterations were made in the government and practice of this Institution. It was enacted that the President should only hold office for two years, and that whilst the Autumn Meeting was retained for the business requirements of the Society, a Spring Meeting should be established for the sole and more especial purpose of the reading and discussion of papers; and thus it came to pass that, in default of a Report from the Council to initiate the latter meeting, my biennial predecessors in this chair have all thought it becoming to welcome the audience by offering some remarks of their own, which have always partaken more or less of the form of an introductory address.

Through the favour of the Society it is now my turn of office, and I am too conscious of the obligations that I have incurred by accepting this compliment not to feel desirous of following in the footsteps of my predecessors, as far as my attempting to do so may appear to me to be in accordance with the expectation of the members. In venturing to do so, the tenour of the Society's operations during the time they have fallen under my own observation will constitute the thread of my discourse; as being a subject unpretending in itself, and of such a nature nevertheless, as to give promise, if dealt with frankly, of proving not devoid of interest to my hearers.

It is to be borne in mind, on the very threshold, that we do not affect to be either a learned or a scientific Society; insomuch that, not to mention subordinate subscribers, we are in the habit of incorporating as members, who enjoy the privilege of sharing in the government of the Institution, all persons who are prepared to pay the appointed annual subscription; provided we deem them likely to deport themselves decorously in that capacity;—opening our doors as freely to those whose sole motive in joining us is to avail themselves of the advantages afforded by the Institution, or merely to assist it pecuniarily for the benefit of others who may seek to do so, as to those who contemplate placing their talents at its service.

There is no doubt that the dominant idea of this Institution in the minds of its founders (to whose intelligence, energy, and liberality we are so conspicuously indebted) was, as is still the aim of the Royal Institution of Great Britain, just as much to provide facilities for inculcating the knowledge of the day by means of lectures and social gatherings, as to encourage the prosecution of original research by the publication of papers, and that this generosity of conception as to the qualifications for membership was in strict keeping with their general purpose. It must be plain that such an Institution as this could not have continued to

develop itself for more than half-a-century so as still to be more prosperous than ever without consenting to modifications in its conduct as experience has suggested their need ; and though the tendency of those modifications has been, and still continues to be, to divert the means at its disposal from the direction of popular teaching to the encouragement of original literary and scientific inquiries, I may safely affirm that nothing has ever occurred to lead us to regret that our conditions of membership remain such as to enlist the widest possible sympathy in behalf of the Society.

Again, just as inducements rather than impediments to membership have been put forward by the Society, so it has been careful not to hedge in by definition, the sources of knowledge from which it hopes to derive its usefulness. The Institution owes its origin and growth to voluntary support, and the rule has been to welcome help and countenance from whatever quarter they come. Without touching upon details, I may aver that it was in no other way than this, that it has become the proprietor of a spacious freehold premises in which not only is contained this library or reception-room in which there is ample accommodation for our members and guests on occasions like the present and on those of our evening *conversazioni*, an amphitheatre for lectures with laboratory attached, but a Museum, which, if not a British Museum in miniature, is almost as heterogeneous in its contents,—not only displaying a valuable collection of objects illustrative of the diverse characteristics of the county, but a multitude of others gathered from beyond its borders, many of which have been fondly contributed by Cornishmen (a race prone to adventure) whose pursuits have taken them into remote lands.

Reverting to our community itself, it is, in my estimation, not the least of the *agrément*s of this Institution that it has become a sufficiently attractive centre to have drawn into more or less intimate relation to it nearly all persons dwelling hereabouts who are moved by a lively taste for literary or scientific research of any kind, and has procured a mutual acquaintance and fellow-feeling amongst them, which, in many instances, would not otherwise have obtained ; a result which in a province so distant from Metropolitan Institutions must be a gain to all such residents, as well as beneficial to our own Institution. For though the thoughts of some of these individuals (a word used advisedly to imply both sexes) may be mainly engaged upon subjects that would be more appropriately brought under the notice of some central society than under ours, or published in some special journal, yet minds of such inquisitive activity could not fail to be interested in the work done or attempted by this Society ; since, notwithstanding that the scope of such work (as has already been stated) has been

left undefined to this day, it has been becoming yearly more evident that this Society regards it as its mission, *par excellence*, to promote all inquiries that tend to elucidate facts that more immediately concern the inhabitants of this county: staple subjects for the memoirs communicated at our Spring Meetings are its ancient language, antiquities, history, geology, mineralogy, botany, zoology, meteorology, its mining industry, fisheries, &c.

It will now, I believe, be comprehensible to you all that, however lax be the conditions for ordinary membership, a Society that has not lacked such individuals as have just been described to guide its actions, and that has been able to reckon on the help of such Honorary and Corresponding Members and Associates as have allowed their names to be connected with it, is animated with scientific and literary aspirations; moreover that thus, for many of the persons alluded to are not only eminent but even pre-eminent in their peculiar departments, it has means of appeal at its command, which, if judiciously used, may be a check against ill-digested papers being published at its expense, and against trashy curiosities being exhibited in its Museum as noteworthy objects.

Indeed, nothing indicates more convincingly that the constitution of this Society is not radically unsound than the growing sense of responsibility manifested by its councils as to the intrinsic value of the contents of its Museum and Journal. In the former case, either by the gratuitous help of skilled members or friends, or by the hands of paid experts, good progress has been made in getting the specimens in several sections of the Museum into methodical order,—purchases being resorted to, as far as our funds permit, to fill up blanks, and interchanges with other collectors where we possess duplicates. There is, of course, always more work of this kind in contemplation. I cannot refrain, however, from revealing that those among us who are solicitous as to the character of the Museum are sometimes embarrassed in their actions by the fact that its prosperity is virtually dependent upon the bounty of the public. There can be no doubt that paltry curiosities or spurious specimens may have been presented to the Institution by donors who have had no misgiving as to their being valuable or genuine, and that the Council of the day may have hesitated to decline the gift lest an ungracious act should chill the generosity through which the Museum had thriven. Once on the premises such objects may have been suffered to remain in their places either from inadvertence, or neglect of periodical revisions. As an incentive towards an attempt to eliminate whatever lumber may have found shelter within our walls, I will pass on to you an anecdote that reached my ears so directly that I can guarantee

that it has been told once at our expense. Only a few years ago the present representative of one of the most influential of our founders brought into our neighbourhood a distinguished ornithologist and thought well of showing him our Museum. The latter had eyes for nothing but our bird-cases, but whilst he was inspecting their inhabitants in detail, leaving no one of them unexamined, in some corner or other, he stumbled upon an example of the blackbird species, decked in dappled plumage, which so excited his curiosity, that the case had to be opened for him to handle it. On turning up a wing of this apparent *lusus naturee* he detected that the white feathers it contained were fixed there by glue, and he pointed out what he viewed as a hoax with an exclamation not flattering to the Society itself. An implication of the sort falls harmless upon a Society that has been chosen as a medium of publication by so many able writers on the Fauna of the West of England, and whose journals comprise so long a series of graphic notices of the Ornithology of Cornwall from the pen of a gentleman who has made the subject the recreative study of his life.

In these remarks I have assumed, for the sake of the lesson conveyed, that the feathers glued in were false ones, though the bird-stuffer may merely have used glue to repair a wing injured by shot. It is easy to imagine, however, that we might be more obnoxious to such misadventures as the one narrated in some of the other characters we have to sustain than in that of naturalists: —*exempli gratia*, in playing the part of archaeologists. That such enthusiasts have been a standing butt for the sceptical, Sir Walter Scott's Antiquary and Dickens' Pickwick Papers testify in the realms of fiction, and more recently, in those of history, the story of Flint Jack appears in ridicule of geologists as soon as they dreamed of excelling archaeologists in their own investigations; and at this moment Mr. Shapira and other agents of the Prussian Government stand on the defensive against a grave charge of M. Ganneau's, that they have acquired, at a heavy cost, a lot of inscribed and other pottery, under the persuasion that they were Moabite Antiquities gleaned by intelligent Arabs; whereas, in reality, they are spick-and-span new from a clandestine manufactory in Jerusalem. At all events, by indulging in these side glances before turning our backs upon this uninviting topic, we may derive the consolation that, whatever mischances may befall us in this kind, we shall not be without reputable companions in misfortune.

The true moral to be drawn from the foregoing avowals is, that an establishment like a museum, which is dependent for its success upon voluntary support, ought rather to be judged by what it accomplishes than by flaws in its superintendence. It may some day be of consequence to this Institution that this

principle should not be lost sight of. "The Royal Commission on Scientific Instruction and the Advancement of Science" has just issued its "Fourth Report" in which—besides what it contains on Metropolitan Institutions—much space has been devoted to estimating the capabilities in this way of the Museums already existing in the chief Provincial towns—many of which, like our own, owe their origin to the munificence of individuals or associations. That our Museum, in combination with other means of teaching at the command of this Institution, may be rendered fairly available for scientific instruction was evinced whilst the Mining School was carried on under our auspices. A much more moderate aid from Government than the commission has recommended for Museums in large towns would render our means of instruction highly efficient. It is scarcely presumptuous to hope that a commission may some day deign to consider claims like ours and that this Institution may own a more useful future than even its founders contemplated.

Irrespective of the said Commission there are many indications that there is an idea afloat that there are various provincial institutions of which use may be made for the purposes of instruction; such was the general offer made to local societies by the South Kensington authorities some years ago, to assist any of these that will establish a science-class with the loan of collections of scientific instruments, &c. With a view to an address to the Edinburgh Botanical Society, which was delivered in November, 1872, Sir Walter Elliot, K.C.S.I., spared no pains to make himself acquainted with the constitution and proceedings of every provincial society that was engaged in promoting its study, and has compiled a well-digested summary with respect to them. Guided by this summary, and from independent inquiries, a writer in *Nature* (Oct. 23, 1873), makes out that there are in the provinces nearly 150 societies engaged in one form or another in scientific pursuits; an enumeration, if it be correct, that justifies the thoughts that are being bestowed upon them.

To speak next of our Journal, it may be too much to affirm that, in its management, the Council has never been biased by a desire to retain the goodwill of individual contributors. But as far as I can remember, this has happened so little of late years, that we need not claim much indulgence from its readers on this account. The fact of a paper appearing in the Journal only implies that, as far as the Council can inform itself, it has merits—as in novelty of views or in its sources of research—that entitle it to attention: but this in nowise commits the Council or any member of the Society to an approval of its conclusions. Without the recognition of such a principle as this no society could be kept in working

order. Indeed, that there may be no misapprehension on this head, it is an usual, though it may not be an universal practice, both of national and local societies to have an advertisement, or announcement, to this effect printed at the commencement of each of its volumes.

That defects which may be discerned in our Journal may not be gain-said, but I feel assured that it must be conceded by even the most captious reader, that the quality of its memoirs is, in the main, good, and often excellent, and that the annual addition to it is so creditable to the Society that it is a cause of regret that economical considerations should compel us to keep its size within the ordinary limits assigned to it. It must have been, I presume, from various speculations of this nature as applied to local societies generally, that a project, has been, ever and anon, cropping up, which it is incumbent on me to refer to, and which may be spoken of here, as little in the way of a digression, as elsewhere. The import of the project, as more immediately concerning us, is, in some guise or other, to induce these societies to operate in groups. In this way, it has been said, there would be a greater scope for a nicer discrimination of papers selected for publication, and a greater freedom from the influence of partiality in doing so; whilst there would relatively be more funds at command for publishing important ones, and for these an increased number of readers secured. I recollect that some years ago we were written to by the secretary of a Bristol Society who hoped to make that the centre of a group for the west of England. With my immediate predecessor, the present Sir John St. Aubyn, the union of this Institution, the Royal Geological Society of Cornwall, the Royal Cornwall Polytechnic Society, and the Miners' Association of Cornwall and Devon was a favourite theme on which he always argued fervently. Lastly, it was only a few months ago, that at the annual meeting of the Royal Cornwall Polytechnic Society a sub-committee was appointed to consider with like committees that might be named by the several county societies alluded to, in what way concerted action between them might be practicable. Two of the gentlemen of the Polytechnic sub-committee have now become our honorary secretaries, so that the question can readily be taken up in earnest should there appear any probability of the idea getting realized. Happily these Societies have always been ready, and I am persuaded none more so than our own, to unite in a common purpose whenever opportunity has occurred. But to speak with candour, those members of our Society who have been longest experienced in its working, find it difficult to conceive how a closer union can be brought about. Our Council are of opinion that the constituent laws of

our Society preclude them from entering into any arrangement with other societies which should affect the self-government of our own. I may safely affirm that, whenever the subject has been mooted in our Council, the idea of fusion between the four Societies which may imply community of funds and property has always seemed chimerical; and that they should have no other mouth-piece than a common journal their joint property is, all impediments being kept in view, infeasible.

The dreams we have been pursuing have only found their full development in some of the "prospecting" minds of The British Association for the Advancement of Science. Their own Report of their last meeting at Bradford has not yet been published, but according to the *Bradford Observer* the "Report of the Sub-committee on Scientific Organization as regards Local Societies" was read, in the absence of their Secretary, Sir Walter Elliot, by Prof. Balfour Stewart, and stated that it was contemplated as to the "scientific memoirs of local societies" "to collect as many of them as were of value and publish them collectively. It was found, however, there was a disposition on the part of such societies to retain their memoirs and to publish them separately, and that it would not be possible to get them to work together on such a work."

Herein we have the gist of the whole matter. The self-esteem of these societies, whichever of them may have been more especially alluded to, and however it may have surprised the committee, is not only indispensable to their existence but becoming. Nor is this disposition of theirs wholly an evil; for though among a multiplicity of publications it may happen that a valuable contribution to science may get buried from the sight of those persons who may be most fitted for appreciating it, there can be no doubt that it is sometimes well for authors whose reputations have to be made, as well as for the advancement of knowledge, that there should be a portal of appeal from the judgment of one editor or committee to that of another.

From this running commentary I shall proceed to specify a few instances in which, since our last Spring Meeting, fruit has been matured in one or other of our literary domains.

The event which more immediately touches this Society is the appearance, at the beginning of the present year, of the first of the two promised volumes of the "*Bibliotheca Cornubiensis. A Catalogue of the Writings both Manuscript and Printed of Cornishmen, and of Works relating to Cornwall, with Biographical Memoranda and copious Literary References. By George Clement Boase and William Prideaux Courtney. (London, Longman & Co.)*"

All who are acquainted with the doings of this Society will

recollect that, having already ventured upon the publication, in a separate form, of some essays in natural history and antiquities, it became emboldened in the year 1863 to embark in an undertaking, which it had long been premeditating, to wit, in the words of a resolution on the subject passed by the Council on the 19th of February, "the preparation of a Catalogue of all works and papers relating to the County of Cornwall." On the same occasion a gentleman, well known to be qualified for the task, was appointed (honorary) Editor of "the proposed volume." On July 27 it was further resolved that the able Editor of our Journal should "be appointed Sub-editor of the proposed Bibliotheca," as a charge upon "the surplus of the Cambrian Fund," which was at the disposal of the Council. In November a prospectus signed by the President (now Sir) Edward Smirke and the Secretaries announced that "the Council of the Institution have resolved to undertake the publication of a classified Catalogue of Books, Pamphlets, Essays, and Documents, relating, in whatever way, to the County of Cornwall.....This Catalogue will be published with the title of *Bibliotheca Cornubiensis*.....Mr. Thomas Q. Couch, of Bodmin, who has long been collecting materials for such a work, has kindly undertaken the duties of Editor, and he will be assisted by Mr. Chorley, of Truro, and several members of the Society, and others conversant with the subject who have already promised their aid." The prospectus goes on to solicit appropriate information in furtherance of the work; and being backed by a preliminary list of ninety-six subscribers to the volume resulted in a goodly increase of the number.

By 1865 the project had so steadily progressed that there had been printed, at the cost of the Society, an 8vo. pamphlet of 75 pages, entitled "Bibliotheca Cornubiensis: Preparatory Lists," which was a carefully constructed skeleton of the intended work, the subject-matter being distributed under twenty-one headings. Though the printer's name was subjoined, it bore on it neither the name of the Institution, nor the names of the editors; for it was not meant for sale or for publication in any sense, but, in the words of Sir E. Smirke at the Spring Meeting of 1864, whilst it was yet in the press, it was to be made use of "to circulate in quarters whence further additions may be looked for." In a word its recipients were asked to return their copies to the sub-editor with such interpolations, or, if necessary, emendations, as they might be in a position to make, with a view to the incorporation of their remarks in the final work.

For seven years the Bibliotheca was the refrain of the Autumn Reports of the Council and of the Spring Addresses from the chair. How far the Institution has anything to show to-day for

the money and solicitude it has so freely expended, shall be told by the following *verbatim* extracts; all but the last being from the minute-book of the Council.

1866. March 2. "Resolved, that a guarantee fund be opened to obviate the risk of loss to the Institution."
 1868. May 22. "Resolved, that an effort be made to publish the Bibliotheca as soon as possible, on such a plan as may be feasible with the funds at command."
 1869. April 5. "A communication having been read from Mr. George Boase, respecting a catalogue of works by Cornishmen on which he has been engaged, it was resolved, that communication be opened with him, with reference to the use by him of the lists prepared by the Society for the Bibliotheca Cornubiensis, through Dr. Barham."

Seven weeks later, May 18, at our Spring Meeting, as is reported in our Journal, "Dr. Barham made announcement that the completion and publication of the Bibliotheca Cornubiensis originally projected by this Institution had been taken in hand by Mr. George Boase, of London."

In juxtaposition with these extracts I put another which does not emanate from this Society, but is taken from the preface to the first volume of the Bibliotheca Cornubiensis which has just been published. There being no mention therein of the Royal Institution of Cornwall in connection with its printed Bibliotheca Cornubiensis, or, indeed, at all, I cite the following for want of something more tangible:—

"To Thomas Quiller Couch, Esq., of Bodmin, and Charles Chorley, Esq., of Truro, they" (the said editors) "are indebted for the use of some MS. collections formed by them with the intention they once entertained of publishing a catalogue of works on Cornwall."

Lest, by any misapprehension, the circumstance of our Council having,—in order that there might be a *sole* Bibliotheca Cornubiensis in which all information at present ascertainable may be comprised,—unreservedly placed in the hands of the editors of the work just alluded to, the materials which this Institution had been at so much pains to get together and assort for a similar purpose, might cause it to be forgotten that the Royal Institution of Cornwall had been the pioneer in such a compilation, I have thought it but a fair tribute to its fame that its efforts in respect to it should be put on record in the foregoing unvarnished historical recapitulation.

Coming back to the open question of recent literary progress, I do not hesitate to affirm that, Messrs. Boase and Courtney are producing a work that cannot fail to take rank among the standard

works of reference relating to this County. The first volume is an elegantly printed 4to. of over 400 pages, and is, doubtless, so redundant in original research, that "within" it, as they have truly said, "is brought together an immense catalogue of local materials such as could not elsewhere be found, with exact references to the various sources of information."

If, after these commendations I might venture to hint a desideratum, it would be this;—The precision with which the titles of all the writings mentioned in the book are copied, or the works in which they are to be found indicated, is so perfect, that to verify them by reference is easy: thus fulfilling a fundamental requirement in any work of a historical nature. To my apprehension, it would have been further complying with such requirement were the reader similarly rendered independent of authority as to the *completeness* of the various lists of writings it comprises. In each instance he should be told whether it was meant to be a full list or a partial one, and whether it were furnished, directly or indirectly, by the author himself, or by some one else. It would have been some guide to the reader's judgment had the editors followed the example of such a book as the *Medical Directory*, and marked with an asterisk the name of every writer who had declined to fill up the form in the printed circular they had addressed to him, asking (with questions of a personal kind) for a list of his writings. After the same exemplar no university degree, or other literary distinction should be appended to a name without specifying the corporation that had conferred it. It is not every name thus associated in the *Bibliotheca* that could withstand this test; and when such distinction is properly appended, not to indicate whence it was derived is to overlook a suggestive fact in the career of the owner. As to the bearing of the first hint, I observe that, with rare exceptions, all the lists of writings are presented without comment, so that an artless reader would take it for granted that all were equally authenticated as complete; whereas, to the initiated eye, it is perceptible at a glance that many of them have no pretensions to be thus regarded. As an instance that lies patent to all the world I may point to the notice of the writings of a native of this town, Dr. Bastian, professor of pathology in University College, London, &c., whose experiments during the last four or five years on "The Modes of Origin of Lowest Organisms" have been repeated and varied throughout Europe, and have familiarized his name with every physiologist alive. In the enumeration of his literary contributions to periodical literature, the *Bibliotheca* omits just one half of those that might have been found, ere a line of that work was in type, cited by himself in the *Medical Directory*; not, probably,

as a full list of his memoirs at such date, but as a selection in conformity with the conditions imposed by the proprietors of that annual.

It would be doing the editors of the Bibliotheca an injustice were it not stated in conjunction with the foregoing suggestions that they frankly avow their regret at failing to fill up their scheme in all its details. In the matter of cotemporary biographical notices (a part of the project peculiarly theirs) I cannot imagine that full success were attainable, even though they wished to catalogue the literary work only of such persons as had earned a substantial reputation; for not only would they come across authors who would be too incommunicative for their purpose; but, surely, no two gentlemen could be so fortunately circumstanced as to hear mention of the Cornish blood of all authors who possess it. At all events I, who am not likely to be unusually well-informed in this respect, could tell of Cornishmen (if ever such a designation with regard to name and race can be rightly applied), or the sons of such, who are widely esteemed, even eminent in science or letters—not to allude to others who have at least acquired notoriety—whose surnames, in a work alphabetically arranged (as is the Bibliotheca) would have fallen within the volume now in print, of whom they say nothing. But when we call to mind that they are so far from affecting to comprise only worthies in their work, that they manifest a contrary intention in a variety of ways, as when—to take an extreme instance—they see occasion to admit into it the name of more than one person of whom they would never have heard had he not been charged at the assizes with a capital offence; and that such everyday productions as casual sermons, speeches, letters and other communications to newspapers are recorded—as if they would fain have registered, *en masse*, the public utterances by, or in respect to, all individuals who may be reached by their hospitable definition of the word Cornishman—, it is plain that, unless they were prepared to carry through the press some dozen volumes rather than two only, the attempt must lead to their evincing a preference for one kind of literature over another, and one writer over another, according with their judgment, predilection, or sense of propriety. As a sample of their discrimination:—they place their pages without stint at the service of the homœopathist, whilst they leave uncommemorated the enterprise of that *facile princeps* of nostrumists (well known to be a Cornishman) on whose multiform and polyglot advertisements, it is affirmed, the sun never sets.

In ceasing to speak of the Bibliotheca, I think it fitting to subjoin that the claim I have advanced in behalf of the reader, as to his right of being informed of the nature of the authority on

which statements offered for his acceptance rest, is equally called for with respect to other county histories. As far as I can judge from the few Cornish genealogies I have been induced to scan, I should doubt of there being any such thing as pure Celtic blood among us. Yet, if the histories of Cornish families, such as they are, are of interest enough to justify their being recounted, every precaution should be taken that nothing but the truth shall be propagated concerning them. Many incidents, however, have convinced me that the accuracy of these narratives is often vitiated at their source. *Exemplorum gratiâ*.:—In C. S. Gilbert, a family of old standing, is traced down to a wealthier man (who has left mention of himself in identical terms) as its “heir and representative,” though there were male issue of an elder brother, who is ignored in the genealogical account, then alive. In Davies Gilbert, the name of a husband is substituted for that of a wife in giving—in the case of an old family distinguished in our literature whose male line had failed—those descendants in female lines that still held some of its landed property. It was the husband who, unsolicited, supplied the historian with the revision of the list of such descendants down to that date. The sole intrinsic value I attach to these facts is, that I happen to be able to say, in either case, by what instrumentality the historian was misled. I have also watched the steps by which a family fiction, nursed by a man of genius, has, within the last few years, acquired the semblance and currency of history;—a result that could never have been attained had our recent writers in this section of letters adhered to the recognised canons of their art.

In other subjects than History I do not perceive that the past Institutional year has produced anything of paramount importance to us. Within it, as far as I am aware, no further insight into the Cornish language has been gained. Through the good offices of the Rev. G. L. Church, however, the widow of the late Dr. Bannister has paid us the high compliment of presenting to us the interleaved copy of Dr. Williams’ *Lexicon Cornu-Britannicum*, in which he had made notes with a view to a companion volume in which the English words should stand first; as the best way of fulfilling the last wishes of her husband that his labours with this object might be so placed as to be easily accessible to scholars.

Antiquarians are never asleep, whether at home or abroad; and it will be proved to-day that our own have not ceased to be on the alert. But just now more of their operations on a large scale are carried on among the celebrated ruins of Asia than in Europe. We have to join them in their regret at the deaths of Mr. Wm. Sandys, F.S.A., and Mr. Albert Way, F.S.A. The former was,

presumably, of Cornish extraction, and had made a collection of MSS, and rare printed-matter relating to this county; whilst in our Reports and Journals may be found valuable contributions of an antiquarian kind from both their pens. The latter's, for the most part, are in the form of courteous answers to questions asked of him by our members in his capacity of honorary secretary of the Archæological Institute.

In the department of Natural History we have very recently sustained the loss of one of our oldest members. The late Mr. Williams Hockin was ever ready to help us, and being, in regard to English shells more especially, an accomplished Conchologist, he was enabled to render us much service in the classification of the shells in the Museum. Though, fortunately, there still remain to us some of our old contributors in Natural History, our representatives in these fields do not seem to be as numerous as they once were; whether this may arise from the exhaustion of local material, or from the want of younger men to take the places of those who can no longer work for us. The chief attention of Naturalists at present seems to be centred on the strange fauna procured from the deep seas, and they have more than enough upon their hands in striving to trace the resemblances and differences between the multitudinous organisms now distributed over the globe, and those that have existed in other geological epochs.

It were an easy transition from Natural History to Physiology, and striking progress has been made in this pursuit during the last year or two, but we, ourselves, have so little work to show in this line, that I should not have alluded to the subject at all had we not to record the death, at a good old age, of one of our Corresponding Members, who was a native of this town. Mr. Thos. Turner was virtually the founder of the Royal School of Medicine at Manchester, and with great credit, long occupied its chair of Anatomy and Physiology. He had been on the Council of the Royal College of Surgeons of England, a rare compliment for a provincial surgeon.

The late John Phillips, LL.D., &c., &c., "Reader in Geology in the University of Oxford," was neither connected with our Society nor contributed to our Journal, but we cannot avoid an expression of regret at the untimely end of a distinguished man who had made many friends in this county during the time he was engaged in the Ordnance Geological Survey, and gathering materials for his work on the Palæozoic Fossils of Cornwall, Devon and Somerset. Many valuable memoirs on Geology and Mineralogy have appeared in our Journal of late years; and it was owing to an elaborate contribution in its last number on "Detrital Tin Ore" that the publication of our last spring papers became delayed

beyond the time intended, as its author suffered so much in health (which it is gratifying to hear has since much improved), during its going through the press, that he was obliged to adjourn his work from day to day. In the Phil. Trans. of 1873, has appeared the long promised "Report of the Exploration of Brixham Cave," founded mainly upon the labours of our Honorary Member, Mr. W. Pengelly—giving the description of the Animal Remains by G. Busk, and of the Flint Implements by J. Evans and J. Prestwidge, all being Fellows of the Society under whose auspices the Report appears; which cannot but contain important matter, though, perhaps, some of the inferences may seem, even to unprejudiced minds, to want further corroboration. As we have had the good fortune to enlist two new secretaries, each of whom, in addition to the one we previously possessed, has acquired reputation in geology or mineralogy, we may expect that our Society will even display increasing activity in this way.

Our Institution has for long years been so unflinching in its promotion of Meteorology, that I must not conclude without devoting a paragraph to that subject. Much accuracy and patience are indispensable in making the meteorological returns that are entrusted to our curator—and many are the instructive expositions we have had at these meetings of the laws and varieties of our climate, in which these, with concurrent observations of their own have been turned to happy account by two of our members; one or both of whom will again favour us to-day with what I have no doubt you will find to be novel and interesting information on this subject. In a general glance, I take it for granted, that the Meteorological Congress, held in September last at Vienna, was so well responded to in an international sense that its influence will be great in bringing about an uniformity in the modes of registering observations throughout the world, and thus facilitating the intelligent study of meteorology. The phenomena that have to be discussed are, *primâ facie*, so fleeting and capricious, that each instance in which it has been demonstrated, that they are subservient to laws which are ascertainable, comes almost like a surprise to the mind. Perhaps nothing has been so instrumental in yielding such results as Bessel's paper "On the Determination of the Law of a Periodical Phenomenon" (*Astronomische Nachrichten*, 136, for May, 1828). Because its applicability to meteorology has been shown to be so general.

Our friend Mr. W. W. Rundell, once Secretary of the R.C. Polytechnic Society, and now Secretary of the Liverpool Lloyds, and who seems to have been assiduously working in the manner he mentions, in a letter read at the Meteorological Society in April of last year, made great impression by this remark:—"It must be

plain, however, to those who have applied Bessel's formula to the investigation of Meteorological phenomena, that a duodecantal term exists which deserves attention—that is a term which has twelve maxima and twelve minima in each year”—and he illustrates this by using the formula on the Kew temperatures of July, 1869. Again, a paper was published in the Phil. Transactions in autumn last that very forcibly elucidates its utility. It is entitled “The Diurnal Variations of the Wind and Barometric Pressure at Bombay. By F. Chambers.” It undertakes to demonstrate “that a remarkable relation exists between the diurnal variations of the wind, and the double diurnal oscillation of the barometer at Bombay.” It finishes by pointing out that the law is so general, as, in a more or less definite manifestation, to pervade many other climates,—distinctly that of the Orkney islands. It has long been coming into light that the movements of the mercury in the barometer are associated with the velocity of the wind; and we are now clearly arriving at a stricter knowledge in relations of this order.

We should *a priori* imagine that any meteorological law that may override minor deviations of climate would be more likely to be evinced in the steadier climate of Bombay than in a gusty one like ours.

Dr. LE NEVE FOSTER read the Lists of Presents:—

DONATIONS TO THE MUSEUM.

Crocodile Mummies	Mr. A. Pendarves Vivian, M.P.
Axinite. From Pit close to the Cross near the Old Church in the Sand, Perranzabuloe ..	Dr. Le Neve Foster.
Garnets found with Axinite near the Old Cross, Perranzabuloe.....	Ditto.
Garnets and Garnet Rock, from Smallacombe Iron Mine, Devon	Mr. J. H. Collins.
Garnets and Garnet Rock, from Great Retallack Mine, Perranzabuloe	Ditto.
Garnets, from Wheal Devonshire, St. Agnes..	Ditto.
Hornblende, from Great Retallack Mine, Perranzabuloe.....	Ditto.
Vivianite, or Phosphate of Iron, from Gravel Hill Iron Mine, Perranzabuloe	Ditto.
Epidote, from Huel Cock Cliffs, St. Just	Ditto.
Fine Crystal of Mica, from the Phosphorite Deposits of Canada	Ditto.
Fragment of the rare substance Selenium ..	Ditto.
Three small rough Diamonds, from the Cape of Good Hope.....	Ditto.

Micaceous Iron Ore, from Bampfyld Mines, North Molton	Mr. M. G. Klingender, Director of the Bampfyld Mining Company.
British Marine Shells	Mrs. Williams Hockin, Truro.
An Old Musket dredged up near Padstow	Capt. W. Menzies, Inspecting Commander H.M. Coast Guard, Padstow.
Fragmentary Remains of a Scarabæus in Stone, from Egypt	Mr. G. F. Remfry, Torquay.
Photograph of White's Speckled Thrush	Mr. E. H. Rodd.

ADDITIONS TO THE LIBRARY.

Fac-simile of Charter of Henry II. to the Monks of St. Michael's Mount	From Mr. Rogers, of Penrose.
Fac-simile of Charter of Henry II. to the Monks of St. Michael's Mount,* with extended Text and Translation.....	Major-General Sir Henry James.
Comparisons of Standards, and Lengths of Cubits, from Philosophical Transactions, 1866 and 1873 †	Ditto.
Annales de Chimie et de Physique, par MM. Chevreul, Dumas, Boussingault, Regnault, Wurtz, avec la collaboration de M. Bertin. 4 ^{me} Série. Décembre, 1873. T. XXX....	Presented by Mr. Henwood, F.R.S.
Études sur les Filons du Cornwall.—Par M. L. Moissenet, Ingénieur des Mines, Pro- fesseur à l'École des Mines, Membre Honoraire de la Société Royale Géologique de Cornwall. 1874	From the Author.
Ditto Ditto Atlas	Ditto.
On the Mining District of Cornwall and West Devon. By J. Henry Collins, F.G.S. Excerpt Minutes of Proceedings of the Meeting of the Institution of Mechanical Engineers, in Penzance, 29th July, 1873 ..	From the Author.

* In a MS. note, Sir Henry James says: "This probably refers to St. Michael's Mount in Normandy, and not to St. Michael's Mount in Cornwall."

† Comprising: Abstract of the Results of the Comparisons of the Standards of Length of England, France, Belgium, Prussia, Russia, India, Australia, made at the Ordnance Survey Office, Southampton. By Captain A. R. Clarke, R.E., F.R.S., &c., under the direction of Colonel Sir Henry James, R.E., F.R.S., &c., Director of the Ordnance Survey. With a Preface by Colonel Sir Henry James, R.E., F.R.S., &c.; and Results of the Comparisons of the Standards of Length of England, Austria, Spain, United States, Cape of Good Hope, and of a second Russian Standard, made at the Ordnance Survey Office, Southampton. By Lieut.-Colonel A. R. Clarke, C.B., R.E., F.R.S., &c., under the direction of Major-General Sir Henry James, R.E., F.R.S., &c., Director-General of the Ordnance Survey. With a Preface and Notes on the Greek and Egyptian Measures of Length, by Sir Henry James.

- On Subaërial Denudation, and on Cliffs and Escarpments of the Chalk and the Lower Tertiary Beds. By William Whitaker, B.A. (Lond.), F.G.S., of the Geological Survey of England. (From the *Geological Magazine* for October and November, 1867.) From the Author.
- On the succession of Beds in the "New Red" on the South Coast of Devon, and in the locality of a new specimen of *Hyperodapedon*. By William Whitaker, B.A. (Lond.), F.G.S. (From the *Quarterly Journal of the Geological Society for May*, 1869.) Ditto.
- List of Works on the Geology, Mineralogy, and Palæontology of the Hampshire Basin. By William Whitaker, B.A. (Lond.), of the Geological Survey of England. (Reprinted from the *Journal of the Winchester and Hampshire Scientific and Literary Society*, 1873.) Ditto.
- Lists of Works on the Geology, Mineralogy, and Palæontology of Devonshire. By William Whitaker, B.A. (Lond.). (Reprinted from the *Transactions of the Devonshire Association for the Advancement of Science, Literature, and Art*, 1870.) Ditto.
- Supplementary List of Works on the Geology, Mineralogy, and Palæontology of Devonshire. By William Whitaker, B.A. (Lond.), of the Geological Survey of England. (Reprinted from the *Transactions of the Devonshire Association for the Advancement of Science, Literature, and Art*, 1872.) Ditto.
- Memoir of John Samuel Enys, Assoc. Inst. C.E. Excerpt Annual Report of The Institution of Civil Engineers, 1872—73* Presented by Mr. Whitley.
- The Drought of 1870, and its influence on Agricultural Crops. By N. Whitley, F.M.S. (Reprinted, by permission, from the *Journal of the Bath and West of England Society and Southern Counties Association*. Vol. III.—Third Series.) From the Author.
- The Meteorology of the Southern Counties of England, 1872. By N. Whitley, F.M.S. (Reprinted, by permission, from the *Journal of the Bath and West of England Society and Southern Counties Association*. Vol. V. Third Series.) Ditto.

* Appended to the Memoir is a list of "Papers published by Mr. J. S. Enys in the Transactions of Learned and Scientific Societies, &c." (1833—1866).

- On Extraordinary Agitations of the Sea not produced by Winds or Tides; with a refutation of the new theory thereon. By Richard Edmonds, Plymouth. (Reprinted from the *Transactions of the Devonshire Association for the Advancement of Science, Literature, and Art*, 1869.) From the Author.
- On Recent Extraordinary Oscillations of the Waters in Lake Ontario and on the Seashores of Peru, Australia, Devonshire, Cornwall, &c.—By Richard Edmonds. (Reprinted from the *Quarterly Journal of Science*, April, 1874.) Ditto.
- On the name *Britain* and the Phœnicians. By Richard Edmonds. (Reprinted from the *Transactions of the Devonshire Association for the Advancement of Science, Literature, and Art*, 1871.) Ditto.
- On a Bronze Vessel from the province of Huelva, Spain. (From the *Archæologia*, Vol. XLIII) From Mr. S. R. Pattison, F.G.S.
- Brief Sketches of the parishes of Booterstown and Donnybrook, in the county of Dublin. By the Rev. Beaver H. Blacker, M.A., Incumbent of Booterstown, and Rural Dean. Fourth Part. 1874. From the Author.
- Vienna Universal Exhibition, 1873. A Classified and Descriptive Catalogue of the Indian Department. By J. Forbes Watson, M.A., M.D., F.L.S., F.C.S., F.R.A.S., Reporter on the Products of India; Chief Commissioner and Director, Indian Department, Vienna Exhibition, 1873. From Mr. J. Forbes Watson.
- Astronomical and Magnetical and Meteorological Observations made at the Royal Observatory, Greenwich, in the year 1871; under the direction of Sir George Biddell Airy, K.C.B., M.A., LL.D., D.C.L., Astronomer Royal From the Lords Commissioners of the Admiralty.
- Results of the Magnetical and Meteorological Observations made at the Royal Observatory, Greenwich, 1871. (Extracted from the *Greenwich Observations*, 1871) Ditto.
- Annual Report of the Board of Regents of the Smithsonian Institution, showing the operations, expenditures, and condition of the Institution for the year 1871.—Washington, 1873 From the Smithsonian Institution.
- Monthly Notices of the Royal Astronomical Society. Annual Report of the Council. Vol. XXXIV. No. 4. February, 1874. From Mr. Edwin Dunkin, Hon. Sec. R. Astron. Soc.
- The Journal of the Royal Historical and Archæological Association of Ireland. Vol. II. Fourth Series. October, 1873. No. 16.. From the Association.

Journal of the Anthropological Institute of Great Britain and Ireland. Vol. III. No. II. July and October, 1873.....	From the Institute.
Transactions of the Historic Society of Lancashire and Cheshire. New Series.—Volume XIII. Session 1872—73	From the Society.
Transactions of the Manchester Geological Society. Vol. XIII. Part III. Session 1873—4	From the Society.
Proceedings of the Literary and Philosophical Society of Liverpool, during the Sixty-second Session, 1872—73. No. XXVII ..	From the Society.
Proceedings of the Scientific Meetings of the Zoological Society of London. For the year 1873. Part I. January—March	From the Society.
Proceedings of the Scientific Meetings of the Zoological Society of London. For the year 1873. Part II. March—June	Ditto.

From William Henry Archer, Registrar-General of Victoria, Melbourne.

Indexes of Patents applied for and Patents granted; and of Patentees and Applicants for Patents of Invention	Vol. I. From 1854 to 1866, (both inclusive).
Ditto ditto	Vol. II. 1867.
Ditto ditto	Vol. III. 1868.
Ditto ditto	Vol. IV. 1869.
Ditto ditto	Vol. V. 1870.
Ditto ditto	Vol. VI. 1871.

(Compiled from Specifications lodged in the Patent Office attached to the Registrar-General's Department, Melbourne).

Abstracts of Specifications of Patents applied for from 1854 to 1866. *Ac to Bu.* (1870).

Abstracts of Specifications of Patents applied for from 1854 to 1866. Metals. Part I. 1872.

Abstracts of English and Colonial Patent Specifications relating to the Preservation of Food, &c. 1870.

Statistical Tables relating to the Colony of Victoria, compiled from Official Records in the Registrar-General's Office, Melbourne.

Dr. Le Neve Foster said, that he could not close the list without calling the attention of the Meeting in particular to the valuable work presented by Sir Henry James and that of M. Moissenet on Cornish Lodes. He stated that M. Moissenet had made a long stay in the county and had been most indefatigable in his underground researches, some of the results of which were embodied in the work in question. He recommended the study of M. Moissenet's work to all persons interested in the geology of the county.

I.—*Note on a Charter of Privileges granted by King Henry the Second of England to the Monks of St. Michael's Mount (circa 1154–63).—By J. JOPE ROGERS, Penrose.*

Extended Transcript.

Henricus, Rex Angliæ et Dux Normanniæ et Aquitaniæ et Comes Andegaviæ, Justiciariis et Vicecomitibus et præpositis et Ministris suis Angliæ et Normanniæ et Portuum maris, Salutem.

Præcipio quod omnes res Monachorum de monte Sancti Michaelis, quas homines eorum poterunt affidare suas esse proprias, sint quietæ de Thelonio et Passagio et Pontagio et omni aliâ Consuetudine per totam Angliam et Normanniam et per Portus maris.

Et prohibeo ne quis eos inde disturbet injustè, super decem librarum forisfacturam. Teste Roberto de novo Burgo.

Apud Moritonium.

Translation.

Henry (ii). King of England, and Duke of Normandy and Aquitaine, and Count of Anjou, to his Justices and Sheriffs and Constables and other his Officers of England and Normandy, and of the Ports of the sea, sends greeting.

I enjoin, that all goods of the Monks of St. Michael's Mount, which their people can prove to be their own property shall be free of toll and Passage and Pontage, and every Customs duty throughout England and Normandy and the ports of the sea.

And I forbid any one from unjustly disturbing them in the enjoyment of this privilege under a penalty of £10.

Witness Robert de Newbury.

Dated at Mortain, (Normandy).

THIS little document, by which such large privileges are granted to the Monks of St. Michael's Mount, was found among the more ancient deeds at Penrose, and I was not aware of its contents or character, until I examined them in the autumn of 1873 with a view to their better arrangement and preservation. This resulted in a literal transcript of each document, and a

careful repair of the originals, which are now separately flattened, docketed, and arranged, for convenience of reference.

This operation caused me to visit the Public Record Office in London, where the charter was considered to be of sufficient value to deserve a place among the public records which are there preserved. I therefore placed it at the disposal of the Master of the Rolls, who has accepted it as an addition to the national collection: and I have the gratification of knowing that any one who desires to see it will be able in future to do so without difficulty. Those, however, who have not leisure for such a pilgrimage may be satisfied by inspection of the exact fac-simile, which I am enabled by Sir Henry James' process of Photo-zincography to present, together with an extended transcript and English translation, to our Library.

The original Charter is well preserved, being beautifully written with very good ink, the parchment being uninjured by damp, and suffering only from a very few small specks of rust contracted from a tin box in which it was once deposited, and a trifling rent which has now been repaired at the back.

The great seal of Henry II is still attached to the parchment, and though mutilated by the loss of its marginal legend on each side,—a defect which may be excused after the lapse of more than seven centuries,—it exhibits a sufficient portion of the two designs which form the obverse and reverse of the seal, for the purpose of its identification as the great seal of that monarch; Henry being represented on one side as seated in his robes of state with the emblems of sovereignty, and on the other side as armed and on horseback, holding a drawn sword in his extended right hand.*

* The legend on the obverse was "+ Henricus: Dei: Gratia: Rex: Anglorum," surrounding his portrait as King of England; and that of the reverse, "+ Henricus: Dux: Normannor: et Aquitanor: et comes: Andegavor," illustrative of his other chief dominions of Normandy, Aquitaine, and Anjou.

See Sandford's Genealogical History of the Kings of England, fo. 1677, page 54:—Series of Great Seals engraved by the process of Achille Collas; and appendix to Report on Public Records, fo. 180, plate xlii.

The witness to this Charter, Robert de Novo Burgo, is also witness to 2 other Charters of Hen: II to Reading Abbey, in the collection of the Duke of Westminster, at Eaton Hall,—Archæol: Journal, Vol. xx, pp. 294-296.

The Photo-zincograph represents each side of the Charter as well as the seal, and faithfully and fully displays the condition and character of each, whilst the extended transcript and translation render a further description of them unnecessary. Much doubt has, however, been thrown upon the question whether the Monks of our Cornish Mount or those of that in Normandy were intended to be privileged. The Charter is in Latin and grants freedom from the tolls and custom duties of the period to the Monks of St. Michael's Mount, simply, (*Monachis Sancti Michaelis*) without the additional words, which in ancient documents, usually distinguished the Cornish from the Norman Monastery.* We must therefore look at the place of date, which might be expected to determine the question: For if the Charter were sealed anywhere in England, it would be reasonable to conclude the English Mount was intended, but if in Normandy, the Norman Mount.

No date of month or year is given in the Charter, and as Henry's reign lasted 35 years (1154-89) and the King frequently visited Normandy, the Charter might well have been sealed there; because at that period of our history the great seal usually accompanied the Sovereign, and Normandy was then practically a part of this kingdom.

It will be seen on reference to the fac-simile that the date is "Apud Mariton, or Moriton, and the competing claims of the two monasteries must be determined by the reading of the second letter of this word: for if that letter be an *o*, the Charter was sealed at "Moritonium" *i.e.* "Mortain" in Normandy, whence Robert, Earl of Mortain derived his title; but if an *a*, the place was probably "Merton" in Surrey, where, the famous Becket, Henry's Chancellor, was educated, and where Henry is often found.

It is curious that the probabilities outside the document, as well as those within it appear equally to favour each Monastery. Thus, Becket's connexion with Merton, itself a Monastery of some

* The Norman Mount was sometimes spoken of as that of St. Michael "In procella," or, "in periculo maris," as well as, "in Normanniâ"; and the Cornish Mount was usually described as "In Cornubia"; whilst St. Michael "In tumbâ," or "in Monte Tumbâ" applied occasionally to both houses. (See examples of early charters given by Dr. Oliver in his *Monasticon Diocesis Exoniensis*, folios 30, 31, 414).

note, and the King's visits there seem to favour the Cornish Mount: and as we learn from Dr. Oliver's *Monasticon Exon*: that in 1135 a Church, then newly erected there, was consecrated by Warelwast, Bishop of Exeter, and an establishment of 13 brethren settled there shortly afterwards, with the approval of that prelate, there was some reason for their obtaining through Becket, (who was all-powerful with the King until his rupture with him in 1163) the valuable privileges of the Charter, for their enlarged establishment. On the other hand, Robert de Torigny, who was elected abbot of the Norman Mount in the very year that Henry II came to the throne, is said to have been "a great favourite with the King," and an "excellent scholar and encourager of learning, and to him the abbey and convent were indebted," as Dr. Oliver says "for the preservation of their most valuable Charters and MSS." (*Mon: Exon: fol. 30*). Further, Mortain being very near the Norman Mount, it would be reasonable to suppose that Henry, who was frequently in Normandy, might choose that place for sealing a Charter to the favoured abbot of the neighbouring Monastery.

I had hoped that some light might be thrown upon the question, by tracing the history of the document itself, but I have searched in vain for a clue. When I first became aware of its existence, it was in the same box with the earliest deeds of Carminow and Penrose Manors, and was wrapt in a small covering of paper indorsed by my father "ancient deed," from which I infer that he was ignorant of its contents. How it came there I know not, nor how long it has been at Penrose.

It might possibly have been presented to my father, as I thought, by M. De Gerville, the late eminent antiquary of Normandy, with whom he corresponded for many years. I have searched through a file of M. De Gerville's letters, but find no trace of it, nor do I suppose that, if M. De G. had chosen to part with a document connected with the history of Normandy, so indefinite a memorandum of it would have been found upon its cover.

Indeed the determination of the question between the two Monasteries depends upon the letter in the place of date to which reference has been made; and upon the best information that I can obtain, it seems most probable that the Charter was sealed at

Mortain in Normandy, and that we must be content to consider that the claim of the Cornish Mount to freedom from toll and customs duty under it has at least not been satisfactorily established.*

* *Moritonium* and *Moritonensis* occur in more than one early Charter to the Monks of S. Michael's Mount, and one of those given by Dr. Oliver is a Charter by Robert, Earl of Mortain himself to the Monks of both Monasteries. (Monast: Exon: folio 31).

II.—*The Tokens of Cornwall.*—By R. N. WORTH, *Plymouth, Corr. Mem.*

FOR five-and-twenty years during the latter half of the seventeenth century there were issued all over England, Wales, and Ireland, what are known as tradesmen's tokens. They had their origin in a national necessity, and they continued current until that necessity was supplied. A little more than a century later a similar need again arose, and again private enterprise supplied the deficiencies of the national mint, until the regal coinage was once more brought up to the mark of the times. This paper is intended to give a list, as complete as may be, of the tokens of both series issued in the county of Cornwall.

For centuries the coinage of this kingdom was either wholly silver, or what was made to pass current as such, or silver and gold. In Northumbria of the Heptarchy, brass or copper coins known as stycas were struck, two of which were equal in value to a farthing; but the old silver penny continued to be almost the sole money of England down to the reign of Edward I (John had issued silver pence) who ordered in 1279 a large coinage of silver half-pence and farthings. As years went on and trade increased so much the more severely was the want of small change felt. Pence represented a far larger proportionate value in those days than they do now; and half-pence and farthings were of consequence accordingly. There were continual complaints of their scarcity; and as whenever they were issued it was in silver, this fact, coupled with the gradually decreasing size of the silver penny (originally a pennyweight), rendered them at the best excessively inconvenient. Various devices were had resort to in order to make up the deficiency; and in the reign of Henry VII the first private tokens were struck, in lead. They continued to be issued notwithstanding several enactments to the contrary for many years. Edward VI was the last who coined silver farthings; but silver half-pence was coined down to the reign of Charles I; and Elizabeth issued silver three-farthing pieces.

Up to this time, with the exception of the foreign tokens which

are now known as black money, and the leaden private tokens aforesaid, no attempt had been made to issue coins of any other metal than gold and silver, although these metals were frequently sadly debased for coinage purposes. In 1613, however, James I not only abolished the leaden tokens, but granted a patent to Lord Harrington, of Exton, to issue farthing tokens of copper. As they only weighed nine grains, they did not find favour with the public. Charles I granted a patent to coin copper farthings for 17 years to the Dowager Duchess of Richmond and Sir Francis Crane. These also were very small; moreover the patentees refused to re-change them. So the discontent waxed great, and in 1644, in reply to many petitions, Parliament "decried" the farthings and the legal issue of copper coinage ceased.

But the course of trade could not be checked. "Change," as some of the tokens themselves express it, was "necessary"; and so in every city and town, and almost in every village, throughout the kingdom, traders of all kinds issued their own brass or copper penny, half-penny, or farthing tokens, chiefly the latter; which, as the intrinsic was far beneath the nominal value, they would change again for their customers. This fact was occasionally announced on the tokens, as by Edward Broad, Southmolton.

"When you please
He change these."

The earliest date on these tokens is 1648; the latest, in England, 1672, in which year Charles II made a very stringent proclamation against them; and what was very much more to the purpose, ordered half-pence and farthings of copper to be issued from the mint. The necessity for the tokens thus disappeared coincidently with their prohibition. They fell into disuse and are now only objects of curiosity;—interesting relics of the internal commerce of this kingdom two centuries ago.

But Charles II did not issue any copper pence, nor did his successors down to 1797. Meantime, small change had again become scarce, immense quantities of copper half-pence and farthings had been forged, and failing to grapple with the monetary wants of the nation itself the government permitted the issue of copper tokens. Pence, half-pence, and farthings were again coined privately, but this time of a size that made them

more nearly worth what they were represented to be. Thus the first local copper coin of this series issued, the Anglesea penny in 1787, weighed an ounce. For about 10 years coins of this class continued to be struck in large quantities; but the issue of the massive penny and two-penny copper pieces of 1797 for the while checked the operations of private issuers. In 1811, however, there was again a scarcity of small change, and again private copper tokens were issued, in such large numbers that in 1817 an Act of Parliament was passed to prohibit their coinage and circulation. In 1811 and 1812 there were also issued silver tokens; and these were all ordered to be withdrawn from circulation in 1813. Since 1818 the traders of England have depended entirely upon the Royal Mint for their metallic coinage. It cannot be said that tokens have altogether disappeared whilst bank notes and bills of exchange are still required to supplement our currency, and to carry on the ramifications of a commerce based upon mutual credit. But bank notes are issued under the direct sanction of the law, and bills of exchange and their kin are personal contracts by law enforceable; and the most legitimate successor of the tokens of old now are the metallic cheques occasionally used by co-operative societies in apportioning profits among their members.

Such briefly is a history of the conditions under which the coins of which this paper treats were issued.

The great authority on the 17th century tokens is a work issued in 1858 by Mr. Boyne, F.S.A., to which I shall have to make frequent reference. It contains descriptions of 9,466 varieties; but Mr. Boyne calculates the total to have been nearly 20,000, and seeing how many have come to light since his work was published, there is very little doubt that this is correct. For example, he assigns to Devon 231 tokens. My friend Mr. H. S. Gill, of Tiverton, (to whose ever ready help I am greatly indebted) has succeeded in cataloguing about 330. To Cornwall Mr. Boyne assigns 41. That number I have been enabled to raise to 90, with 8 that may possibly be added—an increase in the one case of 49 and in the other of 57. Twenty-eight of the additional ones are to be found in other parts of Boyne's list, but—certainly in most cases—wrongly assigned. Nearly the whole of the remainder—29—are here published for the first time. For most of these I am indebted to the courtesy of Mr. H. S. Gill; Mr. C.

Golding, London ; (who kindly furnished a valuable list of the distribution of the bulk of the tokens) Mr. Henry Christie, London ; Mr. J. S. Smallfield, London ; and Mr. G. B. Millett, of Penzance. Several, however, are the result of my own researches.

I have stated that a number of the tokens here recovered for Cornwall are in Mr. Boyne's list wrongly assigned. This arises from the fact that there are so many places of the same names in different counties ; which, without some personal knowledge concerning the issuers, renders it very difficult and at times impossible, to say whereto they belong. In this respect, Cornwall is very unfortunately placed. Its St. Ives and St. Neot, are matched by St. Ives and St. Neot in Huntingdon. Its Newport and Millbrook have namesakes in several counties. Nay, even Cornwall itself has a double in Oxford. These facts have rendered the compilation of this list one of peculiar difficulty ; and I have thought it best when there may be a chance that a token belongs to the county to include it here ; but to assign to it only a subordinate place by ranking it under a number instead of giving it a number to itself. All the tokens that are mentioned by Mr. Boyne are given without any distinguishing mark ; the additions have an asterisk prefixed. To most I have put such available notes as may serve to illustrate and elucidate ; and initials indicating in whose possession examples of the tokens are. B. M., signifies British Museum ; Bod., Bodleian Library ; T. M., Museum of the Royal Institution, Truro ; G., Mr. Golding ; B., Mr. Boyne ; S., Mr. Smallfield.

One token assigned to Cornwall by Mr. Boyne really belongs to Wales, which reduces his 41 therefore to 40. It is a penny by Richard Preece of Porthelly. There was a Porthelly near Mevagissey ; but it is clear from the name—Preece ; the value—there was no Cornish penny ; and other circumstances ; that it really belongs to Pwllheli in Wales, the only token assigned to which in Mr. Boyne's list is a penny. Instances of phonetic spelling on the tokens are by no means rare ; and Porthelly is a very reasonable approach to Pwllheli. For example an unpublished farthing of Machynlleth reads Mahentleth.

There are only a few general points to note in connection with the Cornish 17th century tokens. According to Mr. Boyne only five counties issued less—Cumberland, Monmouth, Northumberland, Rutland, and Westmoreland. The number now quoted

would place it in advance also of Shropshire, Stafford, Bedford, Huntingdon, Cheshire, Durham, and Hereford; but of course these counties have their own additions to make. Cornwall is possibly peculiar in this, that—two of St. Ives excepted—none of its tokens are “town pieces,” that is, pieces issued by the authorities of a town. In Devon such tokens were coined and circulated by Ashburton, Axminster, Bideford, Dartmouth, Moretonhampstead and Torrington. Cornwall is peculiar also in the fact that so large a proportion of its tokens bears the arms of the issuers—nearly a fourth—a proportion greater, so far as I am aware, than is to be found in any other county. This at once indicates the extent to which the old families of the county engaged in commercial pursuits, and the fact that they thought it no derogation. A third peculiarity is that not one of the Cornish tokens of the 17th century has the slightest reference to mining. In the later tokens the case was quite the reverse. A fair proportion of the coins bears the arms of the old incorporated companies. The mercers, who in those days were general shopkeepers, greatly predominate; then come the grocers; next the haberdashers and the salters; then the chandlers, the vintners, and the apothecaries.

Of devices there occur—women packing pilchards, St. Ives; a man making candles, Callington; the seven stars, Falmouth; a dolphin, Looe and St. Ives; an anchor, Looe, St. Ives, and Saltash; sheep in a fold, Newport; a ferry boat, Saltash; a post boy, Truro; three men round a globe, Scilly; a shuttle, St. Neot; an angel, Penare; a mullett, Penzance; a bull, St. Ives; a bell, Penryn; a ship, Looe and Saltash; a cross, Probus; a cross moline, and possibly a frying pan, St. Neot; a fleur de lis, Mevagissey; two cross swords, St. Ives. There are a few devices upon which it is difficult to pronounce whether they are intended for arms or not; but of those given above many were doubtless the signs of the houses which the issuers kept—signs then being of general use by all classes of traders.

Of the whole of the 98 tokens contained in the following list no less than 85 are farthings, leaving only 13 half-pence. It is likewise a matter worthy of note that only two of the issuers were women. The third (middle) initial on the reverse of a token is that of the issuer's wife, so that it would seem that there were among them few bachelors.

The tokens of the 18th and 19th centuries do not call for any special comment; since they explain themselves. It will be observed that the copper series has the most intimate connection with mining; and in fact appears to have originated in the wants of the mining enterprise of the county.

In conclusion, I have to express my thanks for aid kindly rendered, in addition to the gentlemen already named, by the Rev. J. B. Jones, Vicar of St. Ives, the Rev. T. W. Wintle, Vicar of Maker, Mr. Brooking Williams, junr., St. Ives; Mr. R. K. Frost, Launceston; and Mr. N. Hare, junr., Liskeard.

SEVENTEENTH CENTURY TOKENS.

BODMIN.

1. *O.* IOHN . HARRIS — Grocers' Arms. $\frac{1}{4}$
R. OF . BODMAN — I . A . H

Bod.—The Bodmin parish registers record the burial of Ann, wife of John Harris, in April, 1673; and of John Harris, gent., in Feb. 1679-80.

2. **O.* RICHARD . MANATON — Upon a bend three mullets pierced, differenced with a crescent. Crest, a demi unicorn rampant. $\frac{1}{4}$
R. OF . BODMAN . 1664 — R . P . M between three mullets, a crescent in middle.

The arms are those of Manaton. Richard Manaton was Mayor in 1668. The token is in the Museum of the Bodmin Institution, and is engraved in Sir John Maclean's "History of Trigg Minor—Bodmin," p. 231.

3. *O.* THOMAS . WILLS — Three lions passant gardant within engrailed border. $\frac{1}{4}$
R. IN . BODMYN — T . F . W

B.M.—Lysons ("Cornwall," p. exvii), gives the arms of Wills of Landrake, three wyverns passant within an engrailed border bezanty.

CALLINGTON.

4. **O.* IOHN . WILLS . OF — A man making candles. $\frac{1}{4}$
R. CALLINGTON . 1667 — I . W

Tutet's MS.

FALMOUTH.

5. *O.* THOMAS . HOLDEN — A fesse between two chevrons ermine. $\frac{1}{4}$

R. OF . FALMOVTH -- T . A . H

G., *S.*—The arms as above are given to Robert Holden, city of London, *Gent.*, in "Blome's Brittainia," ed. 1673.

6. **O.* RICHARD . LOBB — Three boars' heads. $\frac{1}{4}$
R. OF . FALMOVTH . 1665 — Three trefoils.

B.—A Richard Lobb was High Sheriff of Cornwall in 1652, and *M.P.* for St. Michael's 1659. The name is common in the district.

7. **O.* BENIAMIN . PENDER — A chevron between three Cornish choughs. $\frac{1}{4}$

R. OF . FALMOVTH . 1664 -- B . A . P

G.—The Pender family are still settled at Falmouth. Peter Pender was Mayor of Falmouth, 1713; and of Penryn, 1714.

8. *O.* BENIAMIN . PYNDER — The Mercers' Arms. $\frac{1}{4}$
R. IN . SMYTHICK . 1665 — B . P

T.M.—This is placed by Mr. Boyne under Smethwick in Staffordshire; but unless there were two Benjamin Penders, father and son, it is simply a variety of the preceding; if so, Pender became a widower, for his wife's initial is here omitted. Smithwick or Smithicke was the old name of Falmouth, which it bore until the year before the borough was incorporated in 1660; and which was retained, partially at least, for some time afterwards. The harbour had been called Falmouth for centuries.

9. *O.* HENRY . PENIELL . AT . YE^E — Seven Stars. $\frac{1}{4}$
R. IN . FALMOVTH . 1666 — H . M . P

B., *G.*—There is still a "Seven Stars" at Falmouth.

10. *O.* MICHAELL . RVSELL — Three escallops. $\frac{1}{4}$
R. IN . SMITHICKE — M . A . R

T.M., Mr. Christie.—Boyne assigns this token to the Staffordshire Smethwick, varying the spelling of the name and place. C. S. Gilbert ("Cornwall," vol. ii, pp. 257, 794), gives a chevron between three escallops as the arms of Russell of Falmouth. Michael Russell, who in Aug. 1705, was in his 86th year, was a French refugee, and, according to Gilbert, then of Bideford. Michael Russell, a physician, was Mayor of Truro in 1736.

FOWEY.

11. *O.* PETER . TOLLER — P . T $\frac{1}{4}$
R. IN . FOWEY — 1660

B.—The Tollers were connected with the Treffrys, and from them, by a marriage with a sister of the last heir male of the Treffry family, the present owner of Place descends (Lysons, p. cliv). Peter Toller, merchant, was buried in Fowey Church, Feb. 1667.

HELSTON.

12. *O.* ROBERT . COCKE — A griffin rampant $\frac{1}{4}$
R. OF . HELSTON . 1666 — R . C

B.M.—“This was long considered one of the most respectable families in the borough of Helston” (C. S. Gilbert, vol. ii, p. 85).

13. *O.* WILLIAM . PENHALVRICK — W . P $\frac{1}{4}$
R. OF . HELSTON . 1667 — W . P

T.M., G., S.—The family of Penalurick were so named from Penalurick in Stithians. In Boyne’s list the name is given Penhalvr. The token with the name incorrect is figured “Gent. Mag.,” Feb., 1790, p. 118, plate 2, fig. 12.

14. *O.* JOHN . PENHELICK — Three butterflies volant, two and
 one $\frac{1}{4}$
R. IN . HELSTON . 1666 — I . M . P

B., G.—The arms are those of Penhellick of Penhellick in St. Clements, a younger branch of which settled at Helston. Alexander Penhellick was returned for the borough in 1660; John Penhellick had a son born in 1659 who became Vicar of Gulval, but the initial of his wife’s name was J. (Lysons, p. cxlv; C. S. Gilbert, vii, p. 225).

15. **O.* HENRY . PENHELLICK — Arms as above (?) $\frac{1}{4}$
R. IN . HELSTON . 1659 — H . P

This token is described for me by Mr. H. S. Gill; but Mr. G. B. Millett of Penzance, to whom it belongs, is doubtful of the details. It is very much corroded.

16. *O.* PETER . PRISKE . OF — 1668 $\frac{1}{4}$
R. HELLSTON . CORNWEL — P . P

T.M., B., G., S.—The Priskes were a Helston family and the name still exists. Mr. Boyne spells Helston with one “l”; the token in the Museum has two.

17. **O.* RICHARD . ROGERS — The Mercers’ Arms $\frac{1}{4}$
R. OF . HELSTON . 1868 — R . T . R

T.M., S.—Different families bearing this name have long been connected with Helston. The issuer of the token was, in all likelihood, a member of a yeoman family settled for centuries at Skewis, in Crowan, one of whom, half a century later, carried on business as a pewterer in Helston, and was the chief actor in a lamentable tragedy, given in detail by Davies Gilbert, (“Cornwall,” vol. iii, p. 267). His elder brother, the owner of Skewis, dying without issue, left the estate to his wife. Henry Rogers resented this as an interference with his rights, and, taking possession of the place, held it by force of arms against all comers. It was besieged twice, once in June, 1734, and next in the March following; five of the besiegers were killed, and it was not taken until soldiers and cannon were brought from Pendennis Castle. Rogers then escaped, but was afterwards caught and hanged.

KILKHAMPTON.

18. *O.* JOHN . COVRTIS . 1667 — I . C conjoined ¼
R. OF . KILKHAMPTON — IN CORNWALL

B.—John Courtis, as appears by his “stately monument” in Kilkhampton Church, died in 1705, aged 65. He was a mercer.

LAUNCESTON.

19. *O.* DECORY . BEWES . OF . SANT — The Mercers’ Arms
R. STEPHENS . LANCESTON — D . B

G.—The issuer of this token was probably a member of the family of Bewes, now of Plymouth. According to Lysons, (p. 192), the barton of Carnedon, near Launceston, was purchased in 1715 by an ancestor of the present representative, the Rev. T. A. Bewes. C. S. Gilbert (v. ii, p. 17) says the St. Stephens branch became extinct in 1811.

20. **O.* THOMAS . BEWES — Three Castles ¼
R. IN LANCESTON . 59 — T . B

B.—Chesten, daughter of William Stokes, who married with John, son of Thomas Bewes, of Launceston, gent., was buried in St. Mary’s, Launceston, Jan. 1679, in her 19th year.—Inscription therein.

21. **O.* OSSOLD . KINGDON — The Chandlers’ Arms ¼
R. OF . LAUNCESTON — O . K

22. *O.* RICH . KINGDOME — The Haberdashers’ Arms ¼
R. OF . LANCESTON — R . K

Both these tokens are in Mr. Golding’s collection. The Kingdons were an ancient family of Trehunsey, in Quethiock, and Trenowth, in St. Cleer. (Lysons, p. cxx.). Oswald Kingdon was a gentleman of large fortune, who owned a great part of the land within the borough. He was three times Mayor, as his father Oswald had been before him. His son, Richard Kingdon, carried on business in Launceston and Boscastle, where he owned many ships. He was also three times mayor of the borough. A daughter of Richard Kingdon married Langford Frost, from whom descends the family of Frost now living in Launceston and Saltash. For these particulars I am indebted to Mr. Richard Kingdon Frost, of Launceston.

LISKEARD.

23. *O.* BENIAMIN . CHAPMAN — The Mercers’ Arms ¼
R. IN . LISCARD — B . C

Bod.—The Chapmans were a family of weight in Liskeard. Benjamin Chapman was Mayor in 1654, and in 1650 was presented by the Grand Jury, with “Jonathan Chapman, Merchant, deceased” (he had been Mayor in 1649, 1653, 1657) and others, “for that the said persons did take upon themselves to be Mayors and Magistrates of the borough, not being thereunto lawfully elected.” (Allen’s “History of Liskeard,” pp. 246, 258). They were of course Puritans.

24. **O.* BENJAMIN . CHAPMAN — The Mercers' Arms $\frac{1}{4}$
R. OF . LISKEARD . 1666 — B . C

S.—This is simply a variety of the preceding.

25. *O.* JOHN . CHAPMAN — I . C $\frac{1}{4}$
R. IN . LISCARD — I . C

B.—John Chapman, of Liskeard, for attending a Quakers' Meeting at Launceston, was sent to gaol there in 1663.

26. *O.* IOSEPH . CLOAKE — The Grocers' Arms $\frac{1}{4}$
R. OF . LISCARD — I . M . C

Hugh Cloake, who was buried at Marazion in 1688, published in 1685, "A Call from Sin to Holiness of Life." Cloake as well as Clogg, which may be another form of the same name, are still to be found at and around Liskeard.

27. *O.* RICHARD . KEMP . 60 — Three fleurs de lis $\frac{1}{4}$
R. IN . LISSCARD — R . K

B., S.—Peter Kemp was one of the town sergeants in 1653, when he, with Francis Pelt, his colleague, bought 75½ lbs. of powder of Mrs. Chapman; and also in 1662, probably continuing in the interim (Allen's "Hist." p. 90). Lysons (p. cviii) gives the arms of Kemp as three garbs and there may have been an error as to the fleurs de lis.

LOOE.

28. **O.* WILLIAM . AMBROSE — A Dolphin $\frac{1}{4}$
R. IN . LOOE . 1664 — W . A

This token, with that of Chandler and Hendra, is taken from Bond's "East and West Looe" (pp. 94-5), whence also the notes on the Looe tokens generally are derived. In 1658, Ambrose signed the indentures of return of John Kendall and John Buller, members for East Looe, as a capital burgess.

29. **O.* PEETER . COADE — The Mercers' Arms $\frac{1}{4}$
R. OF . LOWE . 1666 — P . C

Mr. H. S. Gill.—Peter Coad's name is attached as a capital burgess to the same indenture as Ambrose's.

30. **O.* JOHN . CHANDLER — I . C $\frac{1}{4}$
R. IN . LOOE — I . C

31. **O.* ELIZABETH . HENDRA — Three-masted ship with sail $\frac{1}{4}$
R. OF . LOWE . 1668 — E . H

32. *O.* BENJAMIN . OLVER — The Mercers' Arms $\frac{1}{4}$
R. IN . LOOE . 1656 — B . O

B.M.—This family gave Mayors to East Looe.

33. **O.* RICHARD . STADGELL — An Anchor 1/4
R. IN . EAST . LOOE . 1669 — R . S

G.—Richard Scadgell, senr., and Richard Scadgell, junr., with other members of the family, were appointed free burgesses of East Looe under the charter of James II in 1685.

LOSTWITHIEL.

34. **O.* JOHN . ALLIN . 1664 — The Grocers' Arms 1/4
R. OF . LESTITHELL — I . A

S.—“In 1670, John Allen, cardmaker, bought some land near the town [Liskeard,] which his descendants still retain. He came from Lostwithiel with C. Trelawny, in 1698, to vote at a contested election; and was Mayor of the borough in 1701 and 1707.” (Allen's “Hist. Liskeard,” p. 520). Ralph Allen, Fielding's Allworthy, was probably a member of the same family, being born at St. Blazey, near Lostwithiel, in 1693.

35. *O.* RICHARD . WEBBER — 1664 1/4
R. OF . LESTITHELL — R . W
 G., S.

MARAZION.

36. *O.* THOMAS . COREY — 1668. 1/4
R. IN . MARAZION — T . P . C

B.M.—A clergyman named Cory was vicar of Gwennap—ejected during the Commonwealth but afterwards restored. He died in 1680. The name is not uncommon in West Cornwall.

MEVAGISSEY.

37. *O.* JOHN . KEAGLE — A fleur de lis 1/4
R. IN . MERAGYZEY . 1664 — I . B . K

G.—The die sinkers were not good orthographers; and it is possible that this token also may belong to Marazion, since one of the names of that ancient borough was Marghasiewe. However, Mevagissey is the more likely. A William Keagle issued a token in Exeter in the same year with the same device of a fleur de lis.

MILLBROOK.

38. *O.* RICHARD . NORRIS — A lion rampant 1/3
R. IN . MILLBROOKE . 1671 — R . A . M

Boyne assigns this token to Millbrook, in Bedford, but both Millbrook, in Hants, and Millbrook, in Cornwall, are more important places. Moreover, Norris is not an unfrequent west-country name.

NEWPORT.

There are so many Newports that great confusion exists as to the localities to which many of the tokens bearing that name should be assigned. To

Newport, in Shropshire, Mr. Boyne attributes, in addition to the two given below, tokens issued by Chaloner, Huddell, Juninge, Perrot, Runham, Yonge; and I have heard of others, not included in Boyne's list, and not specially identified, which bear the names of Clarke, Dore, Legg, Maynard, and Thornton. It should be remembered that the Cornish Newport is properly an adjunct of Launceston. If the identification of the two Rowes and Norman be correct, then the joint boroughs would have had a total issue of nine varieties, which might very well have been.

39. *O.* IOHN . KERTON . OF . NEWPORT — Three Sheep in a fold $\frac{1}{2}$
R. IN . CORNWELL . 1688 — HIS HALF-PENY . I . I . K
 B.G., S.

40. **O.* IOHN . KERTON . OF . NUE — Three Sheep in a fold $\frac{1}{4}$
R. PORT . IN . CORNWELL — I . I . K

G.—Kerton, like so many of the trading class of that day, was a Quaker. John Kerton, having been prisoner some time before, for refusing to take the oath of a constable, and on that account brought to the sessions, was then ensnared with the oath of allegiance, and re-committed.—“Sufferings of the Quakers,” vol. ii, p. 99.

40A. *O.* IOHN . NORMAN — The Grocers' arms $\frac{1}{4}$
R. IN . NEWPORT — I . E . N

This is one of the tokens given by Mr. Boyne to the Salopian Newport, but Norman is a name so well known in the district that the balance of evidence appears in favour of Cornwall.

41. *O.* ARTHVR . ROWE — A . E . A $\frac{1}{4}$
R. IN . NEWPORT . 1658 — A Beehive

This is also assigned by Mr. Boyne to Newport, in Shropshire; but I have no hesitation in claiming it for Cornwall. Rowe is not only a common Cornish name, but it is specially common in the Launceston district; and still abides in the borough itself. The late Sir William Carpenter Rowe was a native of Launceston.

42. *O.* WILLIAM . ROWE — A Beehive $\frac{1}{4}$
R. APOTHECARIE — W . M . R

This is one of the tokens to which Mr. Boyne gives no locality. I claim it also with confidence for Newport, for the reasons just given; the device of the beehive, the armorial bearings of the family, clearly establishing a connection between the two.

PENARE.

43. **O.* FRANCES . OSGOOD . IN — An Angel $\frac{1}{4}$
R. PENAYR . CORNWALL — F . V . O

G.—There is more than one Penare in Cornwall; but the one here intended is probably a small hamlet, in the parish of Gorran, which appears in former days to have been of more importance than it is now. The triple initials show that Frances really stands for Francis, and that this token was issued by a man. Unless Osgood can be identified with Hosegood, a frequent surname in the neighbourhood of Credition, it has altogether disappeared from the West.

PENRYN.

- 44 **O.* MICHAEL . COODE — Armorial bearings ¼
R. OF . PENRIN . 1667 — M . C

T.M., B., S.—The arms on the token in the Museum are apparently those of the Coode family, a chevron between three moor cocks.

45. **O.* JAMES . KEMPE — The Salters' Arms ¼
R. OF . PENRYN . 1668 — I . K

G.—Kemp's monument is in St. Gluvias Church, St. Gluvias being the parish in which Penryn is situated. He died in April, 1711, aged 74.

46. **O.* JOHN . PEARCE — The Haberdashers' Arms ¼
R. OF . PENRYN . 1666 — I . P

S.

47. **O.* ANDREW . RIDER — A Bell ¼
R. IN . PENRYN . 1664 — A . C . R

G., S.—Richard Rider was sent to prison as a Quaker by the Mayor of Marazion.—“Sufferings of Quakers.”

48. *O.* THOMAS . SPRY . 1667 — Two bars, chevron in chief,
impaling on a bend engrailed three fleurs de lis ¼
R. OF . PENRIN . CORNWELL — T . S conjoined

B., G., S.—The first coat is that of the Spry family of Cutcrew, in St. Germans; the coat impaled that of Melhuish. The issuer was in all probability a member of the younger branch of the Spry family, settled for several descents at Place, in Anthony in Roseland.

49. **O.* VRSVLA . SPVRR — 1668 ¼
R. IN . PENRYN — V . S

S.—Ursula, relict of Henry Spoure, died in May, 1678, and was buried at St. Gluvias. Her husband was probably connected with the now extinct family of Spoure, of Trebartha.

50. *O.* THOMAS . WORTH — A double headed eagle ¼
R. IN . CORNWELL . 1665 — T . W

T.M., G.—This token is erroneously assigned by Boyne to Cornwall, Oxford. It will be seen that several of the tokens spell Cornwall with the “e” in the final syllable. The Worths of Penryn were a younger branch of the still extant family of Worth, of Worth, in Devonshire, and bore the same arms—a two-headed eagle displayed. William Worth, merchant, of Penryn, died in January, 1689, and was buried at St. Gluvias. His son John was sheriff of the county in 1690 and 1711, and in 1703 bought Tremough, now the seat of Mr. Shilson, who has an example of this token. Thomas Worth may have been a brother of William. He was evidently unmarried when the token was issued.

PENZANCE.

51. *O.* RALPH . BEARD — A Mullet. ¼
R. IN . PENZANCE . 1667 — A Mullet

B., G.—John Beard, born at Penzance in 1769, became town clerk. Mary, wife of John Beard (father of the preceding?) was buried at Madron, near Penzance, in 1778.

52. *O.* IOHN . BLVNT — Three Lions rampant regardant, 2 and 1 ¼
R. IN . PENZANCE . 1665 — I . I . B

B., S.

53. *O.* P . L . IN . PENZANCE — Head of the Baptist on charger ¼
R. (no legend) — In base a castle, chief a falcon and crescent

S.—The arms on the obverse are those of Penzance borough. Those on the reverse are clearly intended for the bearings of Lanyon, of Lanyon, in Madron, and identify the issuer with Philip Lanyon, Mayor of Penzance in 1650.

54. *O.* IOHN . TREVETHAN — A griffin segreant between three
 fleurs de lis ¼
R. IN . PENZANCE . 63 — I . T

G.—The arms are those of the Trevithern family.

PROBUS.

55. *O.* IOHN . LOOGER — A cross ¼
R. IN . PROBVS . 1668 — I . L

Bod.—Possibly one of the Luger family.

REDRUTH.

56. *O.* ANTHONY . COCKE — Three cocks ¼
R. OF . REDRVTH . 1666 — A . C

T.M., G., Bod.—The small flagon of the communion service of Redruth parish church is inscribed “This was the gift of Mr. Anthony Cocke to the parish of Redruth, in Cornwall. Obyt. 11^o Mart, 1700.”—“Historical Sketch of Redruth” in Redruth Directory, by Mrs. F. W. Michell.

57. *O.* ANTHONY . COCKE — Three cocks in escutcheon ¼
R. OF . REDRVTH . 1666 — A . M . C

T.M., G., S.—A variety of the preceding, issued while or when the issuer was married—there is no clue as to which precedes. Eighty-eight of the Cocke tokens of both varieties were in 1871 given to the Royal Institution of Cornwall by Mr. Rogers, of Penrose.

58. *O.* STEPHEN . HARRIS . IN — The Mercers' arms ¼
R. REDRVTH . IN . CORNWAL — S . I . H

Bod.—Stephen Harris, of Redruth, Gent., junior, was appointed Assistant Stannator in the Stannary Parliament of 1710.

ST. AGNES.

59. *O.* EDWARD . NEWSAM — On a fesse between a star in chief
 and globe in base, three saltires ¼
R. ST. . AGNES . 1666 — A bust of the saint, half face

Bod.

ST. COLUMB.

60. *O.* IOHN . OXNAM — The Mercers' Arms ¼
R. IN . ST. . CVLLAME . 1664 — I . O

G.—The Oxenhams are a Devonshire family. An Oxnam was Sheriff of Cornwall in 1810. There is a John Oxnam, a farmer, now living in Newlyn, near St. Columb.

ST. IVES.

Mr. Boyne assigns every token dated St. Ives, to St. Ives in Huntingdon, whereas St. Ives in Cornwall was not only in a flourishing state two centuries since, but the more important town of the two. In this way St. Ives in Huntingdon is credited with 24 out of the 64 tokens given to that county, Huntingdon itself having only nine. Some of these, however, a Cornish eye recognises as Cornubian at a glance; and further examination reveals the curious and suggestive fact that whilst in the other towns of the eastern county there are 25 half-pence to 15 farthings, in St. Ives the proportion is 17 farthings to 7 half-pence—a preponderance of farthings that at once reveals the characteristics of the western. Upon a careful examination of Mr. Boyne's list, it is clear that 8 of the 24 are correctly assigned. There remain then eighteen. Of these I believe we can claim for our own St. Ives, with confidence, 13. The other five are doubtful. Of the 18 tokens, all except four are farthings, so that their subtraction would bring the Huntingdon St. Ives into harmony, so far as the proportion of half-pence is concerned, with the rest of that county. There can be no doubt, that instead of being wholly barren in the matter of tokens, St. Ives was really the most prolific community in that respect in Cornwall.

- 60A. *O.* THE . OVERSEERS . HALFE . PENY . OF . ST. . IVES . 1669
 (in 5 lines) ½

R. POOR . WOMEN — Two women packing fish (?)

- 60B. *O.* THE . OVERSEERS . FARTHING . OF . ST. . IVES . 1669 (in
 5 lines) ¼

R. POOR . WOMEN — Two women packing fish (?)

These are two of the tokens that Mr. Boyne assigns to Hunts, and his reading of the device is two women washing in a tub. Both these tokens are in the possession of Mr. Golding, and on that gentleman examining them

closely, in conjunction with Mr. H. S. Gill, it was found that the supposed tub as closely resembled a wicker maund; and that while the woman on the right was apparently holding up a fish, her companion was stooping down over the basket apparently packing another in. This would be so clear an identification with the staple trade of St. Ives, in Cornwall, that the assignment of both tokens to that town hardly admits of doubt. If the interpretation of the device be correct it admits of none.

61. O. THOMAS . ANDREWS — A Bull 1/4
R. OF . SAINT . IVES . 1663 — T . E . A

B.M.—Andrew and Andrews are local names of very common occurrence.

- 61A. O. THOMAS . BERRIFFE — The Haberdashers' Arms 1/4
R. OF . SAINT . IVES — T . M . B

G.

62. O. ARON . BROWNE — An Anchor 1/4
R. OF . ST. . IVES . 1659 — A . B

G.—This can hardly fail to belong to Cornwall. The anchor would have been a device of little meaning in the Huntingdonshire town, but specially appropriate in the Cornish. Browne is an old name in West Cornwall. Moreover it was connected with the fish trade. Richard Browne, in 1595, petitioned Lord Burghley to have the free enjoyment of his grant for curing and packing fish in Devon and Cornwall.—“Lansdowne MSS.” 78, art. 58.

63. O. HENRY . CORDALL — The Haberdashers' Arms 1/4
R. IN . ST. . IVES . 1658 — H . E . C

G., B.M.—Cardell is peculiarly a Cornish name; and there are Cardell's yet in St. Erth, close to St. Ives. The change of the “a” to the “o”, or of the “o” to the “a” is nothing uncommon in connection with either names or tokens.

64. O. EDWARD . HALLSEY — The Salters' Arms 1/4
R. IN . ST. . IVES . 1663 — E . H

65. O. EDWARD . HALLSEY — A Sugar Loaf 1/4
R. OF . ST. . IVES . 1667 — E . I . H

G., B.M.—We may take it that these tokens were by the same issuer, who married in the interim. I claim them with confidence for Cornwall. The first bears the Salters' Arms, and it is a fact worth noting, that none of the tokens given by Boyne for the counties around Hants, have this device—Bedfordshire, Northamptonshire, and Cambridge; and that three of the five Salters' Arms tokens given to Hants itself are open to more than a doubt. Of four Salters' Arms tokens given to St. Ives, in Huntingdon, one, that of John Ibbott, is, I think, correctly so identified, as the Ibbotts were an old Quaker family in that county. Still even this is not certain, for the name occurs also in West Cornwall. The other token of this kind is under St. Neots, and that I cannot claim. It need hardly be pointed out that in a town so largely engaged in the fish trade as our own St. Ives, salters may be expected to have driven a thriving business. The arms occur also at Penryn. Halsey is or was a Cornish surname, possibly connected with Halse, a name specially associated with St. Ives. Joseph Halsey was ejected in 1662 from the living of St. Michael Penkivil.

- 65A. *O.* WILLIAM . HARRISON — W . H 1/4
R. OF . ST . IVES — 1667

B.M., G.—This is a common name everywhere, and the coin is therefore difficult to locate.

- 65B. *O.* IAMES . HEATON — HIS HALF-PENY 1/2
R. OF . ST . IVES -- I . H

B.M.

66. *O.* IOHN . HICKMAN . OF — The Salters' Arms 1/4
R. ST . IVES . 1660 — I . E . H

67. *O.* IOHN . HICKMAN . IVNIOR — The Salters' Arms 1/2
R. IN . ST . IVES . 1668 — HIS HALF-PENY

G.—Father and son. The device (vide Hallsey) and the name alike lead to the conclusion that these tokens belong to Cornwall. Hicks is a very common name in the county, and Hickman has occurred in connection with West Cornwall. Possibly it is now represented by Higman.

68. *O.* IOHN . HVTCHINS — 1667 1/4
R. OF . ST . IVES — I . H

69. *O.* RICHARD . HVTCHINS — Three roses 1/4
R. OF . ST . IVES . 1666 — R . W . H

Bod., G.—The evidence as to these tokens is beyond dispute. The last is classed as Cornish in the Bodleian, and John Hutchins was nominated one of the inferior burgesses in the charter granted to the town by Charles I.

70. *O.* IOHN . KING — Two swords crossed 1/4
R. IN . S . IVES . 1667 — I . K

B.M.—The balance of evidence is in favour of this being Cornish likewise. King is an old county name. There was a Henry King, at Truro, in 1659; and John King, afterwards rector of Chelsea, was born at St. Columb, in 1652.—“*Bibliotheca Cornubiensis.*”

71. *O.* ROBERT . PAIGE . OF — The Tallow Chandlers' Arms 1/4
R. SAINT . IVES . 1663 — R . I . P

B.M.—A local name of frequent occurrence.

72. *O.* IONATHAN . READ . IN — The Haberdashers' Arms 1/4
R. IN . SAINT . IVES — J . R . R

G.—There are two varieties of this token. The name still exists in the town.

73. *O.* THOMAS . STOCKER . OF . ST . -- A Dolphin 1/2
R. IVES . HIS . HALF-PENY — T . M . S

This does not admit of a doubt. Stocker is the name of a family of Flemish refugees, which settled in the West in the 16th century to escape religious persecution; and in Cornwall it is particularly well known. The dolphin too marks the maritime connection.

ST. NEOT.

Here again there is confusion between Huntingdon and Cornwall, unless the tokens which bear the name in the possessive, St. Neots, are all clearly assignable to the former.

- 73A. *O.* THOMAS . ANNIS . OF — The Apothecaries' Arms $\frac{1}{2}$
R. SAINT . NEOTTS . 1667 — HIS HALF-PENY

Given by Boyne to Hunts and probably correctly. Still the point is not clear, for Annis is a West Country name.

- 73B. *O.* THOMAS . HANCOCKE — A Frying Pan . T . H $\frac{1}{2}$
R. OF . SAINT . NEOTS . 1667 — HIS HALF-PENY

Also assigned to Hunts; but I am disposed to claim it for Cornwall, seeing that Hancock is such a common name even now in the neighbourhood of Liskeard and St. Neot. Edward Hancocke, of Menheniott, was sent to Bodmin gaol as a Quaker in 1662.

74. *O.* WALTER . HODGE . OF . ST. — A Shuttle $\frac{1}{4}$
R. NEOT . IN . CORNEWALL — W . E . H

Bod.

ST. MAWES.

75. *O.* WILL . KNAPTON . AT . S. MAWES — The Vintners' Arms $\frac{1}{4}$
R. IN . CORNWALL . 1666 — W . S . N

Bod.—The substitution of n for k on the reverse was probably a phonetic blunder.

SALTASH.

76. **O.* IOHN . FOSTER . OF — An Anchor $\frac{1}{2}$
R. SALTE . ASH . 1670 — HIS HALF-PENY

Tutet's MS.—It is a singular fact that all the Saltash tokens are half-pence.

77. *O.* CHRISTOPHER . STEPHENS . IN — A Boat with passengers $\frac{1}{2}$
R. *Saltaish* . *His* $\frac{1}{2}$. 1667 (in three lines across the field)

G.—Was not Stephens the ferryman? The ferry at Saltash was anciently one of great importance and apparently emolument. It was granted by Edward the Black Prince, in 1348, to one of his followers in consideration of his services, and his disfigurement by the loss of an eye in battle.—Worth's "Hist. Plymouth," p. 22.

78. *O.* PETER . STEPHENS . OF . 1667 — A Ship $\frac{1}{2}$
R. SALTASH . IN . CORNWELL — HIS HALF-PENY

B.

79. *O.* THOMAS . SWETNAM . IN — The Vintners' Arms $\frac{1}{2}$
R. *Saltaish* . 1669 . *His* $\frac{1}{2}$ (in four lines across the field)

Bod.

SCILLY.

80. O. THOMAS . EKINES . IN . Y^E . ILAND — Three men around
a globe ½
R. OF . SILLY . HIS . HALF-PENY — T . E and a merchant's
mark

B., G., S.—Thomas Ekins was a considerable merchant, the first steward of the Godolphin family, once lessees of Scilly, who resided on the islands. Having obtained a long lease of St. Martin's for himself, he encouraged settlement thereon. He likewise built a tower there for a day mark which still stands. Over the door is a stone inscribed "TE. 1683."—*Vide* Borlase's and Woodley's "Scilly Isles."

TREGONY.

81. O. HENRY . SLADE — H . I . S ¼
R. IN . TREGONY . 58 — The Grocers' Arms

G.—This issuer either subsequently removed to Truro, or had an establishment in both places.

TRURO.

82. O. ANDREW . CROCKER — 1668 ¼
R. IN . TRURO — A . C

T.M., S.—The Crockers, of St. Agnes, near Truro, to whom the issuer of this token probably belonged, are said (C. S. Gilbert's "Cornwall," v. ii, p. 89) to have been descended from the Devonshire family of that name, of whom it was rhymed

"Crocker, Cruwys, and Coplestone
When the Conqueror came were all at home."

83. *O. RICHARD . FREEMAN — The Mercers' Arms ¼
R. OF . TRURO . 1667 — R . M . F

S.—Freeman is a prominent name in the county.

84. *O. WILLIAM . JACKMAN — The Haberdashers' Arms ¼
R. OF . TRURO . 1666 — W . I . I

G.

85. *O. MATHEW . ROWETT — The Mercers' Arms ? ¼
R. OF . TRURO . 1668 — M . A . R

T.M., S.—John Rowett, of Mevagissey, was imprisoned in Launceston Gaol as a Quaker.

86. *O. HENRY . SLADE — H . I . S ¼
R. OF . TRURO — 1663

G.—*Vide* Tregony.

87. **O.* THOMAS . TREWILLOW — Three Owls 1/4
R. IN . TREWROW . 1667 — ditto

T.M.—The owls are the arms of the Trewholla family, who once occupied a leading position in the town.

88. **O.* SAMVEL . WEALE — A Postboy 1/4
R. IN . TRUROE — 1663

Tutet's MS.

UNKNOWN LOCALITIES.

89. **O.* IN . CORNWELL — T . R 1/4
R. MERCER . 1667 — detrited

T.M.

90. *O.* WILLIELMUS . TINGCOMBE — detrited 1/4
R. ECCE . SIGNUM . 1659 — A CROSS MOLINE

This is given by Mr. Boyne among those unassigned, but the Tingcombes being an old Cornish family, there is very little doubt that it is properly classed here.

EIGHTEENTH AND NINETEENTH CENTURY TOKENS.

COPPER—PENNY.

O. PAYABLE IN CASH NOTES AT SCORRIER HOUSE— A Pilchard
between three blocks of tin and four cakes of copper.

R. CORNISH PENNY, 1811 — A Mine in work.

O. FOR THE ACCOMMODATION OF THE COUNTY — As above.

R. As above — ditto.

O. PAYABLE AT SCORRIER HOUSE (part round field) — A Mine in
work; (in exergue) ONE POUND FOR 240 TOKENS 1812.

R. CORNISH PENNY (on garter) — Prince of Wales Plume.

(There are other varieties of the Scorrier token differing in trivial points).

O. SUCCESS TO THE CORNISH MINES 1812 — PENNY PIECE.

R. (No legend) — De Dunstanville Arms.

O. PAYABLE IN CASH NOTES AT DOLCOATH MINE — CORNISH PENNY.

R. As above.

O. WEST WHEEL FORTUNE . ONE PENNY TOKEN — Prince of Wales Plume.

R. CORNISH MOUNT . ONE PENNY TOKEN — St. Michael's Mount.

HALF-PENCE.

O. CORNISH COPPER HALF-AN-OUNCE 1791 — The County Arms surmounted by a ducal crown.

R. No legend — A Druid's Head within an Oak wreath ; beneath, the initials of the engraver, R. D.

O. A scroll with the Arms of Penryn on a martial trophy — above PENRYN VOLUNTEERS. In exergue — FIRST ENROLLED APRIL 3, 1794.

R. The De Dunstanville Arms and Motto. In exergue LORD DE DUNSTANVILLE, COLONEL.

O. FALMOUTH INDEPENDENT VOLUNTEERS 1797, (across field).

R. The Arms of Falmouth.

FARTHING.

O. HARRIS . SURGEON . REDRUTH.

R. DATUM SERVA ANNO DOMINI 1810.

WHITE METAL — TWO SHILLINGS.

O. SAMUEL HIGGS PENZANCE — (In inner circle) TEA DEALER AND GROCER.

R. ONE TOKEN, TWO SHILLINGS — A Wheat-Sheaf.

SILVER SHILLINGS.

O. NORTH CORNWALL, 1811 — Arms of the Duchy of Cornwall ;

R. ONE SHILLING VALUE, — (within an olive wreath).

O. Same legend and device as No. 1.

R. SILVER TWELVE-PENNY TOKEN, SOLD BY MORGAN, 12, RATHBONE PLACE, LONDON. — (In 8 lines across the field).

- O.* CORNWALL. Arms of the Duchy, in an olive wreath.
R. A TOKEN FOR ONE SHILLING. — within a wreath.
- O.* LAUNCESTON TOKEN, ONE SHILLING, 1811. — A Castle
(part of the Borough Arms).
R. ISSUED TO FACILITATE TRADE — W. AND G. PEARCE, T.
CHING, H. NICHOLS, AND J. PROCKTER.
- O.* SHEPHARD, WATTS AND CO., STRATTON — “12,” within an
olive wreath.
R. NORTH CORNWALL, 1811. — The Arms of the Duchy of
Cornwall.
- O.* Same as the obverse of last.
R. DEVONSHIRE SILVER TOKEN. — per pale, (a part of the Arms
of Exeter) a triple towered Castle, within a wreath.

III.—*Mineralogical Notices.*—By J. H. COLLINS, F.G.S.

DURING the past few months several facts bearing upon the mineralogy of the two western counties have come under my notice, which may, perhaps, be interesting to some members of the Royal Institution of Cornwall.

On many occasions Garnets have been found in considerable abundance both in Cornwall and in Devon. They are rarely more than semi-transparent—sometimes quite opaque—and very seldom of good color—but these deficiencies do not much reduce the interest with which they are viewed by scientific mineralogists. Above 20 localities are recorded in my “Handbook,”* and I have now the pleasure of presenting specimens from three new localities. The first specimen is from the decomposed surface of a highly ferruginous trap-rock which is worked for iron ore at Smallacombe in Devon. The crystals are dark brown and have considerable lustre, but are only semi-transparent. The second specimen is from Huel Devonshire, near St. Agnes. The crystals which are small and dark-colored, occur in a dark green rock like many tinstones; and I am informed by Mr. Kitto, to whom I am indebted for a knowledge of the fact, that they were mistaken by the miners for tin-ore—although the stone does not contain a particle of tin. This particular specimen was, in fact, taken from the pile of so-called best work.

The third specimen consists of yellowish brown crystals of considerable size, but these also are dull and nearly opaque. They were taken from workings about 20 fathoms deep in Great Retallack Mine, Perranzabuloe, and very similar specimens have been recently found at Gravel Hill Mine, in the same parish, as well as near the old church of St. Perran in the sands.

This last is also a new locality for the rare mineral Axinite, which occurs with the Garnets already mentioned.

Until recently I believe that no Cornish Garnets have been

* Handbook to the Mineralogy of Cornwall and Devon, Part II, p. 53.

analyzed, but I have lately analyzed those from Great Retallack with the following results, viz :

Silica	41·70
Peroxide of Iron	35·71
Protoxide of Iron	trace
Manganese	trace
Alumina	3·20
Lime	18·52
Water	·25
	<hr/>
	99·38

They are therefore Iron-Lime Garnets. Their hardness is about 6·5, specific gravity 3·496. They are brittle, easily pulverised, and small fragments are readily fused to a dark slag before the blow-pipe. The fine powder is slowly soluble—except the silica—in hydrochloric acid.

The remark has been made that “the Cornish Garnets are associated mostly with greenstone.” This is equally true of those from Devon and the new localities are no exceptions. At Great Retallack fine masses of radiated hornblende occur with the garnets and with zinc-blende. I have the pleasure of presenting a fair specimen to the Institution.

I append brief notices of some other new localities which may be useful for future reference.

Fluor and Jasper have been found at Great Work Mine in Breage.

Toad’s Eye Tin has been found at Polbreen Mine, St. Agnes.

Lithia Mica has occurred in large brown plates in the railway cutting at Luxulyan. In the same cutting a fine lode of tin has been exposed.

Carbonate of Lead has occurred in considerable masses in the railway cutting at Trewithen, in Cubert.

Cassiterite as pseudomorphous replacements of crystals of Bismuthenite has been brought under my notice by Mr. Rd. Talling of Lostwithiel. Some of the crystals are merely coated with Cassiterite, others are entirely replaced by a radiating mass of minute crystals. They occur on a mass of cellular quartz apparently from a copper lode.

On a recent visit to the Gravel Hill part of the Great Perran

Iron Lode, I found the specimen of Blue Phosphate of Iron which I now present to the Royal Institution. I have also found Phosphate of Lead on several occasions—always, however, near some of the numerous intersections of the lode by lead lodes. The occasional occurrence of these minerals may, perhaps, explain the extraordinary analyses of the Perran Iron Ores which have, from time to time, been published. I have had occasion recently to examine scores of samples, specially for Phosphoric Acid. In some instances I have found none—sometimes only a trace—at others, quantities of Phosphoric Acid varying from .1 p.c up to 2.45 p.c,* which is the highest I have ever been able to find. One analysis, however, giving 6.99 p.c of Phosphoric Acid is on record, and if the portion analysed contained a fragment of either of these phosphates, such a result might be expected. These facts illustrate the importance of Mineralogical knowledge, not only to the workman who picks over piles of iron-ore for the market, but also to the chemist who analyses the sample.

* A later analysis of ore from near a cross-course at Gravel Hill gives 3.84 p.c of Phosphoric Acid.

IV.—*Nangitha Cross*.—By JAMES JAGO, M.D., OXON., F.R.S.

EXCEPTING a narrow space, next the church, the small farm of Nangitha alone intervenes between the parish church of Budock and the large estate of Kigilliack (or Kegellik), which was “once a seat of the Bishops of Exeter.” Nangitha lies, in other respects, too, so closely related to a district that has been celebrated in the Cornu-Celtic Miracle Play, bearing the Latin title of *Ordinale de Origine Mundi*, that I have thought that any hitherto-unnoticed ecclesiastical remains that may be seen thereon, though only those of a dismembered cross of no great artistic merit, might have a literary interest for the members of this society. Moreover, I have thought that I might make an account of this cross the medium for conveying a little information about the district in question, which may prove corrective of some of the comments that have been supplied by E. H. P. in the Appendix to Norris’ translation of the drama.

This drama on the creation, before it ends, embraces the time of the building of Solomon’s temple; and that munificent King is made to say to his chief “carpenters” on the completion of the structure:

“Blessing of the Father be on you!
 You shall have, by God’s faith,
 Your payment, surely;
 Together all the field of Bohellan,
 And the wood of Penryn, wholly.
 I give them now to you;
 And all the water-courses.
 The island and Arwinnick,
 Tregenver, and Kegellik,
 Make of them a charter to you.”*

Close to the parish of Gluvias, but lying within that of Budock, there once flourished at Penryn the collegiate Church of St. Thomas of Glasney, and the conjecture that the author of the drama was one of its resident ecclesiastics has been commonly approved.

* *The Ancient Cornish Drama*. By Mr. Edwin Norris, Sec. R.A.S., Vol. I, p. 197.

The most recent of the many descriptions of this institution that has been written, is, I presume, that* of the Rev. C. R. Sowell, who cites an Elizabethan map of the neighbourhood, a copy of which I have consulted. In this map I find "Bohellan Field" (as now) just by Gluvias Church; whilst only one spacious wood is shown on it. This spreads over a tongue of land from the precincts of the College and the Bishop's Palace in its vicinity to the confines of Kegellik, and can be no other than the wood of Penryn, sometimes called Bishop's Wood. There is a ten-acre enclosure of Kegellik at this day that is known on the farm as College Wood, which is the extension of a much larger area so called that lies between it and Penryn, that may be regarded as the eastern wing of what was formerly known as the wood of Penryn, but which has now for the most part been converted into arable land.

As to the water-courses I may remark that there are only three streams in the parish of Budock that may be spoken of as mill-streams, emptying themselves into the sea, respectively, at Penryn Creek by the way of Glasney, at Swanpool after having bounded one side of Tregenver, and at Mainporth, and that Kegellik so spans the ridge of a hill as to drain into each of them; being separated from the parish of Mabe by the first, originating the second, and supplying a streamlet to the last by way of Nangitha valley. The only other mill-stream near Glasney flows into the Gluvias head of Penryn Creek; so that Bohellan rises a little beyond it. On the Elizabethan map† the leats that have been derived from the last two streams are traced as they now exist; whilst on the first of those leats near the gates of Glasney three mills are depicted, and on the other, just as it reaches the shore of the estuary, one.‡ It is thus evinced that water-mills were of value thereabouts in those days, and the import of the term water-course made evident.

* *Journal of the R.I. of Cornwall*, No. iii.

† *Journal R.I.C.*, No. iii. A woodcut of Glasney taken from the Elizabethan map shows these four mills.

‡ *Op-cit*, V. ii, p. 483. E. H. P. avows himself at a loss to explain the watercourses and conjectures that shipping-tolls on the creek may have been hinted at, an idea that leads him (the late Mr. Pedlar) to try to explain away the plurals of Norris' translation.

With E. H. P., I infer that the island presented by Solomon was more probably the *peninsula* of Pendennis whose isthmus connects it with Arwinnick than, the alternative, Enys (*i.e.* island), which lies a little eastward of Bohellan. Thus going westward, Arwinnack house would be a mile from the Castle; Tregenver a mile from it; and this a mile from Budock Church. Glasney would be two miles north-west of Arwinnick, a little over a mile north of the church, and less than a mile north-east of Kegellik house, whilst this house and the church were a half-of-a-mile asunder.*

In the map there is shown a highway, which still exists, leading from the head of one creek to that of another along the coast, and in this manner passing Bohellan, going through Penryn, and between Glasney and the palace near it by the mills, bisecting the wood and Kegellik (touching the house) in the way round the heads of the Gweek Creek. Its first branch leftward arises in the midst of the wood and leads to Budock Church, and between it and Nangitha to Helford Ferry. Now there is a road at the present time that leaves the church to intersect the branch and trunk highways at right-angles, consisting of a field pathway at either end and of a cart road only used for the purposes of the farm called Nangitha Lane in the middle part. In this lane at one-quarter-of-a-mile from the church, there is a stile that opens upon a field-path that conducts straight towards Penryn; and a pedestrian, when at this point, has the choice of three field-paths into the trunk road, and of several routes, two of which (one on either hand) touch, and one traverses Tregenver to Falmouth (in the map, Arwinnick). In Elizabethan times the minor roads and paths hereabouts must have been much as those of our day. Hence without indulging in further details, it is plain that the entrance to the stile in Nangitha Lane must have been in the days of Glasney, a point where wayfarers proceeding to and from various busy neighbourhoods would have occasion to pass.

* *Op-cit*, V. ii, p. 480. E. H. P. says of "Tregenver and Kegyllik." "The former is in the parish of Falmouth and the latter in St. Budock, but near the boundary dividing it from Falmouth:" whereas both farms lie wholly in Budock. The latter is bounded both on the south and east by Falmouth, whilst north-westward Trescobaes and two or three fields lie between it and Kegellik. It is true, however, that both Tregenver and Trescobaes belonged to the Manor of Arwenack (Arwinnick).

In this lane, and only a few yards from the stile, are yet to be seen the remains of a cross. These consist (see fig. 1) of a well-cut convex granite base of 5 ft. 9 in. diameter, whose middle is perforated by an oblong mortice-hole of 1 ft. 9 in. in length, and 1 ft. in breadth; also of a granite plate in the form of a rude segment of a circle, the straight side of which is 2 ft. long and whose broadest part measured perpendicularly to this side is 1 ft. 1 in. This plate has a rudely cut cross in relief on either face, as I have sketched in figs. 2 and 3. The entire border of the segment seems to have been tool-cut; there being now no flaw on the straight side, nor is there on the curved portion along one face, and through half the thickness of the plate, though two splinters have been chipped from the other half of the thickness so as to infringe upon the curved margin of the other face, more or less (that which is underneath in fig. 2, and uppermost in fig. 3). This plate though longer than the mortice-hole is thin enough to pass easily through it when presented to it edgewise.

Since the dimensions mentioned make it obvious that the plate could, in no manner, have been set in the hole, we may safely conclude that it must have rested, somehow, upon a shaft, though a cursory search thereabouts failed to detect such a thing utilized as stile-step, gate-post, or grazing-post for cattle. Yet it has not the appearance of having been broken off from a shaft, as the marks of fracture in such case should have affected its whole thickness. There might have been a groove in the upper end of the shaft into which the straight edge of the segment fitted, so that an unsymmetrical St. Andrew's cross resulted.

I may add, that, prompted by the recollection of a stone pedestal just visible through a brake of brambles, that had often puzzled my boyish curiosity, I seized an opportunity a few weeks since to revisit the spot, accompanied by my brother, whose recollections of the pedestal extended several years further back than mine. Neither of us had ever heard that a cross had stood there, but having lifted up through the mortice-hole, a stone plate that was lying in a pit that had been excavated in the soil underneath, and whose depth from the upper surface of the pedestal was 1 ft. 6 in., we found a cross on either aspect of it. After I had taken the two sketches it was dropped into the hole again. The brake had been cut away, but a bramble rooted in the pit grew up

NANGITHA CROSS.

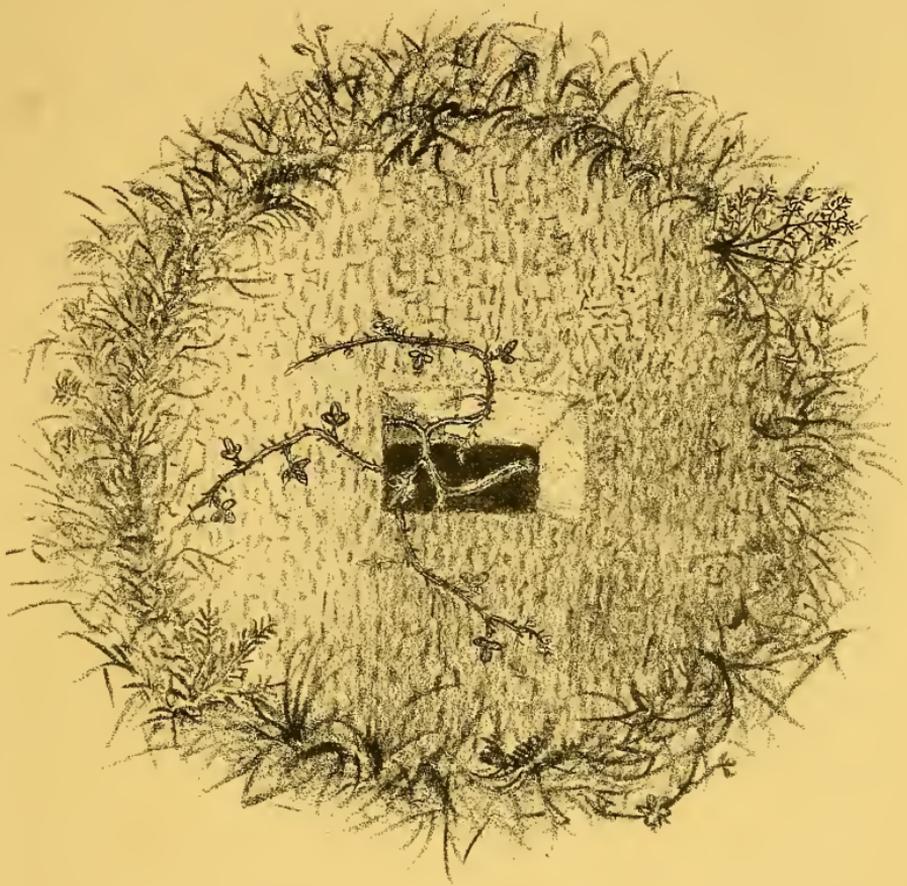


Fig 1.

Fig. 2.

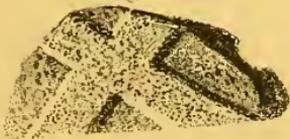
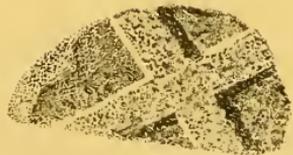


Fig 3.



Scale $\frac{1}{2}$ Inch to the Foot.

through the hole, and the margin of the granite base was overlapped by the turf. Since my visit, I have had the good fortune to make the acquaintance of some of the members of a family that has owned and occupied Nangitha for several successive generations, from whom I gathered that the remains have always been spoken of at Nangitha as those of a cross. There was no tradition which fixed the date of its overthrow, though, as is usual, there were myths that the base had undergone three removals in the vain search after treasure, that was known to have been buried underneath it.

V.—*Note on the Ornithology of Cornwall for the year 1873-4.*—By
E. H. RODD.

IF the neighbouring parish of Probus had not come to our assistance, the Spring Meeting of the Royal Institution of Cornwall would probably have passed off without any Ornithological report of any interest from my Journal as regards the County.

There was no occurrence of any interest or addition to our calendar of British Birds from the time of your last Spring Meeting to the month of January, the winter having passed off without the slightest severity and without giving us anything like the average number of our common wild fowl, and no instance of any rare member of the British family of anatidæ. There appears, however, to have been a very large increase of Snipes this year everywhere, and it will, no doubt, be remembered by many, that several severe winters some years since, coming in succession, caused our markets to be deluged with these birds and the waders generally; and for several years after the dwarfed numbers were very apparent, till last year, when the numbers all over the moors of Cornwall from east to west, including the Lizard district, exceeded anything that had been before seen, and especially in the open moors of Goonhelly.

The pages of the "Zoologist" are silent as to any addendum to the Cornish avifauna till the month of January, when I recorded the capture of a very beautiful species of Thrush which is figured and named by our British Ornithologists as "White's Thrush," an oriental species which wanders occasionally from China and other countries in Asia to our shores; the specimen now under notice making, I think, the ninth instance of its occurrence in Britain. It is of much larger size than any of our British Thrushes, exceeding the well-known Missel Thrush by one third at least; and it is twice as heavy as our common Song Thrush. It is distinguished also from all our Thrushes by the mottled character of the dorsal plumage, that portion in all the British Thrushes being of an uniform olive brown. It was ob-

served for some time by the Keeper at Trewithen frequenting swampy ground about a pond. There is a figure of this Thrush in Yarrell's British Birds, and also in Gould's "Birds of Europe," and his more recent work "The Birds of Great Britain."

Length	12½ inches.
Tarsus	1½ „
From Carpal joint to end of first quill.	6½ „
Weight	6½ ounces.
No. of Tail Feathers 14, usual number 12.	

I have much pleasure in presenting the Society with two photographs of this fine Thrush, and I believe the first and only Cornish example.

I have noted this spring the occurrence of the Garganey Teal in several instances. This is the only species of our numerous Ducks that visits us in the spring months, and then only for a few days, on its way to the north or elsewhere to breed and rear its young; but I never remember seeing them in their equatorial return flight in the winter with the other ducks. When they visit us in the spring they are in their full adult plumage, exhibiting an arrangement of colours far less gaudy than many of our wild ducks, but at the same time quite as attractive from its elegant arrangement and markings. In size it is one of our smallest species.

My note on our Spring Migrants for 1874 is as follows:—

"The Blackcap was in full song on April 6th in Trereife Valley, about a mile from Penzance. This is the earliest date I ever recorded the first song of the Blackcap, but it happened to be a genial spring morning with plenty of sun. At the same time I heard the song of the Chiffchaff for the first time in this neighbourhood, which is unusually late. I heard it on the 28th March in the eastern part of the County. It may be well to remark that both the Chiffchaff and the Blackcap remain with us all through the winter in limited numbers, and I expect that the bird I heard this morning was no migrant, and simply commenced his spring song. I heard no more of the Blackcap's song till Monday, the 20th, when they were generally distributed. I observed swallows on the Marazion Pond on the 11th April. On the 21st I heard the first song of the Sedge Warbler, and on the

same day the first Hoopoe was obtained from the grounds of Clowance, in our eastern district. As these birds always appear in larger or smaller numbers every spring with us, it may be well to note the earliest arrival. Cuckoos, Willow Wrens and White Throats have not reported themselves. Garden Warblers, Lesser White Throats, Wood Wrens, Reed Wrens, Nightingales and Red Starts do not visit our western shore."

Note on the Spring Migration of the British Warblers.

The arrival of our summer visitors with their welcome spring notes and songs always suggests the query where they actually come from; I mean those that visit the British Isles and rear their young there during the summer. This thought is now again suggested by my friend Mr. T. S. Bolitho, who, a few weeks since, in his tour through Italy, wrote me that Nightingales, Blackcaps, Garden Warblers, Willow Wrens and others are all in full vigorous song, and fill the groves with their melody. The question naturally arises how is it that these birds are singing in Italy, and what business have they to be so far south at this season, as it is generally understood that the great vernal migration draws away the family of our migratorial warblers from the south to the northern European countries to breed, to return again at the great autumnal migration to the southern countries of Europe to avoid the rigours of our northern climate in winter? The question which seems to arise therefore, is, whether this polar (or from south to north) migration in the spring is *general* or *partial*,—some birds choosing to stay where they are, whilst others migrate; or, whether these birds in *Italy* in the spring and in full song are migrants from a still lower range of latitude, such as the northern and central parts of Africa, and are satisfied with their limited trip to Italy only, without going farther north, in the same way as those from Italy and the south of Europe (the limit of their southern migration in the autumn) aspire to a higher range, and thus visit us.

EDWD. HEARLE RODD.

Penzance, May 15th, 1874.

VI.—*List of Works on the Geology, Mineralogy, and Palæontology Cornwall.*—By WILLIAM WHITAKER, B.A. (Lond.), of the *Geological Survey of England.*

THE following list contains the names of 237 authors and the titles of 654 books, papers, maps, &c., ranging from the year 1602 to 1873. These titles are given according to the date of publication, though that is sometimes difficult to find out exactly.

The writer has to thank Mr. Henwood for information, not only obtained from his published papers, but also given personally.

In the Mining Record Office, Jermyn Street, London, there is a very large collection of drawings of plans and sections of Cornish Mines, enough indeed to fill a lengthy catalogue; and in the Museum there are models of Cornish Mines.

Long though this list may seem, yet the writer is aware that it is imperfect. Many foreign papers doubtless have not been noticed, and also some English ones that have appeared in Mining Journals.

It may be useful to notice that a corresponding list for Devonshire has been published by the Devon. Association in their Transactions for 1870, with a supplement in the Transactions for 1872.

Index of Authors, with the Numbers of their Papers, &c.

- | | |
|---|---------------------------------------|
| Accum, F., 32. | Bate, C. S., 525, 542. |
| Adger, J. B., 612. | Bawden, S., 526. |
| Aikin, A., 26. | Becquerel, — 322. |
| Allan, T., 53. | Bennetts, J., 204. |
| Allport, S., 591. | Berger, Dr. J. F., 47. |
| Anon., 2, 3, 29, 46, 72, 103, 138, 145, | Berzelius, 147. |
| 146, 175, 176, 181, 182, 190, 213, | Blake, C. C., 462. |
| 223, 237, 247, 248, 414, 429, 430, | Blyth, Dr. J., 372. |
| 476-478, 485-487, 523, 571, 578, | Boase, H., 109. |
| 592, 613, 631. | Boase, Dr. H. S., 110, 157, 158, 191, |
| Ansted, Prof. D. T., 238. | 209, 211, 214, 217, 224, 225, 239. |
| Argall, W. (or W. H.), 540, 603, 614. | Bond, T., 133. |
| Arundell, W., 429. | Bonnard, A. H., 30. |
| Austin, Major T., 524, 541. | Borlase, Rev. W., 7, 9-12, 14, 15, |
| Barham, Dr. T. F., 155, 156. | 488, 505. |
| Barnett, A. K., 572, 579. | Box, W. H., 323. |
| Bartlett, — 279. | Brayley, E. W., 42, 183. |

- Britton, J., 42.
 Brooke, H. J., 425.
 Bryant, Capt. N., 593.
 Budge, Rev. E., 269, 280, 296, 297, 311, 332.
 Burr, F., 213, 226, 240, 249.
 Calvert, J., 404.
 Carew, R. C., 1.
 Carne, Miss E., 448.
 Carne, J., 40, 81-83, 111, 112, 159-161, 192, 193, 205, 270, 271, 324, 379, 388.
 Chapman, Prof. E. J., 405.
 Chenevix, R., 23.
 Church, Prof. A. H., 479, 506-513, 527-529, 554, 573, 580, 581, 594, 595, 632.
 Claypole, E. W., 582, 615.
 Colenso, J. W., 194.
 Collins, J. H., 574, 592, 596, 616, 633-635.
 Connell, A., 350.
 Conybeare, Rev. J. J., 75, 76, 134.
 Cornish, T., 583.
 Couch, J., 312, 409, 415.
 Couch, R. Q., 313, 325, 333, 351, 389, 397, 410, 416, 417, 426, 431.
 Couper, R. A., 352.
 Da Costa, E. M., 13.
 Daubr e, — 272.
 Davey, S., 195.
 Davidson, T., 489, 514.
 Davies, T., 523, 543, 544, 555.
 Davy, Sir H., 84.
 Davy, Dr. J., 85, 148.
 Day, Dr. A.
 De Beaumont, E., 140, 149, 153, 162.
 De Bournon, Count, 24, 33, 34, 43.
 Dechen, — von., 179.
 Dela Beche, Sir H. T., 206, 218, 227, 228, 250, 281, 334, 390, 643-652.
 De Luc, J. A., 48.
 Drew, S., 139.
 Dufrenoy, P. A., 140, 149, 153, 162.
 Ebelmen, — 380.
 Edmonds, R., 163, 335, 363, 364, 373, 463, 556.
 Endey, J., 603.
 Enys, J. S., 207, 490.
 Faraday, M., 173.
 Field, F., 464, 515.
 Fisher, Rev. O., 636.
 Fitton, Dr. W., 56.
 Flight, Dr. W., 602, 619.
 Forbes, D., 545, 546, 557, 558, 575.
 Forbes, Dr. J., 113-115.
 Foster, Dr. C. Le N., 530, 531, 547.
 Fox, R. W., 116, 117, 164, 177, 184, 196, 215, 229-231, 241, 257, 273, 282, 298, 336, 353, 418, 432.
 Francis, H., 576.
 Francis, Capt. W., 354.
 Gages, A., 440.
 Garby, J., 314, 326, 365.
 Gilbert, C. S., 77.
 Giles, J., 374, 381, 391, 398.
 Godwin-Austen, R. A. C., 392.
 Greg, R. P., 419, 433, 449.
 Gregor, Rev. W., 37, 44, 67, 69, 70, 86, 87, 165.
 Grierson, Dr. J., 54, 57.
 Grosche, Dr. I. G., 19.
 Grove, W. R., 559.
 Haidinger, W., 166.
 Hall, T. M., 560.
 Hancock, R., 597.
 Hatchett, C., 35.
 Haughton, Rev. Prof. S., 406, 420, 427, 491, 577.
 Haury, Abb e, 36.
 Hawkins, Sir C., 88.
 Hawkins, J., 18b, 89, 90, 118-124, 167, 197-200.
 Heath, R., 8.
 Heddle, Dr., 421.
 Heming, J., 185.
 Henderson, Capt., 617.
 Henty, G. M., 548.
 Henwood, G., 422.
 Henwood, W. J., 168, 169, 178, 186, 187, 201, 202, 208, 219, 232, 233, 242-244, 299, 300, 315, 337, 393, 399, 441, 450, 454, 584, 598, 599, 618.
 Hessenberg, F., 637.
 Higgs, S., 465.
 Hitchins, Rev. M., 25.
 Holl, Dr. H. B., 561.
 Hopkins, W., 220.
 Horner, L., 411.
 Hunt, R., 283-285, 301, 327, 562.
 Jars, M. G., 18.
 Johns, Rev. C., 366.
 Jones, Prof. T. R., 442.
 Jukes, J. B., 563.
 Karkeek, W. F., 338.
 Kelly, J., 516.
 Kidd, Dr. J., 38.
 Kinahan, G. H., 585.
 Kingston, J. F., 188.
 Kitto, B., 586.
 Klapproth, M. H., 19, 31, 51

- Lankester, E. R., 564.
 Lean, T., 91.
 Lemon, Sir C., 355.
 Letsom, — 433.
 Lindenthal, — von., 18a.
 Lobley, J. L., 600.
 Longmire, J. B., 58, 71.
 Lyell, Sir C., 517.
 Lysons, Rev. D. and S., 59.
 M'Coy, Prof. F., 394.
 Mac. Culloch, Dr. J., 60.
 Majendie, A., 92-95.
 Maskelyne, Prof. N. S., 480, 492, 493,
 518, 532, 533, 601, 602, 619.
 Maton, W. G., 20.
 Maynard, Capt. J., 620.
 Merret, Dr. C., 4.
 Michell, J., 170.
 Michell, S., 603,
 Miller, Prof. W. A., 494, 502.
 Millet, J. N. R., 286.
 Mitchel, J., 39.
 Mohs, Prof. — 104.
 Moissenet, L., 466.
 Moore, E., 339.
 Moyle, M. P., 61, 125, 126, 135, 136,
 141, 154, 245, 251, 258, 259, 274.
 Murchison, Sir R. I., 252, 262, 263,
 340, 356, 357, 412.
 Newton, R., 341.
 Nicholls, Prof. F., 5, 6.
 Noble, Capt. J., 621.
 Oats, F., 549.
 Oeynhavsen, — von., 179.
 Paris, Dr. J. A., 72, 96-98.
 Pattison, S. R., 260, 287, 342, 343,
 358, 359, 367, 368, 375, 382, 400,
 413, 451, 622.
 Peach, C. W., 275, 288, 289, 302, 316,
 328, 329, 344, 345, 360, 369, 376,
 383, 384, 395, 565, 587, 588.
 Peacock, A., 566.
 Pearce, R., 455, 467, 481, 495, 496,
 534, 623.
 Penberthy, Capt. I., 303.
 Pendarves, E., 171.
 Pengelly, W., 377, 385, 401, 456, 457,
 468-471, 519, 535, 536, 550-552,
 467, 604, 624.
 Percy, Dr. J., 458, 497.
 Perkins, F. P., 520.
 Phillips, Prof. J., 276, 443.
 { Phillips, J., 285, 301, 317.
 { Phillips, J. A., 304, 318, 605, 606,
 { 638.
 Phillips, R., 27, 105, 127, 128, 137, 142.
 Phillips, W., 49, 62, 63, 73, 105, 142
 143, 172, 173.
 Phipson, Dr. T. L., 472.
 Pike, J. W., 537.
 Piot, — 277.
 Pisani, F., 498, 568.
 Plattner, M., 261.
 Playfair, Prof. J., 28.
 Polwhele, Rev. R., 74.
 Pryce, W., 16.
 Punnett, H. M., 452.
 Punnett, Rev. J., 346.
 Rashleigh, P., 21, 129.
 Reynolds, Prof. J. E., 625.
 Richardson, Dr. C. T., 607.
 Riley, E., 473, 482.
 Rogers, Rev. J., 99, 100, 130, 131,
 203, 278.
 Rogers, J. J., 444.
 Rosewarne, H., 15.
 Rule, J., 101, 386.
 Rundell, W. W., 361.
 Salmon, H. C., 429, 459, 474-477, 499.
 Salter, J. W., 500, 521.
 Schrauf, Dr. A., 632.
 Sedgwick, Rev. Prof. A., 107, 132,
 150, 209, 216, 246, 252, 262, 263,
 402.
 Sharpe, D., 362.
 Smith, A., 434.
 Smith, E., 78.
 Smithson, J., 41.
 Smyth, W. W., 435, 502, 569, 642, &c.
 Sorby, H. C., 436.
 Sowerby, G. B., 234.
 Spargo, T., 501.
 Statham, Rev. F. F., 445.
 Stephens, H., 626.
 Stockdale, F. W. L., 144.
 Stocker (or Stoker), H. M., 407, 408.
 Sutcliffe, Rev. J., 79.
 Symonds, Rev. W. S., 627, 628.
 Symons, B., 347, 483, 503.
 Taylor, J., 22, 64, 108, 180, 212.
 Taylor, R., 305.
 Thomas, Capt. C., 423, 446, 553.
 Thomas, Capt. J., 589.
 Thomas, R., 106, 221, 235, 236, 306
 319.
 Thomson, Dr. T., 55, 65, 66, 68.
 Tilly, H., 640.
 Tooke, A. W., 222.
 Tregay, Capt. W., 641.
 Trist, S. J., 102.
 Turner, Dr. E., 151, 152, 174.
 Tweedy, W. M., 253, 290, 330, 370.

- | | |
|---|---|
| Voelcker, Dr. A., 437. | Williams, J., 80. |
| Warner, Rev. R., 45. | Williams, Capt. R. H. (or W. H.),
439, 461, 484. |
| Warrington, R., 189. | Winn, Dr. J. M., 256, 268. |
| Watson, J. Y., 307. | Wollaston, W. H., 52. |
| Weaver, T., 264. | Woodhouse, J. T., 609. |
| Werther, — 371. | Woodward, B. H., 539. |
| Whitley, N., 265, 291, 308-309a, 320,
378, 396, 403, 424, 428, 438, 447,
453, 460, 504, 538, 629. | Worgan, G. B., 50. |
| Williams, C., 522. | Worth, R. N., 610, 611. |
| Williams, Rev. D., 254, 255, 266, 267,
292-295, 310, 321, 348, 349, 387. | Woulfe, P., 17. |
| Williams, Sir F. M., 608. | Wyatt-Edgell, Rev. E., 570. |
| | Yorke, Lt.-Col. P. T., 331, 630. |

LIST OF WORKS.

1602.

1. CAREW, R. C. Survey of Cornwall, *4to.*, Reprinted in 1723? 1769 (*4to. Lond.*), and 1811 (*4to. Lond.*)

1671.

2. ANON. An Account of some Mineral Observations touching the Mines of Cornwall and Devon, &c. *Phil. Trans.*, vol. vi (No. 69), p. 2096.

1675.

3. ANON: The Improvement of Cornwall by Sea Sand. *Phil. Trans.*, vol. x, (No. 113), p. 293.

1678.

4. MERRET, DR. C. A Relation of the Tinn-Mines and working of Tinn in the County of Cornwall. *Phil. Trans.*, vol. xii, (No. 138), p. 949.

1728.

5. NICHOLLS, PROF. F. Some Observations towards composing a Natural History of Mines and Metals. *Phil. Trans.*, vol. xxxv, (No. 401), p. 402.

6. ——— A Second Letter containing further Observations towards composing a Natural History of Mines and Metals. *Ibid.*, (No. 403), p. 480.

1750.

7. BORLASE, REV. W. An Enquiry into the original State and Properties of Spar, and Sparry Productions, particularly the

Spars, or Crystals found in the Cornish Mines, called Cornish Diamonds. *Phil. Trans.*, vol. xlvi, (No. 493), p. 250.

8. HEATH, R. A Natural and Historical Account of the Islands of Scilly, and a General Account of Cornwall, 8vo. *Lond.*

1754.

9. BORLASE, REV. W. An Account of the great Alterations which the Islands of Sylley have undergone since the Time of the Ancients, who mention them, as to their Number, Extent, and Position. *Phil. Trans.*, vol. xlviii, p. 55.

1756.

10. BORLASE, REV. W. Observations on the Ancient and Present State of the Islands of Scilly. 4to. *Oxon.*

1758.

11. BORLASE, REV. W. The Natural History of Cornwall. *Fol. Oxon.*

12. ——— An Account of some Trees discovered underground on the Shore at Mount's-bay, in Cornwall. *Phil. Trans.*, vol. 1, p. 51.

13. DA COSTA, E. M. An Account of the Impressions of Plants on the Slates of Coals [refers to cross-loads of Cornwall]. *Ibid.*, p. 228.

1767.

14. BORLASE, REV. W. Extract from Two Letters [Native Tin]. *Phil. Trans.*, vol. lvi, pp. 35, 305.

1770.

15. BORLASE, REV. DR. W. and H. ROSEWARNE. Letters giving an Account of a Specimen of Native Tin found in Cornwall. *Phil. Trans.*, vol. lix, p. 47.

1778.

16. PRYCE, W. Mineralogia Cornubiensis, a Treatise on Minerals, Mines and Mining. *Fol. Lond.* See also long notice in *Journ. des Mines*, t. i, No. 3, p. 91, with "Additions tirées des Joarnaux Allemands," p. 1181.

1779.

17. WOULFE, P. Experiments on some Mineral Substances. *Phil. Trans.*, vol. lxiix, (Part i), p. 11. [Cornish Clay].

1781.

18. JARS, M. G. Voyages Métallurgiques, tome 3, 4to. Paris, (Cornwall, pp. 86, 186).

1782.

18A. LINDENTHAL, — VON. Nachricht von mineralien und bergwerken in England, besonders Cornwallis und Derbshire. *Klipstein's Mineral Briefwechsel*, 2 Band, p. 1.

1786.

18B. HAWKINS, J. Einige mineralogische nachrichten von Cornwall, und den dortigen Kupfererzen. *Crell's Beyträge zu den Chemischen Annalen*, 2 Band, p. 43. English edition in 1792.

1787.

19. KLAPROTH, M. H. Observations relative to the Mineral and Chemical History of the Fossils of Cornwall. Translated by DR. I. G. GROSCHÉ. 8vo. Lond.

1797.

20. MATON, W. G. Observations relative chiefly to the Natural History, &c., of the Western Counties of England. 2 vols. 8vo. Salisbury.

? 1797, 1802.

21. RASHLEIGH, P. Specimens of British Minerals, selected from the Cabinet of P. R., with general descriptions of each article. 2 vols., 4to. Lond.

1800.

22. TAYLOR, J. Sketch of the History of Mining in Devon and Cornwall. *Phil. Mag.*, vol. v, p. 357.

1801.

23. CHENEVIX, R. Analysis of the Arseniates of Copper and of Iron (described in the paper by Count de Bournon); likewise an Analysis of the red octaedral Copper Ore of Cornwall; with

Remarks on some particular Modes of Analysis. *Phil. Trans.*, vol. xci, p. 193, and *Phil. Mag.*, vol. xii, pp. 141, 212, 302.

24. DE BOURNON, COUNT. Description of the Arseniates of Copper and of Iron, from the County of Cornwall. *Ibid*, p. 169 and *Phil. Mag.*, pp. 3, 135.

25. HITCHINS, REV. M. Account of the Discovery of Silver in Herland Copper Mine. *Ibid*, p. 159, and *Phil. Mag.*, vol. ix, p. 77.

1802.

26. AIKIN, A. Description of the Schieferspath. *Phil. Mag.*, vol. xiv, p. 293.

27. PHILLIPS, R. Analysis of the Schieferspath from Cornwall, &c. *Ibid*, p. 289.

28. PLAYFAIR, PROF. J. Illustrations of the Huttonian Theory of the Earth. 8vo. *Edin.* Reprinted in 1822, in vol. i of "Playfair's Works," 8vo. *Edin.*

1803.

29. ANON. (F. P. M. S.). Mining. *Phil. Mag.*, vol. xv, p. 370.

30. BONNARD, A. H. Sur le Gisement, l'Exploitation, et le Traitement de l'Etain, dans le duché de Cornouailles. *Journ. des Mines*, t. xiv, p. 443.

31. KLAPROTH, M. H. Extracts from the 3rd vol. of his Analyses (Olive-ore of Cornwall). *Phil. Mag.*, vol. xvii, p. 234.

1804.

32. ACCUM, F. Examination of a stone containing Potash. *Journ. of Nat. Phil. Chem. and Arts*, Ser. 2, vol. viii, p. 127.

33. DE BOURNON, COUNT. Description of a triple Sulphuret of Lead, Antimony and Copper, from Cornwall; with some Observations upon the various Modes of Attraction which influence the Formation of mineral Substances, and upon the different Kinds of Sulphuret of Copper. *Phil. Trans.*, vol. xciv, p. 30.

34. ——— Reply to the Observations of M. l'Abbé Haüy on arseniated Copper (A Translation). *Journ. of Nat. Phil. Chem. and Arts*, Ser. 2, vol. viii, p. 267.

35. HATCHETT, C. Analysis of a triple Sulphuret of Lead, Antimony and Copper, from Cornwall. *Phil. Trans.*, vol. xciv, p. 63. Reprinted in *Journ. Nat. Phil. Chem. and Arts*, Ser. 2, vol. ix, p. 14.

36. HAUY, ABBE. Observations on Arseniated Copper. (A Translation). *Journ. of Nat. Phil. Chem. and Arts*, Ser. 2, vol. viii, p. 187.

1805.

37. GREGOR, REV. W. Experiments on a Mineral Substance formerly supposed to be Zeolite; with some Remarks on two Species of Uran-glimmer. *Phil. Trans.*, vol. xcvi, p. 331. Reprinted in *Journ. Nat. Phil. Chem. and Arts*, Ser. 2, vol. xiii, p. 247 (1806).

1806.

38. KIDD, DR. J. Analysis of a new Mineral found in Cornwall. *Journ. of Nat. Phil. Chem. and Arts*, Ser. 2, vol. xiv, p. 134.

39. MITCHEL, J. An Account of a new semi-metallic Substance, called Menacane, and its Ores. *Trans. Roy. Irish Acad.*, vol. x, p. 11. Reprinted in *Journ. of Nat. Phil. Chem. and Arts*, Ser. 2, vol. xvi, p. 128 (1807).

1807.

40. CARNE, J. An Account of the Relistian Tin Mine. *Phil. Trans.*, vol. xcvi, p. 293, and *Journ. of Nat. Phil. Chem. and Arts*, Ser. 2, vol. xx, p. 24 (1808).

1808.

41. SMITHSON, J. On the Composition of the Compound Sulphuret from Huel Boys, and an Account of its Crystals. *Phil. Trans.*, vol. xcvi, p. 55.

1809.

42. BRAYLEY, E. W. and J. BRITTON. The Beauties of England and Wales. Vol. ii (Notice of the Minerals, Mines, &c. of Cornwall, pp. 328-352). *Svo. Lond.*

43. DE BOURNON, COUNT. Memoir of the triple Sulphuret of Lead, Copper, and Antimony, or Endellion. *Journ. of Nat. Phil. Chem. and Arts*, Ser. 2, vol. xxiv, pp. 225, 251, 321.

44. GREGOR, REV. W. On a native Arseniate of Lead. *Phil. Trans.*, vol. xcix, p. 195, and *Phil. Mag.*, vol. xxxv, p. 87 (1810).

45. WARNER, REV. R. A Tour through Cornwall (with an account of the Mines). *Svo. Bath and Lond.*

1811.

46. ANON. [Note of a Silver-vein in Cornwall]. *Monthly Mag.*, vol. xxxii, p. 516.

47. BERGER, DR. J. F. Observations on the Physical Structure of Devonshire and Cornwall. *Trans. Geol. Soc.*, vol. i, p. 93.

48. DE LUC, J. A. Geological Travels, vol. 3. Translated from the French MS. (pp. 1-454). *Svo. Lond.*

49. PHILLIPS, W. A Description of the Red Oxyd of Copper, the production of Cornwall...with observations on the Lodes which principally produced it.....*Trans. Geol. Soc.*, vol. i, p. 23.

50. WORGAN, G. B. General View of the Agriculture of the County of Cornwall (short account of soils). A Reprint, with corrections &c. *Svo. Lond.*

1812.

51. KLAPROTH, M. H. Analyses of Minerals (some from Cornwall). *Journ. of Nat. Phil. Chem. and Arts*, Ser. 2, vol. xxxii, p. 160, vol. xxxiii, p. 381.

52. WOLLASTON, W. H. On the primitive Crystal of Carbonate of Lime, Bitter Spar, and Iron Spar. *Phil. Mag.*, vol. xxxix, p. 455.

1813.

53. ALLAN, T. Remarks on the Transition Rocks of Werner. *Ann. of Phil.*, vol. i, p. 414.

54. GRIERSON, DR. J. On Transition Rocks. *Ibid*, vol. ii, p. 103.

55. THOMSON, DR. T. Some Mineralogical Observations in Cornwall. *Ibid*, pp. 247, 346.

1814.

56. FITTON, DR. W. On the Porcelain Earth of Cornwall. *Ann. of Phil.*, vol. iii, p. 180.

57. GRIERSON, DR. J. Reply to Mr. Allan's additional Observations on Transition Rocks. *Ibid*, p. 286.

58. LONGMIRE, J. B. On the Rise of Water in the Chess-water Mine. *Ibid*, vol. iv, p. 258.

59. LYSONS, REV. D. and S. *Magna Britannia*, vol. iii. Cornwall (Soils and Strata, Surface and Scenery, pp. clxxxii-v. Fossils and Minerals, pp. exciv-viii. Mineral Waters, pp. cci, ccii). *4to. Lond.*

60. MAC CULLOCH, DR. J. On the Granite Tors of Cornwall. *Trans. Geol. Soc.*, vol. ii, p. 66.

61. MOYLE, M. P. Queries respecting the flowing of Water in Mines. *Ann. of Phil.*, vol. iii, p. 393.

62. PHILLIPS, W. On the Veins of Cornwall. *Trans. Geol. Soc.*, vol. ii, p. 110. (The greater part reprinted in his "Geology of England and Wales," pp. 193-237. 12mo. Lond.)

63. ——— A Description of the Oxyd of Tin, the production of Cornwall, &c. *Ibid*, p. 336.

64. TAYLOR, J. On the Economy of the Mines of Cornwall and Devon. *Ibid*, p. 309.

65. THOMSON, DR. T. On the Composition of Blende. *Ann. of Phil.*, vol. iv, p. 89.

66. ——— Analysis of Asbestous Actinolite. *Ibid*, p. 209.

1815.

67. GREGOR, REV. W. Experiments upon Green Uran Mica, with a view to its Chemical Analysis. *Ann. of Phil.*, vol. v, p. 281.

68. THOMSON, DR. T. Carbonate of Bismuth. *Ibid*, vol. vi, p. 236.

1816.

69. GREGOR, REV. W. On the Tremolite of Cornwall. *Trans. Geol. Soc.*, vol. iii, p. 399.

70. ——— Experiments on Topaz and Carbonate of Bismuth. *Ann. of Phil.*, vol. viii, p. 276.

71. LONGMIRE, J. B. An Essay on the Shapes, Dimensions, and Positions of the Spaces in the Earth which are called Rents, and the Arrangement of the Matter in them. *Ibid*, vol. vii, p. 122.

72. PARIS, DR. J. A. [ANON:] A Guide to the Mount's Bay and the Land's End, being a Sketch of the.....Mineralogy and Geology of Western Cornwall. 12mo. Penzance. Ed. 2 in 1824, 8vo. Lond.

73. PHILLIPS, W. On the Oxyd of Uranium, the production of Cornwall, &c...*Trans. Geol. Soc.*, vol. iii, p. 112.

74. POLWHELE, REV. R. The History of Cornwall. Vol. iv, Mining, pp. 131-7. 4to. Lond.

1817.

75. CONYBEARE, REV. J. J. Memoranda relative to the Porphyritic Veins, &c., of St. Agnes, in Cornwall. *Trans. Geol. Soc.*, vol. iv, p. 401.

76. CONYBEARE, REV. J. J. Notice of Fossil Shells in the Slate of Tintagel. *Ibid*, p. 424.

77. GILBERT, C. S. An Historical Survey of the County of Cornwall, vol. i. *4to. Plymouth and Lond.* (Miscellaneous Curiosities p. 208; Mineralogy and Mining Concerns, p. 212; Crystalizations, Stones, Sands, Earths, Clays, and Soils, p. 277).

78. SMITH, E. On the Stream Works of Pentowan. *Trans. Geol. Soc.*, vol. iv, p. 404.

79. SUTCLIFFE, REV. J. A Short Introduction to the Study of Geology, &c. (Cornwall, veins, pp. 36, 37). *8vo. Lond.*

80. WILLIAMS, J., (Junr.). Account of some remarkable Disturbances in the Veins of the Mine called Huel Peever, in Cornwall. *Trans. Geol. Soc.*, vol. iv, p. 139.

1818.

81. CARNE, J. On Elvan Courses. *Tran. Roy. Geol. Soc. Cornwall*, vol. i, pp. 97, 241.

82. ——— On the Discovery of Silver in the Mines of Cornwall. *Ibid*, p. 118.

83. ——— Notice relative to the Formation of Swimming Stone. *Ibid*, p. 239.

84. DAVY, SIR H. Hints on the Geology of Cornwall. *Ibid*, p. 38.

85. DAVY, DR. J. An Account of some Granite Veins at Porth Just, near Cape Cornwall. *Ibid*, p. 20.

86. GREGOR, REV. W. Observations on a remarkable change which Metallic Tin undergoes, under peculiar circumstances, and on its partial conversion into a Muriate of Tin. *Ibid*, p. 51.

87. ——— Kupper-Nickel. *Ibid*, p. 224.

88. HAWKINS, SIR C. Observations on Gold found in the Tin Stream Works of Cornwall. *Ibid*, p. 235.

89. HAWKINS, J. On Submarine Mines. *Ibid*, p. 127.

90. ——— On some remarkable Phænomena attending the Lodes of Polgooth Tin Mine. *Ibid*, p. 142.

91. LEAN, T. On the Temperature of the Mines in Cornwall. *Phil. Mag.*, vol. lii, p. 204.

92. MAJENDIE, A. Notes on the Coast West of Penzance, and on the Structure of the Scilly Islands. *Trans. Roy. Geol. Soc. Cornwall*, vol. i, p. 27.

93. MAJENDIE, A. A Sketch of the Geology of the Lizard District. *Ibid*, p. 32.

94. ——— Stalactites. *Ibid*, p. 236.

95. ——— Contributions towards a Knowledge of the Geological History of Wood Tin. *Ibid*, p. 237.

96. PARIS, DR. J. A. On a recent Formation of Sandstone, occurring in various Parts of the Northern Coasts of Cornwall. *Ibid*, p. 1.

97. ——— Observations on the Geological Structure of Cornwall, with a view to trace its connexion with, and influence upon its Agricultural Economy, and to establish a rational system of Improvement by the scientific application of Mineral Manure. *Ibid*, p. 168.

98. ——— Gregorite (Menacchanite) discovered at Lanarth. *Ibid*, p. 226.

99. ROGERS, REV. J. Observations on the Limestone of Veryan and the neighbouring parishes. *Ibid*, p. 114.

100. ——— Vegetable Remains in the Basin at Portleven. *Ibid*, p. 236.

101. RULE, J. Cavern in Dolcoath Mine. *Ibid*, p. 225.

102. TRIST, S. J. Notes on the Limestone Rocks in the Parish of Veryan. *Ibid*, p. 107.

1819.

103. ANON. English Gold. *Quart. Journ. of Lit. Sci. and Arts*, vol. vii, p. 398.

104. MOHS, PROF. Observations on Cornwall (from Gilbert's *Ann. der Phys.*, lix, 217). *Ann. of Phil.*, vol. xiii, p. 311.

105. PHILLIPS, W. Description of an Ore of Copper from Cornwall. *Quart. Journ. of Lit. Sci. and Arts*, vol. vii, p. 95. Analysis of the Copper Ore by R. PHILLIPS, p. 100.

106. THOMAS, R. Report on a Survey of the Mining District of Cornwall, from Chasewater to Camborne. *4to. Lond.*

1821.

107. SEDGWICK, REV. PROF. A. On the Physical Structure of those Formations which are immediately associated with the Primitive Ridge of Devonshire and Cornwall. *Trans. Cambridge Phil. Soc.*, vol. i, p. 89.

108. TAYLOR, J. On the Smelting of Tin Ores in Cornwall and Devonshire. *Trans. Geol. Soc.*, vol. v, p. 358.

1822.

109. BOASE, H. Observations on the Submersion of part of the Mount's Bay; and on the Inundation of Marine Sand on the north coast of Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. ii, p. 129.

110. BOASE, DR. H. S. On the Tin-ore of Botallack and Levant. *Ibid*, p. 383.

111. CARNE, J. On the Relative Age of the Veins of Cornwall. *Ibid*, p. 49.

112. ——— On the Mineral Productions and the Geology of the Parish of St. Just. *Ibid*, p. 290.

113. FORBES, DR. J. On the Temperature of Mines. *Ibid*, p. 159.

114. ——— On the Geology of the Land's-end District. *Ibid*, p. 242.

115. ——— On the Geology of St. Michael's Mount. *Ibid*, p. 366.

116. FOX, R. W. On the Temperature of Mines. *Ibid*, pp. 14, 19.

117. ——— Remarks on Mr. Moyle's "Observations on the Temperature of Mines in Cornwall." *Ann. of Phil.*, Ser. 2, vol. iii, p. 381.

118. HAWKINS, J. On the stratified deposits of Tin-stone, called the floors, and on the diffusion of Tin-stone through the mass of some primitive rocks. *Trans. Roy. Geol. Soc. Cornwall*, vol. ii, p. 29.

119. ——— On the Nomenclature of the Cornish Rocks. *Ibid*, p. 145, and *Phil. Mag.*, vol. lxi, p. 102 (1823).

120. ——— On the Phenomena of Intersected Lodes, and the legitimate Inferences which may be drawn from them. *Trans. Roy. Geol. Soc. Cornwall*, vol. ii, p. 225.

121. ——— On the Intersection of Lodes in the direction of their dip or underlie. *Ibid*, p. 232.

122. ——— Observations on the Alluvial Strata at Poth, Sandrycock, and Pentuan. *Ibid*, p. 285.

123. ——— On some instances of the alternate Disposition

of the Primitive Strata which have been observed in Cornwall. *Ibid*, p. 376.

124. ——— On the Temperature of Mines. *Ann. of Phil.*, Ser. 2, vol. iv, p. 440.

125. MOYLE, M. P. Observations on the Temperature of Mines in Cornwall. *Ibid*, vol. iii, pp. 308, 415.

126. ——— On the Temperature of the Cornish Mines. *Trans. Roy. Geol. Soc. Cornwall*, vol. ii, p. 404.

127. PHILLIPS, R. Analyses of the Variegated Copper Ore, or Buntkupfererz. *Ann. of Phil.*, Ser. 2, vol. iii, p. 81.

128. ——— On the Crystalline Form of Yellow Copper Ore. *Ibid*, p. 296.

129. RASHLEIGH, P. An Account of the Alluvial Depositions at Sandrycock. (Drawn up in 1792). *Trans. Roy. Geol. Soc. Cornwall*, vol. ii, p. 281.

130. ROGERS, REV. J. Observations on the Hornblende Formation in the Parish of St. Clere. *Ibid*, p. 218.

131. ——— On the Serpentine District of Cornwall. *Ibid*, p. 416.

132. SEDGWICK, REV. PROF. A. On the Physical Structure of the Lizard District in the County of Cornwall. *Trans. Cambridge Phil. Soc.*, vol. i, p. 291.

1823.

133. BOND, T. Topographical and Historical Sketches of the Boroughs of East and West Looe, in the County of Cornwall, with an Account of the Natural and Artificial Curiosities, &c...of the neighbourhood. *8vo. Lond.*

134. CONYBEARE, REV. J. J. On the Geology of Devon and Cornwall. *Ann. of Phil.*, Ser. 2, vol. v, p. 184, and vol. vi, p. 35.

135. MOYLE, M. P. On the Temperature of Mines. *Ann. of Phil.*, Ser. 2, vol. v, p. 34, and vol. vi, p. 15.

136. ——— On Granite Veins. *Ibid*, vol. vi, p. 90.

137. PHILLIPS, R. Analysis of Uranite from Cornwall. *Ibid*, vol. v, p. 57.

1824.

138. ANON. A new Ore of Lead. *Edin. Journ. of Sci.*, vol. i, p. 379.

139. DREW, S. The History of Cornwall. 2 vols. 4to. *Helston*. Vol. i, Lakes...rivers...wells, p. 509. Soils, &c., p. 553. Ochres, clay stones, semi-metals, and gems, p. 591. Metals, p. 599.

140. DUFRENOY, P. A. and E. DE BEAUMONT. Sur le gisement, l'exploitation et le traitement des minerais d'étain et de cuivre du Cornouailles. *Ann. des Mines*, t. ix, p. 827.

141. MOYLE, M. P. On the Temperature of Mines. *Ann. of Phil.*, Ser. 2, vol. viii, p. 446.

142. PHILLIPS, W. New Locality of Skorodite. With a Chemical Examination by R. PHILLIPS. *Ibid*, vol. vii, p. 97.

143. ——— On the Occurrence of Cleavelandite in the older Rocks generally. *Ibid*, p. 118.

144. STOCKDALE, F. W. L. Excursions in the County of Cornwall. With a Description of the Mines, &c. 8vo. *Lond*.

1825.

145. ANON: Beryl in Cornwall. *Ann. of Phil.*, Ser. 2, Vol. x, p. 383.

146. ——— Axotomous Antimony Glance, a New Mineral Species. *Edin. Journ. of Sci.*, vol. ii, p. 374.

147. BERZELIUS. Analysis of Uranite. *Ibid*, p. 372 (*from Ann. der. Phys.*, 1824, p. 379).

148. DAVY, DR. J. Observations on the Temperature of Springs, Wells, and Mines in Cornwall. *Ibid*, vol. iii, p. 75.

149. DUFRENOY, P. A., and E. DE BEAUMONT. Suite de la Notice sur le gisement, l'exploitation et le traitement des Minerais d' Etain et de Cuivre du Cornouailles. *Ann. des Mines*, t. x, pp. 33, 401.

150. SEDGWICK, REV. PROF. A. On the Origin of Alluvial and Diluvial Formations. *Ann. of Phil.*, Ser. 2, vol. ix, p. 241. (Cornwall, p. 288).

151. TURNER, DR. E. Analysis of a Mica from Cornwall. *Edin. Journ. of Sci.*, vol. iii, p. 137.

152. ——— On Lithion Mica (Cornwall, p. 266). *Ibid*, p. 261.

1826.

153. DUFRENOY, P. A. and E. DE BEAUMONT. Sur la constitution géognostique et les gîtes métallifères du Cornouailles et du Devonshire. *Ann. Sci. Nat.*, vol. vii, p. 195.

154. MOYLE, M. P. On the Temperature of Mines. *Ann. of Phil.*, Ser. 2, vol. xi, p. 259.

1827.

155. BARHAM, DR. T. F. Some Arguments in support of the opinion that the Iktis of Diodorus Siculus is St. Michael's Mount. *Trans. Roy. Geol. Soc. Cornwall*, vol. iii, p. 86.

156. ——— Some further Observations on the Temperature of Mines. *Ibid*, p. 150.

157. BOASE, DR. H. S. Some Observations on the Alluvial Formations of the Western Part of Cornwall. *Ibid*, p. 17.

158. ——— On the Sand-Banks of the Northern Shores of Mount's Bay. *Ibid*, p. 166.

159. CARNE, J. On the Period of the Commencement of Copper Mining in Cornwall; and on the Improvements which have been made in Mining. (Geology, p. 74). *Ibid*, p. 35.

160. ——— On the singular state of some Ancient Coins lately found in the Sands of Hayle; and, On the evidence deducible from them relative to the period of the earliest deposition of sand on the Northern Coast of Cornwall. *Ibid*, p. 136.

161. ——— On the Granite of the Western part of Cornwall. *Ibid*, p. 208.

162. DUFRENOY, P. A. and E. DE BEAUMONT. Voyage Métallurgique en Angleterre. (Cornish veins, &c., pp. 1, &c.) 8vo., Paris. Ed. 2, vol. ii, 1839, (pp. 171, &c.), 8vo., Paris.

163. EDMONDS, R. Notice of a Granite Vein discovered in the Herland Mine. *Trans. Roy. Geol. Soc. Cornwall*, vol. iii, p. 332.

164. FOX, R. W. Some further Observations on the Temperature of Mines. *Ibid*, p. 313.

165. GREGOR, W. Notice of the Analysis of Zinc ore from Huel Ann. *Ibid*, p. 338.

166. HAIDINGER, W. On Isopyre, a new Mineral Species. *Edin. New Phil. Journ.*, vol. iii, p. 263.

167. HAWKINS, J. On the Changes which appear to have taken place in the primitive form of the Cornish Peninsula. *Trans. Roy. Geol. Soc. Cornwall*, vol. iii, p. 1.

168. HENWOOD, W. J. On a singular exudation of Gas in the Union Mines. *Ibid*, p. 203.

169. HENWOOD, W. J. Notice of some circumstances connected with the heave of a Copper lode by a Flucan vein, in the Consolidated Mines, Gwennap. *Ibid*, p. 327.

170. MICHELL, J. Notice of the Analysis of Copper ore found at Huel Falmouth, which appears very much like the Buntkupfererz of Werner. *Ibid*, p. 338.

171. PENDARVES, E. W. Notice of the Native Copper of Condorrow Mine. *Ibid*, p. 333.

172. PHILLIPS, W. On the Crystalline Forms of the Natural and Artificial Sulphuret of Bismuth. *Phil. Mag.*, Ser. 2, vol. ii, p. 181.

173. ——— Description of two remarkable Ores of Copper from Cornwall. With an Analysis of the same by M. FARADAY. *Ibid*, p. 286.

174. TURNER, DR. E. Chemical Examination of Isopyre. *Edin. New Phil. Journ.*, vol. iii, p. 265.

1829.

175. ANON: A Manual of Mineralogy; in which is shown how much Cornwall contributes to the Illustration of the Science. *Svo. Lond.*

176. ——— (W. H. M.) Evident traces of Manganese in Slate. *Mag. Nat. Hist.*, vol. ii, p. 72.

177. FOX, R. W. Some Remarks on Mineral Veins. *Phil. Mag.*, Ser. 2, vol. vi, p. 17.

178. HENWOOD, W. J. A Summary of Experiments recently made on the Temperature of Mines. *Edin. Journ. of Sci.*, vol. x, p. 234.

179. OEYNSHAUSEN, — VON, and — VON DECHEN. On the Junction of the Granite and the Killas Rocks in Cornwall. *Phil. Mag.*, Ser. 2, vol. v, pp. 161, 241.

180. TAYLOR, J. Records of Mining. *4to. Lond.*

1830.

181. ANON: (H.) On the Discovery of Mineral Veins, and Preliminary Operations on them. *Quart. Mining Rev.*, vol. i, (No. 3), p. 402.

182. ANON? Mineral Pitch near St. Agnes, Cornwall, discovered by Mr. Henwood. *Edin. Journ. of Sci.*, Ser. 2, vol. ii, p. 374.

183. BRAYLEY, E. W. On the probable Connection of Rock-Basins, in Form and Situation, with an internal concretionary Structure in the Rocks on which they occur: introduced by Remarks on the alleged Artificial Origin of those Cavities. *Phil. Mag.*, Ser. 2, vol. viii, p. 331, (and in the Rev. T. Moore's 'History and Topography of the County of Devon.'

184. FOX, R. W. On the electro-magnetic properties of metalliferous veins in the mines of Cornwall. *Phil. Trans.*, vol. cxx, p. 399, and *Quart. Mining Review*, vol. i, (No. 4), p. 546.

1831.

185. HEMMING, J. Analysis of a specimen of Tennantite from...Gwennap. *Phil. Mag.*, Ser. 2, vol. x, p. 157.

186. HENWOOD, W. J. Facts bearing on the Theory of the Formation of Springs, and their Intensity at various Periods of the Year. *Ibid.*, vol. ix, p. 170.

187. ——— Notice of a Geological Survey of the Mines of Cornwall; with a Programme of an intended Arrangement of the leading Details of the Metalliferous Veins, &c. *Ibid.*, vol. x, p. 358.

188. KINGSTON, J. F. A Sketch of the Distribution of Animals and Plants in the Southwestern extremity of Great Britain. *Edin. Journ. of Nat. and Geograph. Sci.*, vol. iii, p. 340.

189. WARRINGTON, R. Examination of a Native Sulphuret of Bismuth. *Phil. Mag.*, Ser. 2, vol. ix, p. 29.

1832.

190. ANON: On the Mining District of Redruth. *Quart. Mining Rev.*, No. 6, p. 201.

191. BOASE, DR. H. S. Contributions towards a Knowledge of the Geology of Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. iv, p. 166.

192. CARNE, J. A Description of the Stream-work at Drift Moor near Penzance. *Ibid.*, p. 47.

193. ——— An Account of the Discovery of some varieties of Tin-ore in a Vein, which have been considered peculiar to Streams; with remarks on Diluvial Tin in general. *Ibid.*, p. 95.

194. COLENZO, J. W. A Description of Happy Union Tin Stream-work at Pentuan. *Ibid.*, p. 29.

195. DAVEY, S. Notice of Pseudomorphous crystals of oxide of tin, found in Huel Coates mine, in St. Agnes, in the year 1828. *Ibid*, p. 484.

196. FOX, R. W. Notice of a Marine Deposit in the Cliffs near Falmouth. *Phil. Mag.*, Ser. 3, vol. i, p. 471.

197. HAWKINS, J. Some general Observations on the Structure and Composition of the Cornish Peninsula. *Trans. Roy. Geol. Soc. Cornwall*, vol. iv, p. 1.

* 198. ————— Some Observations made in Cornwall, in the summer of 1829. *Ibid*, p. 40.

199. ————— On a very singular Deposit of Alluvial Matter on St. Agnes Beacon, and on the Granitical Rock which occurs in the same situation. *Ibid*, p. 135.

200. ————— Some account of the soft Growan at the Beam mine, in the Parish of Roche, and at Carclaze mine, in the Parish of St. Austle. *Ibid*, p. 475.

201. HENWOOD, W. J. On some Intersections of Mineral Veins in Cornwall. *Proc. Geol. Soc.*, vol. i, p. 405.

202. ————— On some of the Deposits of Stream Tin-Ore in Cornwall, with remarks on the Theory of that Formation. *Trans. Roy. Geol. Soc. Cornwall*, vol. iv, p. 57.

203. ROGERS, REV. J. Notice of Wood and Peat found below high water-mark on the beach at Mainporth, in Cornwall. *Ibid*, p. 481.

1833.

204. BENNETTS, J. On the Electro-magnetism of Veins of Copper-Ore in Cornwall. *Phil. Mag.*, Ser. 3, vol. iii, p. 17.

205. CARNE, [?J.] On the relative age and direction of the veins in Cornwall. *Rep. Brit. Assoc. for 1832*, p. 580. (Abstract).

206. DE LA BECHE, [SIR] H. T. A Geological Manual. Ed. 3, 8vo. *Lond.*, (pp. 46, 77).

207. ENYS, J. S. Some Remarks on the Granite found near Penryn, and on the Mode of working it. With A Geological Sketch of a Portion of the Granite District near Penryn.....by R. W. FOX, (p. 326). *Phil. Mag.*, Ser. 3, vol. ii, pp. 321, 483.

208. HENWOOD, W. J. Observations on the Rise and Fall of Water in some Wells in Cornwall, with brief notices of other matters bearing on the Phænomena of Springs. *Phil. Mag.*, Ser. 3, vol. iii, p. 417.

209. SEDGWICK, REV. PROF. A. and DR. [? H. S.] BOASE. Discussion on Mr. Taylor's Paper on Vein-stones. *Rep. Brit. Assoc. for 1832*, p. 578.

1834.

210. Analysis of the Blue Arseniate of Copper of Cornwall (from *Ann. des Mines, June, 1833*). *Phil. Mag.*, Ser. 3, vol. iv, p. 237.

211. BOASE, DR. H. S. Treatise on Primary Geology, being an Examination of the Old Formations. *8vo. Lond.*

212. TAYLOR, J. Account of the Depth of Mines. *Rep. Brit. Assoc. for 1833*, p. 427.

1835.

213. ANON: (F. B[URR?]). Descriptive Notice of the Consolidated and United Mines. *Mining Rev.*, No. 7, p. 17.

214. BOASE, DR. H. S. An Inquiry into the Nature of the Structure of Rocks. (Read to Roy. Geol. Soc. Cornwall). *Phil. Mag.*, Ser. 3, vol. vii, pp. 376, 445.

215. FOX, R. W. Account of some Experiments on the Electricity of the Copper Vein in Huel Jewel Mine. *Rep. Brit. Assoc. for 1834*, p. 570.

216. SEDGWICK, REV. PROF. A. Remarks on the Structure of large Mineral Masses, and especially on the Chemical Changes produced in the Aggregation of Stratified Rocks during different Periods after their Deposition. *Trans. Geol. Soc.* Ser. 2, vol. iii, p. 461. (Cornwall, pp. 481-4.

1836.

217. BOASE, DR. H. S. Remarks on Mr. Hopkin's "Researches in Physical Geology." *Phil. Mag.*, Ser. 3, vol. ix, p. 4.

218. DE LA BECHE, [SIR] H. T. Letter accompanying a collection of fossils from the schistose rocks of the North of Cornwall. *Proc. Geol. Soc.*, vol. ii, p. 225.

219. HENWOOD, W. J. Difference of Temperature between Granite and Slate in the Cornish Mines. *Records of Science.*

220. HOPKINS, W. Reply to Dr. Boase's "Remarks on Mr. Hopkin's 'Researches in Physical Geology.'" *Phil. Mag.*, Ser. 3, vol. ix, p. 366.

221. THOMAS, R. Geological Survey of the Carn Menelis District, Cornwall. *Mining Rev.*, No. 8, p. 263.

222. TOOKE, A. W. The Mineral Topography of Great Britain. Cornwall. *Ibid*, p. 253.

1837.

223. ANON. Cornwall. "Geological Character," "Natural Curiosities." *Penny Cyclopædia*, vol. viii, pp. 30, 37, *Fol. Lond.*

224. BOASE, DR. H. S. Additional Remarks on Mr. Hopkins's "Researches in Physical Geology." *Phil. Mag.*, Ser. 3, vol. x, p. 14.

225. ———— On the Composition and Origin of Porcelain Earth. *Ibid*, p. 348.

226. BURR, F. Observations on the Theory of the Formation of Mineral Veins. *Mining Rev.*, No. 9, p. 60. Continued under the title "On Metalliferous and Mineral Deposits, their General Structure, and Apparent Laws of Development." *Ibid*, No. 10, p. 165.

227. DE LA BECHE, [SIR] H. T. On certain Phænomena connected with the Metalliferous Veins of Cornwall. *Rep. Brit. Assoc. for 1836, Trans. of Sections*, p. 83.

228. ———— (Lettre...sur les systèmes de fissures parallèles que l'on observe dans les roches du Cornouailles). *Bull. Soc. Geol. France*, t. viii, p. 73.

229. FOX, R. W. On Voltaic Agencies in Metalliferous Veins. *Rep. Brit. Assoc. for 1836, Trans. of Sections*, p. 81.

230. ———— On Mineral Veins. *4th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 81, (*and Phil. Mag.*, Ser. 3).

231. ———— Substance of a Communication on the Temperature of some Mines in Cornwall and Devonshire, made to the Roy. Geol. Soc. Cornwall. *Phil. Mag.*, Ser. 3, vol. xi, p. 520.

232. HENWOOD, J. W. A Lecture on the Phenomena of Metalliferous Veins; delivered at the Penzance Institution. *Edin. New Phil. Journ.*, vol. xxii, p. 152.

233. ———— On the Electric Currents observed in some Metalliferous Veins. *Ibid*, p. 270. (Corrected from the *Annals of Electricity*, and reprinted from the *Annals of Electricity*, with Additions, in *Mining Rev.*, No. 10, p. 214).

234. SOWERBY, G. B. Oxydulous Copper. *Mag. Nat. Hist.*, Ser. 2, vol. i, p. 168.

235. THOMAS, R. Remarks on a Section presented by the

Cliffs at Tremearne, in the Parish of Breage, Cornwall. *Mining Rev.*, No. 9, p. 28.

236. ——— Geological Particulars of Parts of the Cliffs in the Land's-end District, Cornwall. *Ibid*, No. 10, p. 234.

1838.

237. ANON. The Mining District of Gwinnear, Phillack, and Crowan. *Mining Review*, No. xi, vol. iv, p. 175.

238. ANSTED, [PROF.] D. T. On a new Genus of Fossil Multilocular Shells, found in the Slate-Rocks of Cornwall. *Trans. Cambridge Phil. Soc.*, vol. vi, p. 415.

239. BOASE, DR. H. S. The Geological Notices in D. GILBERT'S "Parochial History of Cornwall," 4 vols. 8vo. Lond.

240. BURR, F. Notice of the Localities and General Features of the Slate Quarries of Great Britain. *Mining Review*, No. xi, vol. iv, p. 161.

241. FOX, R. W. Report of some Experiments on the Electricity of Metallic Veins, and the Temperature of Mines. *Rep. Brit. Assoc. for 1837*, p. 133.

242. HENWOOD, W. J. On the higher Temperature which prevails in the Slate than in the Granite of Cornwall. *Rep. Brit. Assoc. for 1837, Trans. of Sections*, p. 36.

243. ——— On some Intersections of Veins in the Mines of Dolcoath and Huel Prudence, in Cornwall, and on their bearing on the Theory of the Mechanical Origin of their ("heaves") Dislocations. *Ibid*, p. 74.

244. ——— Granite of Cligger Head, and the elvan course of the same neighbourhood. *Ann. Rep. Roy. Inst. Cornwall*, No. 20, p. 29.

245. MOYLE, S. On the ventilation of Mines, and the deterioration of the air in the lower levels. *Ibid*, p. 26.

246. SEDGWICK, REV. PROF. A. A synopsis of the English series of stratified rocks inferior to the old red sandstone—with an attempt to determine the successive natural groups and formations. *Proc. Geol. Soc.*, vol. ii, p. 675.

1839.

247. ANON. Notices of Mining Districts. *Mining Review*, No. xiii, vol. v, p. 5, No. xiv, p. 19, No. xvii, p. 71, No. xviii, p. 87, No. xx, p. 122, No. xxii, p. 157, No. xxiii, p. 167.

248. ANON. Mining Notices. *Ibid*, No. xxiv, p. 180.
249. BURR, F. On the Occurrence of the Precious Metals in Great Britain. *Ibid*, No. xix, p. 17.
250. DE LA BECHE [SIR] H. T. Report on the Geology of Cornwall, Devon, and West Somerset. (*Geological Survey*), 8vo., Lond.
251. MOYLE, S. On the Ventilation of Mines. *Ann. Rep. Roy. Inst. Cornwall*, No. 21, p. 57.
252. SEDGWICK, REV. PROF. A., and [SIR] R. I. MURCHISON. Classification of the Older Stratified Rocks of Devonshire and Cornwall. *Phil. Mag.*, Ser. 3, vol. xiv, pp. 241, 317.
253. TWEEDY, W. M. Notice of bog Iron Ore found at Perran. *Ann. Rep. Roy. Inst. Cornwall*, No. 21, p. 44.
254. WILLIAMS, REV. D. On the Geological Position of the Culm- and Plant-bearing Beds of Devon and Cornwall. *Phil. Mag.*, Ser. 3, vol. xv, p. 293.
255. ———— On as much of the Transition or Grauwacke System as is exposed in the counties of Somerset Devon and Cornwall. *Proc. Geol. Soc.*, vol. iii, p. 115.
256. WINN, DR. J. M. Notice of Fossil Bones found in Pentewan Valley. *Ann. Rep. Roy. Inst. Cornwall*, No. 21, p. 45.
- 1840.
257. FOX, R. W. Letter relative to the Origin of Mineral Veins. *Trans. Geol. Soc.*, Ser. 2, vol. v, p. 497.
258. MOYLE, M. P. On the Atmosphere of Cornish Mines. *7th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 74.
259. ———— An Account of some specimens of auriferous Pyrites. *Ann. Rep. Roy. Inst. Cornwall*, No. 22, p. 76.
260. PATTISON, S. R. Notice of Fossils found at South Petherwin. *Ibid*, p. 20.
261. PLATNER, M. Analysis of Octahedral Copper Pyrites. (*From Poggendorf's Annalen*, vol. xlvii, p. 351); *Phil. Mag.*, Ser. 3, vol. xvii, p. 202.
262. SEDGWICK, REV. PROF. A., and [SIR] R. I. MURCHISON. Description of a Raised Beach in Barnstaple or Bideford Bay, on the North-west Coast of Devonshire. *Trans. Geol. Soc.*, Ser. 2, vol. v, p. 279. (Cornwall, p. 283).
263. ———— ———— On the Physical Structure of Devon-

shire, and on the Subdivisions and Geological Relations of its older stratified Deposits. (Refers to Cornwall also). *Ibid*, p. 633.

264. WEAVER, T. On the Mineral Structure of the South of Ireland, with correlative matter on Devon and Cornwall, Belgium, the Eifel, &c. *Phil. Mag.*, Ser. 3, vol. xvi, pp. 276, 388, 471.

265. WHITLEY, N. Notice of Elvan Course in a quarry near Malpas. *Ann. Rep. Roy. Inst. Cornwall*, No. 22, p. 30.

266. WILLIAMS, REV. D. On as much of the great graywacke system as is comprised in the group of West Somerset, Devon, and Cornwall. *Proc. Geol. Soc.*, vol. iii, p. 158. See also *Rep. Brit. Assoc. for 1839, Trans. of Sections*, p. 68, [? same paper under different title].

267. ——— On the Geology of Devon and Cornwall, with reference to a paper read before the Geological Society on Decr. 4th, 1839. *Phil. Mag.*, Ser. 3, vol. xvi, p. 59.

268. WINN, DR. J. M. Notice of Antlers found at Pentewan. *Ann. Rep. Roy. Inst. Cornwall*, No. 22, p. 38.

1841.

269. BUDGE, REV. E. On the Conglomerates and Raised Beaches of the Lizard District. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 1.

270. CARNE, J. On the Pseudomorphous Minerals found in Cornwall, illustrative of a replacement of one mineral substance by another. *Ibid*, p. 24.

271. ——— Additional contributions to the Mineralogy of the Parish of St. Just. *Ibid*, p. 47.

272. DAUBREE, —. Extrait d'un mémoire sur le gisement, la constitution et l'origine des amas de minerai d'étain. (Refers to Cornwall). *Bull. Soc. Géol. France*, t. xii, p. 393.

273. FOX, R. W. Report on some Observations on Subterranean Temperature. *Rep. Brit. Assoc. for 1840*, p. 309.

274. MOYLE, M. P. On the Atmosphere of Mines. *8th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 37.

275. PEACH, C. W. An Account of the Fossil Organic Remains found on the South-east coast of Cornwall, and in other parts of that County. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 12. See also *Rep. Brit. Assoc. for 1841, Trans. of Sections*, p. 61, under a slightly different title, (1842).

276. PHILLIPS, PROF. J. Figures and Descriptions of the Palæozoic Fossils of Cornwall, Devon, and West Somerset. *Geological Survey, Ser. Lond.*

277. PIOT, —. Mémoire sur le terrain devonien de l'Angleterre. *Bull. Soc. Géol. France*, t. xii, p. 485.

278. ROGERS, REV. J. Notice of the Serpentine of Pennare. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 41.

1842.

279. BARTLETT, —. On the Post-Tertiary Formations of Cornwall and Devon. *Rep. Brit. Assoc. for 1841, Trans. of Sections*, p. 61.

280. BUDGE, REV. E. On the tract of Land called the Lowlands in the Parish of St. Keverne. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 59.

281. DE LA BECHE, SIR H. T. On the Connection between Geology and Agriculture in Cornwall, Devon and West Somerset. *Journ. Roy. Agric. Soc.*, vol. iii, p. 21.

282. FOX, R. W. Notice of a Vegeto-metallic specimen found near Falmouth. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 76.

283. HUNT, R. Analysis of the Air from the Deep Levels of the Consolidated Mines, Gwennap. *9th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 136.

284. ——— On the Waters from the Mining Districts of Cornwall. *Ibid*, p. 151.

285. HUNT, R. and J. PHILLIPS. On the Electricity of Mineral Veins. *Ibid*, p. 157.

286. MILLET, J. N. R. Notice of Pseudomorphous crystals of Quartz lately found in the St. Ives Consols Tin mine. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 77, and *24th Ann. Rep. Roy. Inst. Cornwall*, p. 27, (1843).

287. PATTISON, S. R. Notice of specimens of slate from Tintagel containing organic remains. *23rd Ann. Rep. Roy. Inst. Cornwall*, p. 26.

288. PEACH, C. W. On the Geology of part of the Parish of Gorrán in Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 51.

289. ——— Letter giving an account of various places on the South Coast in which he has discovered fossil organic remains. *23rd Ann. Rep. Roy. Inst. Cornwall*, p. 25.

290. TWEEDY, W. M. Notices of Minerals of uncommon occurrence recently found in Cornwall. *Ibid*, p. 38.

291. WHITLEY, N. Notes on the Geology of part of the Parish of Veryan, Cornwall. *Ibid*, p. 33.

292. WILLIAMS, REV. D. On the Stratified and Unstratified Volcanic Products in the neighbourhood of Plymouth. *Rep. Brit. Assoc. for 1841, Trans. of Sections*, p. 61.

293. ——— Plausible Reasons and positive Proofs, showing that no Portion of the Devonian System can be of the age of the Old Red Sandstone. *Phil. Mag.*, Ser. 3, vol. xx, p. 117.

294. ——— Supplementary Notes on the true Position in the "Devonian System" of the Cornish Killas. *Ibid*, vol. xxi, p. 25.

295. ——— On Granite Veins. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 64.

1843.

296. BUDGE, REV. E. On Diluvial action as exemplified in the Gravel-beds and Sienitic formation of Crousa-Down, in the Parish of St. Keverne. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 91.

297. ——— Notice of specimens of petrified Moss or Tufa (Bosullan Cove). *24th Ann. Rep. Roy. Inst. Cornwall*, p. 28.

298. FOX, R. W. Notice of some Experiments on Subterranean Electricity made in Pennance Mine, near Falmouth. *10th Ann. Rep. Roy. Cornwall Polytech. Soc.*, Part 2, p. 103 and *Phil. Mag.*, Ser. 3, vol. xxiii, p. 491. See also *Proc. Geol. Soc.*, vol. iii, p. 755 (Abstract under a slightly different title, 1842).

299. HENWOOD, W. J. On the Metalliferous Deposits of Cornwall and Devon. *Trans. Roy. Geol. Soc. Cornwall*, vol. v, p. 1 (to end), ? partly in *Phil. Mag.*, Ser. 3, vol. xxii, pp. 373, 443.

300. ——— On Subterranean temperatures, observed in the Cornish Mines. *24th Ann. Rep. Roy. Inst. Cornwall*, p. 38.

301. HUNT, R. and J. PHILLIPS. Experiments and Observations on the Electricity of Mineral Veins. *10th Ann. Rep. Roy. Cornwall Polytech. Soc.*, Part i, p. 26.

302. PEACH, C. W. On the Fossil Fishes of Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 79. ? Abstract, under a different title, in *Rep. Brit. Assoc. for 1843, Trans of Sections*, p. 56.

303. PENBERTHY, CAPT. J. Notice of the discovery of 'a quantity of Pitchblende, at the Providence Mines, near St. Ives. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 106.

304. PHILLIPS, J. A. Notice on Native Malleable Copper. *Proc. Lond. Electric Soc.*, vol. i, (Part 5), p. 318.

305. TAYLOR, R. On the relative position of the yellow and vitreous sulphurets of copper in the lode of Pembroke Mine. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 99.

306. THOMAS, R. Contributions towards a Description of the district of Meneage, (with an unpublished map, given to the Society). *Ibid*, p. 108.

307. WATSON, J. Y. A compendium of British Mining with statistical notices of the principal Mines in Cornwall...&c. 8vo. *Lond.* (privately printed).

308. WHITLEY, N. Remarks on the minor Fractures of Rocks. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 104.

309. ——— On the Agricultural character of the soils which rest on the various rocks of the Lizard Peninsula. *24th Ann. Rep. Roy. Inst. Cornwall*, p. 43.

309A. ——— The Application of Geology to Agriculture, &c. (Cornwall, pp. 8-38, 147-150). 8vo. *Lond.*

310. WILLIAMS, REV. D. On the Stratified and Unstratified Volcanic Products of the West of England. *Rep. Brit. Assoc. for 1842, Trans. of Sections*, p. 54.

1844.

311. BUDGE, REV. E. On the Hornblende Slate and other associated Rocks of the Meneage District. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 173.

312. COUCH, J. On the cause of the red colour in the fossiliferous rocks in the neighbourhood of Looe. *Ibid*, p. 139.

313. COUCH, R. Q. On the Silurian remains in the strata of the south-east coast of Cornwall. *Ibid*, p. 147.

314. GARBY, J. Observations on the Condurrite and Native Copper, as found at Wheal Druid. *Ibid*, p. 194.

315. HENWOOD, W. J. On the (Displacements) Heaves of Metalliferous Veins by Cross-veins. *Phil. Mag.*, Ser. 3, vol. xxiv, pp. 180, 258.

316. PEACH, C. W. On the Fossil Geology of Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 181.

317. PHILLIPS, J. On the Electricity of Mineral Veins. *11th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 54.

318. PHILLIPS, J. A. Abstract of a Paper on the Decomposition of Mineral Lodes. *Ibid*, p. 59.

319. THOMAS, R. Contributions towards forming a Geological description of the Land's-end and Tregonning-hill districts. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 190.

320. WHITLEY, N. Notes on the Geology of the neighbourhood of Perran Porth, with a Map and Sketches. *25th Ann. Rep. Roy. Inst. Cornwall*, p. 34.

321. WILLIAMS, REV. D. On the Killas Group of Cornwall and South Devon; its relations to the subordinate formations in Central and North Devon and West Somerset; its natural subdivisions; and its true position in the scale of British Strata. *Phil. Mag.*, Ser. 3, vol. xxiv, p. 332. From *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 122, (1843), with corrections.

1845.

322. BECQUEREL. On Terrestrial Electric Currents, and on their influence over the Phenomena of Decomposition and Recomposition in the Strata which they traverse. Translated from *Comptes Rendus*, vol. xix, p. 1052, (1844). (*Cornwall*, p. 576). *Electric Mag.*, vol. i, p. 570.

323. BOX, W. H. Notice of a Submarine Forest near Looe [Millendreath]. *26th Ann. Rep. Roy. Inst. Cornwall*, p. 36.

324. CARNE, J. Notice of the Remains of a Submarine Forest in the north-eastern part of Mount's Bay. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 230.

325. COUCH, R. Q. Report on the Fossil Geology of Cornwall. *Ibid*, p. 219.

326. GARBY, J. Notice of the occurrence of Gold in a cross-course in Cornwall. *Ibid*, p. 265.

327. HUNT, R. On the Electricity of Mineral Veins. *Electric Mag.*, vol. ii, p. 117.

328. PEACH, C. W. On the Fossil Geology of Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 236.

329. ———— On the Organic Fossils of Cornwall. *12th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 65.

330. TWEEDY, W. M. A description of the lode at Wheal

Coates Mine, in which the pseudomorphic crystals of tin occurred. *Ann. Rep. Roy. Inst. Cornwall*, No. 27, p. 20.

331. YORKE, LT.-COL. P. I. On Brown Iron Ore. *Mem. Chem. Soc.*, vol. ii, p. 321, and *Phil. Mag.*, Ser. 3, vol. xxvii, p. 264.

1846.

332. BUDGE, REV. E. On the Granitic and other associated Rocks of Cornwall and Devon. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 288.

333. COUCH, R. Q. Notes on the Fossil Corals of Cornwall. *Ibid.*, p. 276.

334. DE LA BECHE, SIR H. T. On the Formation of the Rocks of South Wales and South-Western England. *Memoirs of the Geological Survey*, vol. 1.

335. EDMONDS, R. On the Origin of the Sand-hillocks of St. Ives Bay, Whitesand Bay, and Mount's Bay. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 301, (and *Edin. New Phil. Journ.*, vol. xliii, p. 181.—1847).

336. FOX, R. W. On certain Pseudomorphous Crystals of Quartz. *13th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 1, and *Phil. Mag.*, Ser. 3, vol. xxviii, p. 5.

337. HENWOOD, W. J. Notices of the Superposition of certain Minerals in some of the Metalliferous Deposits of Cornwall and Devon. *Phil. Mag.*, Ser. 3, vol. xxix, p. 359.

338. KARKEEK, W. F. On the Farming of Cornwall [with an Account of the Geology, &c.]. *Journ. Roy. Agric. Soc.*, vol. vi, p. 400.

339. MOORE, E. On the Fossils of Crownall Bay, Plymouth. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 285.

340. MURCHISON, SIR R. I. A brief review of the Classification of the Sedimentary Rocks of Cornwall. *Ibid.*, p. 317.

341. NEWTON, R. Notice on the St. Agnes Beacon. *Ibid.*, p. 354.

342. PATTISON, S. R. On the Carboniferous System in Cornwall. *Ibid.*, p. 267.

343. ——— Notice of Fossils. *Ann. Rep. Roy. Inst. Cornwall*, No. 28, p. 60.

344. PEACH, C. W. On the Fossils of Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 296.

345. PEACH, C. W. Notice of the discovery of Serpentine, and of its associated Rocks, in the parish of St. Veep, near Fowey. *Ibid*, p. 351.

346. PUNNETT, REV. J. On a remarkable disturbance of the strata at Hayle Foundry. *Ibid*, pp. 305, 356.

347. SYMONS, B. A Geological Mining Map of Gwennap (? *MS.*).

348. WILLIAMS, REV. D. On the circumstances and phænomena presented by the Granite of Lundy Island, and of Hestercombe in the Quantock Hills, compared with those which characterise the Granites of Devon and Cornwall. *Quart. Journ. Geol. Soc.*, vol. ii, p. 68.

349. ——— On an important Slate term in the Killas series of Cornwall and South Devon, not sufficiently adverted to in my former classification of that group, as communicated to the Society in 1843, with additional proofs in confirmation of the true geological position of the Ocrynian or Devonian System. *Trans. Roy. Geol. Soc. Cornwall*, vol. vi, p. 334.

1847.

350. CONNELL, A. On Sulphato-chloride, a new Mineral. *Edin. New Phil. Journ.*, vol. xliii, p. 243. (*Brit. Assoc.*), and *Phil. Mag.*, Ser. 3, vol. xxxi, p. 537.

351. COUCH, R. Q. Remarks on the present state of the Geology of Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 13.

352. COUPER, R. A. On the Chemical Composition of the Substances employed in Pottery. (Read to *Phil. Soc., Glasgow*). *Phil. Mag.*, Ser. 3, vol. xxxi, p. 435.

353. FOX, R. W. Some Remarks on the High Temperature in the United Mines. *14th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 1, and *Edin. New Phil. Journ.*, vol. xlii, p. 23.

354. FRANCIS, CAPT. W. On the High Temperature of the Water at the United Mines. *14th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 4.

355. LEMON, SIR C. On a Stump of a Tree found in cutting a Drain at Heligan. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 28.

356. MURCHISON, SIR R. I. On the Discovery of Silurian Rocks in Cornwall. *Phil. Mag.*, Ser. 3, vol. xxx, p. 336, and *Ann. and Mag. Nat. Hist.*, vol. xix, p. 326.

357. MURCHISON, SIR R. I. A brief Review of the Classification of the Sedimentary Rocks of Cornwall. *Edin. New Phil. Journ.*, vol. xliii, p. 33.

358. PATTISON, S. R. On the Geology of the Tintagel District. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 3 (should be p. 1).

359. ——— On some Post-tertiary Deposits in Cornwall. *Ibid.*, p. 34.

360. PEACH, C. W. On the Fossil Geology of Lantivet and Lantick Bays, near Fowey. *Ibid.*, p. 17.

361. RUNDSELL, W. W. Notice of certain peculiar circumstances in Gwincar Consols and Wheal Seaton Mines. *Ibid.*, p. 37.

362. SHARPE, D. On Slaty Cleavage. *Quart. Journ. Geol. Soc.*, vol. iii, p. 74.

1848.

363. EDMONDS, R. On the Rapid Diminution of the Sandbanks in Mount's Bay. (*Roy. Geol. Soc. Cornwall*); *Edin. New Phil. Journ.*, vol. xlv, p. 113.

364. ——— Notice of Land-shells found beneath the surface of sand-hillocks on the Coasts of Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 70, (and *Edin. New Phil. Journ.*, vol. xlvii, p. 263.—1849).

365. GARBY, J. A Catalogue of Minerals found in Cornwall, with their Localities. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 72.

366. JOHNS, REV. C. On the Land-slip at the Lizard. *Quart. Journ. Geol. Soc.*, vol. iv, p. 193.

367. PATTISON, S. R. A brief description of the Coast of Cornwall, between the Padstow River and Perran Sands. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 47.

368. ——— On an insulated patch of Devonian Strata, in the parish of St. Stephens by Launceston, Cornwall. *Ibid.*, p. 63.

369. PEACH, C. W. On the Fossiliferous Strata of part of the South-east Coast of Cornwall. *Ibid.*, p. 57.

370. TWEEDY, W. M. Notices of the Trap Veins and Limestone Rocks of the Towan head, St. Columb Minor. *Ibid.*, p. 53.

371. WERTHER, —. Composition of Uranite and Chalkolite (from *Journ. de Phys. et de Chem.*). *Phil. Mag.*, Ser. 3, vol. xxxiii, p. 397.

1849.

372. BLYTH, DR. J. On the composition and origin of Condurrite. *Quart. Journ. Chem. Soc.*, vol. i, p. 213.
373. EDMONDS, R. On the Fragments of a Bronze Furnace (supposed to be Phœnician) discovered near St. Michael's Mount. *Rep. Penzance Nat. Hist. and Antiq. Soc.*, vol. i, p. 347, and *Edin. New Phil. Journ.*, vol. 1, p. 58, (1850).
374. GILES, J. On the Fossiliferous Rocks of the Liskeard District. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 93.
375. PATTISON, S. R. On Strata in the parish of Stokesclimsland, Cornwall, containing Vegetable Fossils. *Ibid*, p. 109.
376. PEACH, C. W. Additions to Cornish Geology. *Ibid*, p. 100.
377. PENGELLY, W. On the Ichthyolites of East Cornwall. *Ibid*, p. 106.
378. WHITLEY, N. On the Remains of Ancient Volcanoes on the North Coast of Cornwall, in the parish of St. Minver, with Sketches illustrating the spots referred to. *30th Ann. Rep. Roy. Inst. Cornwall*, p. 60.

1850.

379. CARNE, J. On the Geology of the Islands of Scilly. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 140.
380. EBELMEN, —. On the Decomposition of Trap Rocks (from *Ann. des Mines*). *Edin. New Phil. Journ.*, vol. xlvi, p. 186
381. GILES, J. On the Geology of the neighbourhood of Liskeard. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 155
382. PATTISON, S. R. On the Petherwyn beds. *Ibid*, p. 132.
383. PEACH, C. W. On the Fossils of the Blackhead Slate Quarry, near St. Austell, and on the Fossil Fishes of Cornwall. *Ibid*, p. 121.
384. ———. Notes on Cornish Fossil Geology. *Ibid*, p. 125. (See also *Rep. Brit. Assoc. for 1849, Trans. of Sections*, p. 63).
385. PENGELLY, W. On the Ichthyolites of East Cornwall. *Ibid*, p. 115.
386. RULE, J. Notice of the discovery of several Rounded Stones in the Lode at South Wheal Frances Mine. *Ibid*, p. 161.
387. WILLIAMS, REV. D. On an original broad sheet of Granite, interstratified among Slates with Grit Beds, between

Falmouth and Truro in Cornwall. *Rep. Brit. Assoc. for 1849, Trans. of Sections*, p. 68.

1851.

388. CARNE, J. Notice of a Raised Beach lately discovered at Zennor. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 176.

389. COUCH, R. Q. Notice of the occurrence of the Horns and Bones of several species of Deer in the Tin Works of Cornwall. *Ibid*, p. 185.

390. DE LA BECHE, SIR H. T. *The Geological Observer*, 8vo. *Lond.* (This is in great part a New Ed. of the "Geological Manual,") pp. 6, 10, 58 &c., 525 &c., 661 &c., 750 &c., 778, 786 &c., 816. (Ed. 2 in 185-).

391. GILES, J. On the Geology of the Liskeard District. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 169.

392. GODWIN-AUSTEN, R. A. C. On Recent Changes of Sea-level. *Rep. Brit. Assoc. for 1850, Trans. of Sections*, p. 71.

393. HENWOOD, W. J. Observations on the Providence Mines. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 179, and, under a different title, in *Phil. Mag.*, Ser. 4, vol. iv, p. 538, (1852), and *Edin. New Phil. Journ.*, vol. liv, p. 68, (1853).

394. M'COY, PROF. F. On some new Devonian Fossils. *Ann. and Mag. Nat. Hist.*, Ser. 2, vol. viii, p. 481.

395. PEACH, C. W. Notice of the Geology of St. Pinnock. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 175.

396. WHITLEY, N. Remarks on some polished and grooved Rocks found in Cornwall. *32nd Ann. Rep. Roy. Inst. Cornwall*, p. 29.

1852.

397. COUCH, R. Q. On the Fucoidal appearances observed in the Cornish Slates. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 193.

398. GILES, J. On the Metalliferous Associations of the Liskeard Rocks. *Ibid*, p. 198.

399. HENWOOD, W. J. Notice of the Sulphate of Barytes found at Wheal Mary Ann, in Menheniot. *33rd Ann. Rep. Roy. Inst. Cornwall*, p. 38.

400. PATTISON, S. R. On the Geology of the South Coast of Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. viii, p. 208.

401. PENGELLY, W. Remarks on the Geology of the South Coast of Cornwall. *Ibid*, p. 211.

402. SEDGWICK, REV. PROF. A. On the Slate Rocks of Devon and Cornwall. *Quart. Journ. Geol. Soc.*, vol. viii, p. 1.

403. WHITLEY, N. The effects of Geological structure, and the action of the waves, on the geographical outline of Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 220.

1853.

404. CALVERT, J. The Gold Rocks of Great Britain, &c., with a Treatise on the Geology of Gold. *8vo. Lond.*

405. CHAPMAN, PROF. E. J. Mineralogical Notes. Second Series. 5 Tinstone Pseudomorphs. *Phil. Mag.*, Ser. 4, vol. vi, p. 121.

406. HAUGHTON, REV. PROF. S. Notes on the Serpentine of Cornwall and Connemara. *Journ. Geol. Soc. Dublin*, vol. v, p. 136.

407. STOCKER, H. M. Account of some Remains found in the Pentewan Stream-work, and of the circumstances under which they were found. *Rep. Penzance Nat. Hist. and Antiq. Soc.*, vol. ii, p. 88.

408. STOKER, H. M. An Essay on the China-stone and China-clays of Cornwall, &c. *20th Ann. Rep. Roy. Polytech. Soc. Cornwall*, p. 77, and *Edin. New Phil. Journ.*, vol. lv, p. 91, and vol. lvi, p. 50, (1854).

1854.

409. COUCH, J. On a supposed new species of the Fossil Genus *Astroæa*, found in Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 244.

410. COUCH, R. Q. Notes on the Bones found in the Alluvial Deposits of Cornwall. *Ibid.*, p. 233.

411. HORNER, L. On some Intrusive Igneous Rocks in Cawsand Bay, near Plymouth. *Quart. Journ. Geol. Soc.*, vol. x, p. 359.

412. MURCHISON, SIR R. I. Siluria The History of the Oldest Known Rocks containing Organic Remains. *8vo. Lond.*, (pp. 257-66). Ed. 2 in 1859. Ed. 3 in 1867.

413. PATTISON, S. R. On Auriferous Quartz-rock in North Cornwall. *Quart. Journ. Geol. Soc.*, vol. x, p. 247.

1855.

414. ANON: Cornwall: its Mines and Miners. *8vo. Lond.*

415. COUCH, J. Description of the Fossils found in a quarry near Trelawney, in the parish of Pelynt, Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 249.

416. COUCH, R. Q. On the Zoology of the Post-tertiary Deposits of Cornwall. *Ibid*, p. 263.

417. ——— Notes on the Foliation and Cleavage of the Cornish Slates. *Ibid*, p. 273.

418. FOX, R. W. On Sand-worn Granite near the Land's End. *Quart. Journ. Geol. Soc.*, vol. xi, p. 549.

419. GREG, R. P. On two doubtful British Species, Glottalite and Zenaite. *Phil. Mag.*, Ser. 4, vol. x, p. 118.

420. HAUGHTON, REV. PROF. S. Notes on Mineralogy. No. 3. On Serpentine and Soapstones. *Ibid*, p. 253.

421. HEDDLE, DR. Analysis of Lunnite from Cornwall. *Ibid*, p. 39.

422. HENWOOD, G. Four Lectures on Geology and Mining. On the Study of Geology and Mineralogy, &c...Observations on Certain Tin Stream Works in the County of Cornwall. On the Metaliferous Veins or Lodes of Devon and Cornwall, &c. 8vo. *Lond. and Leeds*.

423. THOMAS, CAPT. C. Remarks on Mining in Cornwall and Devon. *22nd Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 28.

424. WHITLEY, N. On some Peculiarities of the Climate of the South-West of England, and on the Temperature of its Soils, Springs, and Rivers. *Journ. Bath and W. Eng. Soc.*, Ser. 2, vol. iii, p. 126.

1856.

425. BROOKE, H. J. On a substance named Bleiniere in modern Treatises on Mineralogy. *Phil. Mag.*, Ser. 4, vol. xii, p. 126.

426. COUCH, R. Q. The Silurian Fauna of Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 300.

427. HAUGHTON, REV. PROF. S. On Slaty Cleavage, and the Distortion of Fossils. *Phil. Mag.*, Ser. 4, vol. xii, p. 409.

428. WHITLEY, N. The Physical Geography of the South-Western Counties of England. *Journ. Bath and W. Eng. Soc.*, Ser. 2, vol. iv, p. 227.

1857.

429. ANON: [? W. ARUNDELL or H. C. SALMON ?] On the

Physical and Geological Structure of the Mining Districts of Cornwall and South Devon. Parts 1 and 2. *Pick and Gad*, No. i, p. 1, No. ii, p. 48, and No. iii, p. 105.

1858.

430. ANON. Note on the Positions of Fossils in Cornish Slates. [See last page of Journal].

431. COUCH, R. Q. On the Slates of Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 317.

432. FOX, R. W. Report on the Temperature of some Deep Mines in Cornwall. *Rep. Brit. Assoc. for 1857*, p. 96.

433. GREG, R. P., and — LETSOM. Manual of Mineralogy of Great Britain and Ireland. *8vo. Lond.*

434. SMITH, A. On the Chalk Flints and Green-sand fragments, found on the Castle Down of Tresco, one of the Islands of Scilly. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 343.

435. SMYTH, W. W. On the Iron Mines of Perran. *Ibid*, p. 332.

436. SORBY, H. C. On the Microscopical Structure of Crystals, indicating the Origin of Minerals and Rocks. (Cornwall, pp. 473-476, 486-488, 492-496, &c.). *Quart. Journ. Geol. Soc.*, vol. xiv, p. 453.

437. VOELCKER, DR. A. On the use of Lime, Marl, and Shell-sand in Agriculture, with special reference to the Soils in the West of England. (Analysis of Cornish Sand, pp. 242-244). *Journ. Bath and W. Eng. Soc.*, Ser. 2, vol. vi, p. 220.

438. WHITLEY, N. On the Strike of the Slate-beds in Cornwall and Devon. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 336.

439. WILLIAMS, CAPT. R. H. Notice of the occurrence of Nickel and Cobalt, at St. Austle Consols Mine, near St. Austle, Cornwall. *39th Ann. Rep. Roy. Inst. Cornwall*, p. 32.

1859.

440. GAGES, A. On a Method of Observation applied to the Study of some Metamorphic Rocks, &c. *Phil. Mag.* [See last page of Journal].

441. HENWOOD, W. J. Notice of the Submarine Forest near Padstow. *40th Ann. Rep. Roy. Inst. Cornwall*, pp. 17, 31.

442. JONES, [PROF.] T. R. Note on some Granite-tors. *Geologist*, vol. ii, p. 301.

443. PHILLIPS, PROF. J. Anniversary Address to the Geological Society of London. (Cornwall, p. lvii). *Quart. Journ. Geol. Soc.*, vol. xv.

444. ROGERS, J. J. Strata of the Cober Valley, Loe-pool, near Helston. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 352.

445. STATHAM, REV. F. F. On the Geology of the Scilly Isles. (Brit. Assoc.). *Geologist*, vol. ii, p. 12.

446. THOMAS, CAPT. C. Remarks on the Geology of Cornwall and Devon in connexion with the Deposits of Metallic Ores and on the Bearings of the Productive Lodes. *8vo. Redruth*.

447. WHITLEY, N. On the effects of the Granite-joints on the physical geography of Penwith. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 349.

1860.

448. CARNE, MISS E. On the evidence to be derived from Cliff Boulders, with regard to a former condition of the land and sea, in the Land's-end district. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 369.

449. GREG, R. P. On several New British Minerals. *Phil. Mag.*, Ser. 4, vol. xix, p. 13.

450. HENWOOD, W. J. Note on Changes produced by the deepening and extension of Mines on the temperatures at their previous bottoms. *41st Ann. Rep. Roy. Inst. Cornwall*, p. 21, and *Edin. New Phil. Journ.*, Ser. 2, vol. x, p. 166, (1859).

451. PATTISON, S. R. [Letter on Quaternary Deposits]. *42nd Ann. Rep. Roy. Inst. Cornwall*, p. 13.

452. PUNNETT, H. M. On some peculiar deposits of Tin in St. Aubyn and Grylls Mine. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 379.

453. WHITLEY, N. The undeveloped Natural Resources of Cornwall. *41st Ann. Rep. Roy. Inst. Cornwall*, p. 24.

1861.

454. HENWOOD, W. J. Notes on the Silver produced in Cornwall. *Edin. New Phil. Journ.*, Ser. 2, vol. xiii, p. 173.

455. PEARCE, R. On some interesting Minerals recently found in a few of the Cornish Mines. *43rd Ann. Rep. Roy. Inst. Cornwall*, Part 1, p. 34.

456. PENGELLY, W. On the Chronological and Geographical Distribution of the Devonian Fossils of Devon and Cornwall. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 388, and *Rep. Brit. Assoc. for 1860, Trans. of Sections*, p. 91. (See No. 469).

457. ——— On the Devonian Age of the World. *Geologist*, vol. iv, pp. 332, 557.

458. PERCY, DR. J. Metallurgy [vol. i.] Fuel, Fire-clays, Copper, Zinc, &c. (Analysis of Cornish Clays, p. 215, and account of Copper-ores, by W. W. SMYTH, pp. 313, 314). 8vo. Lond.

459. SALMON, H. C. On the Occurrence of Large Granite Boulders, at a Great Depth, in West Rosewarne Mine, Gwinear, Cornwall. *Quart. Journ. Geol. Soc.*, vol. xvii, p. 517.

460. WHITLEY, N. On the Developement of the Agricultural Resources of Cornwall. *Journ. Bath and W. Eng. Soc.*, Ser. 2, vol. ix, p. 193.

461. WILLIAMS, CAPT. R. H. The Mineral District of St. Austell. *Miners' Assoc. of Cornwall and Devon* (? printed in *Roy. Cornwall Gazette, or West Briton*).

1862.

462. BLAKE, C. C. On the Crania of the most ancient Races of Men. *Geologist*, vol. v, p. 205. (Cornwall, p. 210).

463. EDMONDS, R. The Land's End District, its Antiquities, Natural History, Natural Phenomena, and Scenery. 8vo. Lond. and Penzance.

464. FIELD, F. On the General Distribution of Bismuth in Copper Minerals. *Quart. Journ. Chem. Soc.*, vol. xiv, p. 304.

465. HIGGS, S. Notice of a singular specimen much resembling a Chalk Flint, found in the Balleswiddden Mine, St. Just. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 449.

466. MOISSENET, M. L. Etudes sur les Filons du Cornouailles et du Devonshire. *Ann. des Mines*, 6 Ser., t. iii, p. 161, (and *Comptes Rendus*).

467. PEARCE, R. Interesting Minerals. 44th *Ann. Rep. Roy. Inst. Cornwall*, Part 1, p. 19.

468. PENGELLY, W. On the Relative Age of the Petherwin and Barnstaple Beds. *Rep. Brit. Assoc. for 1861, Trans. of Sections*, p. 124.

469. PENGELLY, W. The Geographical and Chronological Distribution of the Devonian Fossils of Devon and Cornwall. *Geologist*, vol. v, pp. 10, 74. (A Reprint, with Additions, of No. 456).

470. ——— On the Correlation of the Slates and Limestones of Devon and Cornwall with the Old Red Sandstones of Scotland. (Brit. Assoc.). *Ibid*, p. 456, and *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 441.

471. ——— On the Supposed Uniform Height of Contemporary Raised Beaches. *Trans. Roy. Geol. Soc. Cornwall*, vol. vii, p. 446.

472. PHIPSON, DR. T. L. On the Argentiferous Gossan of Cornwall. *Chem. News*, vol. vi, No. 151, p. 205.

473. RILEY, E. On the Manufacture of Iron. (Analyses of Ores). *Trans. Soc. Eng. for 1861*, p. 59.

474. SALMON, H. C. Illustrated Notes on Prominent Mines. (1) East Carn Brea and Wheal Uny; (2) East Pool; (3) Pedn-an-drea Mine; (4) Herod's foot Mine and Wheal Mary Ann. *Mining and Smelting Mag.*, vol. i, pp. 314, 384, and vol. ii, pp. 140, 211.

475. ——— The Seton Mining District. *Ibid*, vol. ii, pp. 277, 332.

1863.

476. ANON. [? H. C. SALMON]. The Condurrow District. *Mining and Smelting Mag.*, vol. iii, p. 82.

477. ——— ——— The St. Ives and Lelant Tin-Mining District, Cornwall. *Ibid*, p. 138.

478. ——— History of Mining in Caradon and Liskeard District. *Svo. Lond.*

479. CHURCH, [PROF.] A. H. Notes on certain Processes of Rock Formation now in Action. *Journ. Chem. Soc.*, Ser. 2, vol. i, p. 30.

480. MASKELYNE, PROF. N. S. Mineralogical Notes. 1. On Connellite. *Phil. Mag.*, Ser. 4, vol. xxv, p. 39.

481. PEARCE, R. The Granites of Metalliferous Districts. Miners' Assoc. Cornwall and Devon, Quarterly Meeting, (Camborne), p. 5. (Reprinted from the *West Briton*), and *45th Ann. Rep. Roy. Inst. Cornwall*, p. 54.

482. RILEY, E. On the Occurrence of Titanium in Pig Iron, &c....(Analyses of Cornish Iron-ores, p. 199). *Mining and Smelt-*

ing Mag., vol. iv, p. 193, and *Journ. Chem. Soc.*, Ser. 2, vol. i, p. 387.

483. SYMONS, B. Geological Map of Caradon and Ludcott Mining Districts.

484. WILLIAMS, CAPT. W. H. On Mineral Deposits [near St. Austell]. *45th Ann. Rep. Roy. Inst. Cornwall*, p. 44.

1864.

485. ANON: Notes and Memoranda of Excursions. *Miners' Assoc. Cornwall and Devon, Annual Meeting*, p. 7.

486. ——— Notes on the Excursions of the Helston Branch. *Ibid*, p. 11.

487. ——— On the Surface Indications of Mineral Deposits. *Ibid*, p. 15.

488. BORLASE, DR. Additions to his "Natural History of Cornwall," Chaps. vi, ix, xi. *Journ. Roy. Inst. Cornwall*, No. 2, *Supplement*.

489. DAVIDSON, T. A Monograph of the British Devonian Brachiopoda. (No. 1). [Cornwall, pp. 17, 25, 30, 41, 56]. *Palæontograph. Soc.*

490. ENYS, J. S. On Specimens of Hornblende and Serpentine from the junction at Porthalla. *31st Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 42.

491. HAUGHTON, REV. [PROF.] S. On the Joint-Systems of Ireland and Cornwall, and their Mechanical Origin. *Phil. Trans.*, vol. cliv, (Part 2), p. 393.

492. MASKELYNE, PROF. N. S. New British Mineral. *Phil. Mag.*, Ser. 4, vol. xxvii, p. 316.

493. ——— New Minerals from Cornwall (Warringtonite and Lyellite). *Chem. News*, vol. x, No. 260, p. 263.

494. MILLER, DR. W. A. Chemical Examination of a Hot Spring containing Cesium and Lithium in Wheal Clifford, Cornwall. *Chem. News*, vol. x, No. 254, p. 181, and *Rep. Brit. Assoc. for 1864, Trans. of Sections*, p. 35, (1865).

495. PEARCE, R. The Influence of Lodes on Rocks. *Miners' Assoc. Cornwall and Devon, Annual Meeting*, p. 17, and *Chem. News*, vol. xi, p. 100, (1865).

496. ——— Scientific Summary. Mineralogy, &c. *Journ. Roy. Inst. Cornwall*, No. 1, p. 53.

497. PERCY, DR. J. Metallurgy, [vol. ii], Iron and Steel. (Analysis of Cornish Ore, p. 207). *8vo. Lond.*
498. PISANI, F. Analysis of Langite, a new Mineral from Cornwall. *Phil. Mag.*, Ser. 4, vol. xxviii, p. 403. From *Comptes Rendus*.
499. SALMON, H. C. The Mines and Mining Operations of Cornwall. *Mining and Smelting Mag.*, vol. v, pp. 257, 328.
500. SALTER, J. W. A Monograph of British Trilobites. Part 1, (pp. 18-20, 30, 59, 60). *Paleontograph. Soc.*
501. SPARGO, T. Statistics and Observations on the Mines of Cornwall and Devon. *8vo. Lond.*
502. SMYTH, W. W. On the Thermal Water of the Clifford Amalgamated Mines, Cornwall. With an Analysis by PROF. MILLER, (see above). *Mining and Smelting Mag.*, vol. vi, p. 193, and *Rep. Brit. Assoc. for 1864, Trans. of Sections*, p. 70, (1865).
503. SYMONS, B. Geological Map of the Crowan and Wheal Abraham Mining Districts.
504. WHITLEY, N. The "Flint Implements" from Drift, not authentic. *Journ. Roy. Inst. Cornwall*, No. 2, p. 19.

1865.

505. BORLASE, DR. . Additions to his "Natural History of Cornwall," Chaps. xii, xv, xvii-xix. *Journ. Roy. Inst. Cornwall*, No. 3, *Supplement*.
506. CHURCH, PROF. A. H. On some Hydrated Cupric Oxylchlorides from Cornwall. *Journ. Chem. Soc.*, Ser. 2, vol. iii, p. 77.
507. ———— On some Hydrated Cupric Oxysulphates from Cornwall. *Ibid*, p. 83.
508. ———— Notes on a Cornish Mineral of the Atacamite Group. *Ibid*, p. 212.
509. ———— Notes on a Ferric Hydrate from Cornwall. *Ibid*, p. 214.
510. ———— Chemical Researches on some new and rare Cornish Minerals. *Ibid*, p. 259.
511. ———— Preliminary Notes on Brochantite and Atacamite from Cornwall. *Chem. News*, vol. xi, p. 61.
512. ———— On the Occurrence of Crystallized Melanconite in Cornwall. *Ibid*, p. 122. (See also p. 191).
513. ———— Preliminary Note on a New British Mineral containing Cerium. *Ibid*, vol. xii, pp. 121, 300, (see also p. 241).

514. DAVIDSON, T. A Monograph of the British Devonian Brachiopoda. No. 2. *Palaontograph. Soc.*, (pp. 58, 61, 62, 81, 83-5, 87, 90-2, 99, 101, &c).

515. FIELD, F. On a Specimen of Tin-ore hitherto undescribed. *Rep. Brit. Assoc. for 1864, Trans. of Sections*, p. 27.

516. KELLY, J. Some Remarks on the Doctrine of Characteristic Fossils. *Journ. Roy. Geol. Soc. Ireland*, vol. i, (Part 1), p. 34.

517. LYELL, SIR C. Presidential Address. *Rep. Brit. Assoc. for 1864*, p. lx. (Redruth, p. lxxv).

518. MASKELYNE, [PROF.] N. S. On New Cornish Minerals of the Brochantite Group. *Proc. Roy. Soc.* (See also *Chem. News*, vol. xii, p. 277).

519. PENGELLY, W. On Cetacean Remains washed ashore at Babbicombe, South Devon. (? refers to Cornwall). *Trans. Devon Assoc.*, Part iv, p. 86.

520. PERKINS, F. P. The Petherwin Beds. *Science Gossip*, No. 7. p. 150.

521. SALTER, J. W. A Monograph of British Trilobites. Part 2. *Palaontograph. Soc.* (Cornwall, pp. 99, 112).

522. WILLIAMS, C. G. On the Presence of Didymium in Churchite. *Chem. News*, vol. xii, p. 183.

1866.

523. ANON: (T. D[AVIES]). Crystallized Stephanite and Argentite from Cornwall. *Geol. Mag.*, vol. iii, p. 432.

524. AUSTIN, MAJOR T. Rock-Basins, Logan Rocks, and Tolmên. *Proc. Bristol Nat. Soc.*, Ser. 2, vol. i, p. 65.

525. BATE, C. S. An Attempt to approximate the Date of the Flint Flakes of Devon and Cornwall. *Trans. Devon Assoc.*, Part 5, p. 128. See also No. 542.

526. BAWDEN, S. Dislocation of Lodes and Strata. *Miners' Assoc. of Cornwall and Devon, Annual Meeting*, p. 29.

527. CHURCH, [PROF.] A. H. Chemical Researches on New and Rare Cornish Minerals. *Journ. Chem. Soc.*, Ser. 2, vol. iv, p. 130.

528. ——— Preliminary Notice of a New Cornish Mineral. *Chem. News*, vol. xiii, p. 85.

529. ——— Chloropal in Cornwall. *Ibid*, vol. xiv, p. 71.

530. FOSTER, DR. C. LE N. On the Occurrence of...Linarite in Cornwall. *Geol. Mag.*, vol. iii, p. 525.

531. ——— Notes on New Rosewarne Mine. *Miners' Assoc. of Cornwall and Devon, Annual Meeting*, p. 26. (See also No. 547).

532. MASKELYNE, PROF. N. S. On Crystals of Melanconite, and on Tenorite, [Lostwithiel]. *Rep. Brit. Assoc. for 1865, Trans. of Sections*, p. 33.

533. ——— New Cornish Minerals. *Chem. News*, vol. xiii, p. 84.

534. PEARCE, R. Scientific Summary. Recently discovered Minerals. *Journ. Roy. Inst. Cornwall*, No. 6, p. 167.

535. PENGELLY, W. The Insulation of St. Michael's Mount in Cornwall. *Rep. Brit. Assoc. for 1865, Trans. of Sections*, p. 71.

536. ——— Raised Beaches. *Trans. Devon Assoc.*, Part 5, p. 103.

537. PIKE, J. W. A Description of some remarkable Heaves or Throws in Penhalls Mine. *Quart. Journ. Geol. Soc.*, vol. xii, p. 535.

538. WHITLEY, N. On recent Flint Finds in the South-West of England. *Journ. Roy. Inst. Cornwall*, No. 6, p. 121.

539. WOODWARD, B. H. Rambles in Cornwall for Minerals and Ferns. *Intellectual Observer*, vol. ix, p. 111.

1867.

540. ARGALL, W. Notes on an Excursion to the Chiverton District. *Miners' Assoc. of Cornwall and Devon, Annual Meeting*, p. 50.

541. AUSTIN, MAJOR T. The Towans of Cornwall, the Dunes of Norfolk, the Sandhills of Holland, and sandy accumulations generally. *Proc. Bristol Nat. Soc.*, Ser. 2, vol. ii, No. 11, p. 100.

542. BATE, C. S. An Attempt to approximate the Date of the Flint Flakes of Devon and Cornwall. *Pop. Sci. Rev.*, vol. vi, p. 169. See also No. 525.

543. DAVIES, T. Senarmontite from Cornwall. *Geol. Mag.*, vol. iv, p. 192.

544. ——— [Letter on] Researches in British Mineralogy. *Ibid.*, p. 575.

545. FORBES, D. On the Alleged Hydrothermal Origin of Certain Granites. *Ibid.*, p. 49. (Note on Cornwall, p. 57).

546. FORBES, D. The Microscope in Geology. *Pop. Sci. Rev.*, vol. vi, p. 355.

547. FOSTER, DR. C. LE N. On a Curious Lode or Mineral Vein at New Rosewarne Mine, Gwinear, Cornwall. *Rep. Brit. Assoc. for 1866, Trans. of Sections*, p. 52. (See also No. 531).

548. HENTY, G. M. On the Occurrence of Wood Tin at the Great Wheal Vor Mines. *Miners' Assoc. of Cornwall and Devon, Annual Meeting*, p. 55.

549. OATS, F. Notes on an Excursion to the Chiverton District. *Ibid*, p. 48.

550. PENGELLY, W. The Antiquity of Man in the South-west of England. *Trans. Devon Assoc.*, vol. ii, p. 129.

551. ———— On the Distribution of the Devonian Brachiopoda of Devonshire and Cornwall. *Ibid*, p. 170.

552. ———— Fish in Devonian Rocks. *Geol. Mag.*, vol. iv, p. 284.

553. THOMAS, C. Mining Fields of the West, Cornwall and Devon. *8vo*.

1868.

554. CHURCH, PROF. A. H. Chemical Researches on New and Rare Cornish Minerals. *Journ. Chem. Soc.*, Ser. 2, vol. vi, p. 276.

555. DAVIES, T. Silver-fahlerz in Cornwall. *Geol. Mag.*, vol. v, p. 102.

556. EDMONDS, R. On the Phœnician Tin Trade in Cornwall, with Remarks on the Great Irruption of the Sea in the Eleventh Century, Sand-hillocks, "Raised Beaches," &c. *Trans. Plymouth Inst.*, vol. iii, p. 17.

557. FORBES, D. [Letter on] researches in British Mineralogy. *Geol. Mag.*, vol. v, p. 47.

558. ———— Polytelite in Cornwall. *Ibid*, p. 147.

559. GROVE, W. R. Artificial Rocking-stones. *Geol. and Nat. Hist. Repertory*, vol. ii, p. 255, and *Rep. Brit. Assoc. for 1868, Trans. of Sections*, p. 65, (1869).

560. HALL, T. M. The Mineralogists Directory. *8vo. Lond.*

561. HOLL, DR. H. B. On the Older Rocks of South Devon and East Cornwall. *Quart. Journ. Geol. Soc.*, vol. xxiv, p. 400.

562. HUNT, R. The Economic Geology of Devonshire and Cornwall in 1868. *Journ. Bath and W. Eng. Soc.*, Ser. 2, vol. xvi, p. 67.

563. JUKES, J. B. Notes on parts of South Devon and Cornwall with remarks on the True Relations of the Old Red Sandstone to the Devonian Formation. *Journ. Roy. Geol. Soc. Ireland*, vol. ii, p. 67.

564. LANKESTER, E. R. On the Discovery of the Remains of Cephalaspidean Fishes in Devonshire and Cornwall; and on the Identity of *Steganodictyum*, M'Coy, with Genera of those Fishes. *Quart. Journ. Geol. Soc.*, vol. xxiv, 546.

565. PEACH, C. W. On the Fossil Fishes of the Duchy of Cornwall. (Brit. Assoc.). *Geol. Mag.*, vol. v, p. 568.

566. PEACOCK, A. Physical and Historical Evidences of vast Sinkings of Land on the North and West Coasts of France and South Western Coasts of England; within the Historical Period. *Svo. Lond.*

567. PENGELLY, W. The History of the Discovery of Fossil Fish in the Devonian Rocks of Devon and Cornwall. *Trans. Devon Assoc.*, vol. ii, p. 423.

568. PISANI, F. On the Woodwardite of Cornwall. *Phil. Mag.*, Ser. 4, vol. xxxv, p. 320, (from *Comptes Rendus*, 1867).

569. SMYTH, W. W. President's Anniversary Address. Notes of the Temperature in Cornish Mines. *Quart. Journ. Geol. Soc.*, vol. xxiv, pp. lxxxiii-v.

570. WYATT-EDGELL, REV. E. Fish Remains in the Lower Devonian of South Devon and Cornwall. *Geol. Mag.*, vol. v, p. 247.

1869.

571. ANON: (W. B.). A Geological Puzzle [alluvium, Fowey]. *Science Gossip*, No. 52, p. 95.

572. BARNETT, A. K. A Ramble through Wheal Buller, West Bassett, and South Frances Mines. *Miners' Assoc. Cornwall and Devon*, 1869, p. 33.

573. CHURCH, PROF. [A. H.]. Preliminary Note on a New Cornish Mineral. *Chem. News*, vol. xx, p. 149.

574. COLLINS, J. H. A Walk in a Cornish Valley (Blackwater). *Miners' Assoc. Cornwall and Devon*, 1869, p. 28.

575. FORBES, D. Researches in British Mineralogy. III. (Native Gold). *Phil. Mag.*, Ser. 4, vol. xxxvii, p. 321.

576. FRANCIS, H. Mineral Phenomena, (Breage). *36th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 19.

577. HAUGHTON, REV. PROF. S. Notes on a Comparison of the Granites of Cornwall and Devonshire with those of Leinster and Mourne. *Journ. Roy. Geol. Soc. Ireland*, vol. xii, p. 166.

1870.

578. ANON : (B. J. R.). Hall's Mineralogist's Directory (Corrections of Localities). *Geol. Mag.*, vol. vii, p. 443.

579. BARNETT, A. K. Mineral Phenomena, (Gwennap). *37th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 53.

580. CHURCH, PROF. A. H. Chemical Researches on New and Rare Cornish Minerals. *Journ. Chem. Soc.*, Ser. 2, vol. viii, pp. 3, 165.

581. ——— Notes of Contributions to Mineralogical Chemistry. *Chem. News*, vol. xxii, p. 219.

582. CLAYPOLE, E. W. On some Evidence in favour of Subsidence in the South West Counties of England during the Recent Period. *Proc. Bristol Nat. Soc.*, Ser. 2, vol. v, Part 1, p. 34.

583. CORNISH, T. Memorandum [on hazel-nuts found underground at St. Hilary]. *Trans. Plymouth Inst.*, vol. iv, Part 1, p. 36.

584. HENWOOD, W. J. Excursion to Dolcoath. *37th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 38.

585. KINAHAN, G. H. Notes on the Features of Devon, Cornwall, and Galway. *Geol. Mag.*, vol. vii, p. 310.

586. KITTO, B. On Mineral Veins, (Breage). *37th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 48.

587. PEACH, C. W. Cornish Fossils. *Journ. Roy. Inst. Cornwall*, No. xi, p. xxxi.

588. ——— Notice of the Discovery of Organic Remains in the Rocks between the Nore Head and Porthalla Cove, Cornwall. *Rep. Brit. Assoc. for 1869, Trans. of Sections*, p. 99.

589. THOMAS, J. Description of the operations at Dolcoath Mine. *Journ. Roy. Inst. Cornwall*, No. xi, p. 191.

590. WHITLEY, N. Indications of Glacial Action in Cornwall. *Ibid*, p. 184.

1871.

591. ALLPORT, S. On the Microscopical Structure and Composition of a Phonolite from the "Wolf Rock." With a Chemical Analysis by J. A. PHILLIPS. *Geol. Mag.*, vol. viii, pp. 247, 336.

592. ANON: [? J. H. COLLINS]. Notices of Mineralogy and Geology. *Western Chronicle of Science*, Nos. i, p. 13; ii, p. 29; iv, p. 61; xi, p. 173.

593. BRYANT, CAPT. N. On the Perran Iron Lode. *38th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 98.

594. CHURCH, PROF. A. H. Analysis of Pitticite, from Redruth, Cornwall. *Chem. News*, vol. xxiv, p. 135.

595. ——— Note on a Cupric Phosphate from Cornwall. *Ibid.*, p. 239.

596. COLLINS, J. H. A Handbook to the Mineralogy of Cornwall and Devon. *8vo. Truro and Lond.*

597. HANCOCK, R. On the Mineral Deposits of the Old Wheal Vor Mine, Breage. *38th Rep. Roy. Cornwall Polytech. Soc.*, p. 101, and *Miners' Assoc. Cornwall and Devon*, p. 39.

598. HENWOOD, W. J. Observations on Metalliferous Deposits. (Cornwall, pp. 655-720). *Trans. Roy. Geol. Soc. Cornwall*, vol. viii, Part 1.

599. ——— Observations on Subterranean Temperature. (Cornwall, pp. 745-749). *Ibid.*, Part 2.

600. LOBLEY, J. L. Two Days in a Mining District. *Proc. Geol. Assoc.*, vol. ii, No. 2, p. 45.

601. MASKELYNE, PROF. N. S. On Andrewsite. *Chem. News*, vol. xxiv, p. 99, and *Rep. Brit. Assoc. for 1871, Trans. of Sections*, p. 75.

602. MASKELYNE, PROF. N. S. and DR. W. FLIGHT. Mineralogical Notices. 3 Francolite. 5 Vivianite. 6 Cronstedtite. *Journ. Chem. Soc.*, Ser. 2, vol. ix, p. 3.

603. MICHELL, S., W. H. ARGALL, and J. ENDEY. Account of an Excursion.....to the Clay and Tin Works of Carclaze, St. Austell. *Miners' Assoc. Cornwall and Devon*, p. 33.

604. PENGELLY, W. Notes on the Geology and Archæology of Cornwall and Devon. *Journ. Roy. Inst. Cornwall*, No. 12, p. 260.

605. PHILLIPS, J. A. On the Chemical Composition and Microscopic Constitution of certain Cornish Rocks. *Phil. Mag.*, Ser. 4, vol. xli, p. 87.

606. ——— On the Connexion of certain Phenomena with the Origin of Mineral Veins (Analyses of Waters from Cornish Mines). *Ibid.*, vol. xlii, p. 401.

607. RICHARDSON, DR. C. T. On a Visit to the Scilly Isles. *Proc. Geol. Assoc.*, vol. ii, No. 2, p. 37.

608. WILLIAMS, SIR F. M. Recent Observations on Subterranean Temperature in the Clifford Amalgamated Mines. *Journ. Roy. Inst. Cornwall*, No. 12, p. 283.

609. WOODHOUSE, J. T. Iron Ores Committee. Iron Ores of Cornwall. *Journ. Iron and Steel Inst.*, vol. ii, p. 27.

610. WORTH, R. N. The Ornamental Rocks of Devon and Cornwall. *Western Chronicle of Science*, No. 7, pp. 99.

611. ——— Building Stones of Devon and Cornwall. *Ibid*, No. 8, p. 120.

1872.

612. ADGER, J. B. Analysis of an Anomalous Variety of Stannite (Tin Pyrites) from Cornwall. *Chem. News.*, vol. xxv, p. 259.

613. ANON: The Annual Excursion of 1871 (Lelant). *Miners' Assoc. Cornwall and Devon*, p. 29.

614. ARGALL, W. On Gossans. *Ibid*, p. 37.

615. CLAYPOLE, E. W. On the Subsidence which has taken place in the South Western Counties of England during the Recent Period. *Proc. Bristol Nat. Soc.*, Ser. 2, vol. vii, Part 1, p. 11.

616. COLLINS, J. H. The Iron Ores of Cornwall. *Mining Mag. and Rev.* vol. i, p. 177.

617. HENDERSON, CAPT. (On the Botallack Mine). *Journ. Roy. Inst. Cornwall*, No. xiii, p. xcvi.

618. HENWOOD, W. J. Observations on the Metalliferous Deposits of Cornwall, in the Presidential Address. *Ibid*, p. ix, and *Rep. Miners' Assoc. Cornwall and Devon*, 1872-3, p. 1, (1873).

619. MASKELYNE, PROF. N. S., and DR. FLIGHT. Mineralogical Notices. 8 Isopyre. 9 Uranite. 13 Prasine. *Journ. Chem. Soc.*, Ser. 2, vol. x, p. 1049.

620. MAYNARD, CAPT. J. On "Lodes," "Heaves," and "Slides." *Miners' Assoc. Cornwall and Devon*, p. 42.

621. NOBLE, CAPT. J. Remarks on Mineral Veins in the Parish of Constantine. *Ibid*, p. 45, and *39th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 74.

622. PATTISON, S. R. On the Upper Limits of the Devonian System. *Proc. Geol. Assoc.*, vol. ii, No. 7, p. 277.

623. PEARCE, R. Notes on the occurrence of Cobalt in connection with the Tin Ores of Cornwall. *Journ. Roy. Inst. Cornwall*, No. xiii, p. 81.

624. PENGELLY, W. The Insulation of St. Michael's Mount, Cornwall. *Ibid*, p. 1.

625. REYNOLDS, PROF. J. E. Notes on Woodwardite. *Journ. Roy. Geol. Soc. Ireland*, vol. iii, Part 2, p. 84.

626. STEPHENS, H. Remarks on the Mineral Phenomena of Huel Rose in the parish of Sithney. *Miners' Assoc. Cornwall and Devon*, p. 47, and *39th Ann. Rep. Roy. Cornwall Polytech. Soc.*, p. 77.

627. SYMONDS, REV. W. S. Fish-remains in the Devonian Beds of Cornwall. *Geol. Mag.*, vol. ix, p. 239.

628. ——— Records of the Rocks; or Notes on the Geology, &c...of North and South Wales, Devon, and Cornwall. *Svo.*, *Lond.*

629. WHITLEY, H. M. Note on a Sub-Marine Forest at Market Strand, Falmouth. *Journ. Roy. Inst. Cornwall*, No. xiii, p. 77.

630. YORKE, COL. P. Note on the Quantity of Cesium contained in the Water of the Hot Spring found in Wheal Clifford. *Journ. Chem. Soc.*, Ser. 2, vol. x, p. 273.

1873.

631. ANON. Account of an Excursion to St. Just. *Rep. Miners' Assoc. Cornwall and Devon*, 1872-3, p. 62.

632. CHURCH, PROF. A. H. New Analyses of certain Mineral Arseniates and Phosphates.....3 Childrenite. 4 Ehlite....*Journ. Chem. Soc.*, Ser. 2, vol. xi, p. 103.

633. COLLINS, J. H. Note on the Rocks and Goonbarrow Mines, near St. Austell. *Rep. Miners' Assoc. Cornwall and Devon*, 1872-3, p. 66.

634. ——— Note on the Evidences of Vertical Movement in the Lodes of Cornwall. *Ibid*, p. 70.

635. ——— On the Mining District of Cornwall and West Devon. *Proc. Inst. Mechan. Eng. for 1873*, p. 89.

636. FISHER, REV. O. On some Points connected with late Glacial Action and Raised Sea-bed. (Carclaze, p. 164). *Geol. Mag.*, vol. x, p. 163.

637. HESSENBERG, F. [Axinite from Botallack]. *Jahrb. fur Mineralogie*, p. 186.

638. PHILLIPS, J. A. On the Composition and Origin of the

Waters of a Salt Spring in Huel Seton Mine, with a Chemical and Microscopical Examination of certain Rocks in its vicinity. *Phil. Mag.*, Ser. 4, vol. xlvi, p. 26.

639. SCHRAUF, DR. A. Mineralogische Beobachtungen. [Brochantite, Warringtonite]. *Sitzungsb. Kaiserlich. Akad. Wissenschaft.* lxvii, p. 275.

640. TILLY, H. Particulars of a Thermal Spring at Wheal Seton Mine, in the Parish of Camborne, with a Comparative Table of Analyses of similar Springs in the United, Balleswidden, Botallack, and Crown Mines. *Rep. Miners' Assoc. Cornwall and Devon*, 1872-3, p. 53.

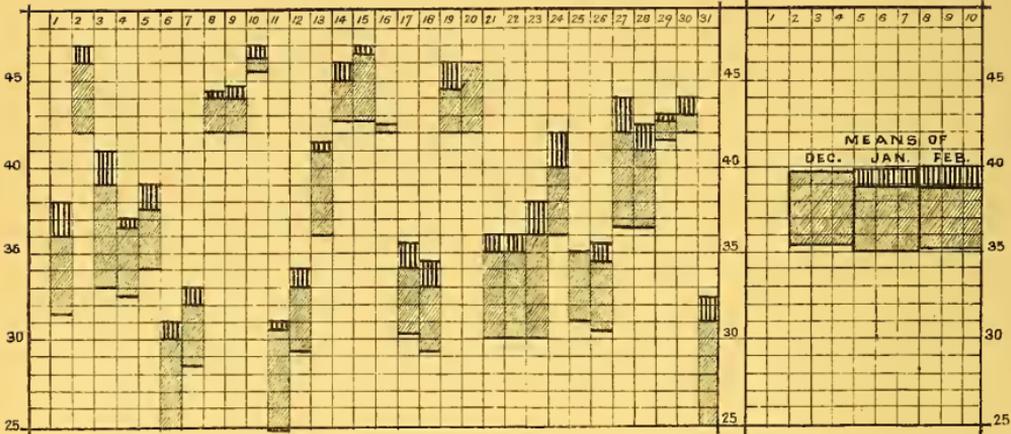
641. TREGAY, CAPT. W. Some Remarks on Crossbranches and Crossheads; being an Enquiry into their Effect on Mineral Veins. *Ibid.*, p. 57.

NO DATE.

643-652. Sheets 24, 25, 26, 27, 28, 29, 30, 31, 32, 33 of the Map of the *Geological Survey*, by SIR H. DE LA BECHE (1839 or earlier). Mineral Lodes added by W. W. SMYTH some years later.

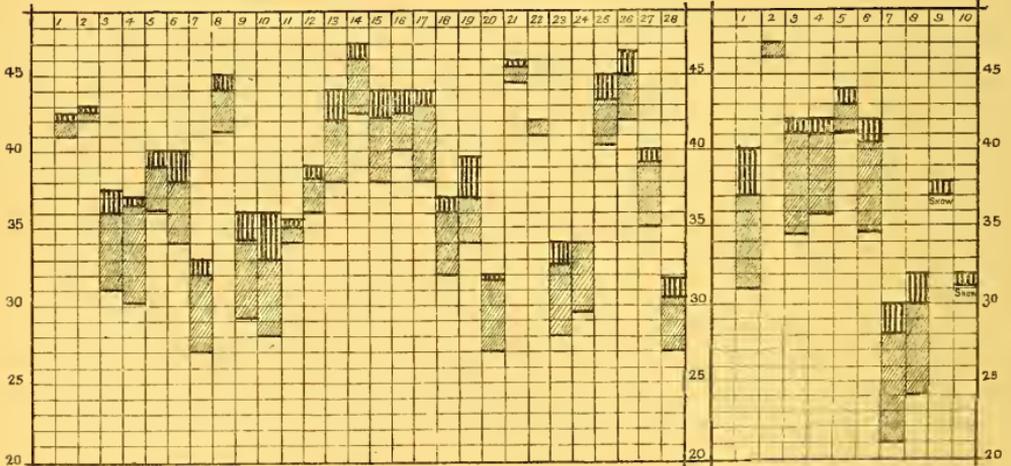
DIAGRAM SHOWING THE MINIMA BY SELF-REGISTERING THERMOMETERS UNDER A SHED AND ON THE GRASS AT STRANGWAYS TERRACE, TRURO: AND ALSO THE DIFFERENCE OF THE MINIMA INDICATED BY A THERMOMETER ON GRASS AND UNDER SHELTER.

1874. JANUARY.

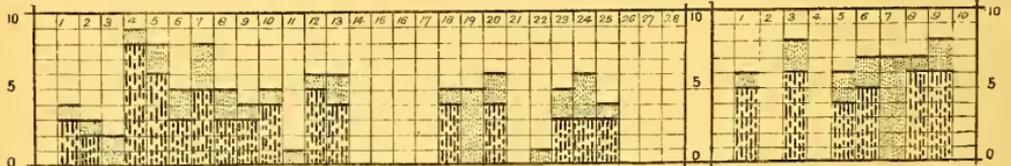


1874. FEBRUARY.

MARCH.



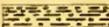
BODMIN. DIFFERENCE OF MINIMA ON GRASS BY THERMOMETERS EXPOSED AND SHELTERED BY MUSLIN.



 DIFFERENCE BETWEEN THERMOMETER IN SHED AND UNDER SHELTER.

 DIFFERENCE BETWEEN MINIMA IN SHED AND UNDER SHELTER.

 DIFFERENCE BETWEEN THERMOMETER UNDER SHELTER AND ON GRASS.

 DIFFERENCE BETWEEN MINIMA UNDER SHELTER AND ON GRASS.

REMARKS ON SURFACE TEMPERATURE AND ON THE EFFECT OF SHELTER.

By C. BARHAM, M.D., CANTAB.

At our last Spring Meeting I ventured to draw attention to the very considerable difference between the lowest temperature of the night indicated by the self-registering thermometer, placed, as it usually is, on a stand or under a shed, and that shown by a similar instrument exposed on the grass, and radiating freely into space. This difference is in itself an illustration of the influence of shelter; and the importance of its bearings on plants and animals has made it worth some special inquiry through the agency of this Institution. I am particularly indebted to Mr. Moyle of Helston and Capt. Liddell of Bodmin, who have made continuous observations on surface temperature in those places through a long series of years, for placing their results at my disposal; and to Mr. R. W. Fox, F.R.S., in the neighbourhood of Falmouth, for purposely instituting a like record for our service; whilst Mr. Whitley has lent most ready and valuable aid to the investigation.

It may be safely affirmed that the common estimate of the greatest cold of night is derived from the record of the thermometer on the stand or in the shed. This is what passes current as the minimum, and that not only among the public, but also generally with those who pay a good deal of attention to meteorology. Yet when the sky is clear, the temperature of the grass, that to which vegetables and man and animals out of doors are exposed, will be from five to ten degrees lower, sometimes more; and it is just these additional degrees of cold, when the ordinary sheltered thermometer indicates pretty sharp frost, that destroy tender plants, and often nip, more or less seriously, the delicate and the very old and very young. I remember having been struck by an account about fifty years ago of the guard of the Bath Mail having been frozen to death one night in June. It was a bitter spring all through—and, no doubt, the poor fellow, not dressed for winter, was benumbed into his death sleep by 15 or 20 degrees of frost; whilst people judging from the ordinary register, which indicated a cold of moderate severity, wondered that a strong man should thus perish.

It is needless to dwell on the recognized cause of this loss of heat, its radiation from the earth's surface; or on the established fact that all opaque bodies, distant as well as near, which intercept its passage into space, send that heat back again, and thus more or less abate the cooling process. This fact must, however, be kept in mind as of practical bearing on differences of surface temperature as observed in distant places, and even in different parts of this county, as they vary in cloudiness or in moisture of atmosphere.

Turning then to the materials at our command for ascertaining the surface temperature in Cornwall—Helston and Bodmin have furnished, as I have said, records of surface observations by self-registering thermometers for many successive years. Mr. Moyle has placed his instrument on the top of a box edging in his garden; Capt. Liddell's has been laid on the grass.

REMARKS ON SURFACE TEMPERATURE.

TABLE 1.

YEAR.	JANY.		FEBY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.		AUGUST.		SEPT.		OCT.		NOV.		DEC.	
	Stand	Grass	Stand	Grass	Stand	Grass	Stand	Grass	Stand	Grass	Stand	Grass	Stand	Grass	Stand	Grass	Stand	Grass	Stand	Grass	Stand	Grass	Stand	Grass
1864....	25	24	24	20	30	26	30	28	36	30	40	36	45	39	42	36	47	39	42	38	30	26	26	25
1865....	29	24	31	26	30	24	33	31	39	35	46	42	45	43	45	42	48	45	33	32	35	30	31	29
1866....	33	28	29	25	31	27	34	30	30	29	47	40	46	40	45	38	40	38	40	37	35	33	32	28
1867....	20	16	35	28	36	29	38	33	37	30	42	38	44	40	46	38	41	34	38	35	32	29	30	25
1868....	24	22	31	26	37	30	33	30	42	36	43	36	52	45	49	45	48	44	38	31	34	28	38	28
1869....	35	31	36	33	34	28	36	30	39	30	43	34	45	36	46	38	47	35	40	34	34	27	23	18
1870....	34	30	28	24	33	27	35	29	35	30	43	38	48	38	45	35	45	36	41	33	35	28	23	20
1871....	26	23	33	28	32	28	32	29	37	33	42	39	46	44	47	44	42	38	40	35	30	22	26	24
1872....	30	26	36	30	30	22	34	30	36	33	46	36	52	42	46	40	35	30	38	30	36	32	34	30
1873....	32	26	31	28	30	23	29	25	32	30	42	40	40	43	48	44	44	38	38	26	30	26	33	24
	28.8	25.0	31.4	26.8	32.3	26.4	33.8	29.5	36.3	31.6	43.4	37.9	46.3	41.0	45.9	40.0	43.7	37.7	38.8	33.1	33.1	28.1	29.6	25.1
Diff.	3.8		4.6		5.9		4.3		4.7		5.5		5.3		5.9		6.0		5.7		5.0		4.5	

Mr. Moyle has also furnished me with the *greatest differences* occurring in each of the above years between the surface and stand thermometers, whatever the absolute temperature might be. They are as follows:—

1863 1864 1865 1866 1867 1868 1869 1870 1871 1872 1873
 12° 10° 6° 7° 8° 10° 12° 10° 8° 10° 12°

TABLE 2.

The absolute minima for each month have been regularly published in the Reports of the Polytechnic Society, and may be there referred to. The following tabular statement for the last ten years, kindly prepared for me by Mr. Moyle, shews the lowest temperature in each month marked by the thermometer on the surface exposed to the sky, contrasted with that by the instrument on the *stand*, about four feet above the ground, which furnishes the ordinary record of the greatest cold of the night. The variations from month to month, and year to year, are also sufficiently exhibited, as regards the climate of Helston, which is not one of intense extremes. (Table 1).

The roof of the Museum, on which the shed is placed where our ordinary observations are made, being covered with lead, is not of course adapted for ascertaining the temperature on grass; but a fair average estimate on this point for the neighbourhood of Truro may be formed from the following summary of Mr. Whitley's register at Penarth, for the year 1868, with which he has kindly furnished me. (Table 2).

Table showing the mean Monthly Temperatures of the highest of the day, and the lowest of the night, 4 feet above the ground, and from an exposed Thermometer on the grass; and also the extreme Minimum Temperature 4 feet above the ground and on the grass, at Penarth, Truro, 200 feet above mean sea level.

	JAN.	FEB.	MAR.	APR.	MAY.	JUNE.	JULY.	AUG.	SEP.	OCT.	NOV.	DEC.	THE YEAR.
1868.													
Mean of all the highest, 4 feet } above the ground.....	46·5	51·3	54·3	57·9	65·1	69·1	76·3	69·9	67·9	57·7	50·5	52·9	60·0
Mean of all the lowest, 4 feet } above the ground.....	38·5	40·2	41·6	42·5	47·5	52·8	56·4	55·3	52·7	45·4	39·4	44·9	46·4
Mean Minimum on grass.....	33·8	35·0	36·1	36·0	43·3	46·0	50·3	50·0	47·0	38·7	32·4	38·0	40·5
Extreme Minimum, 4 feet above } the ground	23·	28·	32·	29·	40·	42·	48·	50·	42·	36·	32·	32·	36·2
Extreme Minimum on grass	16·	20·	26·	20·	34·	35·	42·	42·	38·	26·	22·	22·	28·6

The following statement, for the years 1872 and 1873, kindly supplied by Capt. Liddell, R.N., of the greatest differences between the lowest temperatures marked by his self-registering thermometer exposed on grass, and one $4\frac{1}{2}$ feet above the ground, hung below a thatch roof of a small summer house sheltered by trees, affords sufficient confirmatory evidence in regard to the climate of Bodmin, which is illustrative of that of the central district of the county:—

1872.

Date.	Min. on grass.	Diff.	Date.	Min. on grass.	Diff.
Jan. 1.	33	7	July 31.	48	8
22.	36	7	August 1.	49	8
Feb. 4.	32	8	2.	60	8
March 11.	31	8	4.	66	8
26.	22	7	28.	42	7
27.	27	7	Sept. 1.	44	9
April 19.	29	8	Oct. 7.	30	8
May 4.	39	7	15.	30	8
15.	37	7	Nov. 4.	35	7
June 20.	47	11	19.	32	7
26.	47	10	Dec. 18.	34	8
July 24.	50	7	24.	31	7

1873.

Date.	Min. on grass.	Diff.	Date.	Min. on grass.	Diff.
Jan. 12.	36	8	July 12.	44	10
13.	35	9	13.	42	10
Feb. 11.	23	6	14.	42	10
March 26.	36	12	15.	42	10
April 11.	28	8	16.	42	11
20.	31	10	August 1.	47	10
21.	35	9	17.	40	10
22.	29	10	19.	42	11
24.	22	11	23.	43	12
25.	23	10	24.	39	12
26.	21	11	25.	45	10
27.	28	12	Sept. 19.	43	8
28.	28	13	Oct. 15.	32	10
May 2.	31	10	20.	36	9
3.	28	11	30.	26	8
June 2.	41	8	Nov. 11.	36	8
July 9.	42	10			

The results furnished by Mr. C. U. Tripp for Altarnun, our most eastern

and elevated station, do not differ materially from those at Bodmin, except that the *absolute* minima are lower in the winter months.

At the Spring Meeting for 1873, I presented and explained two diagrams, since published in the last number of the Journal, which exhibited the differences between the minima on grass at Penjerrick, near Falmouth, as recorded by Mr. R. W. Fox, and those registered on the stand at the Observatory in that town. These differences are remarkable, reaching to 15 and 17 degrees; and not less so are the low points (as *e.g.* 12 and 14 degrees of frost), to which the surface temperature fell at Penjerrick, a spot where delicate exotics thrive. The following statement of results of observations at that place solely, will serve, though brief, for more strict comparison:—

	1873.		1874			
	Dec. 28.	Jan. 31.	Feb. 7.	March 12.	April 6.	May 9.
Therm. 6 in. above grass..	24	26	26	18	26	26
„ 3 feet „ ..	25	27	27	20	27	27
„ against N.E. wall.	36	37	38	31	38	37

In my own garden the greatest differences between the minima during the same season were as follows:—

	1873.		1874.			
	Nov. 7.	Dec. 8.	Jan. 3.	Feb. 10.	March 7.	May 4.
Therm. on grass..	35	35·3	33	38	21	27
„ in shed ..	42	43·3	41	46	30	35

The grass temperature here never fell below 21° in that winter; it was 24·5° on March 12th, when it was 18° at Penjerrick. The season was mild. In the present year the minimum here on February 25th was 13° on the grass, 29° in the shed; and on March 21st 18°, on grass, and 28° in the shed. Differences fully as great occur in clear nights in summer.

The kind of surface on which the thermometer is placed makes a material difference in the indications dependent on the extent of cooling of that surface, which again varies with its radiating and conducting powers. Thus, to give the relative cooling powers of a few substances as determined by Mr. Glaisher,—long grass being 1000:—

Hare Skin is	1316	Glass	864
Raw White Wool	1222	Snow	657
Flax	1186	Garden Mould	472
Raw Silk.....	1107	Sand	454
White Cotton Wool	1085	Stone	390
Lamp-black Powder.....	961	Gravel.....	288

But it must be borne in mind that the result, especially as regards the soils and surface of the earth, will vary with the seasons; in other words that the rate at which those soils are cooled at night will depend on the extent to which they have been heated in the preceding day; not to speak

of the influence of the seasonal temperature of the earth at greater depths, to which the same principles apply.

This point is well brought out in the following statements of results of the observations of Mr. Whitley at Penarth in the summer, and of my own later in the year :—

1873.	Max. of the day before.	Min. in Therm. Stand.	Min. on Grass.	Min. on Gravel.	Min. on Bare Soil.	Remarks.
June.						
9	66.	49.	43.6	48.8	41.8	
16	65.	45.	40.6	44.4	37.6	Heavy dew.
17	66.	53.	52.8	54.4	52.5	Cloudy.
18	69.	53.	51.	54.	51.	Do. and rain.
19	68.	52.	54.	53.4	52.	Do. do.
23	64.	47.	44.	48.5	41.	Clear—Dew.
July						
10	70.	55.	55.	56.	54.	Cloudy.
11	68.	53.	52.	54.	50.	Do.
12	65.	51.	46.	51.	45.	Partially do.
14	63.	50.	44.	48.	44.	Tolerably clear.

Here while the slight cooling power of gravel is in accordance with Mr. Glaisher's estimate, the minimum of the mould falls below that on the grass, in strong divergence from his rule.

My own observations in the following December give very different results, the surface temperature on grass being distinctly lower than that on garden mould :—

1873.	Min. on Grass.	Min. on Garden Mould.	1873.	Min. on Grass.	Min. on Garden Mould.
Dec. 1	34.7	37.	Dec. 12	21.	26.
2	41.4	43.	13	24.5	27.
3	42.6	44.	14	40.3	40.5
4	39.	40.	15	37.	38.
5	32.	36.	16	43.2	43.4
6	33.8	36.	17	46.4	47.3
7	42.8	44.	18	48.	48.5
8	35.3	39.	19	44.7	45.5
11	24.	25.3			

It may be noticed that the higher temperature of the mould is most marked in the coldest nights.

In further elucidation of this subject, observations were made during August and September on the cooling effect of radiation from the lead covering the roof of our Museum. The results noted by Mr. Newcombe, as compared with those in the shed adjoining in which our thermometers are hung, were as follows:—

The mean minimum of 24 nights in August was in shed $58^{\circ}0$ on lead $51^{\circ}5$.
 „ „ 30 „ September „ $50^{\circ}8$ „ $43^{\circ}9$.
 Showing an average cooling effect of $6^{\circ}5$ in August, and $6^{\circ}9$ in September.
 The minima of the nights on which the difference was 8° or more were:—

Aug. 16	Shed 60	Lead 52	Sept. 2	Shed 54	Lead 46
„ 17	„ 48	„ 39	„ 4	„ 42	„ 34
„ 19	„ 54	„ 45	„ 12	„ 45	„ 36
„ 20	„ 51	„ 43	„ 13	„ 48	„ 39
„ 22	„ 54	„ 46	„ 14	„ 45	„ 35
„ 23	„ 54	„ 46	„ 19	„ 50	„ 42
„ 25	„ 54	„ 44	„ 23	„ 41	„ 32
„ 27	„ 54	„ 45	„ 24	„ 45	„ 36
„ 28	„ 55	„ 47	„ 26	„ 47	„ 39

The influence of radiation in this case is not materially different from that on grass, but the conduction of heat from the earth is much more direct in the latter situation and renders exact comparison difficult.

This conduction, as a condition of different soils, was, many years ago, submitted to elaborate inquiry by Mr. Whitley; and the results are recorded in the Journal of the Bath and West of England Society, (Vol. III, pages 136, 137). Of these valuable and interesting observations I must content myself with a very brief summary. They were made at Alverton, near Truro, the seat of the late Mr. W. M. Tweedy, who kindly furthered them. Four pits about 2 feet deep and 2 feet wide were dug in good healthy garden loam. The first was filled with pure fine siliceous sand; the second with garden loam; the third with yellow clay from the clay-slate; the fourth with well worked peat. The bulb of the thermometers was placed 4 inches below the surface, in the centre of each pit; and another thermometer was placed in the same manner under the turf of the short grass of the lawn. The thermometers were read in the morning when the temperature of the soil was lowest, and again in the evening when it was highest. The table has been deduced from all the observations, and is the result of about 5000 readings of the thermometers. The record extends from April 1852 to August 1853. The *garden loam* shewed a power of receiving and retaining heat superior to that of any other naked soil. *Siliceous sand* did not come up to the expectations formed of it. *Clay* maintained a bad preeminence for coldness, but improved, by the good drainage, in the second year. The temperature of the *Peat* was nearly equal to the garden loam, although naturally wet and cold.

As illustrative of the several seasons, I may give the results for November in the former year, and for February, April, and August in the latter:—

Months.	Temperature of Air.			Siliceous Sand.			Garden Loam.			Clay.			Peat.			Grass.			Rain in inches.
	Mean Max.	Mean Min.	Mean.	Mean Max.	Mean Min.	Mean.	Mean Max.	Mean Min.	Mean.	Mean Max.	Mean Min.	Mean.	Mean Max.	Mean Min.	Mean.	Mean Max.	Mean Min.		
Nov. . . .	56.3	45.5	50.9	50.2	48.1	49.1	51.2	49.2	50.2	51.2	48.1	46.1	51.2	49.2	50.2	53.1	51.3	52.2	11.6
Feb.	43.2	30.9	37.0	36.1	33.1	34.6	38.2	35.4	36.8	37.8	34.3	36.0	38.3	36.5	37.4	42.2	39.4	40.8	3.2
April.	57.3	44.7	50.5	52.6	47.3	50.0	53.6	48.0	50.8	53.1	46.7	49.9	53.4	48.4	50.8	55.0	51.0	53.0	4.0
Aug.	69.2	51.7	60.5	65.8	59.2	62.5	67.4	60.4	63.9	65.0	59.0	62.0	65.6	60.1	62.8	71.7	64.5	68.1	2.7

In the winter months the mean temperature of the air was about 2° higher than that of the soil (excepting under the grass which was very high throughout). The daily range of the air was 10°, that of the soil 2°. The mean maximum of the air was 6° higher than that of the soil, and the mean minimum of the air 2° lower than the soil. The temperature of the soil gradually approximated to that of the air until April, when the amount of heat in both was the same.

In the summer months, these conditions became reversed. The mean temperature of the soil in July and August was 3° or 4° higher than the air; the retention of the heat of the sunshine by the soil during the night being to that extent more than equivalent to the higher temperature of the air in the day. The grass was hotter in both.

The relative amount of heat received and retained by the different kinds of soil, a matter of great moment, may be readily inferred from the table.

The effect of Shelter on Temperature may be now considered more particularly. The self-registering thermometers are usually placed either on a stand giving some protection from rain, or within some sort of open shed through which the air passes freely, and in either case radiation of heat into space is much impeded. Consequently the ordinary record of the greatest cold of the night may serve very well to indicate what would be the temperature under matting, or other impervious material, at the same height from the ground at which the instruments are hung. As that height is commonly from 4 to 6 feet, it would be expected that the stratum of air thence to the soil would retain, as a bad conductor, a portion of the heat of the preceding day, and be distinctly warmer than the surface below. The temperature of the surface under two forms of shelter, placed 18 inches above it, is shown in the following registers kept by Capt. Liddell and myself:—

Minimum Temperature indicated by Self-registering Thermometers (Negretti and Zambra) under trelliced Summer-house, and on Grass, either open to the sky, or covered by Straw-matting 18 inches above the ground. Observed in Garden, No. 11, Strangways Terrace, Truro.

	1873.		1874.					
	DECEMBER.		JANUARY.		FEBRUARY.		MARCH.	
	Grass.	Covered.	Shed.	Grass.	Covered.	Shed.	Grass.	Covered.
1	34.7	39.7	38.	31.5	36.	42.5	41.	42.
2	41.4	45.0	47.	42.	46.	43.	42.	42.6
3	42.6	45.5	41.	33.	39.	37.4	31.	36.
4	39.0	42.5	37.	32.5	36.5	37.	30.2	36.5
5	32.0	38.0	39.	34.	37.5	40.	35.2	39.
6	33.8	38.8	31.	25.	30.	40.	34.	38.
7	42.8	45.0	33.	28.5	32.	33.	27.	32.
8	35.3	43.3	44.	42.	44.	45.	41.3	44.
9	20.0	27.0	44.8	42.	44.	36.	29.2	34.2
10	20.0	27.0	47.	45.5	46.3	36.	28.	33.
11	24.0	30.5	31.	24.8	30.5	35.5	34.	35.
12	21.0	28.0	34.	29.2	33.	39.	36.	38.3
13	24.5	30.0	41.5	36.	41.	44.	38.	42.
14	40.3	41.5	46.	42.7	45.	47.	42.5	46.
15	37.0	39.0	47.	42.7	46.5	44.	38.	42.2
16	43.2	48.7	42.	42.	42.5	44.	40.	42.5
17	46.4		35.7	30.3	34.	44.	38.	43.
18	48.0		34.5	29.3	33.	37.	32.	36.
19	44.7	47.0	46.	42.	44.5	39.5	34.	37.
20	32.0	37.0	46.	42.	46.	32.	27.	31.6
21	40.7	44.0	36.	30.	35.	46.	44.5	45.5
22	41.0	44.2	36.	30.	35.	42.	41.	42.
23	30.3	34.5	38.	30.	36.	34.	28.	32.7
24	46.2	47.0	42.	36.	40.	33.3	29.5	34.
25	37.0	42.5	34.8	31.	35.	45.	40.4	43.4
26	43.0	45.3	35.5	30.5	34.5	46.5	42.	45.
27			44.	36.5	42.	40.	35.	39.2
28	22.0	29.2	42.6	36.5	41.	31.8	27.	30.6
29	27.0	31.0	43.	41.8	42.8			
30	38.0	41.0	44.	42.	43.			
31	38.7	42.5	32.5	25.	31.			
Lowest. . .	20.	27.	31.	24.8	30.	31.8	27.	30.6
Greatest diff. upon grass.	8.	8.	8.	"	6.	8.	"	6.3
							21.	27.
							"	7.

* Under Snow.

Similar observations were made at the same time at Bodmin, by Capt. Liddell, the only difference being the substitution of a screen of muslin for the straw matting used by me. The following extract from his register is sufficient for all purposes of corroboration and comparison:—

Date.	February.			Date.	February.			Date.	March.		
	Grass exposed	Grass with Screen.	Shed.		Grass exposed	Grass with Screen.	Shed.		Grass exposed	Grass with Screen.	Shed.
1874.											
1	40	43	44	12	33	38	39	1	36	43	44
2	41	43	44	13	38	42	44	2	48	48	48
3	40	42	42	18	32	36	37	3	34	40	42
4	28	36	37	19	34	39	39	4	40	43	44
5	28	34	36	20	28	32	34	5	42	44	46
6	33	36	38	21	42	42	42	6	37	42	44
7	27	32	35	22	42	43	43	7	25	32	32
8	39	42	44	23	32	35	37	8	26	32	33
9	34	37	38	24	38	41	44	9	30	36	38
10	28	32	33	25	41	43	45				
11	33	34	34								

The results of these observations are conspicuously shown on the accompanying diagram. It will be seen, as might be expected, that the sheltering efficacy of muslin is not equal to that of straw matting; but the amount of protective influence of so slight a material is worthy notice. The average difference between the sheltered thermometer and that in the shed was for Truro 1·22°, for Bodmin 1·40°; the greatest difference for Truro and also for Bodmin 3·0°.

The following record of a few observations made by Mr. Whitley, at Penarth, near Truro, 200 feet above mean sea level, shews the effect of a slight covering of straw over large Brocoli plants during a period of hoar frost. The thermometer amid the Brocoli was on a level with the heart of the plants.

Date.	In Stand 4½ feet above sur- face.	Fully open 4½ feet above sur- face.	On the Grass.	On worked soil.	Under Brocoli Plants.	Remarks.
1873.						
Decr. 10..	32·0	31·5	22·5	27·0	32·5	Hoar Frost.
„ 11..	35·0	35·0	29·0	32·0	37·0	Do., but less.
„ 12..	31·0	29·0	23·0	26·5	32·0	Do.
„ 13..	33·0	31·5	25·5	28·5	33·3	Do. less.
„ 14..	41·0	38·0	38·0	38·0	39·0	No Frost.
Mean	34·4	33·0	27·6	30·4	34·9	

It may then be stated as a general result from the observations here recorded that, in the climate of Cornwall, the soil covered with vegetation will be from 8 to 10 degrees warmer, in sharp frosts, if screened from the sky by straw matting, or other moderately thick material, spread over it, 3 or 4 feet from the ground, than if left unprotected. This is a difference of the utmost importance in those parts of the county in which early vegetables are grown, which lie chiefly along the southern coast, where the minimum on the stand rarely falls below 25°. That degree of cold would seldom be destructive if the air is at all still; but a depression of temperature to 15° or sometimes lower, by radiation, might *per se* seriously imperil the crop; and it is usually a night or two of this degree of depression united with wind that causes the blight by which the hopes of the season and many thousands of pounds are lost. A further benefit resulting from shelter is the prevention of the deposit of dew, and at times of hail and sleet, the evaporation from which further chills the plant, and abstracts its heat in a way more pernicious than the action of the same degree of dry cold. Snow a few inches thick constitutes in itself, while it lasts, an effectual shelter; but frost supervening on its thaw renders it often a delusive one.

Another element of great moment in relation to the effect of temperature is the movement of the air. The blight caused by a local draught of icy wind may be frequently traced in well defined lines from a gap in a north eastern hedge along the rows of early plants. In a still frost, the conditions are similar to those illustrated by Mr. Whitley's broccoli, the leaves preventing radiation from the soil, and the specific heat of the vegetable being retained around it; but a high wind robs it of both protecting influences with every blast. So much is this the case that the placing of wattled hurdles or other effective screens, about 4 feet high, on the north and east sides of a tender crop, in rows 20 or 30 feet apart, must be recommended as a preservative measure even more important than the provision of horizontal covering. It would also entail no very heavy charge; whilst it would furnish a frame-work from which straw matting, or other sheltering material, might be readily spread over the whole or any more delicate portion of the plants. It is not, however, for me to point out in what precise manner, or with what materials, the object in view may be most readily and cheaply attained; particulars varying in different localities, and on which the practical knowledge of the grower and market gardener is greatly superior to mine. My purpose has been to state some of the meteorological facts and principles which may guide the cultivator, leaving their application in his hands.

I may add, as the result of observations continued through a long series of years, that in the more intense frosts associated with a settled wind from the east, the temperature of the night is at Truro about 10° lower than at Penzance, and at Penzance 10° lower than at Scilly. It has not come to my knowledge that the early potatoes or broccoli have ever been materially blighted in the Islands by the light frosts to which alone they are exposed; and shelter such as has been suggested will just prevent the surface temperature at Penzance from falling below what it is naturally and without shelter at Scilly. This rule may be probably extended to various sheltered

spots on the south western coast. The extension of the use of glass will enlarge the area for the culture of delicate plants and fruits; but shelter will still be important, for if the glass is transparent it will only lessen the cooling power of radiation to the extent of 2 or 3 degrees; the effects of this in lowering the day temperature are, however, diminished through the retention of heat by the body of air enclosed within the frames.

Much might be said on the influences of the cold caused by this radiation into space on the health of persons exposed to it, the more delicate especially, but it is not within my scope to touch on medical topics. It may, however, be suggested that the umbrella will serve at times for protection against some ten extra degrees of frost, as it does against the sun and rain.

Roman Roads in the South of England—By MR. WHITLEY.

MR. WHITLEY presented to the Institution a Map showing the course of the Roman roads in the south of England, and read an explanatory paper. The Map was a reduction from the ordnance survey on which the Roman roads and stations are laid down so far as they may at present be traced on the ground; and the connecting links and probable extensions were obtained from other available sources; the object being an endeavour to trace the extension of the Roman occupation of the country westward, and to lay the foundation for a more searching investigation to identify the sites of Roman stations, and other remains in Devon and Cornwall. In accordance with the Author's wishes the publication of the Map and Paper was deferred in order that the inquiry might be rendered more complete.

VII.—*A Calendar of Natural Periodic Phenomena: kept at Bodmin for the year 1874.*—By THOMAS Q. COUCH, F.S.A.

“Il semble, en effet, que les phénomènes périodiques forment, pour les êtres organisés, en dehors de la vie individuelle, une vie commune dont on ne peut saisir les phases qu'en l'étudiant simultanément sur toute la terre.”
—*Quetelet.*

N.B.—The names printed in *Italics* indicate animals and plants marked for special observation.

fl., means flowers; fol., foliates; defol., defoliated.

The time of flowering is to be noted when the flower is sufficiently expanded to show the anthers; of foliation, when the leaf-bud is so far open as to show the upper surface of the leaves; of fructification, at the period of dehiscence of the pericarp, in dehiscent fruits; and, in others, when they have evidently arrived at maturity; of defoliation, when the greater part of the leaves of the year have fallen off.

This year may be generally described as a fertile one. For this account of the crops and the obvious causes which forwarded or retarded them I am indebted to Mr. Tellum of Tregawn, and Mr. R. Olver of Trescow.

Wheat—in consequence of the dry spring, was very short in the straw, but the grain was good, and the yield throughout the district above the average.

Barley was also short in the straw. On light soils the crop was much below the average, but on deep loamy grounds the yield was good, and the sample excellent. The early crops were well saved, but the later ones much injured by rain.

Oats were short in straw, and deficient in grain, the season being much too dry for them. The worst grain crop of the year.

Turnips, from the drought of May and June, and the ravages of the fly, were a partial crop. The moist weather of July and August, however, recovered them to a great extent, and made them generally a fairly good crop.

Mangolds were much injured by the weather of May and June, and the yield was much below the average.

Potatoes. There was a very good crop, of prime quality, in many places; but they were generally much affected by the disease, a large proportion, one third in some cases rotting in the field, or after being stored.

Apples. A good average crop, large in size and good in quality. In some places they were much damaged by the May frosts.

Hazel-nuts. An average crop.

Plums. A small crop.

Grass. In the early part of the year there was a light crop, but when the rains came it grew very fast, and the mild, moist Autumn continued its growth, and kept the cattle in the fields until near Christmas, thus supplementing the scanty stock of hay and straw, which would have been found very deficient if the winter had been long and severe.

Hay. The crop was light and much below the average, but well saved.

Among the oxen we have had some cases of foot and mouth disease, Eczema Zymoticum, but on the whole cattle have been fairly free from disease.

The Cuckoo arrived in scanty number. Corn-crakes scarce.

January 1. Barren Strawberry, (*Potentilla fragariastrum*), fl.

2. Thrush, (*Turdus Musicus*), sings.

• 17. Hazel, (*Corylus avellana*), fl.

28. Hedge Strawberry, (*Fragaria vesca*), fl.

February 2. Hedge Primrose, (*Primula vulgaris*), fl.

3. Gooseberry, (*Ribes grossularia*), fol.

4. Pilewort, (*Ranunculus ficaria*), fl.

6. Frog, (*Rana temporaria*), spawns.

7. Lent Lily, (*Narcissus pseudo-Narcissus*), fl.

9. Honey-suckle, (*Lonicera Perichlymenum*), fol.

- February 12. Adder, (*Pelias Berus*), sunning itself.
 — Elder, (*Sambucus nigra*), fol.
 15. Wren, (*Troglodytes Europæus*), sings.
 22. Blackbird, (*Turdus Merula*), sings.
 27. Skylark, (*Alauda arvensis*), sings.
- March 2. Dog-violet, (*Viola canina*), fl.
 3. Rooks, (*Corvus frugilegus*), build.
 — *Stellaria holostea*, fl.
 — Yellow-hammer, (*Emberiza citrinella*), sings.
 4. Wood-sorrel, (*Oxalis Acetosella*), fl.
 6. Privet, (*Ligustrum vulgare*), fol.
 7. Lilac, (*Syringa vulgaris*), fol.
 — Sulphur Butterfly, (*Gonopteryx rhamni*), seen in great numbers.
 12. Wild Strawberry, (*Fragaria vesca*), fl.
 13. Blackthorn, (*Prunus spinosus*), fl.
 — *Caltha palustris*, fl.
 14. Whitethorn, (*Cratægus oxyantha*), fol.
 17. Ground Ivy, (*Glechoma hederacea*), fl.
 18. White dead-nettle, (*Lamium album*), fl.
 — Colt's-foot, (*Tussilago farfara*), fl.
 23. Wood Anemone, (*Anemone nemorosa*), fl.
 25. Sycamore, (*Acer pseudo-platanus*), fol.
 26. Horse-chesnut, (*Æsculus Hippocastanum*), fol.
 31. Birch, (*Betula alba*), fol.
 — Germander Speedwell, (*Veronica Chamœdrys*), fl.
- April 1. Glow-worm, (*Lampyrus noctiluca*), shines.
 2. Blue-bell, (*Hyacinthus non-scriptus*), fl.
 — Sandmartin, (*Hirundo riparia*), seen.
 3. Wood Argus Butterfly, (*Lascommata*), seen.
 4. Chiffchaff, (*Sylvia hippolais*), seen.
 6. Lime Tree, (*Tilia Europæa*), fol.
 — *Adoxa Moschetellina*, fl.
 — *Arum-maculatum*, fl.
 7. Hazel, (*Corylus Avellana*), fol.
 8. Broom, (*Cytisus scoparius*), fl.
 — Early purple Orchis, (*Orchis mascula*), fl.
 — Tuberous Vetch, (*Orobus tuberosus*), fl.
 — Wheatear, (*Saxicola œnanthe*), seen.

- April 11. *Laburnum*, *Cytisus Laburnum*, fol.
 15. *Swallow*, (*Hirundo rustica*), arrives.
 18. *Lady's-smock*, (*Cardamine pratensis*), fl.
 — *Luzula campestris*, fl.
 20. *Wych elm*, (*Ulmus montana*), fol.
 22. *Oak*, (*Quercus sessiflorus*), fol.
 — *Plantago media*, fl.
 — *Horse-chesnut*, (*Æsculus hippocastanum*), fl.
 23. *Grasshopper warbler*, (*Sylvia locustella*), heard.
 24. *Cuckoo*, (*Cuculus canorus*), heard.
 — *Bugle*, (*Ajuga reptans*), fl.
 — *Tormentil*, (*Tormentilla officinalis*), fl.
 — *Milkwort*, (*Polygala vulgaris*), fl.
 27. *Woodruff*, (*Asperula odorata*), fl.
 28. *Laburnum*, *Cytisus laburnum*, fl.
 29. *Ash*, *Fraxinus excelsior*, fol.
 30. *Bird's-foot trefoil*, (*Lotus corniculatus*), fl.
 — *Corncrake*, (*Crex pratensis*), heard.
- May 1. *Salmon-Peal*, (*Salmo Trutta*), ascends the Camel River.
 — *Yellow Loosestrife*, (*Lysimachia nemorum*), fl.
 — *Hawthorn*, (*Cratægus oxycantha*), fl.
 2. *Mountain Ash*, (*Sorbus aucuparius*), fl.
 7. *Martin*, *Hirundo urbica*, arrives.
 — *Columbine*, (*Aquilegia vulgaris*), fl.
 9. *Pimpernel*, (*Anagallis arvensis*), fl.
 10. *Tufted Vetch*, (*Vicia cracca*), fl.
 — *Elder*, (*Sambucus nigra*), fl.
 11. *Foxglove*, (*Digitalis purpurea*), fl.
 — *Yellow rattle*, (*Rhinanthus Crista-galli*), fl.
 — *Silver weed*, (*Potentilla anserina*), fl.
 17. *Sanicle*, (*Sanicula Europœa*), fl.
 18. *Hypericum pulchrum*, fl.
 21. *Dog-rose*, (*Rosa canina*), fl.
 25. *Stellaria graminea*, fl.
 — *Honeysuckle*, (*Lonicera Periclymenum*), fl.
 — *Horsedaisy*, (*Chrysanthemum leucanthemum*), fl.
 — *Bladder*, (*Silene inflata*), fl.
 26. *Guelder-rose*, (*Viburnum opulus*), fl.
 — *Blackberry*, (*Rubus fruticosus*), fl.

- May 27. *Field scabious*, (*Knautia*, vel *scabiosa arvensis*), fl.
 28. Horsefly, (*Estrus equus*), seen.
- June 3. Tutsan, (*Hypericum Androsæmum*), fl.
 — Cow-wheat, (*Melampyrum pratense*), fl.
 5. *Habenaria chlorantha*, fl.
 — *Lotus major*, fl.
 6. Green-winged Orchis, (*Orchis Morio*), fl.
 7. *Sedum anglicum*, fl.
 8. *Privet*, (*Ligustrum vulgare*), fl.
 10. Hay harvest begun.
 — *Jasione montana*, fl.
 11. *Valeriana officinalis*, fl.
 12. *Wheat in flower*.
 16. *Erica cinerea*, fl.
 — Self heal, (*Prunella vulgaris*), fl.
 17. *Bartsia viscosa*, fl.
 18. *Millefoil*, (*Achillea Millefolium*), fl.
 — Centaury, (*Erythræa Centaurium*), fl.
 20. *Galium mollugo*, fl.
 — *Thymus serpyllum*, fl.
 — Wood Sage, *Teucrium scorodonia*, fl.
 22. Yellow Snapdragon, (*Linaria vulgaris*), fl.
 30. Cuckoo still heard, without the usual alteration of note.
- July 3. Way-bread, (*Plantago major*), fl.
 5. Golden-rod, (*Solidago virgaurea*), fl.
 6. Betony, (*Betonica officinalis*), fl.
 8. *Convolvulus arvensis*, fl.
 11. *Oat-harvest begins*.
 20. Hemp Agrimony, (*Eupatorium cannabinum*), fl.
 28. *Wheat-harvest begins*.
 30. Blackberry, (*Rubus fruticosus*), fruit ripens.
- August
- September 27. Starlings, *Sturnus vulgaris*, congregate in flocks.
- October 5. Holly berries redden.
 11. *Lesser Periwinkle*, (*Vinca minor*), fl.
 15. *Guelder-rose*, (*Viburnum opulus*), ripens fruit.
 — Briony, (*Tamus communis*), ripens fruit.
 — Greater Periwinkle, (*Vinca major*), fl.
 — *Swallow*, (*Hirundo rustica*), seen in numbers.

- 2nd week. Wych Elm, (*Ulmus montana*), defol.
 Lime, (*Tilia Europœa*), defol.
Aspen, (*Populus tremula*), defol.
Ash, (*Fraxinus excelsior*), defol.
30. Laurustinum, fl.
- November 14. Hedge Primrose, (*Primula vulgaris*), fl.
 — Barren Strawberry, (*Potentilla fragariastrum*), fl.
 25. Teal, (*Anas Crecca*), seen.
- December 12. Golden Plover seen.
 21. *Bean geese*, (*Anas segetum*), arrive.
 28. *White dead nettle*, (*Lamium album*), fl.

METEOROLOGICAL NOTES FOR 1874.

The Meteorology of Cornwall during 1874 presents few points requiring comment; the only one perhaps calling for special notice being the more than usual exemption of these western parts from severe cold towards the end of the year, when other counties underwent all the rigours of an intensely wintry season. In noticing presently the several months, I will give a few details in illustration of this difference which was so favourable to ourselves. Before doing this, I may say generally that observations have now been regularly made and registered at several stations in the county, fairly representing its varieties of climate, through so long a succession of years, that it will hardly be necessary hereafter to speak in this place of the ordinary weather history of the seasons, which is sufficiently told by the figures in the tables. Such a history has been also of late very well supplied by the popular summaries given early in the new year in the local newspapers. The time seems to have arrived for a trustworthy estimate of the climate of Cornwall generally, and with discrimination of its chief varieties. We are in possession of records of continuous and simultaneous observations for the last twenty-five years from Helston, Truro, and Bodmin; and being thus provided with sufficient evidence in regard to the average differences between these places, as well as between different years, we are in a position to turn to account the registers kept at other stations during portions of the same period, and also those kept at any station among the lot at former periods. The establishment of a recognized Observatory at Falmouth, where the chief meteorological instruments register themselves hourly, has greatly added to our facilities for utilizing our old records, and attaining trustworthy conclusions; furnishing, as it does, the corrections needed for observations made only twice or three times a day, as well as definite information on some points—on the force and velocity of winds, for instance—as to which the real facts could not before be got at. To illustrate these remarks, I need only direct attention to the paper and tables prepared by Mr. Dymond and just issued in the Report of the Polytechnic Society, which is in the hands of most of our members. The comparative view of the meteorology of Helston, Falmouth, Truro, and Bodmin, during the last five years, is particularly valuable for the purposes to which I have just referred.

The early months of 1874 were very mild in all parts of England. In *January* and *February* this was especially the case; the thermometer in the stand at Truro not having fallen below 30°, nor below 26° on grass either at Helston or Bodmin. At Altarnun it marked 20°. The rainfall was slightly above the average in January and slightly below it in February. The former month was unusually exempt from storms; in the latter it blew hard on five days, and the mean velocity of the wind, (19·5) as measured at Falmouth, was as high as that of any month of the year, being only equalled by Decem-

ber; but the greatest velocity (58) was not extreme: this occurred on the 11th, in the course of the same gale when the brigantine *Trial* was wrecked at the back of the Albert Pier, Penzance. The oscillations of the barometer were rapid and large. *March* was fine generally. The rainfall was little more than half the usual amount, and the number of days at all wet was much below the average. There was a short spell of weather more wintry than before, from the 9th to the 12th. Snow fell generally; at Altarnun 3 inches, the deepest for the winter. The equinox passed without a gale.

The next quarter was noticeably dry; the rainfall, and the number of days on which it occurred being less than the average for 25 years in each month,—the former in the proportion of 5·14 to 7·30 inches, the latter as 32 to 39. The mean temperature in all was distinctly above the average. The first fortnight of *April* was unsettled and bleak, with heavy showers and high winds ending in a strong westerly gale on the 13th. Afterwards the weather was fine and warm. The shade temperature reached 70° at Truro, and 80° at Altarnun. Mr. Tripp notes the early bursting of the oak into abundant blossom and leaf, but the last night “of April,” he remarks, “gave on grass 7 degrees below freezing point, and this commenced a period “of bitter cold dry weather, which lasted till quite the end of *May*.” This harshness was mitigated, but not removed, in the west. The days on which rain fell were few at all the stations, but fewer than elsewhere in a marked degree at the Land’s End, being only 3 when there were 9 at Helston, and 10 at Truro. The three first weeks of *June* maintained the same character. At Altarnun, where “the temperature of vegetation fell below 32° on seven “nights, garden and farm crops felt the drought severely; potatoes, &c., cut “down for the second or third time by the frost.” A change took place on the 22nd, when the barometer fell steadily and genial showers followed during the next week. The hay crops were light, but of good quality.

Taking Greenwich for his centre, Mr. Glaisher gives the following summary of the season:—“The warm period which set in on 13th March (the “excess of the daily temperature of which till the end of March was 5¼°) continued with very slight exceptions throughout April, the average daily excess “of temperature for this month being 4°. On several days towards the end “of the month the days were very warm, the excesses being as large as 10° “to 13°. On 1st May a cold period set in, and continued without exception “till the 21st; these three weeks of low temperature were very painful, following so immediately the heat of the preceding seven weeks. A period “of warm weather then occurred from 22nd May to 11th June, the average “daily excess being 4½°, deficiency to the same amount existing from that “time to the end of the quarter, while low temperatures prevailed. The “continued deficiency of rain is very remarkable, and it seems to be general “over the whole country. In the 6 months ending May, and in the 7 “months ending June, there is no instance of so little rain recorded at “Greenwich.” On the whole the season was more genial than in Cornwall.

July resembled June in being fine during the first 3 weeks (during which Coggia’s comet was well seen), then rainy for a week, with a fair close. The

rainfall was less than the average at all stations, at Truro about 2-3rds. I may again note on how few days rain fell at Land's End; only 3 such are registered there, whilst Helston has 13, and Truro 18. The mean temperature of the month was nearly 3° above the average, but the maxima were not very high at Penzance, Truro, and Bodmin, being 73°, 78°, and 76° respectively, but Helston reached 82°, and Altarnun 87°. At this place "the shade temperature was above 80° on 6 days, and the nights were very warm. Hay, corn, and peat all harvested *together*, during this month and the next, "when possible—Rivers very low."

August was unsettled and showery during the first fortnight, afterwards finer with fresh easterly winds, and again unsettled the last week. The rainfall and the number of days with rain were both about one-third beyond the average at all the stations. On the 31st more than an inch was gauged. The mean temperature was about one degree above the average. The highest point reached at Penzance was 70½°; Helston, 77°; Truro, 79°; Bodmin, 76°. At Altarnun it was above 80° on five days. Mr. Tripp notes "glorious summer weather after the 18th." This was less marked in the west, although harvest operations were not much impeded. The restoration of the equilibrium of rainfall, which commenced in August, was strongly marked in *September*, when the quantity gauged was about 2-5ths in excess of the average for that month at most stations, and the number of rainy days was nearly in the same proportion. The temperature was slightly above the mean, there being little cold at night. The greatest warmth was towards the end of the month. On the 25th, the maximum was 76° at Helston, 74° at Truro, 72° at Bodmin, and the mean of day and night was 65° at Altarnun. There was no heavy gale about the equinox, but the nearest approach to it occurred on the 21st and 22nd, when the velocity of the wind was 45 miles an hour.

Mr. Glaisher's remarks on the quarter correspond nearly with the facts stated above. In the rainfall, the differences between this County and Greenwich deserve mention; the quantity at the latter place being rather above the average in July, 1 inch below it in August, and again a little deficient in September, in each case the reverse of what it was here.

October was still wet and warm. The rainfall was rather below the average at Truro, but more or less above it at the other stations; and at all of them the number of rainy days was in excess. The temperature of the month was just the mean of 25 years; but this was mainly owing to the absence of cold at night. There was no frost, even on the grass, as far east as Bodmin; and only 8 slight touches at Altarnun. The minimum on the stand was at Falmouth, 44·2°; at Truro, 38°; at Bodmin, 42°; at Altarnun, 33°. Westerly gales occurred on the 6th and 21st, but not extremely violent, the greatest velocity being 45. This was on the 21st, when there were serious wrecks on the Scotch coast.

November was still more remarkable for mildness. The mean temperature was 3 degrees above the average, and frost was noted on one night only at Truro; this was on the morning of the 12th, when the minimum was 31° here; at Helston, 26°; Falmouth, 36·2°; Bodmin, 34°; and at

Altarnun, 26°, the instrument on grass marking 17°. The rainfall and number of rainy days did not vary much from the ordinary standard for the month. There was a heavy gale on the 29th, from W. by N., the velocity of the wind at Falmouth reaching 59 miles an hour at 9 a.m., the barometer there dropping to 28·664, the lowest point for the year. The weather towards the end of the month was exempt in Cornwall from the fogs and severe cold which prevailed up the country after the 21st.

December was a rough and wintry month in this county, although we escaped the intense frosts which characterized the season further east. The quantity of rain in the western districts was almost twice the usual amount, and about one-third beyond it in the eastern, and only 5 or 6 days—at Altarnun only 3—were quite dry. It blew hard at intervals from the 6th to the 12th, and on the 8th there was a very heavy westerly gale, when the highest velocity of the year, 66 miles per hour, was registered at the Falmouth Observatory, at 11 p.m. The mean temperature of the month at Bodmin was 38·9°, four degrees below the average; but the minimum was only 30° in the stand, and 24° on the grass: this was on the 18th when it was 18° on the grass on my lawn, and 26 in the shed at the Royal Institution. This was the greatest cold of the month, and also of the year. At Falmouth Observatory the lowest point was 32·4°, being on the same day. At Altarnun the cold was much more intense, 21° having been registered on the stand, and 12 on the grass; and “on only *four* nights did the temperature of vegetation *not* fall below 32 derees.” Even at Truro frost is recorded on 12 nights. A pretty correct estimate of the differences of the localities at night in this month may be derived from a comparison of the *mean* of the minima at each. This is for Scilly, 40·4°; Penzance, 38·9°; Helston, 36·8°; Falmouth, 38·2°; Truro, 35·5°. The warmth derived from the sea is here strongly marked. This year ended and the next began with torrents of rain, and little cold, whilst the utmost rigour of winter was being experienced through the greater part of England. After giving details of the general mildness of the quarter previously, Mr. Glaisher remarks:—“On 21st November a “severe cold period set in and continued with very slight exceptions till 1st “January, 1875; the average daily temperature of the 42 days ending on “this day was 33·5°, being 6·6° below the average. The temperature on “several days was more than 10° in defect, and on the last day of the year it “was as large as 16½° nearly. On this day the mean temperature was 21·1° “only; the day being painfully cold.” The lowest temperatures were on the 30th and 31st, when the minima were at Cardington, 6° and 10°; and at Hull, 5° and 9°. It is worth notice that the minima on the same days were 27·5° and 27° at Guernsey, when they were 37° and 32° at Truro. The predominance of a westerly element in the wind during all this period was, no doubt, the main cause of the mitigation of the cold with which we were favoured. The *whole* winter deserves further consideration, inasmuch as it exemplifies very clearly the conditions of the varying differences between the climates of the S.W. of England and that of the N. and E. at this season of the year.

C. BARHAM.

TABLE No. 1.

Summary of Meteorological Observations at Truro, in Lat. 50° 17' N., Long. 5° 4' W., for the year 1874, from Registers kept at the Royal Institution of Cornwall.

1874.	MONTHLY MEANS OF THE BAROMETER. Cistern 43 feet above mean sea level.																		
	Month.	Mean pressure corrected to 32 deg. Fahr. at sea level.			Mean of monthly means.	Mean diurnal range.	True mean of monthly means.	Mean force of vapour.	Mean pressure of dry air.	Corrected absolute maximum observed.	Day.	Corrected absolute minimum observed.	Day.	Extreme range for the month.	Mean diurnal range.	Greatest range from 9 a.m. to 9 p.m.	Day.	Greatest range in any consecutive 24 hours.	Between which days it occurred.
		9 a.m.	3 p.m.	9 p.m.															
January	30.103	30.110	30.133	30.115	.004	30.111	.260	29.851	30.620	28	29.387	16	1.233	.103	.25	20.	.55	15 & 16	
February	29.983	29.980	29.971	29.978	.003	29.975	.247	29.728	30.566	1	28.947	26	1.619	.100	.53	27	.78	27 & 28	
March	30.264	30.259	30.270	30.264	.007	30.257	.258	29.999	30.710	6	29.720	9	0.990	.076	.35	8	.52	7 & 8	
April	29.906	29.884	29.877	29.889	.004	29.885	.281	29.604	30.210	29	29.164	11	1.046	.095	.46	2	.84	13 & 14	
May	30.014	30.005	30.018	30.012	.003	30.009	.294	29.715	30.411	13	29.565	23	0.846	.046	.15	21	.22	21 & 22	
June	30.147	30.139	30.133	30.140	.001	30.139	.357	29.782	30.517	15	29.617	26	0.900	.044	.25	3	.34	3 & 4	
July	30.051	30.050	30.046	30.049	.002	30.047	.418	29.629	30.337	6	29.631	28	0.706	.004	.17	29	.28	29 & 30	
August	30.024	30.016	30.009	30.016	.004	30.012	.421	29.591	30.438	21	29.477	13	0.961	.062	.26	14	.45	13 & 14	
Sept.	29.930	29.933	29.947	29.937	.004	29.933	.403	29.530	30.337	14	29.540	21	0.797	.067	.28	3	.32	11 & 12	
Oct.	29.884	29.881	29.916	29.894	.006	29.888	.355	29.553	30.294	20	29.311	15	0.983	.120	.46	4	.61	5 & 6	
Nov.	29.988	29.976	29.938	29.967	.004	29.963	.295	29.668	30.443	8	28.947	30	1.496	.088	.37	28	.46	27 & 28	
Dec.	29.833	29.833	29.863	29.843	.003	29.840	.206	29.634	30.295	18	28.873	11	1.422	.160	.56	8	.101	6 & 7	
Means	30.010	30.005	30.010	30.008	.004	30.004	.314	29.690	30.431		29.348								

REMARKS.—The Barometer used is a Standard, made by Barrow, and compared with the Standard Barometer at the Royal Observatory, Greenwich, by Mr. Glaisher. The corrections for Index Error (+.008), Capillarity (+0.013), height above sea (43 feet), and temperature, have been applied.

TABLE No. 2.

1874.	MONTHLY MEANS OF THE THERMOMETER.																										
	MASON'S HYGROMETER.						SELF REGISTERING.						ABSOLUTE.														
	9 A.M.		3 P.M.		9 P.M.		Mean of all the Dry Bulb.	Mean of all the Wet Bulb.	Mean correction for diurnal range.	True mean of Dry Bulb.	Mean of Wet Bulb.	Mean correction for diurnal range.	Mean temp. of evaporation.	Wet Therm. below dry.	Mean dew point.	Dew point below Dry Therm.	Mean of all the maxima.	Mean of all the minima.	Appropriate mean temp.	Correction for the month.	Adopted mean temp.	Mean daily range.	Maximum.	Day.	Minimum.	Day.	Range.
January.	44.8	43.2	49.0	45.7	44.6	43.0	46.2	0.4	45.8	44.0	0.3	43.7	2.1	41.3	4.5	51.0	41.0	46.0	0.1	45.9	10.0	55.0	19	30	6	25	0
February	44.2	41.9	49.2	45.2	44.6	42.9	46.0	0.7	45.3	43.3	0.5	42.8	2.5	40.0	5.3	50.3	40.5	45.4	0.1	45.3	9.8	53	oft	31	28	22	22
March ..	47.5	44.6	51.3	46.6	45.4	43.6	48.1	1.0	47.1	44.9	0.6	44.3	2.8	41.1	6.0	52.7	42.3	47.5	0.2	47.3	10.4	58	22	28	11	30	30
April.....	53.0	49.3	57.0	50.2	49.0	46.9	53.0	1.6	51.4	48.8	1.3	47.5	3.9	43.4	8.0	58.0	44.7	51.3	0.1	51.4	13.3	70	27	30	11	40	40
May	55.9	50.8	59.9	52.0	50.9	48.2	55.6	2.3	53.3	50.3	1.4	48.9	4.4	44.5	8.8	61.0	43.0	52.0	0.8	52.8	18.0	69	24	31	3	38	38
June	62.3	55.5	65.6	57.5	56.6	53.7	61.5	2.9	58.6	55.6	1.7	53.9	4.7	49.7	8.9	67.8	50.3	59.0	0.3	58.7	17.5	75	8	41	14	34	34
July	64.7	59.3	69.0	60.5	60.6	57.8	64.8	2.1	62.7	59.2	1.2	58.0	4.7	54.0	8.7	70.0	54.5	62.2	0.3	62.5	15.5	78	19	41	6	37	37
August ..	62.4	58.3	66.8	60.4	59.0	56.4	62.7	2.0	60.7	58.4	1.2	57.2	3.5	54.2	6.5	68.0	54.0	61.0	0.2	60.8	14.0	79	20	45	thr	34	34
Sept.	59.5	56.8	64.0	57.8	56.2	54.1	59.8	1.7	58.1	56.3	0.9	55.4	2.7	53.0	5.1	65.0	52.6	58.8	0.4	58.4	12.4	74	25	39	14	35	35
Oct.	54.1	51.5	58.1	53.3	51.4	49.5	54.5	0.8	53.7	51.4	0.6	50.8	2.9	48.0	5.7	59.0	48.0	53.5	0.1	53.6	11.0	63	11	38	24	25	25
Nov.	48.2	46.3	53.0	49.4	48.7	47.0	50.0	0.6	49.4	47.6	0.5	47.1	2.3	44.6	4.8	54.4	44.3	49.3	0.1	49.4	10.1	61	9	31	12	30	30
Dec.	39.3	37.2	44.6	41.3	40.0	38.0	41.3	0.2	41.1	38.8	0.3	38.5	2.6	35.3	5.8	46.5	35.5	41.0	0.0	41.0	11.0	54	68	26	18	28	28
Means ..	53.0	48.6	57.3	51.7	50.6	48.4	53.6	1.4	52.3	49.9	0.9	49.0	3.3	45.7	6.5	58.6	45.9	52.3	0.2	52.1	12.7	65.7		34.2		31.5	31.5

The Thermometers are placed on the roof of the Royal Institution in a wooden shed, through which the air passes freely. The Standard Wet and Dry Bulbs are by Negretti and Zambra, and have been corrected by Mr. Glaisher.

TABLE No. 3.

1874.	WINDS.												AVERAGE FORCE.																							
	E.			S.E.			S.			S.W.			W.			N.W.			N.			N.E.														
Month.	9 a.m.	3 p.m.	9 p.m.	9 a.m.	3 p.m.	9 p.m.	9 a.m.	3 p.m.	9 p.m.	9 a.m.	3 p.m.	9 p.m.	9 a.m.	3 p.m.	9 p.m.	9 a.m.	3 p.m.	9 p.m.	9 a.m.	3 p.m.	9 p.m.	9 a.m.	3 p.m.	9 p.m.	9 a.m.	3 p.m.	9 p.m.	Mean.								
January..	0	2	2	0	0	0	12	5	7	7	10	4	4	4	1	1	0	8	7	8	4	4	1	1	0	1	2.2	2.8	1.9	2.3						
February.	4	4	4	4	3	2	4	5	7	7	8	1	0	0	3	5	2	9	7	8	0	0	1	0	1	2.5	3.2	2.2	2.6							
March ..	4	4	4	1	1	2	6	6	3	8	11	6	4	4	0	0	8	8	11	12	6	4	1	0	1	2.4	3.1	2.0	2.5							
April	6	6	7	3	4	0	2	6	4	4	7	3	3	2	2	0	5	4	7	10	3	2	1	0	0	2.7	3.0	2.1	2.6							
May	5	7	6	5	2	3	2	2	5	2	6	7	8	6	3	0	2	7	6	10	7	8	3	0	0	2.0	2.8	1.6	2.1							
June	5	5	2	1	4	1	3	4	6	3	6	7	5	11	5	2	4	4	7	6	7	5	7	5	2	2.2	2.4	1.5	2.0							
July ...	4	3	3	1	2	0	6	6	3	7	11	3	2	4	2	2	7	11	10	3	2	2	2	1	0	2.2	2.5	1.3	2.0							
August ..	4	5	6	1	0	0	7	6	4	4	5	2	2	2	1	1	5	7	11	2	2	1	1	0	0	2.8	3.0	1.8	2.5							
Sept.....	1	1	3	4	5	3	8	8	10	10	9	3	2	0	2	2	1	5	9	3	2	0	1	1	0	2.2	2.7	1.5	2.1							
Oct.	0	0	0	0	0	0	9	6	11	6	12	7	3	2	1	2	4	8	12	7	3	2	1	2	1	2.2	2.8	2.0	2.3							
Nov.....	2	5	4	3	3	2	2	4	6	5	10	3	5	2	4	2	3	10	9	10	3	5	2	0	1	2.0	2.5	2.0	2.2							
Dec.	1	1	1	1	1	1	2	3	1	4	10	9	9	9	3	7	3	10	9	12	10	9	9	3	7	2.3	2.6	2.2	2.4							
Total....	36	43	42	23	25	14	63	57	67	77	94	56	47	46	19	13	10	77	94	120	56	47	46	19	13	10	27.7	33.4	22.1	27.6						
Means ..	40.3			20.7			21.3			62.3			60.3			97.0			49.7			14.0			2.3				2.8				1.8			

The force of the Wind is estimated on a scale from 0 to 6, from calm to violent storm.

TABLE No. 4.

1874.	WEATHER.																																
	Month.	AVERAGE CLOUDINESS.			RAINFALL.				Mean weight of vapor in a cubic foot of air.	Mean additional weight required for saturation of the air.	Mean humidity of atmosphere.	Mean elastic force of vapor.	Mean weight in grains of a cubic foot of air.	Amount of water in a vertical column of air.	SUN.			Dry.	Wet.	REMARKS.													
		9 a.m.	3 p.m.	9 p.m.	Mean.	Amount in inches.	Penetr.	No. of days in which rain fell.							Depth.	Greatest Fall in 24 hours. Truro.	Truro.				Penetr.	in.	in.	grs.	grs.	grs.	in.	in.	grs.	in.	grs.	in.	grs.
January .	8.2	7.5	7.4	7.7	4.80	4.09	23	.92	8	3.1	0.5	86	.260	531.0	3.4	20	1	41	73	20	Frost, 6, 7, 11, 31. Hail, 3, 4. Gale, 3, 4. Fog, 11, 12, 21. Rainbow, 12.												
February	7.4	7.6	7.7	7.6	4.35	3.75	18	.90	25	2.9	0.5	85	.247	532.3	3.3	24	0	32	70	14	Frost, 10. Hail, 16, 17, 18. Gale, 10, 11, 12, 25, 26. Remarkable Rain, 21, 25.												
March ..	7.4	6.9	5.4	6.6	1.17	1.43	17	.23	27	2.9	0.8	79	.258	530.1	3.5	27	1	34	83	10	Frost, 10, 11, 12, 19. Hail, 9, 10. Snow, 10, 11.												
April	6.0	5.8	4.1	5.3	1.96	1.86	14	.43	2	3.1	1.1	74	.281	525.9	3.8	42	1	17	81	9	Frost, 6, 15. Hail, 3, 4, 13. Gale, 2, 13, 14. Mist, 10, 11, 12, 13. Thunder heard, 11. Light not seen, 13. Snow seen, 3. Frost, 1, 3, 10, 11. Hail, 9, 7, 8, 9. Remarkable Rain, 21.												
May	6.3	6.5	5.7	6.2	1.34	1.23	10	.74	21	3.6	0.9	80	.294	523.7	4.0	39	3	20	88	5													
June	5.4	5.5	5.5	5.5	1.84	1.78	8	.56	25	4.0	1.6	71	.357	517.2	4.9	42	3	15	80	10													
July	6.4	6.0	5.6	6.0	1.60	1.50	18	.49	25	4.6	1.8	72	.418	513.1	5.7	48	2	12	87	6													
August ..	6.1	6.2	5.9	6.1	3.71	3.33	16	1.06	31	4.6	1.4	77	.421	514.8	5.8	39	4	19	80	13	Remarkable Rain, 12, 31. Thunder Storm, 29. Hail, 29.												
Sept.	6.5	6.3	5.6	6.1	5.90	4.63	24	1.07	3	4.4	1.0	81	.403	518.1	5.5	38	2	20	73	17	Remarkable Rain, 2, 10. Thunder Storm, 3, 9. Hail, 9. Gale, 21.												
Oct.	7.2	7.0	5.8	6.7	4.59	4.04	24	1.20	6	3.8	0.9	80	.335	522.3	4.6	31	5	26	74	19	Hail, 2. Gale, 1, 6. Remarkable Rain, 3. Lightning seen, Thunder not heard, Remarkable Rain, 1, 24, 26, 28. Frost, 11. Hail, 29. Gale, 16, 17, 29. Hail, 29.												
Nov.	7.4	7.9	7.5	7.6	4.43	4.12	22	.69	28	3.4	0.6	86	.295	528.0	4.0	22	4	34	69	21													
Dec.	7.3	7.0	5.6	6.6	8.04	7.88	24	1.18	31	2.3	0.7	77	.206	537.2	2.8	25	7	30	71	22	Frost, 1, 2, 3, 10, 17, 18, 19, 22, 23, 26, 27, 28. Hail, 5, 6, 11, 12, 13. Thunder Storm, 9. Remarkable Rain, 8, 10, 31. Gale, 8, 9, 11, 12.												
Means ..	6.8	6.7	6.0	6.5	43.73	39.64	218			3.6	1.0	79	.315	524.5	4.3	33.0	3.0	25.0	77.0	14.0													

Cloudiness is estimated by dividing the sky into ten parts, and noting how many of these are obscured. The rain gauge at Truro is placed on the roof of the Royal Institution at about 40 feet from the ground. Glean is recorded when the sun's disk is visible through a film of cloud. The rain gauge at Penarth, near Truro, is 150 feet above the mean level of the sea.

THE AUTUMN EXCURSION.

The following account of this Excursion has been taken, almost *verbatim*, from the *Western Morning News* of September 17. The accuracy and ability of the narrator are willingly acknowledged on the part of the Institution.

Tuesday, the 15th, was the day appointed for the Annual Excursion of the members of the Royal Institution of Cornwall. The ground chosen was the district of which Lostwithiel and Fowey are the centres, and the former town was made the trysting-place. There assembled accordingly by the first morning trains a party of fifty ladies and gentlemen, the latter including Dr. Jago, F.R.S., the President of the Institution; Sir John Maclean, F.S.A., Mr. Rashleigh, Menabilly; Mr. Freeth, Duporth; Dr. Barham, Colonel Peard, Rev. Mr. Hill, Rev. G. L. Church, Messrs. R. R. Broad, H. S. Stokes, J. H. Collins, F.G.S., (hon. secretary), H. Remfry, Howard Fox, J. Preece, R. Foster, S. Pascoe, B. Kitto, F.G.S., J. Phillips, H. Leverton, T. Cragoe, &c. Before the actual start there was a short halt at the Talbot Inn, where Dr. Barham gave some interesting general particulars concerning the objects of interest which it was proposed to visit; these were illustrated by excellent diagrams, from his own surveys, by Mr. Whitley, the Senior Secretary, whose unavoidable absence was much regretted.

The first of these was the magnificent old ruin, Restormel Castle, which lies about a mile from the town. The walk thither along the valley and up the hill was delightful, and afforded a happy augury of the anticipated pleasures of the day. Restormel is an edifice of peculiar interest, and seems to have passed through three stages. At first, probably, it was purely defensive; and as such was handed over by one of the Cardinham family, to be held by Simon de Montfort, in the Barons' war, its owner not being able to defend it himself. Subsequently it was transferred by the widow of the last Cardinham lord, to Richard, Earl of Cornwall, and King of the Romans. By him, between the years 1226 and 1272, it was probably rebuilt; and by his son, and successor in

the earldom, Edmund, the chapel was probably added. In these days it was apparently rather a fortified palace than a mere fortress; and whilst it was thus in its highest glory it was visited, as Dr. Barham shewed from documentary evidence kindly furnished by Mr. Deeble Boger, by the renowned Black Prince. The third era in its career saw it pass from the condition of a palace again to that of a fortress; and "decay's effacing fingers" seem to have been laid upon it certainly three, possibly four centuries since. And yet, though unroofed and ivy-mantled, it retains much of its original magnificence. "The whole castle (says Norden), writing in the reign of Elizabeth, beginneth to mourne, and to wringe out hard stones of teares; that she that was embraced, visited, and delighted with great princes, is now desolate, forsaken, and forlorn." The general construction of the castle can be distinctly traced. The building is contained within a circular moat of considerable depth, about fifty feet in width, bordered by a terrace half as wide; and the castle wall is concentric with this ditch. It is about nine feet thick, and forty feet high to the crest of the parapet. It batters considerably and uniformly from base to summit. The included space is about 105 feet in diameter. The rampart wall passes all around, with a rear wall much destroyed, and a parapet about six feet high. The embrasures are quite plain, of rubble work, and rather further apart than usual. The merlons are not pierced; but at the base of the parapet, on the level of the walk, are occasional loops or shoots, pointing downwards towards the ditch. Three staircases, one on each side of the gate and one opposite, lead to the ramparts, upon which also the chimney shafts open. Within, and concentric with the outer wall, is an inner wall of less height and substance; and the annular space between the two, divided by radiating walls, contains the apartments. The open area within is sixty-four feet in diameter. On the right hand of the gate is the kitchen, indicated by a mutilated fireplace, of very unusual breadth; and beyond it is the hall, with three exterior windows. The chapel is a rectangular appendage projecting from the eastern side into the moat. There is a small pointed shelved piscina with conduit. The moat was supplied with water from the hill above by leaden pipes. One of the chief topics of discussion at the castle was the east wall of the chapel, which contains no window, and presents some peculiar appearances. Close examination, however, seemed to prove that these were caused by changes of construction that had taken place, and were no part of the original structure. The chapel originally had an east window of three lights. This was subsequently walled in from the outside, possibly to increase the strength of the edifice in what we have called its

third state. Finally the quoins, mullions, and sill of the window were removed, and left the grooves which were the cause of so much discussion.

Restormel, with its crumbling walls and its encircling trees, was left with regret, and a return made to Lostwithiel. On the road some of the party looked in at the Royal Restormel Iron Mines (Royal because honoured by a visit from the Queen), and found good specimens of hematite, limonite, goethite, and wood iron. Arrived in the town, after a handsome plaster ceiling had been inspected, a visit was paid to the Guildhall, built by one of the ancestors of Earl Mount Edgcombe, patron of the ancient borough, in 1740. Here Mr. Foster and Mr. Pease, the town clerk, had kindly set out the mace and seals of the borough, its latest charter—that of James II—and the massive silver oar, the emblem of that maritime jurisdiction over the Fowey which Lostwithiel still enjoys. Mr. Foster lucidly gave some explanations relative to the corporate history of the town; and Mr. Freeth produced some most interesting documents which, for the first time, shewed the connection of Restormel with the Cardinham, and the way in which it was acquired by the Duchy, as set forth above. The church, with its singularly picturesque and quaint spire, and its ancient memorials were next visited. Here the chief features of interest were the spire aforesaid, octagonal, with eight decorated lights at its junction with the tower, grotesque figures of Norman character on a 14th century font, and an alto-relievo in alabaster of the flaying of St. Bartholomew. This was discovered in the course of some works of restoration which have been carried on with good effect, and it is hoped that funds may be raised to complete the restoration in a thorough and satisfactory manner.

Lostwithiel has been a place of importance. It was the town where the Assizes and Sessions were held; the polling-place for the county before its division; the seat of the Stannary jurisdiction. It retains still the original Stannary Court, or Palace, built by Earl Edmund, the old Stannary Prison, and of later date the now disused Coinage-hall. Massive and even somewhat stately these buildings look outside—one of the most noticeable features being a very old Duchy Coat of Arms, with the 15 bezants, and the lion as a crest.

All this made up a good forenoon's work, and the lunch which was served at the Talbot was heartily welcome. Occasion was taken after it to thank, on behalf of the Institution, Mr. Foster and Mr. Pease for the courtesy they had shewn, and the interes-

ting information they had given ; and Sir John Maclean suggested that Mr. Foster could not do better than take the history of the borough in hand.

The next item in the programme was a drive to Fowey, taking in the fine old camp of Castle Dor on the way, and a Romano-British inscribed stone. The scenery en route was delightful, for the road lay along the high ground which divides the Fowey and Tywardreath valleys ; and the landscape is picturesque and ever-changing. Moreover it has all the charms of historical association. We may not know by whom and when Castle Dor was raised, but we do know that in later times the wisdom which dictated the original choice of the site was justified by its being selected for a Royalist post in the civil wars of the 17th century. What battles were fought there in pre-historic times we know not ; but, standing on its ramparts, one can see Braddock Downs, the scene of a great victory won by Sir Ralph Hopton over General Ruthven ; and Castle Dor itself may be regarded as the scene of the surrender of the entire Parliamentary army under Skippon, while Essex barely made his escape by sea to Plymouth. Castle Dor is a circular earthwork enclosed by three rings of rampart and ditch, and its name is supposed to be derived from the Celtic Dwr, water, and to be applied to it as commanding the waters on either side of the ridge. By the forethought of Mr. Rashleigh the camp had been rendered pleasantly accessible for the ladies. The inscribed stone is a mile nearer Fowey. According to Borlase, the inscription is CIRVSIVS HIC IACIT CVNOWORI FILIVS and, though in parts effaced since his time, most of these letters are still clear ; he regards the W as an inverted M. Cirusius may be a Latinized form of Kerris ; there is Polkerris near by.

Next came Fowey—that quaint old seaport which in the middle ages led the navy of England ; which carried on a war against France on its own account when the King had proclaimed peace, and came to grief therefore ; whose sons by their daring deeds won the name of gallants, which their descendants still fondly cherish.—Fowey, with its lovely harbour, its ruined forts, and chain towers, its fine old church, and the stately mansion of the Treffrys, famed so far back as Poitiers, when Sir John Treffry was the Royal Standard Bearer, and gained the honourable augmentation of supporters to the family arms, of which, as of their pious motto, “ Whyle God wyll,” they may well be proud. Place was the first spot visited, and here the party were received by its owner, the Rev. Dr. Treffry, who conducted them through the picturesque mansion. Special note was taken of its unique feature, the porphyry hall, commenced by the late Mr. J. T.

Treffry and finished by Dr. Treffry. Floor, walls, and ceiling are all of polished porphyry and granite. One of the oldest parts of Place as it now stands is the Dining-room, which has the family arms over the mantelpiece, dated in the 16th century. There is some capital plaster decorative work in this and other rooms. Immediately below the house rises the tower of the church. This is a remarkably fine structure, the high-clerestoried nave about the loftiest in the county. It contains a number of ancient monuments, among them many of the Treffrys and the Rashleighs; and it is intended to effect a thorough restoration. Some progress has been made of late by putting in several very handsome stained glass windows.

Accepting the kind hospitality of Mr. Rashleigh, of Menabilly, the Excursionists then had a welcome tea in the Town-hall, and after that gentleman had been duly thanked the homeward start was made. Time did not allow of visiting the new Railway and Harbour works—something of these had been seen, however, on the Fowey-ward drive—but the party gladly availed themselves of Mr. Rashleigh's kindness to drive by Point Neptune—that charming marine retreat—and through Menabilly, to the world-famed mineral grotto, for it is no less. This grotto is a building lined, after the taste of the past age, with specimens of Cornish and other minerals, each side or panel being devoted to a different family. It contains also two of the links of the old chain which used to be drawn across the entrance to the harbour, and which were dredged up many years ago. In the centre is a table of polished porphyries, and while the seaward view from the window is delightful, the appearance of the grotto in the sunshine is dazzlingly if somewhat grotesquely beautiful. Unfortunately, evening was advancing when the party reached this romantic spot.

The station at Par was reached in good time, and after thanks had been voted by acclamation to Dr. Jago, Dr. Barham, and Mr. Collins, the party separated, well pleased with the events of the day.

The documents referred to in the above notice as having been communicated by Mr. Deeble Boger, and his paper in relation to them, will be published in the next No. of the Journal; but as they are important and interesting it may be advisable to print here, in anticipation, the *Index* of the "Minutes" furnished by him, as it gives their general purport.

September, 1874.

Note of some Entries in the Book of "*Minutes of the Duchy (of Cornwall) Council*" during the life of Edward, the Black Prince, translated from the Norman-French by Deeble Boger.

It appears from the Entries that the Prince was twice at Restormell Castle, first in the 28 Edw. III, (1354) from the 24th August to the 10th September; secondly in the 37 Edw. III, (1363) when the Prince's expedition to Gascony was preparing at Plymouth, and that the time then passed at Restormell was from St. Matthias Day [24th February] and Easter, and that on the first occasion in 1354 he was accompanied by certain Knights of his Household whose names are given.

The following are the Entries extracted :—

- A. Order directed to John de Kendall, the Prince's Receiver in Cornwall and also the Constable of the Castle of Restormell and Keeper of the Park to repair the Castle and the "*Conduyt*."
 - B. Order to deliver up the Lands of a Ward of the Prince who had attained his majority.
 - C. Order to pay additional wages to the Chaplain at the *Hermitage in Restormell Park*.
 - D. Order for the delivery of Timber from Restormell Park to the "*Friars Preachers*" at *Truro* for building their house there.
 - E. Appointment of Deputy Keeper of Restormell Castle and Park under John de Kendall who held the office of Keeper of same.
 - F. Order for removal from Restormell to Southampton of the Venison, Fish, and Pewter, which the Prince had left at Restormell, in September, 28 Edw. III, after his residence there.
 - G. Order that the Keeper of the Park of Restormell be allowed the cost of Ferns brought for bedding for the Deer, and the cost of erecting Lodges for the Deer, and order to repair the Castle.
 - H. Order for repayment to John de Kendall (the Prince's Receiver) for disbursements by him for the Prince when at Restormell in 1363.
- The order signed by the Prince "on board his ship at Plymouth" when embarked for the expedition to Gascony.
- I. Order to the Prince's Officers in Cornwall to assist John Guy, of *Lostwithiel*, employed in the Prince's service.
 - J. { Orders to make *Lostwithiel* a Stannary Town.
 - K. {
 - L. Order for the repair of the *Bridge at Lostwithiel*.

The following mem. was received subsequently:—

November, 1874.

References in the Duchy of Cornwall *Index* to the Minutes of Council relative to Tyntagel.

25 Edw. III. Tyntagel Castle always attached to the office of Sheriff without any fee.—Granted to John de Sherbeck on same conditions.

35 Edw. III. The fee of the Chaplain within the Castle of Tyntagel to be increased.

38 Edw. III. Relative to Tyntagel Castle and the Chaplain.

LIST OF WORKS ON GEOLOGY.

Nos. 430 and 440.—No alteration required in the text.

506.42

Journal

OF THE

ROYAL INSTITUTION

OF

CORNWALL.

No. XVII.

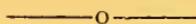
SEPTEMBER, 1875.

TRURO:

W. LAKE, PRINCES STREET.

1875.

CONTENTS.



The Papers marked thus () are illustrated.*

	<i>Page.</i>
I.—Chronicles of Cornish Saints. (VIII. S. Gunwallo), by the Rev. J. Adams	145
II.—Note on some Old Play-Bills found at Launceston, by C. Le Neve Foster, D.Sc.	148
III.—*Description of an Ancient Lamp, by Robert Blight	150
IV.—Note on a Cornish Specimen of Wavellite, by J. H. Collins, F.G.S.	153
V.—Note on an Ancient Signet Ring, by W. H. Tregelles	154
VI.—Notes of some Entries in the Book of “Minutes of the Duchy of Cornwall Council,” by Deeble Boger	155
VII.—The Will of Wm. Treffry, of Fowey, 1504, by Sir John Maclean, F.S.A.	166
Spring Meeting and President’s Address	175
VIII.—*Roman Occupation of Cornwall, by N. Whitley, F.M.S.	199
IX.—Ornithology of Cornwall, 1874-5, by E. H. Rodd	206
X.—Habits of the Kingfisher, by Wm. Jory Henwood, F.R.S.	210
XI.—Appearance of the Grey Mullet, by J. Symons, Jun.	212
*XII.—Note on Belowda Hill Mine, &c., by C. Le Neve Foster, D.Sc., F.G.S.	213
XIII.—On a recently discovered tumulus, by J. H. Collins, F.G.S.	214
XIV.—Building and Ornamental Stones of Cornwall, by R. N. Worth, F.G.S.	215
*XV.—Carminow of Carminow, by J. J. Rogers	220
The Autumn Excursion	239

Journal

OF THE

ROYAL INSTITUTION

OF

CORNWALL.

No. XVII

SEPTEMBER, 1875.

TRURO:

W. LAKE, PRINCES STREET.

1875.

JOURNAL

OF THE
ROYAL INSTITUTION OF CORNWALL.

No. XVII.

APRIL.

1875.

I.—*Chronicles of Cornish Saints.*

VIII.—S. GUNWALLO.

By the REVEREND J. ADAMS.

Read at the Annual Meeting, November 24th, 1874.

TWO Churches in Cornwall are said to owe their foundation to this Saint, viz.: Landewednac and Gunwallo, and both keep their parish festivals on the Sunday nearest his feast-day, which in the Gallican as well as Anglican Martyrologies is March 3rd. He* was the son of Fracan or Brychan,† a Welsh Chieftain, and his mother's name was Gwen. About the middle of the fifth century, Fracan fled into Armorica with his wife, his two sons, and many of his clan, to escape from a deadly pestilence, which

* His name is variously spelt as follows: Guingalocus, Winwalocus, Winnalocus, Vinnavinlocus, Wingalocus, Wingalotus, Wynolatus, Winebaldus, Winwaloe, Galuntius, Gwignolen, Venole, Gwenny, Gwarog, &c. There is a MS. life of the saint in the Cottonian Library, and several lives taken professedly from ancient sources may be found in the *Acta Sanctorum* of the Bollandists—3rd March—one of them is said to have been copied from the chartulary of Landevenec, and to have been written by Gurdistan, a Monk of that Abbey, A.D. 870.

† This Brychan is sometimes confounded with his famous namesake Brychan of Brecknock. There were three Welsh Chieftains of that name, two of them belonging to the early part of the VI Century and the third to the VII. They all seem to have had children who were founders of Churches and accounted saints, and mediæval hagiologists, who seldom troubled themselves to investigate Welsh records, supposed they were all the offspring of the Brecknock Brychan. Hence they attributed a family to him so numerous as to bring discredit upon their narrative.

at that time devastated his native country. He settled on the northern coast, at a place called after him Plonfragan (Plebs Fracani), of which he is still the patron saint, and there it is said Gunwallo, the youngest son, was born.* His youth was spent in the monastery of St. Budock, in the Isle of Laurels,† a teacher renowned for sanctity and learning, and there he became a distinguished student. At that time, so runs the legend in the old lives of this Saint St. Patrick's glory was shining like a bright star in Ireland, and illuminating the Church of Christ. Gunwallo was therefore most anxious to visit him for instruction and guidance, and had made arrangements to start for Ireland in the company of some merchants, when lo! on the eve of the day fixed for his journey, St. Patrick appeared to him in a vision, crowned with a golden diadem, and with the countenance of an angel, informed him that he was sent to give him the interview which he desired, and to bid him seek companions and go elsewhere. Thereupon eleven disciples were assigned to him by his Master, St. Budock, and with them he traversed the whole of Dommonia, as the northern part of Armorica was called, and then settled in a small island at the mouth of the Avon or Auhne, the river of Chateaulin, called by one of his biographers‡ Topspiqia, but subsequently designated Tibidi, or House of Prayer. On this island there formerly existed a famous Druidical Monument, showing that in early times it must have been a high place of heathen rites, and it was probably on this account that Gunwallo and his companions took up their abode there. Vestiges§ of a Christian Chapel have also been found on the spot. The island seems to have been a most dreary and inhospitable place, for it is described as barren, rugged, unfit for human habitation, and exposed to every wind that blew. Very

* A Manuscript of the Chartulary of Llandevnec, now in the Library of Quimper, gives a curious tradition respecting his mother, viz., that a third breast was bestowed upon her to nourish this third son. Hence she is called in Breton Annals Gwen Teirbron, *i. e.*, Gwen with three breasts, and she is so represented in sculpture on a corbel of an old chapel dedicated to her eldest son Guennoc, about ten miles from Quimper. The tradition seems to have been known also in her native country, for a Gwen is mentioned in *Achany Saint* to whom the name of Teirbron was given, though she is confounded with another saint of the same name.

† Now called Isle-verte, not far from the Isle of Brehat.

‡ Guraistan, Abbot of Landevnec, Acta Sanct: March 3, 258.

§ Arch: Camb: 3rd Series, iii, 134.

soon, therefore, the good men grew weary of their abode, and longed for a pleasanter habitation. They patiently endured its privations, however, for three years, and were then permitted to cross over to the opposite coast of Landavenec, a path being supernaturally opened for them through the water, along which they are described as walking hand in hand, and chanting a song of praise.

The fame of the Saint and his brethren soon reached Gradlon the chieftain of the country, and he had recourse to them for instruction, became a convert to Christianity, and made* grants of land for the maintenance of the mission party. The monastic building which they raised subsequently grew into the famous Abbey of Landavinnac, which has been called the cradle, if not the birthplace of Christianity in Armorican Brittany, and it was probably from that place that the Saint migrated into Cornwall,† and established oratories which have perpetuated his name at Landewednac and Gunwallo.

* The Chartulary of Landevenec, a MS. of the eleventh century still in existence, is said to contain copies of the original grants.

† As he is said to be the patron saint of the two or three churches in Wales, it may be inferred that he sojourned for a time amongst his Kinsfolk in that country. His name, however, seldom occurs in Welsh Annals.

II.—*Note on some Old Play-bills found at Launceston, by C. LE NEVE FOSTER, D.Sc., Joint Hon. Secretary.*

Read at the Annual Meeting, November 24th, 1874.

IN the month of May this year, Mr. Pearce, the landlord of the White Hart Hotel, Launceston, had his attention called to an old trunk, and on examination it was found to have been papered inside with play-bills, which had since been covered over with a second papering. Endowed with a large share of patience and a natural taste for anything relating to the drama, Mr Pearce worked hard for a couple of days and succeeded in saving more than a dozen of the play-bills from destruction. As they form an item in the county history of the last century, and, in my opinion, furnish some particulars of the life of a distinguished native of this town, a few remarks concerning these play-bills will not be out of place at the Royal Institution of Truro.

The facts that may be learnt from an examination of these play-bills are as follows:—

In 1772, a regular theatrical company, known as the “The Exeter Comedians,” came over from Exeter to act at Launceston. They played some seven or eight weeks, from April to June, and then went to Plymouth where they were joined by actors from the London “Theatres Royal.” The London season appears to have terminated much earlier than at present, as its “extraordinary length” that year is spoken of, although it ended before 15th June.

The company performed three times a week at the New Theatre, White Hart, Launceston. Mr Pearce informs me that there is a large granary at the White Hart, which was perhaps fitted up as a Theatre 100 years ago. However, it must not be supposed from this that the company was merely one of strolling players. Exeter could doubtless support a good theatre even a

hundred years ago, and probably a provincial theatre in the last century was better than now, when everyone can run up to London and see the best actors.

The company consisted of nine gentlemen, four ladies and a boy, and their selection of plays included tragedies, such as Richard III, Hamlet, Romeo and Juliet; comedies, such as "As you like it," and "The Brothers;" farces and comic operas.

The prices were not extravagant; for the best places, *i.e.* the pit, you only had to pay 1s. 6d., the 1st gallery cost 1s., and the 2nd gallery 6d.

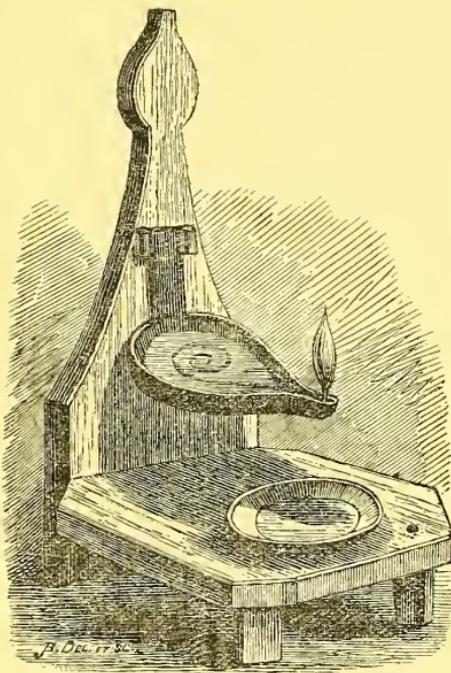
The interesting point for inhabitants of this town is that we invariably find the leading parts taken by a Mr. Foote. I am strongly of opinion that this Mr. Foote is no other than the great actor, wit and author, Samuel Foote, who was born in Truro, in 1721, and died in Dover, in 1777. It is true that in the "Memoirs of Samuel Foote," by William Cooke, (London, 1805) there is no mention of Foote ever having acted in Cornwall, but at the same time there is no mention of his having been anywhere else in the spring of 1772, and therefore, until the contrary is proved, I think we may safely assume that Foote acted in Launceston.

I have to thank Mr. Pearse for kindly allowing me to exhibit his play-bills this evening, and he has been good enough to present one of them to the Museum of this Institution.

III.—Description of an Ancient Lamp, called in the *Meneage* district a *Chil*. By ROBERT BLIGHT, communicated by MR. N. WHITLEY.

Read at the Annual Meeting, November 24th, 1874.

SEVERAL domestic articles formerly in general use in West Cornwall, with many of our time honoured customs, are rapidly disappearing before the march of *modern refinement*, which is pervading the cottage of the poor and the mansion of the rich.



I am not aware that either a written description, model, or engraving has been preserved in the Museum of the Royal Institution of Cornwall of this ancient lamp or *Chil*, which, forty years ago, illuminated the dwellings of fishermen, many farm houses, and the labourer's cottages; it was simple in its construction, inexpensive in material and very economical, particularly so in the early part of the present century, when other artificial lights were few in number, and costly in price.

The engraving accompanying this paper was made from the drawing of a *Chil* that had been in use many years in a labourer's cottage in one of the twelve parishes situated to the south of Helston, a large agricultural district, known by the Phœnician name, *Meneg*.

It appears from History that the shores of Mount's Bay were visited at an early period by people from the east, and mention is made of the British Islands by their names three centuries before the Christian Era. Merchants came in ships to get a supply of metal known and highly prized by the people of Western Asia, and the dwellers along the coast of the Mediterranean; and it may reasonably be supposed that these traders would bring with them some of the domestic articles in use in their own country, which might be quite new to the Cornish of that day, situated as they were far away from the seats of the arts, sciences, and civilization. By such a people, a lamp, though of rude construction, that would light up their huts and caverns during the long winter nights, would be highly prized, and of great value; and as mechanism and the use of tools for ornamenting advance slowly, the same simple and easily constructed lamp would be handed down from generation to generation, and from age to age.

The Cornish Chil, or lamp, was usually made by the combined workmanship of carpenter and blacksmith, sometimes by the cottagers themselves. That represented by the engraving is about a foot in height, and six inches in breadth, the back piece, or upright, sparingly carved or indented. The vessel in which the oil and wick are placed is made of thin sheet iron, terminating in a lip or beak, and hooked on to the upright, so that it can be easily removed for the purpose of being cleaned. The horizontal part is supported in front by two legs, two inches in height. A saucer is usually placed under the lip to catch any drops of oil that might fall from it.

The wick in modern times was generally of cotton, but retained its ancient, and no doubt primitive name, *Purvan*, a Celtic word signifying rushes, or the pith of rushes. When neither cotton nor pith of rushes could be obtained, strips of linen were plaited together and locally called a *Booba*.

History gives the invention of the lamp to the Egyptians, from whom it passed to the Greeks and Romans. The earliest were simply the skulls of animals and sea shells in which *fat* was burned; the wick, frequently of rushes and other vegetable fibre. It is remarkable that that part of the Cornish Chil which contains the oil and the wick resembles the skull of some animal, and also the form of some of the lamps found in excavating the

ruins of Herculaneum and Pompeii, which serves in some measure to support the idea that the *Chil* was introduced from the east at a very early period, by traders from the shores of the Mediterranean.

Among the several writers on the old Cornish, or Celtic Language, I find only one who gives a definition of the word *Chil*. Borlase, in the copious vocabulary at the end of his *Antiquities*, gives "*Chil*, a neck," a meaning which cannot be applied to the Cornish Lamp.

IV.—*Note on a Cornish Specimen of Wavellite.*—By J. H. COLLINS,
F.G.S., *Joint Hon. Secretary.*

Read at the Annual Meeting, November 24th, 1874.

THE Mineral Wavellite, a hydrous phosphate of alumina, is of considerable interest to the mineralogist, although it has not hitherto occurred in such quantities as to be commercially valuable as a source of phosphoric acid. It was originally discovered by Mr. J. Hill of Tavistock, about the year 1785, by whom it was found in rounded concretions resting upon clay-slate at Filleigh, near Barnstaple. It was about thirty years later analysed by Dr. Wavell, and named after him. It has also occurred in Northumberland, Scotland, Ireland, and many foreign localities—usually upon clay-slate or sand-stone.

Its occurrence in Cornwall has been several times reported and as often disputed. Thus in Greg and Lettsom* at page 80, it is said to occur on a decomposing granite at Stenna Gwynn, near St. Austell, often accompanied with fluor and the rare mineral fluellite.

I have now the pleasure of corroborating this statement, and of presenting to the Royal Institution of Cornwall a small specimen from that locality, which was lately placed in my hands for analysis by Mr. Richard Talling, of Lostwithiel, from whom also Messrs. Greg and Lettsom had their information. I was not able to use more than $1\frac{1}{2}$ grains for this purpose, but, although this was not enough to allow of a quantitative analysis, I was able very well to determine the presence of all the essential constituents of Wavellite. It will be seen that the specimen is really upon a granite rock, unlike the specimens from other localities, but it is not, I regret to say, in this instance, associated with the extremely rare Fluellite.

* Manual of the Mineralogy of Great Britain and Ireland.

V.—*Note on an Ancient Signet Ring found at Penryn.*—By W. H. TREGELLES, *Corresponding Member of the Institution.*

Read at the Annual Meeting, November 24th, 1874.

THIS ring was found a few years since in a field near Budock Church, by a Watchmaker of the neighbourhood, of whom I bought it for Mr. Octavius Morgan, F.S.A., late M.P. for Monmouthshire. It has been the subject of much interesting discussion, the result of which, with a description of the ring, and three impressions in hard wax, I have deposited in the Museum of the Royal Institution of Cornwall at Truro.

It is an oriental signet ring of silver, set with an oblong sard, engraved. It appears at one time to have been gilt, and the loop and back of the Bezil were ornamented with a small pattern in Niello, now almost obliterated by long wear.

In the middle of the device is a cartouche or escutcheon, terminating at the top in a Greek cross potent. In the lower part of the escutcheon is engraved a Paschal Lamb, and in the upper part are some oriental characters which have not been deciphered with certainty. On either side of the escutcheon is some ornamental scroll-work, having in the middle the Jerusalem cross potent.

It was submitted to Mr. Albert Way and Mr. C. W. King, and the latter gentleman, who took much pains to make out the inscription, considered that the characters were Servian, and that they represent the name of some ecclesiastic of the Greek Church, to whom it once belonged.

It was evidently an ecclesiastical ring, and M. Castellane states that he has seen several Armenian Priests, at Rome, wearing similar rings. It may perhaps date from the early part of the last century.

The most probable conjecture as to the reason of such an object having been found in Cornwall is, that it may have been brought over by some traveller, and, having been lost by him, or the person to whom he gave it, was mislaid among rubbish and carted out with manure.

VI.—*Note of some Entries in the Book of “Minutes of the Duchy of Cornwall Council,” during the life of Edward the Black Prince, translated from the Norman French.—By DEEBLE BOGER, Member of the Institution.*

IT appears from the entries that the Prince was twice at Restormell Castle, first in the 28 Edwd. 3 (1354), from the 24th August to the 10th September; secondly, in the 37 Edwd. 3 (1363), when the Prince's expedition to Gascony was preparing at Plymouth, and that the time then passed at Restormell was from St. Matthias Day [24th February] to Easter; and that on the first occasion in 1354, he was accompanied by certain Knights of his household, whose names are given.

The following are the entries extracted:—

- A. Order directed to John de Kendall, the Prince's Receiver in Cornwall, and also the Constable of the Castle of Restormell and Keeper of the Park, to repair the Castle and the “*Conduyt*.”
- B. Order to deliver up the Lands of a Ward of the Prince, who had attained his majority.
- C. Order to pay additional wages to the Chaplain at the *Hermitage in Restormell Park*.
- D. Order for the delivery of Timber from Restormell Park to the “*Friars Preachers of Truro*” for building their House there.
- E. Appointment of Deputy Keeper at Restormell Castle and Park, under John de Kendall, who held the office of Keeper of same.
- F. Order for removal from Restormell to Southampton of the Venison, Fish, and Pewter, which the Prince had left at Restormell in September, 28 Edwd. 3, after his residence there.
- G. Order that the Keeper of the Park of Restormell be allowed the cost of Ferns brought for bedding for the Deer, and the cost of erecting Lodges for the Deer, and order to repair the Castle.
- H. Order for repayment to John de Kendall (the Prince's Receiver) for disbursements by him for the Prince when at Restormell in 1363.
The order signed by the Prince “on board his ship at Plymouth,” when embarked for the expedition to Gascony.
- I. Order to the Prince's Officers in Cornwall to assist John Guy, of *Lostwithiel*, employed in the Prince's service.
- J. } Order to make *Lostwithiel* a Stannary Town.
- K. }
- L. Order for the repair of the *Bridge of Lostwithiel*.

An Itinerary of the Prince's visits, though necessarily an imperfect one, may be gleaned from the dates of the orders

of the Prince registered in the minutes of his Council, which give the places where signed and the dates of the signature.

It appears that on two occasions, at least, the Prince was in his Duchy.

His first visit was in the 28th year of Edward 3 (1353). It was in 1337 that the Prince, then seven years old, in full Parliament was made "*Duke of Cornwall*;" consequently, at this first visit, he was twenty-three. He appears to have been accompanied by members of his council and household; for in a grant discharging the Borough of Helston from a rent dated at "Restormell, 2 Sept., 28 Edwd., cap. 1353," the witnesses are "Dominus John de Bohun, Dominus de Dunster, John de Montacuto, Nicholas de Loharrings (the Prince's Chamberlain), John de Sully, and Walter de Wodeland.

On the 11th of August, 1353, the Prince was at Chudleigh; 18th August, at Launceston; 24th August, at Restormell; 1st and 2nd September, at Restormell; 5th September, at Launceston; 10th September, at Restormell; 10th and 11th September, at Exeter.

The above dates are extracted from the register of divers grants, &c., of the Prince.

Where the Prince was between these dates can only be matter of conjecture. His personal occupations were probably receiving the Homage of Vassals—of which many are recorded—and sporting.

It is noticeable that seven days are not accounted for in August, between the Prince being at Exeter and his being at Chudleigh; and that the dates relating to Restormell extend to seventeen days, with the exception of the 5th September, when he was at Launceston. The seven days referred to were probably passed at Exeter, near which was not only the Forest of Dartmoor, part of the Duchy possessions, but also the important Manor of Bradnich belonging to it, and the residence of the Steward of the Duchy.

The Prince's Council in attendance on him, were, it may be supposed, occupied during the time of the visit in obtaining information about the extent and state of the Prince's possessions.

From the tenor of many orders of earlier date, directing his officers to repair his Castles, it would appear that in 1353, they were found to be in a dilapidated and ruinous condition, and that even Restormell, the largest and most commodious of them, afforded but indifferent accommodation for the retinue of a court.

A commission for an inquisition, dated 30th November (1354), was issued for the purpose of ascertaining what lands Edmund, Earl of Cornwall, died possessed of.

In the return of the jurors serving in this inquisition, they gave the particulars of the Castles of Restormell, Launceston, and Town of Lostwithiel in their respective revenues.

Restormell and Lostwithiel are thus described.

RESTORMELL.

They—the jurors—say upon their oath, that there is there a certain Castle, which is worth nothing by the year as to issues; there is there a certain small garden, and it is worth by the year 6d.; there is there a certain park with deer, and it is worth by the year for the same 20s.; there is there a certain meadow in the same park, and worth by the year 6s. 8d.; there is there a certain watermill, and worth by the year 26s. 8d.; also there are in the said park certain "*Cockshetes*,"* and they are worth by the year 12d.; and the pawnage of the same park is worth by the year 3s.; and a certain custom of ale between Lostwithiel and Restormell, near Paukokes Cross, worth by the year 6d.; there is there a certain fishery in the water of Fawe under the said Castle, and it is worth by the year 50s.; and the same fishery extends from the port of St. Salveors, as far as the bridge of Reprenna (Resprin), as long as two oxen joined under one yoke can proceed together in the said water; and there are there two conventionaries, who hold one ferling and a half of land, and rendered yearly 9s. 4d. at the four principal terms of the year; and each of them shall come to the lord's chase, in the park, once a year, and the works are worth 2d.; also there are there thirteen villeins who hold in villenage thirteen ferlings of land, and they render by the year at the four terms aforesaid, 77s. 1d.; and every of them shall come to the lord's chase in the park, once in the year, and those works are worth 13d.; and the chevage of villeins there is worth by the year 9d.; the pleas and perquisites of courts there are worth by the year 5s. -Sum £10. 0. 2.

* Query (Shootings for Woodcocks).

LOSTWITHIEL.

Also they, the jurors, say upon their oath, that there are there in the borough aforesaid, 305 burgages which render by the year, at the feast of St. Michael, £8. 13. 3½.; also there are there three water-mills, and they worth by the year £12; the sullage there in water of Fawe is worth by the year 6s. 8d.; the fairs there on the day of St. Bartholomew are worth by the year 2s.; the chevage of villeins there is worth by the year 2s.; the pleas and perquisites of courts there are worth by the year 50s; also the cellar of the great hall, with the houses of stannary there is worth by the year 66s. 8d. Sum £27. 0s. 7½d.

The Prince's visit (1353) being only the year before this Inquisition, it may be regarded as describing accurately what he then found these possessions to consist of.

At a date (1347) between the date of the grant of the Duchy to the Prince in 1337, and the Prince's visit to Cornwall in 1353, Sir Edward Kendall, Knight, was the Prince's Steward of Cornwall, and it was probably his son, John de Kendall, who became under the Prince the Constable of Restormell Castle, and the Prince's Receiver in Cornwall, making the Castle his residence. It was to this John de Kendall that nearly half the orders issued by the Prince in Council are directed.

The fact of the 2nd visit of the Prince to Cornwall rests upon the evidence of a minute of Council, dated 8th June, 37 Ewd. 3rd (1362), signed by the Prince "*on board ship in the Harbour of Plymouth,*" directing a payment of £12. 8s. 10d. to be allowed to his Receiver, John de Kendall, for his disbursements on the Prince's account "*when he was staying at Restormell between St. Matthias Day last and Easter last.*"

In a memoir of the Black Prince by James it is stated that the year 1362 was passed by the Prince in making preparation for his passage into Aquitaine to assume the Government of that and the adjacent provinces then belonging to England, and that he with his wife and court were at Rochelle in *February*, 1363.

It is probable that the Prince was in Devon or Cornwall early in the year 1362, not only to urge on the preparations at Plymouth of the fleet that was to convey him to his Viceroyalty, but, contemplating a long absence from England, he was desirous of ascertaining by personal inspection to what extent his Duchy had deteriorated in value by the ravages of the plague, which

had reappeared in England in 1361. Numerous orders issued by the Prince to his officers to ascertain to what extent his lands had been depreciated by this dreadful pestilence, with orders to remit and to lower rents, are to be found in the Minutes of Council.

Either this motive or curiosity might have led him, as recorded, to visit Tintagel Castle at this date. The Minutes of the Council afford no direct proof that the Prince was ever at Trematon Castle; although in 1362, he issued orders relative to business connected with the Manor of Trematon. It was, however, easy, from its being in the immediate neighbourhood of Plymouth, for the Prince to pay it occasional visits of a few hours in 1353 and 1362, when he was at Plymouth or Plympton.

It is a corroboration of the date of 1362, as identified with the Prince's visit to Restormell, that two other orders, dated 3rd and 5th of June, 1362, were issued from Plympton, and one from Plymouth on the 6th of June, 1362.

It may reasonably be conjectured as to "Lodgings" on his journeys in Devon and Cornwall, that the Prince would, at Exeter, either honour the Bishop at his Palace with his company, or lodge at his own "Castle of Exeter." In regard to comfort, it is likely that he would prefer the Palace; and that he did select the Palace appears from an entry dated 10th September, 1353, in which it is recorded, that the Prince received the Homage of James Vautort, at Exeter, "*within the chamber of the Palace there.*"

At Chudleigh, where the Manor belonged to the Bishop of Exeter, and where the Bishop had a Palace adjacent to the Town, the Prince might be sure of sufficient accommodation. At Launceston, besides the Castle belonging to the Prince, which, from its apparent construction, would not much invite a halt, there was a religious house, "Launceston Priory;" and to offer hospitality, especially to the Prince, who was the feudal superior of the Prior, would be his natural and pleasant duty.

At Plympton, the Priory, with its high position in the rank of religious houses, and hospitality on a scale suitable to visitors of rank who were constantly making Plymouth a port of embarkation, would naturally have the Prince for its guest; and there probably he was lodged with his illustrious captives in 1356, after the battle of Poitiers. The result of this accustomed profuse

hospitality, even before the advent of the Prince, appears from a Petition of the Prior of Plympton to the Bishop of Exeter, in 1338. The Petition states that the Priory was so impoverished by its hospitalities—"precipue propter contiguatum portus de Plymorae cotidie exerescentis adeo graviter et supra vires onerantur,"—that they besought the Bishop for assistance, in the grant to the Prior of an Advowson. Possibly this impoverishment of the Priory was one of the motives for the Prince making Restormell his residence for a brief period in 1362—rather than burden the Priory with expenses on his account. Assuming that the route taken by the Prince in entering Cornwall, in 1353, was from Exeter through Chudleigh, to Launceston, and then to Restormell, he would have at least a partial view of the Forest of Dartmoor, belonging to the Duchy, of which not long after he appointed a keeper, and in which, from the tenor of the entries, it would appear that there were Deer.

The entry relating to the removal, in 1363, from Restormell of the Prince's furniture, viz.—Pewter and the Provisions left behind—is noticeable as shewing some of the domestic habits of that date.

It will be observed that there is no mention of Silver Plate. Parker ("Domestic Architecture of the Middle Ages,") notices that in the 14th and 15th centuries Pewter constituted the ordinary Dinner Garniture. There are two or three instances in the Minutes of Grants by the Prince of "*Tin*" to some of his Household or Council. On 10th August, 31 Edward 3, the Comptroller of the Prince's Household, and the Receiver of Cornwall have orders to grant "to the Prince's chere chaplain, Sir Richard de Wolveston, Clerk, 100 lbs. of Tin, free of coinage dues, to make vessels for his domestic purposes." Salted provisions were largely used. The Prince, whilst residing at Bordeaux, sent orders to John de Kendall to forward to him considerable quantities of salted Venison and Salmon from his parks and fisheries in Cornwall, as well as other Sea Fish. Although there were oftentimes sumptuous Banquets in these days, by royal and noble personages, it is probable that their ordinary fare was such as would at the present time be considered as exhibiting a very poor cuisine.

APPENDIX A.

Edward the Prince, &c., to John de Kendall, Receiver.—We order you to repair all defects when necessary in the houses and bridges of our Castles and Manors in Cornwall, and also the “*Conduyt*” in our Castle at Restormell at our cost, and by the view and certificate of Johu Dabnoun, our Steward of Cornwall, who is personally charged with our will in this matter, as quickly as possible to be repaired and in the most skilful manner that you know of—and for the cost, due allowance is to be made in your account—and you will take Carpenters and other Workmen, such and as many as shall be needed for the said work, into our service on such terms that they may remain until the said works are completed.

Done at London, May 21, (28 Edw. 3rd.)

APPENDIX B.

Edward the Prince, &c., &c., to John Dabnoun, (the Prince’s Steward in Cornwall).

Reciting that Robert de Beere who was in the Prince’s ward by reason of his minority, and also by reason of the minority of John le Jeu, who is also in our ward, ‘as a wardship within a wardship’ (*come garde dang garde*) had proved that he was of age in order that you deliver to the said Robert his lands.

“*Par avis de Monss: de Wengefeld.*”

Done at the Castle of Restormell, 24 Aug., 28 Edw. 3.

APPENDIX C.

Edward the Prince to the Auditors —Whereas we have the Petitions of Sire William Pruet, Chaplain, to reside (“*demorer*”) at the Hermitage in the Park of Restormell, for the term of his life, to sing masses for our Ancestors [“*a y chante mesmes pour nos ancestres*”], and our desire is to grant him 16s. 8d. annually, in addition to the 50s. which he receives from us for salary, so that he may receive on the whole per annum, 5 marks. We order you to pay him the same sum during his life, and cause those patents to be enrolled.

Dated at Castle of Restormell, 1st Sept., 28 Edw. 3, by command of the Prince himself.

APPENDIX D.

Memorandum that the same day and year the “*Freres Precheurs of Truro,*” have letters to John de Kendall, Keeper of Restormell Park to deliver to them ten oaks [“*cheyues*”] fit for mecyon [or meryns] in the said Park to help them to build their house (“*in aide de faire leur maison.*”)

[Dated at Restormell, 1st Sept., 28 Edw. 3.]

APPENDIX E.

Edward the Prince, &c., to all, &c., &c.—Whereas our dear John de Kendall, has of the gift and grant of Monssr. de Eltham our dear Uncle, Earl of Cornwall, confirmed by our illustrious Lord and father the King—the Keepership of the Castle and Park of Restormell for the term of his life, taking for his wages threepence a day for the said Keepership. We, being unwilling to cause any loss to the said John de Kendall in this matter, again t the form of the said gift and grant, have nevertheless with his assent, and as an assistance to him in the occupations he has in other business assigned to him,—*do* by this our Letter assign our Well beloved William de Wolleye—to have under the said John de Kendall, the Keepership of our said Park and of the Game [“*Savvigne*”] and

our Warren [*“Garvigne”*] there during our pleasure. taking for this office 2 pence a day—of which he shall be paid one penny by the hands of our Receiver of Cornwall, for the time being out of the issues of our Seignory there, and the other penny by the hands of the said John de Kendall, out of the wages which he takes from us as aforesaid, which payment he has at our request granted during our pleasure—and we desire that on this account no harm shall accrue to him in the future, respecting his estate which he has in the Keepership of the Castle and Park aforesaid.

Dated at Exeter, Sept. 10th, 28 Edw. 3. By command of the Prince himself, and the order of Mons. de Wingefeld.

APPENDIX F.

To our dear officer John de Kendall, Receiver, &c., we command that between you and Thomas our Havenor, you allow the carriage by water as far as Southampton to carry there the Venison, Fish, and Pewter [*“Vasscul de Steyn”*], which we have at Restormell, and cause them to be brought in safe keeping to Southampton, but at the least cost that it may come to—and the Steward and Treasurer of our Household to have warning at Sunning to receive the said things from those that bring them, and that they may be certified by you of what you order them, and of the cost which we wish and command our Receiver to pay you out the issues of your Bailwick, and that you have a receipt from our said Treasurer and of what you shall be discharged on your account of the said costs, and the Treasurer shall have charged, as is reasonable.

APPENDIX G.

Edward the Prince, &c., &c., to the Clerks, Sir Nichol Pynnok and William de Spridlington, Auditors.—We order you in the account of John de Kendall, Keeper of our Park of Restormell, to allow him Thirty-five Shillings for Ferns (*“Feins”*) by him bought for *“la picture de nos bestes sauvages”* (query *“Pictures”* means Bedding for the Deer, &c., in the Park), in the said Park for the close [*“Reste”*] season of the last year, and also when the said John had our order to make two new *“Rakehouses,”* (query Houses with Racks—for giving the Deer forage?) for our *“bestes sauvage,”* costing £4. 10s. We order you to allow the said John de Kendall that amount, and [referring to former order to repair the Castle, &c., given to the said Robert de Elforde and John de Kendall, and also to sell Wood for the repairs of the said Castle, &c., which order was afterwards countermanded and further directions given;] *we order* that the said matters should be considered at the coming of the said Auditors, and by the said Robert de Elforde and John de Kendall aiding and assisting them.

Dated London, 22 March, (29 Edw. 3).

APPENDIX H.

Edward the Prince &c., to the Auditors of the account of John de Kendall. Whereas the said John did between St. Matthias's Day last and Easter last, at which time we were staying at our Castle at Restormell, was at expenses, which amount in all to £12 8s. 10d., as more plainly appears by his account which we send you therein we order you to allow the same sum in his account.

Dated in the ship in the Harbour of Plymouth, [*“deing le nief deing la Havena de Plymouth”*] 8th June, (37 Edw.) By command of the Prince himself.

APPENDIX I.

Edward the Prince &c., &c., to John Dabnoun, Steward and Sheriff.—We command that you be aiding and assisting according to Law and right in the business which John Guy of Lostwithiel has in these parts touching lands and tenements from which he has been grievously ousted by Edward Curties and Stephen Torwent.

Done at London, 17 Sept., “lan,” (26 Edw.)

APPENDIX J.

Edward the Prince &c., to John Dabnoun, Steward and Sheriff, John de Kendall and John de Sherbeck, Controller of the Stannary of Cornwall, [Reciting that the Prince had been informed that it would be of great advantage to the Town of Lostwithiel, and also to our profit as well as the increase of the estate of the people of the same Town—if the sale and purchase of the Tin of Cornwall which is now held at Bodmin, being a Town belonging to the Priory of Launceston, and which has greatly improved by reason of that sale and purchase for a long time—were ordered to be at our said town of Lostwithiel, respecting which suggestion and other things touching the business the Prince desires to be informed by the said officers), Wherefore we order that you take good and suitable information by all the means you know of—to ascertain whether it be for our profit and in aid and advantage of our people of the aforesaid Town, that the said sale and purchase should be there or not—and if so, then for what profit to us, and what advantage and increase to the same town—and on the other hand, whether it would be for the profit or loss of the workmen and other people of Devon and Cornwall who sell and purchase Tin, whether it should be there or not; and also then to what amount of profit or loss to them, and if to the great profit an advantage of all of them—or to the greater part of them—and of all other circumstances touching this matter, by which we and our Council may be well and fully informed and advised, whether the thing should be done or not, and that you certify to us.

Done at London 23 day, and at Sussex 23 Nov. (26 Edw. 3). By command of Mons. de Wingfield.

APPENDIX K.

Edward the Prince &c., &c., to John Dabnoun, Steward and Sheriff, and John de Kendall, Receiver, [after reciting divers matters relating to the repairs of Castles, &c., and to the sale of Wool,] and as for the sale of Tin that you cause it to be at our Town of Lostwithiel for the improvement of that place, and that you make that to be known as our wish; and we command that you cause it hereafter to be done there unless it should be to the great damage of the Public, (“*commune*”) or to the discredit of our Workmen Tinnars whose condition we do not wish to be prejudiced.

Done at London, 12 June, (27 Edw. 3). By the council and advice of Mons. de Wingfield.

APPENDIX L.

Memorandum.—The same day 17 June, (32 Edw.) A commission was sent to John Dabnoun, Steward and Sheriff, and John de Kendall, Re., to take workmen and other labourers to repair the Bridge of Lostwithiel, which is very ruinous and greatly needs repairs to last (“*à durrer*”) until the Feast of Saint John the Baptist.

APPENDIX M.

On the 2nd Sept., 28 Edw. 3, (1355), a Charter by which the Prince remits a rent payable to him out of the Borough of Helston is signed at *Restormell*, the following names being given to the witnesses :—Dominus John de Mohun, Dominus de Dunster, John de Montacuto, Antony Nigel, Nicholas de Loharrens (the Prince's Chamberlain), John de Sully, and Walter de Wodeland.

Edward, &c., to the Auditors &c. [noticing a grant by the Prince to his Bond-Tenant, William Romisey, at Dunrew in the Manor of Tintagel, of a piece of Land on the said Manor near to the land which he now holds, ordered that at the next Sessions for the Prince's lands, the said William Romisey should have another piece of land granted to him by the Prince's Officers at the same Rent as others would give for the same.

Dated Castle of Restormell, 10th September (28 Edw. 3rd).

Edward &c. to John de Kendall, Receiver.—Whereas we gave to our Tenants of our Manor of *Tyntagel* twenty shillings because that they nous coillerent de pres (query *proies*) de *Tyndagel*, at the time when we were last there, order to pay to the said Tenants twenty shillings as of our gift.

Dated London en hostiel of the Bishop of Ely, the 14th July, 31 Edw. 3rd. By the command of the Prince himself—Robert de Elforde.

Mr. Boger has supplied the following notes since the foregoing papers were communicated to the Institution.

Nov., 1874. References on the Duchy of Cornwall Index to the Minutes of Council relative to Tyntagel.

25 Edw. 3.—Tyntagel Castle always attached to the office of Sheriff without any fee, granted to John de Sherbeck, on same conditions.

35 Edw. 3.—The fee of the Chaplain within the Castle of Tyntagel, to be increased.

38 Edw. 3.—Relating to Tyntagel Castle and the Chaplain.

Feby., 1875.—Memorandum.—In Oliver's *Monasticon Dioc. Exoniensis*, Page 33, is given a Charter of Edmund, Earl of Cornwall, which includes evidence of his having, at this date (30 December, 19th Edw. 1st), been at Restormell, accompanied by persons of distinguished rank, probably his officers.

It is an *Inspeximus* Charter, by which, after reciting a Charter of Richard, Earl of Cornwall (the father of Earl Edmund), granting certain lands to the Prior, &c., of St. Michael's Mount in Cornwall,—also a second similar Charter to the same Earl Richard—Earl Edmund confirms the said former Charters in favour of the Prior.

This Confirmatory Charter concludes in these words :

“ In cujus rei testimonium presenti scripto sigillum nostrum apponi fecimus, “ His testibus, dominis Wilhemo de Camville, Henerico le Tyes, Wilhemo de “ Botreaux, Wilhemo de Bereford, Reginaldo de Botreaux, Thoma Kent, “ Richard de Hiwys et aliis. Data apud Restormel, xxx die Decembris anno “ regni regis Edwardi filii regis Henrici XIX.”

March, 1875.—Visit of the Black Prince to Cornwall, 28 Edw. 3.—Note.—There ought to be added to the other Documents extracted from the Minutes of the Duchy Council, the following ;

(Translation)—“ Edward the Prince, &c., to the Auditors of the Accounts of “ John Dabnour, lately Keeper of our Fees.—Order “ to allow in the Accounts “ of the said John, three shillings and twopence, which the said John paid for “ one grey Cap (*capam*), bought by him by our command, which John Kelyggen “ ought by custom to carry before us at our entry in Cornwall. Dated at “ Exeter, 13th Septemb r, 28 Edw. 3rd.”

The 13th September was the day before the departure of the Prince from Exeter, en route for London, on his return from Restormell, and this order, as it appears on the Council Minutes, was almost the last given by him on that occasion.

Lysons in his ‘Cornwall,’ under the titles Cardinham and St. Neot, notices a tenure, which may possibly be that referred to in the foregoing extract,—as belonging to the Manors of Cabilla and Pengelly, stating that it was the office of the owner of Cabilla to provide the ‘Cap’ (Lysons calls it the “ *Cloak*”) and the owner of Pengelly to carry it, and that it was the duty of the owner of the former Manor to attend the Duke during his stay in Cornwall.

Sir John Maclean also refers to evidence of the tenure of carrying the *Cap* to a tenant of lands in the Manor of Helston in Trigg, and that it was to be carried *behind* and *not before* the Prince, and that this tenant in Helston Manor had the Cap provided for him by the Duke, and that he carried it at the expense of the Duke for 40 days. It is probable, therefore, that of these tenures, Kelyggens is that to which the Minute relates, as the Prince was at the cost of the Cap.

The *preparation* by the command of the Prince of the Cap to be used on this occasion in discharge of the tenure, implies that the visit to Cornwall was not the result of a hastily improvised resolution by the Prince to have a glimpse of his Duchy, but that it was made with due preparation for a ‘*Seigneurial*’ inspection.

VII.—*The Will of William Treffry, of Fowey, 1504. Communicated by SIR JOHN MACLEAN, F.S.A., Hon. Member of the Royal Institution of Cornwall.*

WILLS more truly and more clearly illustrate the manners, customs, feelings, and practices of the age to which they belong, than any other contemporary documents; correspondence, legal proceedings, or even deeds, may, to some extent, be coloured, and thus have a tendency to deceive, but if a man is ever sincere and honest it is in the solemn act of making his last testament. Hence, irrespective of the value of Wills for genealogical purposes, as exemplifying faith and religious feelings, and as shewing the usages, dress, and the various details making up the spirit and life of the age, these documents are of inestimable value to the philosopher and historian. We, therefore, feel that no apology is necessary for submitting to the members of the Royal Institution of Cornwall the last will and testament of a Cornish worthy, who flourished some four centuries ago.

This is the Will of William Treffry, of Fowey, who died in 1504. He was the brother of Sir John Treffry, of the same place, who was sheriff of Cornwall in 1482 and 1499, and died in the following year. His name appears in the Bede Roll of the Priory of Tywardreath,* under the 7th September, to which house he bequeathed a legacy of 20 marks, that his name might be placed in the Morteledge with their founders so that he might be prayed for in the same manner as they.

William Treffry was the son of Thomas Treffry, of Fowey, son and heir of Thomas Treffry, of the same place, by Elizabeth daughter of John Colyn, of Helland, and Elizabeth his wife, the daughter, and probably heir of John Nicol, of Bodmin, which John Colyn was son and heir of Thomas Colyn, by Ingreta, daughter and coheir of John Giffard, of Helland. Thomas Treffry, the father of William, was the same who was spoken of by Leland, as having built Place House, at Fowey, in the time of King Henry VI, and this is further witnessed to by the

* Mon. Exon. page 37. The original MS. is now the property, by purchase, of Jonathan Rashleigh, of Menabilly, Esq.

ancient glass which formerly existed in one of the Hall windows, in which the arms of Treffry were impaled with those of Giffard, Colyn, and Nicol; whilst his wife, Elizabeth, was the lady, who, in her husband's absence, so gallantly defended the previous house against the French.

Of William Treffry our notices are rather scanty. Like his family, he was a strong Lancastrian, and exerted himself on behalf of the Earl of Richmond, immediately after whose acquisition of the crown—viz., by Privy Seal, dated 21st September, 1485, and Letters Patent, dated 16th October¹—he had a grant for life of the Office of Surveyor of Customs and Subsidies, within the City of London; and on the following day², in consideration of service done at his great cost and expenses, he was granted for life the Offices of Controller of the Coinage of Tin in the Counties of Cornwall and Devon, and of Keeper of the Gaol at Lostwithiel. He was also Groom of the Chamber to the King. His name does not appear in the pedigree of the family recorded at the Heralds' Visitation. His brother Sir John Treffry died on 8th September, 1500, whilst filling the Office of Sheriff of Cornwall, and William executed the Office for the remainder of the year: viz. to Michaelmas, and was appointed for the year following.³ For a gentleman of his degree, he was particularly rich in plate and jewels and choice household stuff and apparel, which by his will he distributed among his friends with no sparing hand. It appears, also, from his will, that he continued the building of the mansion at Fowey, which his father had commenced, and he provides that it should be continued after his decease. It also appears that it was intended to construct an ambulatory, or Cloister, on the south side of the Lady Chapel, at Fowey, in which he directs that a monument of Purbeck Stone shall be erected "with three ymages, oon for my broder, another for me, and another for my wife." This work was never carried out, for the "huge large stone," described by Symonds in 1644, "with three pictures of men scratcht upon the stone,"* in memory of the three brothers, Sir John, this William, and their youngest brother, Thomas, was not the sumptuous tombe with the three

1.—Rot. Pat. 1 Henry VII. Part 1. m 21.

2.—Ibid m. 2.

3.—Pipe Rolls for the year.

* Symond's Diary, page 71. (Camden Soc. 1859).

effigies of his brother, himself, and his wife, which the testator designed. There is another point in the will, relating to the Church of Fowey, which deserves notice. The Church is now dedicated to St. Nicholas, and Dr. Oliver,* mentions that previously to its being rebuilt in 1336, it was dedicated to St. Fimbarr; nevertheless, both in this will and in that of Sir John Treffry, four years earlier, this edifice is described as the Church of St. Barre, and St. Fimbarre, of Fowey.

William Treffry, like his brother Sir John, was married, but left no issue. His wife's name was Margaret, and she predeceased him, but we know not her parentage. Previously to his death he had settled his estates in the County of Cornwall, in Coventry, and in Berkeley, upon Trustees, to the use of his right heirs, but by his will he gave to Thomas Treffry, his youngest brother and heir, a life interest therein. Thomas died in 1509, and his eldest son, of the same name, by Elizabeth, daughter of John Killigrew of Penryn, carried on the succession, which became extinct in the male line upon the death of John Treffry, of Fowey, in 1731. The family is now represented, in the female line, by the Revd. E. J. Treffry, D.C.L., of Fowey.

In the name of God, amen. The yere of our lord god a thousand fyve hundreth and fowre. I William Treffry beyng of hole mynd make my testament in this world, ffirst I bequeth my soule to Almighty God and to our lady Seynt Mary, and to all the Sayntz in heven, and my body to be buryed in the Amlatorye on the South side of our lady chapell, in the church of Saynt Barre, of fflowy, if it please God I dye ther, and assone as the Almatorye ys made I will myn executoꝝ cause to make a tombe w^t three ymages, oon for my broder, another for me, and another for my wif, after their discrecions, and lyke vnto a tombe which lyeth on M^r Browne in the Croched freers of london, w^t the pitie of Saynt Gregory, and such scriptures as ye myn executoꝝ can devise after the apparell of the same. Also I bequeth principally vnto my lord Broke a bordecloth conteynyng in brede iij yerdes, and in lenght x yerdes of damaske wark, and to cutt oute of a hole pece, also to the said lord Broke another pece of Taptarye of Arys Riche conteynyng but a flemysch steke which ys in a Chist w^t shetes in my grete Chambre in my house at

* Mon. Exon. p. 439.

london of the childhood of our lady, Also to S^r John Arundell another pece of cloth of Dyaper of Damaske wark conteynyng in brede thre yerdes, and in length ten yerdes. Also I will, that another pece conteynyng xiiij yerdes shall rest in the grossery at london w^t other plate which I shall reherse hereafter to the use of Thomas Treffry my neveve. They to haue a hundreth shillinges of money or as myn executo^rs and they can agree. Also I bequeth to the said Thomas Treffry my newew, and eldest son of my broder Thomas Treffry my best basyn and my best ewer of silver, two pottes of silver parcell gilt, three candilstikkes of silver parcell gilt with priketts for waxe, and ther sokettes for talowe, also a Smoth standing cup clene gilt w^t a couer, also myn best praunge for grene gynger, also a Spaynysch disch of silver all gilt on the yn syde, also a whit laer pounst of siluer, also a dosen spones of the apostelles their names written on the bak side w^t enamell and on spone of our lord longing to the same which makth xiiij. The which plate I will shuld rest in the Grocery forsaid vnto the tyme the said Thomas my newew come to the age of xxj yeres, by the best advise of myn executors That is to sey Maister William Holybrand Mr. Robert Rydon and my newew John Trevanion that may better attend then these other two gentilmen. How be it I make my lord Broke and Mr. S^r John Arundell of Cornwall ouerseers of my testament, Also I beqeth to William Holybrond my felowe my best gowne Mr. Rydon the seconde, and my newew Trevanyon the third, Also I will Mr. Rydon chese my best couerlet of silk verdur because Mr. Holybrond chosed my best gowne, and the said Mr. Holybrond to haue my second coverlet of silk verdour, Also I bequeth to my newew Henry, broder of the said Thomas my newew, and my broder Thomas sonne half a dosen Parys bolles parcell gilt w^t their couers to the same and the halfe monethes of the yere conteyned w^tin theyme, Also my worse basyn and myn ewer of silver parcell gilt, the said plate to Rest in the forsaid grocery tyll the said Henry come to his age of xxj yeres by the advise of my said executors. Also I bequeth to William the third sone of my broder Thomas Treffry and my godson a gret gilt standing cup of siluer which ys chaest w^t a couer all gilt, also a dosen sponys of siluer and gilt of the xj appostells and our lorde in all but xij, Also another praunge of siluer for grene gynger, the said plate to Rest in the said grocery till the said William come to the age of xxj yeres.

Also I bequeth to my eldest suster Genet a great playn flat Parys boll w^t a cover of siluer to be delivered Immediately after my deth to her by hir sone John Trevanion and by other myn executo^rs, Also I will that my broder Thomas wif have a litell cuppe w^t a cover of siluer and clene gilt w^t a litell law foote, to be delivered Immediately after my deth to her, she neuer to doo it away but to remayn to her children after her deceesse, Also I will that all the said plate which resteth in the grocery forsaid shall remayn from child to childe, if any of theym should happen to dye, Also I will that my newew John Trevanion shal have a litell flate cvpp of silver and half a dosen of small litell sponys, a goblett w^t a couer w^t enamell of violettes on the couer w^t other broken siluer which ys in a standart* of yron in my Counter at London. Maister Holybrond I toke out of the kyngs money x li and a noble, the whiche I pray you take out of my fee Reward gederyng money for the clothes and botehyre money. ffor I have taken no peny of the said parcelles of all this yere past, and the Rest of the said money my accompte made I will be departed betwene you Maister Holybrond, Mr. Rydon, and John Trevanion. It^m I pray you to geve my maydens specially Marget xx^{ti} marc at her mariage, and to Alys myn other mayden xx nobles for the good service she hath doon to me. Maister Holybrond ther ys two hundreth pounds of Royalls lakying xx^{ti} whereof I will that ye make it upp fully the number of the said some of ijcli w^t parte of my woddes as I shall reherse vnto you; that is to say of woode xliiij or xlvj bales wherw^t I will ye refurnyshe the said ijcli lakying xxli of Royalles to the hole some of Ccli or w^t my money of my fees and Rewards of the Custom hous. Also Mr. Holybrond ye have my two chynes in the said Coffor of fine duket gold w^t the other old Henry nobles Crusados and dukettes and ij souerayns which ys in value Chynes and all Cli, and three poundes or ther aboute which is in the said Chiste ther the Ccli ys. Also ther lyeth in the same place two colers of gold wherof oon hath xvij peryll and fyue Rubyes, as I vnderstand, the other coler black enamell w^toute any stone. Mr. Rydon, I haue in my Chiste a pece of purpell veluet conteynyng xxiiij yerdes wherof I pray you to deliuere to the parson or the Wardens of the parissh Church ther as I dwelled, that ys to say

* Standard, a large chest generally used for keeping plate and jewels and sometimes for linen. (Halliwell).

the parisshe of Saynt Olyf in London asmoche as will make theym a frounte for the high Aulter, oon aboue the Aulter, another before the Aulter, and the Remenent of the said veluett, I will ye geve it to the croched ffreers they to make a coope and a vestment thereof, if it will stratche thereto. And they to haue me in ther prayers both in the said parisshe Churche and also in the freers after yo^r discrecions. Maisters and Executo^rs, I beseche you at the Reuerence of God, and in the way of charitie that ye will dispose of the said money, chynes and colers to be sold to the value of theym and to be disposed after the maner and forme as I shall reherse, that is to say to the Church of St Barry of ffowy xxli to be deliuered mediately after my decesse of the said money chynes, and colers, M^r. Holybrond, M^r. Rydon, w^t my newew John Trevanyon, I pray you to purchase asmoche lands as will come to fynd a Preest to syng perpetually ther as I am buried and for the reparacion of the said lond yf ye may let yt the same tenements house and gardyn ther I dwell in london or in some other good soile wⁱⁿ london, and that to the intent to pray for my fader and my moder and my broder Sr John and my wif my fader in law and me. Also I beseche you at the Reuerence of God to convey a tombe to be made, and send to ffowy oute of the yle of Purbek after the forme and and patron of the Tombe ther Maist^r Browne lyeth in the Croched freers, if it be my fortune to dye at fowy. Also I bequeth to the towne and parisshe of ffowy xli to be distrabutt and geven at two tymes to the poore peopel and householders ther vli to be disposed of at the discrecion of the Vicar and Wardeyns of the Churche of the said toune wⁱⁿ the yere. Also at Tregwyte to such poore tenants as I have in that quarter iijli, also to Synvepe parisshe amonges my tenants and poore people ther iijli. Also to Trefryes and Lanhedryk, Tywardreth iijli, in Seynt Penek parisshe xls, also to the Churche of Lansawlowes to be delivered to the poore peopull after the discrecion of the Wardeyns and parson ther xls, and all the money to be ordered after my Executo^rs that know my will, that ys to say all the money that I have bequethed to eury of the townes and parisshes abovesaid, Also I will that Thomas Clark my servant have my best horse after the Vicar w^t xls of money to be paied continent after my decesse beside his wages and his wynter clothing, Also my horskepar John Penhale to haue my third horse he to chese hym and xls of money and his quart' wages and

his wynter clothing, Also to Thomas Haktherope my servant another, to chese hym, next, and xls of money, his wages and his wynter clothing; Also to Thomas of my kechen at home at london his wynter gowne and four nobles of money. Myn Exe-
 cuto^rs at the Reverence of God I beseche you that ye will see that w^t my money, that is to say my Chynes and Colers and wode and other goods that my biolding at ffowy may goo furth accord-
 ing as it is begonne and my neveve, John Trevanion can shew you the playnness thereof. Also I will and pray you that non of my goodes which ys w^tin my house at ffowy be distributed or geven fro the place, but that it remayne w^tin the same to my younger broder and so to his children. Also I bequeth to Maistres Holybrand of London a flour wheryn is a pointed diamond w^t three Rubyes three perills to the value of iiiijlⁱ which is in a littel coffer or standart in my counter. Item I bequeth to my ladye wif of John Aroundale a pawnee w^t diamondes w^t a gret perill hanging vnder, she to pray hir husband to be special goode frende and helpar of myn Exe-
 cuto^rs and he beying oon ouerseur hymself. Also I will that my lord Broke shall haue an Vche* for his pleasur a hert enameled, wrapped in a towell wheryn is coched a fare dyamond, a Rubye and a perell. Also I will that Maistres Rydon have a Rubye in a whit fleure w^t three perylls hangyng vnder to that entent that she pray her husband to be speciall good frende to my neveve Thomas Treffry and to his brethern. Also I will my suster Genat Trevanion have a pomander of Gold which ys in my standart w^tin my Counter as I vnderstand. Also I will that Genat my brothers wif haue a litell Vche of Gold w^t a ametest, a saffer and a peryll. Also I will my suster Trevanion haue a girdell best harnest w^t gold w^t a bonet of black veluet. Also I will my neveve haue to help hym to his mariage a bonet of veluet w^t the best frontlet of gold w^t the next girdle of gold. Also I will my suster William Trevanion wife haue the third girdell of gold w^t a bonet and a frontlet. Also I will my broder Thomas wif haue another girdell of gold w^t a bonet and frontlet if ther be any mo lefte as I am (*sic*) they be. Also my wyll and my last mynd ys that Henry Pester haue the house that he dwelleth yn which hath be in debat betwene hym and me, paying to my broder after his con-

* "Ouch" a jewel—the term was applied to various ornaments.—Exodus 28, 11, 39, 6, 13.

science, Also I will that Sr Thomas Haldman my Chauntrie preest of Barkley haue another of my gildyns he to chuse after this other, also a gowne fured w^t blak buyge, to chuse next after John Trevanion. Also I will my broder Thomas Treffry haue my gowne lyned w^t Sarsenet, another of damaske, also my best dowblet of Tawny saten. Also I will that the forsaid Sr Thomas, Chauntrie Preest of Barkeley, haue three poundes of money for his Reward to pray for me to be delivered incontynent after my decesse. Also I will he haue a pece of lyne cloth to the number of xx^{ti} elles, price the elle xx^d, also other xx^{ti} ellys of lynne cloth price the elle xiiij^d. Also I will that my felow Hugh Denys haue a pece of crymsyn chamlet to haue me in his memorye, Also I will that Mr. Weston of the Kyngs Chambre haue another pece of fyne blak Chamlet, also I will Mr. Shereley, Clerk of the Kechen haue a good pece of Chamlet oreles a gobet* of fyne lynne cloth. Mr. Hugh Denys and Mr. Weston I besече you commaunde me onto my soueraine lord the Kyng he to be good and gracious lord vnto my newewes, and shew his grace that I never had non of his money vntreuly in all my life, and thus I besече you in the way of charitie to pray for me. Also I will that all such moevable goodes as I haue in my hous at london and in the Kyngs place at Wanstead that my newewe John Trevanion haue it to garnisse my place at fflow therw^t at his disposicion, except that, that ys bequest afore. Also I will that the foresaid John Trevanion haue a salt of siluer couered parcell gilt which goeth aboute in the house. Also I will that my newew Thomas Treffry haue my best salt with the couere all gilt, his broder Henry the second salt of silver w^t the couere, his broder William another salt of siluer w^toute a couere. Also I will that Thomas Treffry my newew haue my botyl chyne w^t a devise enameled which I were daiely, and these parcells to be deliuered to the grocery forsaid w^t the other till the children come to the age of xxj yeres. And moreouer as to the disposicion of all my lands and tenements wⁱⁿ the Countie of Cornwall, Couentrie and Barkley this is my last will that my feoffees of the same, Robert Willowby lord Broke, John Aroundale, Knight, Robert Rydon and John Trevanion shall suffer Thomas Treffry my broder and heir to haue and to occupye all the same londes and tenements w^t their appurtenences

* "gobet" "goabet" a morsel a small piece. (Halliwell).

for term of his life w^tout any interupcion or lett, providing alwey so that my said broder aliane sell nor make none estate of the said londs, nor of any parcell thereof, to any person or persones from the Right heyres, and assone as the Right heyres come to their playn age my mynd ys that ye my feoffees make relese vnto them of all the said londs and tenements as ye fynde them of discrecion who-soever happen to be heyre therof &c. Item I will that mynne executours incontinent after my decesse shall fynde a preest to pray for me and Margaret my wif with my fader and moder with all my frends as is aforerehersed the said preest to haue for his stipendy and wages every yere vnto the tyme the said londs be purchased, as is before rehersed, for the contynuanee of the same.

Probatum fuit suprascriptum testamentum coram domino apud Lamethith xxv^{to} die mensis Novembris anno domini Millesimo quingentesimo quarto Juramento Johannis Trevanyon et Willielmi Holybrond executorum in hujusmodi testamento nominatorum Ac approbatum et insinuatum et commissa fuit administratio omnium bonorum et debitorum dicti defuncti prefatis executoribus de bene et fideliter ac sub vnanimi consensu et assensu administrando Ac de pleno et fideli Inventario citra festum Sancti Nicholai Episcopi proximo futurum exhibendo Necnon de plano et vero compoto reddendo ad Sancta dei Evangelia in debita iuramenti forma iurato Reseruata potestate similem commissionem favenda Magistro—Rydon Executori etiam in hujusmodi testamento nominato cum venerit, &c.

(Holgrave 21).

SPRING MEETING,

21st *May*, 1875.

THE PRESIDENT'S ADDRESS.

The President, DR. JAGO, F.R.S., delivered the following Address:—

LADIES AND GENTLEMEN,

In a Society like ours, in which so many of those who constitute it have passed the prime of life, it can hardly be expected that we can meet here, after an interval of a year, without having to notice the absence from our lists of names that have, in one way or another, been identified with it. However this may be, it is not to-day that we are exempt from such regrets. Since our last Spring Meeting we have lost two of our governing Members, each of whom had lived beyond four score years.

Mr. John James, as a member of the Council for much of the six and forty years that he had belonged to the Institution, was a zealous and esteemed coadjutor in all that concerned our welfare.

Sir Edward (then Mr.) Smirke became a Member twenty-one years ago, on the occasion of his receiving the appointment of Vice-Warden of the Stannaries. In the Cambridge tripos he had earned mathematical distinction; and in "Freeman's Reports" and "Roscoe's Evidence," that of an editor learned in the law. In an appendix to the suit of *Vice v. Thomas*, "with its elaborate accounts of the Ancient Charters of the Tinnars, of the Revenues and the Government of the Stannaries," &c., he established a reputation for profound antiquarian research in matters especially affecting this county. Besides which, he was a facile, logical, and sequential speaker in the presence of any audience. A mind so cultivated, and endowed with a genuine taste for so many of the pursuits that are promoted by this

Institution, could not fail to leave indelible marks in the history of its development. No sooner was he enrolled among us, than he contributed "Notes of the Ancient Regalia of the Kings in Mines, and of early Mining and Metallurgy;" a few years after, "an account of the Ancient Inscribed Stone found at Fardal, near Ivybridge, Devon"—containing a lucid description of all that was then known of the Ogham written characters. Again, "Notes on the Gold Gorget or Lunette, found near Padstow, in Cornwall." The members of this Institution had every reason to congratulate themselves, that he had held the presidency on the occasion of the visit of the Cambrian Archæological Society to this county, as their guests, in 1862. In 1866, he once more consented to be our president. And, though on his resigning his office in the Stannaries in 1870 business no longer brought him into Cornwall, we were delighted to have him with us during our two-days excursion in 1872, during which he displayed, if feebler from age, all his wonted ardour in exploring antiquarian remains, and was as prompt as ever with his illustrative remarks. Rarely shall we, I fear, look upon his equal in this chair.

The late Mr. Jacob Olver, who died at the age of 58 years, was a highly respected citizen, and many times Mayor of Falmouth; though not a full member he subscribed to our funds, and was a genial participator in our annual excursions.

Mr. Charles Chorley, our late editor, and an Associate of the Institution, was 65 years old when he was taken from us. Both in the Report of the Council and separately by myself, at our Autumnal Meeting, this sad event has been commemorated. I must not, as I could fondly do, again expatiate on his virtues.

Sir Goldsworthy Gurney (Knight), who died about two months since in his 83rd year, was a Corresponding Member of this Institution. He was born at Trevorgus in this county, and was of Cornish parentage. He soon relinquished the practice of medicine, for which he had been educated, to devote himself to chemistry and mechanics; in which he became distinguished for his practical inventions, as various records in the patent-office would suffice to show. His name will ever be remembered in connection with improvements in the oxy-hydrogen blowpipe, the lime and magnesian lights, steam locomotives for macadamized roads, stoves for warming public buildings, his arrangements for

ventilating the houses of parliament, his stoves for obtaining gas from oil, and their proposed application to light-houses, &c. By his social qualities, and as a man of science, he was an honour to his native county.

John Edward Gray, F.R.S., who died in March last, at the British Museum, in his 76th year, was one of our Honorary Members, but not of this county. At the age of 21 years, he published, in his father's name, "Natural Arrangement of British Plants." At 24, he was appointed an assistant in the British Museum, and in 1840 Keeper of its Zoological Collection. He was an active promoter of many societies having more or less relations with the department of natural history in which his duties lay, and a contributor to their transactions. He was made a doctor of philosophy by the University of Munich for having formed the largest zoological collection in Europe.

Fortunately, it is my privilege to-day to be able to turn from these sad reflections on the blanks of our muster-roll to others that are gratifying to this Society. Foremost among them is the fact that the Geological Society of London, in February last, awarded its Murchison Medal to a Cornishman who four years since filled this chair with such energy and efficiency as will not readily be forgotten. The award is "to William Jory Henwood, in recognition of his long-continued and valuable researches on subterranean temperature, and on the phenomena of mineral veins in Cornwall, South America and India." During fifty of his three score years and ten our ex-president has prosecuted such researches, or has been carrying an account of them through the press. I am sure that you will all unite with me in congratulating him on this flattering recognition of his merits by the most competent judges in the land.

There was further pleasure of this kind in store for us; for in the following month the Royal Society of Edinburgh awarded the Neill Prize for the terminal period of 1871-4 to C. W. Peach, late controller of the Customs at Wick, for his contributions to Scottish Zoology and Geology, and for his recent contributions to Fossil Botany. Mr. Peach, though, I believe, not a native of Cornwall, is one of our Corresponding Members, and truly a Cornish child of science. It was while stationed in this County, nearly half a century since, that his first studies in the sciences in which he has excelled were made; and to this Institution and

to the Royal Cornwall Geological Society, many of his first essays concerning them were communicated; and many are the attached friends he may still count in these parts.

It is also exceedingly gratifying to read in the Athenæum as follows in reference to so old and esteemed a Member of this Institution:—"for the Arctic Expedition, Mr. Robert Were Fox, F.R.S., has been superintending the construction of two of his dipping needles, and notwithstanding his advanced age, eighty-six years, has himself made the final adjustments of these delicate instruments, which have been made by Mr. Olive of Falmouth."

In his presidential address in this room in 1871 Mr. Henwood, F.R.S., traces back the improvements that have been made in our mining steam-engines to their several inventors. The graphic manner in which he draws the line between the respective claims of Trevithick and Woolf, following quickly upon the "Life of Richard Trevithick," by Francis Trevithick, has incited one of our members, Mr. Samuel Hocking, of Camborne, who from 1828 to 1833 was a pupil of Woolf's, to send to the "Iron (The Journal of Science, Metals, and Manufacture,)" for the No.'s of July 11, 18, and 25 last, some notes* on the "Labours of Arthur Woolf," in which he warmly seeks to demonstrate that the credit which is due to his old master for inventions, which are found to be effective in economizing fuel through the mode of employing high pressure steam, have been wrongly ascribed, both by the son and Mr. Henwood, to Trevithick. In support of this allegation, he not only relies upon his recollections of his conversations with Woolf, but he has been at great pains to get together written evidence of his wanderings and occupations through certain years of his life (showing that he could not then have been, as had been believed, in the employ of Trevithick), which he regards as having a critical import with respect to the rival claims. He concludes by endeavouring to explain the facts upon which the cause of Trevithick rests in a manner that is consistent with that he asserts. Additional information rescued from oblivion upon a question of so much interest—no matter on which side it may tend to make the balance incline—cannot be otherwise than a

* In substance these notes were read on June 30, before the "Miners' Association of Cornwall and Devon," and since the above remarks were made, have appeared in their Report for 1874.

welcome contribution to our literature; and all lovers of fair-play, and none more so than Mr. Henwood himself, will agree that attention should be directed to it in a Society that has already had the subject brought under its consideration. It is gracefully admitted in the Iron, that should the advocates of Trevithick be obliged to surrender the point at issue, the inventor of the "locomotive now so universally doing the work of horses all over the world," must ever be remembered as a great engineer.

In reverting to the corporate doings of this Society, I may remind you that I had occasion, a year since, to set before you the causes that led us to forego the project of publishing, at our own hazard, a complete *Bibliotheca Cornubiensis*. Yet we remain true to the principles that formerly animated us. In the number of our Journal just published, there is contained a "List of Works on the Geology, Mineralogy, and Palæontology of Cornwall, by William Whitaker, B.A. (Lond.), of the Geological Survey of England," than whom there can be no more competent authority in such literature. The paper may have a dull aspect to the general reader, but such records are found to be great boons to diligent and conscientious labourers in the particular fields to which they relate; and I am satisfied that none of you will grudge the money it may have cost us to put this catalogue in print.

It would be an act of impertinence in me to offer any estimate of my own, as to the relative importance of the papers which have been selected by your Council for publication in your Journal, and it is with no such purpose that I refer to any one of them. But it has occurred to me that it might not be uninteresting to the less initiated of my audience, if I were, in conjunction with the mention of one which presents us with a mere list of the titles of literary contributions on a given subject, to make a few remarks upon some of the modes in which authors who fail to be accurate in their references are apt to convey a wrong impression to their readers of the literary material they have, or might have availed themselves of in the composition of their own works. It is not that I have been on the look out for instances in illustration, but I find enough for my purpose by arraying a few facts that I have had personal inducements to scrutinize.

To show the vitality of an error once committed, I will advert to one with which a natural curiosity has made me acquainted:—In the year 1652, some months before the extinction of the long parliament in the days of the Commonwealth, an ancestor of mine was buried in St. Erme Church (about four miles from this room), and on the slab that closes his vault, there is an inscription, which C. S. Gilbert, in his History of Cornwall, copies so strictly to the letter as to preserve its obsolete spellings. Nevertheless, it so happens that there is a slip in this respect in such a primary point as the name of the deceased: for the copy has it as John Jago, where the slab presents it in bold Roman capitals as IOHN IAGOE; *i.e.*, not only have the initial II been replaced by JJ, but the final letter of the surname has been omitted. We may presume that this misspelling was somehow accidental, but what shall we say of the fact that there are other county histories that contain the same inscription with the same errors, without ever an intimation than it was obtained otherwise than immediately from the stone? This is not all:—A marriage settlement in which this man was one of the two principals still remains somewhere in private archives, to which a distinguished local historian has access; who thence cites the name in Gilbert's manner,—but clearly from inadvertence; for in an abstract of the deed which he has kindly sent me, he writes throughout of Iohn Jagoe, not only with the addition of an E, but with a coupling of incongruous initials that could never have happened in 1636. It is discernible enough that did the original lie open to our inspection, it would reveal a name precisely according with that on the slab. Again, inasmuch as the son, in issue of this settlement, married a Miss Tonkin, who was an aunt of the author of the Parochial History of Cornwall, wherein the part played in life by the father is recorded, we should have fancied that the surname would be found therein as he was wont to write it himself, yet, as edited by D. Gilbert, it gives it as it is spelt by the other historians alluded to; though an E is therein added for his grandson Itai (over whose grave is simply I. I. 1744), who was Tonkin's own cousin and contemporary. I have never seen the MS. here in question, but had I any doubt that the name, apart from a possible slip of the pen, as spelt in it, in no particular differs from that on the slab, it would be dissipated by my having seen another MS. in Tonkin's handwriting,

in the library of Mr. Freeth, of Duporth. Nay, by observing the mode in which this (though it is not mentioned) has been drawn upon for the construction of a genealogical chart inserted in a recent History of Cornwall, I am able to indicate the contingencies which would be likely to befall the name in the process of transcription. Though it nowhere speaks of the subject of these remarks, it has notices of a couple of deeds in which several earlier members of his family are named; one, is an abstract, replete with details, of a marriage-settlement of the date of 1593, which the marginal note "*Orig: penes me T. T.*" shows to have been made directly from the original document, old, even in his day, by Tonkin himself; of course with the retention of the names as therein spelt. In it, though the date is not cited, the will of the principal's grandfather, John Iagowe, is referred to, and her own and widowed mother's surname spelt like his. The other is an extract of a lease granted in 1587 to her mother and a brother jointly, in which the surname is written similarly, but bereft of the E. One would have conjectured that the compiler of a pedigree, whether delving for its oldest trace or oldest spelling of the name, would have esteemed the first mentioned entry of Tonkin of more interest and more authoritative than the other, yet he says nothing of its John Iagowe, or its spellings, and begins his tree by importing a statement from the second, and editing it as to the surnames of his daughter-in-law and grandson literally to the very w, except that, in each instance, he represents the initial I by a J.

Hence, not to dwell on the collateral authority, we have here an example to teach us how, by a series of misadventures or prepossessions in the minds of successive writers, a name may continue to circulate into the future spelt otherwise than was customary with the owner, notwithstanding the beckoning remonstrance in his own signature, and a voice from his tomb.

There are certain misuses of literary references which no phase of the word negligence will suffice to characterize. In the Annual Report of this Institution for 1853, there is a short paper of mine, thus headed: "The Eustachian Tube, why opened in Deglutition, now first rightly explained." This tube, I may say, connects the tympanum or drum of the ear with the throat. In 1867, the substance of this paper was embodied in an article

on the "Tympanum," which I supplied to the British and Foreign Medico-Chirurgical Review. Thus it found its way to America, and their fructified after a fashion that I had not foreseen. In 1873, a pamphlet on the "Functions of the Eustachian Tube," was published at St. Louis; a copy of which was posted to the care of the editor of the Review for me. In it I found myself lavishly praised for special acquaintance with the subject, and a string of quotations taken from the article arrayed in support of the views propounded by the author. Nevertheless, there is a paragraph, in the midst of the text from which these quotations are obtained, which is dexterously and silently skipped. It commenced with the affirmation that "an open Eustachian tube is not attended with deafness," and justified it upon evidence that is irreconcilable with the essential purpose of the pamphlet, which was to represent such a condition of the tube as an actual cause of that ailment!

Such a style of angling by an American for a flattering review of his essay in this country may seem proposterous. Yet, I can cap this anecdote with another, which evinces that an Englishman may be still more infatuated in paying me a like attention.

Towards the close of last year, I received by post a pamphlet, with compliments in the name of the author written on it, "On the Visible Stellation, &c., of the Crystalline Lens of the Human Eye." Being reprinted from a volume of Ophthalmic Hospital Reports. The autograph notwithstanding, there is no mention of my name in the pamphlet, although there are appeals to entoptical authorities, *i.e.*, to such writers as have applied the science of optics to the investigation of the interior of their own eyes, and that the sole monograph on this process ever published in any language is a little work of mine on "Entoptics with its Uses in Physiology and Medicine," which, in the words of the preface, "in dealing with the subject primarily from my own point of view, does not fail to make the reader acquainted with the views of other writers." In accordance with this promise, this monograph comprises a summary of Listing's entoptical researches on the crystalline lens, as related in his "Beitrag zur physiologischen Optik" (Contribution to Physiological Optics), two passages of which, as indicative of literal translation, are marked by inverted commas. The first of these is rendered from a preliminary remark at p. 47, that the

entoptical characteristics of the lens which he was about to define was derived from observations of his own, which had been pursued for about two years and a half, and from others of friends that had, in "many" instances, been extended over a year. The second gives from p. 58, a definition of these characteristics. To the latter of these I had no motive in making, and did not make a textual reference: but to the original text of the former, I thought it incumbent on me to refer, because the *Beitrag* contains a fundamental principle of entoptics, which, as I contemplated showing in the sequel, had been expounded in a paper of mine more than a half of a year before its appearance; and I would not have it supposed that I would be reticent as to a statement that might be thought by any one to have weight in a question of priority of publication in which I was concerned. Nevertheless (a fact that I must ask you to note) my good intentions as to the reference have been marred by a misprint, by which, instead of to p. 47, the reader is directed to p. 17, at which earlier part of the *Beitrag* totally different matter is treated of. Finally,—to show how this narrative bears upon the pamphlet presented to me,—its definition of the entoptic figure of the crystalline lens as taken from Listing's *Beitrag* is couched in language only slightly varied in phrase from that of my translation of the passage from p. 58; yet it is not from that page the author cites it, but, *mirabile dictu*, from p. 17, exactly according with the misprint in my book! This untoward coincidence is intelligible on the assumption that the drift of my reference had been misapprehended to apply to the subject matter instead of to an interval of time, and that the author, in default of having *read* the *Beitrag* himself, evolved his version of a portion of its contents from the said source, and such other hints in the English language—whether printed, written, or conversational—as he confessedly had at his command. Otherwise it would be a recondite problem in the doctrine of probabilities.

The samples I have here submitted of irregularities in the transcription of texts and avowals of literary obligations, though drawn solely from my own limited experience, suffice to convey some idea of the range of such occurrences, if only an imperfect one of their diversity.

It is not in the regions of accident and misappropriation that the magnitude and frequency of the incommunities touched upon may be most thoroughly realized. It is rather in listening to the declarations—I had almost said lamentations—of the most candid and diligent labourers in some fields of enquiry as to the multiplicity, and, too often, insurmountability of the obstacles they encounter, in their endeavours to ascertain what has actually been accomplished by their predecessors on the same ground;—a perplexity which arises, they tell us, not only from the immense amount of literary material to be sifted, and the vast area in these days of innumerable publications over which it is scattered; but, often, also from the indiscriminating manner in which had been raked together so much of it as they had found already collected; or often, where arrangement and digestion had been attempted upon more or less of it, from the inappreciative and inaccurate way in which that process had been effected.

A natural aspiration in authors of this class is to appear before their readers with unimpeachable consciences, and to set an example worthy of imitation by their successors. In this spirit, for instance, the writers in the *Allgemeine Encyklopädie der Physik* (started in 1856) use Arabic numerals for marking the footnotes, and add an asterisk whenever a work is thus referred to that the writer had himself read, to distinguish it from the remainder that he had cited on the authority of others, or had not cited from at all even if mentioned. Some, too, have similar devices to intimate two or three other facts,—such as whether the work referred to is an important one as to the subject at issue. Should this scheme be simplified, as it surely might be, and persevered in, the time would not be distant when no writer would dare to make a reference without indicating also whether or no he had himself consulted the work he mentions, and whether he is himself writing in accordance with its views or otherwise, &c. It is true that all sources of such errors as we are considering, would not be destroyed should my anticipations really come to pass, yet an inestimable advantage to literature would accrue.

It is very instructive to glance over long lists of such frank references in the works of men who have gained renown for their successful and energetic pursuit of science; and to observe, in

most of the cases, how few of the writings they name they have themselves perused. As if minds that find pleasure in original scientific investigations have no time to spare for gathering materials for the histories of the subjects that are dear to them; or even to carefully inspect the materials that others have cast in their paths. However this may be, the lack of such histories from competent hands is the cause of many a halt or other incongruity in the onward-march, I suspect, of all the sciences. In the course of my casual reading, I am ever and anon coming across curious illustrations of this statement, but it is from the domain of physiological optics that I shall to-day offer a few facts in justification of what I have said. Because there are certain portions of this subject, whose history I have taken much pains to fathom, that present facts so fitting for my purpose that I need not look around in quest of others.

It may be half-a-dozen years ago I stumbled upon a paragraph in some popular address, delivered in Germany, by, unless my memory betrays me, no less an authority than Professor H. Helmholtz, in which it was declared that the Baconian Lecture delivered before the Royal Society in the year 1800 by Dr. Thomas Young, is one of the grandest contributions to physiological optics ever made, but that strange to say, the English themselves seemed quite unconscious that they possessed such a treasure! For my humble part, I had held the said lecture in such reverence as to have ascribed to it in print the foundation of such knowledge of the subject as I had been able to acquire. I could not help surmising that it was the orator himself, who had so lent his thoughts to like investigations as only just then to have awakened to the consciousness that he had had so formidable a precursor in a like career that an immediate study of his celebrated lecture could no longer be dispensed with.

Even in 1866, in penning the preface to his *Handbuch der physiologischen Optik*, which had been ten years going through the press as a portion of the *Encyclopædia* already mentioned, Helmholtz, after saying that he had turned all the means at his disposal to account to render the literary retrospects contained in the work trustworthy, adds, as I translate his words:—"The newer literature will be tolerably complete; the older, in a great degree, I have been obliged to gather from secondary sources,

and can offer no guarantee for its exactness. The compilation of a history of physiological optics that might really be relied on would be a task, which would occupy the time and strength of an inquirer for long years. . . .”

This great work is, no doubt, incomparable in its kind, coming as it does from the hand of a master who could say that his chief effort in composing it had been “to convince himself by his own inspection and experience of the justness of all its moderately weighty facts.”

This handbook devotes a chapter, and a supplementary one, to entoptical phenomena. Out of these I mean to reinforce the adage that truth is stranger than fiction; as well as another that history and fiction are often synonymous.

Perhaps, on this occasion, a definition might not be unwelcome, thus:—“The light that enters the eye causes us to see, under certain conditions, a series of objects that exist in or on the organ itself. An investigation of these conditions is called Entoptics.” Many observers had projected the shadows of such objects upon the retina by means of a beam of divergent light; yet it was left to Sir D. Brewster to conceive the idea of obtaining a pair of such shadows of a given corpuscle by employing a pair of such beams and of determining its distance from the retina by means of the observed angular separation of the shadows. His memoir was read before the Royal Society of Edinburgh in 1843, and was thus announced:—“On the Optical Phenomena, Nature, and Locality of *Muscaë Volitantes*, with Observations on the Structure of the Vitreous Humour, and on the Vision of Objects placed within the Eye.” In 1848 it was reprinted, *in extenso*, in the Philosophical Magazine, of which he was an editor. Again, as late as 1856 in an article on “The Sight and How to See,” avowedly by himself (the editor), it was substantially reproduced in the North British Review. There is little to be wondered at in these reassertions on the part of Brewster; for his solution of the problem continued to be received as authoritative in this country, and had enhanced his reputation among foreigners.

By general consent he was believed never to have had but two rivals in this research, namely Listing and Donders. What the former accomplished is detailed in his Beitrag (1845), of which

I possess a copy. The latter's investigations began in 1846, and in 1854 were narrated in full in a latin thesis written by his pupil Doncan, under his own supervision, entitled (plainly after Brewster's paper) *De Corporis Vitrei Structura*; an order for which, I regret to say, failed to procure me a copy, so that I have been obliged to accept Helmholtz's version of its contents. These two essays are the only ones on entoptical methods asterisked by Helmholtz as having been read "with his own eyes." I do not know whether this may account for the strange slip—for a 3 may readily be mistaken for a 5—by which he postdates Brewster's paper to 1845, and catalogues it actually underneath Listing's, though its full title is quoted in the latter's *Beitrag* itself. Wherein attention also is directed to a mention of it in a German *Lehrbuch*; suggesting the query, whether Listing himself had ever read it in the original English?

It was to the *muscæ* or fitting corpuscles in the vitreous fluid that is lodged immediately in front of the retina that Brewster more particularly applied his scheme. Listing explored the solid media in the interior part of the eye, by means of a single divergent beam of light supplemented by a rotation of the eyeball, and by thus comparing the movement of the shadow of any corpuscle fixed in either of them with that of the shadow of the iris—not troubling himself with actual numerical calculations. Donders adopts a couple of divergent beams upon the eye at rest, in such a way as to compare the distance of a *musca* from the retina with that of the iris, by observing the angular distances between their repective pairs of shadows.

Helmholtz having noticed the casual remarks of early observers, sums up the claims of these three originators, thus:—"As to a more stringent theory of the phenomena, the methods for judging of the places of the corpuscles in the eye were first of all established much more lately by Listing and Brewster, whom more lately Donders followed." The second is here shorn of his absolute priority; but elsewhere, in speaking of the vitreous humour, an abstract of his method is given by the historian, and its fitness for calculating the distance of any corpuscle floating in it from the retina corroborated. It being appended:—"Donders has altered this method." Altered so as to simplify

it, that is to say, not that he *essentially* deviated from it or impugned its accuracy any more than Listing had.

It was in 1856, the very year in which Brewster recapitulated his achievements in the *North British Review*, as if totally unconscious of what Listing and Donders had written that Helmholtz made this award.

Notwithstanding the seeming invincibility of Brewster's position, it was destined to be seriously assailed in 1864. In that year a volume on the "Anomalies of Accommodation, &c., of the Eye," from the pen of Donders, was published, in which there is given a short "History of Entoptic Observation." In it Brewster's absolute priority is granted, also that he was the first to double the shadows, and that he "even made a calculation of the position of one of his *musca volitantes*." Nevertheless, after passing on to commend Listing's method as fully developing the theory, in introducing a description of his own modification of it, Donders remarks "that of Brewster presented difficulties in the projection, and the calculation was uncertain and troublesome. . ." Whilst such a cardinal point as that the said calculation was actually effected by Brewster's method is admitted, I cannot pretend to seize the import of the exceptions Donders would take. But if it could be made to appear that in his earlier essays he had raised explicit exceptions, that might make any of my comments superfluous, the fact that they should have had no influence on Helmholtz' history, would only add force to the tenour of my argument.

However, whilst this work of Donders was in the press, my own Entoptics was in the same predicament. This also contained a history of entoptic methods, the avowed purpose of which was to correct and expand that furnished by Helmholtz. In this, I undertook to demonstrate from Brewster's own papers that all his remarks and all his calculation involved the false assumption that all shadows of intraocular objects, observed in his divergent beams of light, were cast upon the retina by rays that passed through the lenticular (or optic) centre of the eye: that is, that he had never emancipated himself from an old misconception of De la Hire's, which he cites in the beginning of his paper. Independently of which, as I have also pointed out, his calculation of the retinal distance of a *musca* rests upon another grave optical error, that in itself would vitiate the result. Hence

it is not enough to say that "there are difficulties in the projection and the calculation uncertain;" for he could never be right in one case or the other. In a word, Brewster has no claim whatever to be regarded as the author of an entoptical method.

But does it follow that if Brewster's claim be set aside, that the whole credit is to be shared by Listing and Donders? I have emphatically demurred to that by disentering and, as far as needful, reprinting in my Entoptics, a paper of mine on "Points in the Physiology and Diseases of the Eye," published in the London Medical Gazette of May 9 and 16, 1845, about half of a year before Listing's *Beitrag* appeared; in which paper may be found fully developed and geometrically diagrammed and proved, what are, in all essentials, both Listing's and Donders' methods,—that is, by one beam in relative lateral motion with the eye, and by two beams with the eye and these relatively at rest. No historian would assign any other date to Listing's claims than the autumn of 1845, when they were first published to the world, or allow the fact of some of his friends having been making observations for him previously to be a plea for antedating them, even though such observations had not been, as they were, of such a kind that they might have been done without any knowledge of his method, which might have been an afterthought—not to mention that I had really commenced with friends to observe for me in my observations, long before he states himself to have done so. By all customary rules priority of publication of both said methods, however historians had had it, belongs to me.

Listing's motive in speaking of his friend's help was clearly not to antedate his claims, and I do not for a moment imagine that he got his idea from me. It is clear that Brewster had not so got his: on the contrary, I might have derived the thought of a couple of divergent beams from him. What mutual knowledge we may have had of each other's essays I will briefly tell, as I have a letter of his, which, now his fertile mind is lost to us, and as it was in no way confidential, there may be no impropriety in adducing, as it may be interesting in a biographical aspect as regards him. His paper was read only a few weeks before my examination for a medical degree, on

obtaining which, I went, for some time, abroad; and it was printed, I presume, in my absence from England. At all events, I never even heard of it until it fell into my hands on its second issue in 1848. There were no diagrams in it, so it could only be comprehended through its language and numerical calculations of which only the *data* and results were given. I was puzzled to understand it, so I wrote him a note informing him of the existence of my paper, and calling his attention to a want of correspondence between some of his decimals and and fractions, which I said I had no doubt was accidental. But what I really hoped for was to get incidently some more precise information about his figures, as on a first perusal there did not appear to me sufficient data for the making of his calculations. I received the following answer:—

“SIR,—I have read, as you wished me to do, your two papers on *muscæ volitantes* in the Medical Gazette for 1845, and I observe that you have obtained some of the general results I had previously published in the Edinburgh Transactions. I consider the subject as an optical one, capable of an accurate investigation; and by principles of diffraction we may determine the exact size and locality of any body within the eye that projects a shadow in divergent light.

There are two errors in my numbers.” Having corrected them, he concludes:—

“Permit me to call your attention to your explanation of the magnifying effect of a small hole. The *only possible explanation* is that the apparent magnitude of the object is increased by its proximity to the eye, and the hole does nothing more than allow the object to be seen *distinctly*; when its apparent magnitude is increased by being brought nearer to the eye. Had the eye possessed the power of seeing the object AB” (referring to an engraving in my paper, where AB, as a straight line very near the eye, is looked at through a pinhole, and is drawn perpendicular to the common axis of the eye and hole, which cuts it at A) “distinctly, the image of the point B would have been exactly on the same point of the retina as with the hole.

I am, Sir, yours very truly,

D. BREWSTER.”

No authority in these days would doubt that I am entirely right in the particulars on which Sir David took me to task. No point but A could be seen by central rays, or on the same part of the retina without the hole as with it. As a preliminary step in establishing an entoptical method, I was proving, both geometrically and experimentally, that in the use, as about to be proposed, of a divergent beam of light, all the rays, save one, traverse the eye eccentrically, and cast entoptical shadows upon the retina accordingly. Brewster does not deign to notice that such a conception is incompatible with his entoptical scheme, but by informing me *ex cathedra* that they all traverse it centrally, not only hoists his colours, but nails them to the mast. In his recapitulation of 1856, two numerical *data* that had been omitted in the reprint of 1848 were supplied. I was *then* enabled to show, *without using his letter*, that the results in his calculations could only have been obtained on the central theory.

Were the history of entoptical methods amended in agreement with the foregoing statements, it has still another phase of which Helmholtz seems to know nothing. As early as 1834, Capt. Kater (see his letter to Guthrie—in the latter's work on Cataract) suggested the exploration of the eye by the help of a lens of about $1\frac{1}{2}$ inch focal length, showing how by its means the image of a light, or focus of the convergent beam derived from it, might be carried into the depths of the eye, and its rays crossing one another thereat proceed from that point as a divergent beam, so that these two beams taken together may be conveniently termed a decussant beam; and inasmuch as the shadows of all intraocular corpuscles in the transit from one portion of the beam to the other become, through the decussation of rays, inverted in attitude and position, we might thus judge of, and approximately calculate their depths in the eye. If there are difficulties in such a mode of examination of which its ingenious author was not aware, it would have been adequate, nevertheless, for the solution of some prominent entoptical problems. The late Dr. Mackenzie, of Glasgow, one of the earliest and most indefatigable observers in entoptics, and annotators of its history, adopted this hint (*Edinburg Medical and Surgical Journal of Science*, July, 1845, a mid-date as to that of my paper and that of Listing's), and even worked with two such beams, obtained by a lens of the requisite focal length from two lights, as Brewster

had obtained his two divergent beams by a lens of a short focal length. But being guided by the latter's misconception as to the central course of the rays, even so far as to attempt the impossible feat of illustrating it with a diagram, this distinguished oculist fell into inextricable entanglements in his geometrical explanations of the phenomena he thus observed.

Virtually, the idea of the usefulness of decussant beams of light in entoptical explorations lay fallow, until I turned my attention to them, and proved that a single proposition and a single diagram, would as easily suffice to embrace all the elements of decussant beams as those of divergent beams only,—whether, it might be one in relative lateral motion with the eye, or a pair of them relatively at rest with respect to it; that it would yield also, proportionally, the variations in size, and inversions in movements, aspects and positions, which the shadowy images of intraocular corpuscles evince in passing from the convergent to the divergent portions of such beams. In addition to which the contrasts impressed upon these images by diffraction, refraction, and reflection at the corpuscles themselves under such circumstances furnish *criteria* or *experimenta crucis* for determining their nature.

This joint or decussant method is easier of application and more efficacious than the partial or divergent one previously in use by myself and others. To expound it, therefore, and to reinvestigate by its means the whole field of entoptical problems which fall within the scope of these methods are, primarily, the *raison d'être* of my Entoptics. Secondly, outside of this field, the singular movements of the shadows of the retinal blood vessels, long since observed, but first explained by the late H. Müller—and through measuring which he calculated, geometrically, their distances from that layer of the retina that constitutes its “percipient” surface—to treat by a trigonometrical proceeding of my own that entirely dispenses with an objectionable assumption from averages involved in his plan. Finally, both within and without these boundaries, as the preface affirms “it ventures, too, upon untrodden ground in its investigations, and to suggest explanations of phenomena that have remained unaccounted for. Many of its physiological conclusions are peculiar. That is, in every sense, in the main, it is an original essay.” In a word it aimed at recasting the study of entoptics from root to branch.

Though it would not be irrelevant to my present argument, I shall not stop to show, as I might show, that this monograph of mine has been received with favour wherever a scientific literature exists, but it may be adjuvant to instance,—as far as English literature is concerned,—that in the most recent Treatise on Diseases of the Eye, that by Haynes Walton, only a few months from the press, one of the most extreme of my physiological inductions has been incorporated, that is to say, that that work gives from my monograph an account of the structure and properties of the vitreous humour as determined by entoptical investigation; whereas all other entoptical observers, misled by a radical misinterpretation of the phenomena they witnessed, have regarded this part of the eye as positively structureless in the adult, but as exhibiting nevertheless the remnants of a texture that was essential to it in the foetal state, or else as exhibiting morbid products; neither of which useless things are in it.

But my immediate cue is with Germany. About three quarters of a year from the date of its publication the book was noticed in that standard periodical Schmidt's *Jahrbücher der gesammten Medicin*, viz. : in the No. for February 1865. In it Dr. Geissler, well-known by his work on *Verletzungen des Auges*, passes on from commenting on the absence of any previous monograph on entoptics to say, as it may be rendered into English:—"The author has now undertaken this problem and has solved it, whilst furnishing a foundation for the literature that belongs to it—and not without having made studies that are peculiar to himself—in a manner most highly worthy of recognition. The little book, which is illustrated with numerous woodcuts, is also, for us Germans, in every respect, an interesting thesis, wherein, without neglect of mathematical calculation, the relations are depicted with brevity and clearness, and in a lively style of writing," and so on in a strain of undeviating commendation. I may append, as evincing that this was not a singular or transitory opinion among those who speak German or its dialects, that less than three years since I received, if possible, still greater compliments from the lips of Donders himself, whom I have so often spoken of to-day, and who is so famed as professor of physiology and ophthalmology in the University of Utrecht.

In the application of this narrative to what has been said before on the discrepancies of history, I must call attention to the fact that Helmholtz' preface to his work is dated in December 1866, and that its supplementary chapter on "Entoptical Phenomena" is so close to the end as to be preceded by many references to the literature of that year. Nevertheless, a book had been in existence since the Spring of 1864, which remoulds the subject in such a manner as scarcely to leave one of his paragraphs thereon unaffected, and is often (as exemplified in the vitreous humour) subversive of the conclusions he has adopted, besides furnishing many that he nowhere indicates; and though he is familiar with the language in which it is written, and that his own countrymen had been emphatically apprized of its tenour in their own, yet there is no sign that he had ever heard of it! It is of no avail that he chronicles a couple of papers of mine (with an erroneous statement not, apparently, from his own reading, as to the aim of one of them) which by the side of my first essay in 1845 and my last in 1864, are of slight moment in the history of entoptics. These incidents combine in displaying how much the celebrated Heidelberg professor of physiology, in the turmoil of his multitudinous scientific researches and avocations, deceived himself in imagining that the time he had spent in looking up or through other persons writings was enough to keep him abreast of the later contributions to physiological optics in all its sections.

In a historical point of view the fate of my paper of 1845 is curious. We have seen with what *nonchalance* Brewster threw it aside. Mackenzie, who was our only systematic chronicler of entoptical writings, barely gives it mention with its date (omitting its title) in his bibliographical list, among such writings as are there said to treat on "methods of examining spectra." Of course, he saw it through Brewster's spectacles. The Gazette in which it appeared would hardly bring it under Listing's notice. Up to the time of the publication of his "Anomalies," (Brewster's essay excepted) Donders had no other acquaintance with English productions on the subject than what he could glean from Mackenzie's work on Diseases of the Eye. Helmholtz omitted to consult, directly, such literature altogether. In a word the paper had never been read by any unprejudiced and competent entoptical investigator, and had I not, many years

after, resumed the study of entoptics so far as to gain a hearing, the stereotyped history of its methods would never have been challenged through it.

Through Mackenzie's annotations, I have been enabled to amend the history of Helmholtz in favour of an Englishman in more than one particular, though I have never done so without the precaution of consulting the original authority myself. In the solitary instance of the suggestion I have to-day associated with Capt. Kater's name, I left the authorship undetermined; because having to go through Mackenzie's references *seriation*, in the library of the British Museum, in order to discover from whom he had derived it, I was unable to trace it to its author until it was too late to do him justice in the monograph. The contingency that facts may yet come to light to upset more or less of this history, or that facts already before the world may yet be differently estimated by another commentator—by Helmholtz himself, say—has no bearing on my present purpose. I am not now working up the history of a subject; but offering the story I have just told as an epitome of the flaws that often betray themselves in fabrics constructed from literary materials; though they may have commonly been esteemed as substantially built from sure foundations.

The interval between this and last year's Spring Meeting has been more than ordinarily prolific in incidents of such general scientific interest as kindle discussion in great national societies, and animate current literature, so that the sole puzzle in composing an address from them would be that of selecting the threads out of which the texture should be woven. But the very fact that information upon such topics is, in our day, reproduced in every possible guise, and, as it were, dropped gratuitously into all our letter boxes, seems to me a reason why I should refrain from enlarging upon them in a local society, and I have preferred running the risk of being regarded as egotistical rather than, on this occasion, make them the main sources of my remarks. But I shall append a bare mention of a few of the leading incidents which have lately been exciting the attention of all intelligent minds.

Foremost among them have been the observations of the transit of Venus over the Sun's disc, as giving us a rare opportunity of

re-determining in this way the distance between the centres of the Sun and Earth. The transit telescope has, on this occasion, been aided and checked by the modern arts of photography and spectroscopy. All the principal governments of the world have vied with one another, and private individuals with them, in equipping costly expeditions, many of them to remote regions, to put these nice appliances in operation. On the 9th of December last from stations planted thickly over a vast portion of this globe, from plain and mountain, often in inhospitable climates, and among peoples who were rude or inappreciative, observations were effected, which, when collated, will constitute an epoch in practical and theoretical astronomy.

The liberality of our parliament in providing funds for still keeping an English man-of-war, the Challenger, engaged with a scientific staff of observers in investigating the currents, temperatures, chemical constitutions, fauna, the earthy natures of the bottoms, &c., of deep seas, is still being rewarded by novel results.

In the course of our past year there have died three remarkable geologists; Elie de Beaumont (age 76), the director of the geological survey of France, the pride of the French school, whose theory of the relations of great granitic ranges to one another, has been so confidently applied by our recently elected honorary member, M. Moissenet, to explain the directions of leading mineral veins in this county; D'Omalus d'Halloy (age 92), the veteran Belgian author of "Elements de Geologie, numerous memoirs in the Journal des Mines, &c., &c.;" and Sir Charles Lyell, Bart., the most influential, by his inductions, of all geologists, and whose writings have been most potent in acquiring for the English a pre-eminence in this science. These three philosophers had however lived long enough to see some of the most cherished hypotheses of geology threatened with revision upon Lyell's own principles, owing to the light that these oceanic researches have thrown upon natural processes now in operation.

Capt. Nares is, however, no longer on board the Challenger, inasmuch as to him has been entrusted the command in an arctic expedition of two ships, which has been provided with every requisite for scientific observations under the special conditions to which it will be exposed, for it has been felt by the present ministry of this country, that those men were in the right who affirmed that when a southern power with but limited coast line,

like the Austro-Hungarian, has recently earned success in further explorations of those parts, England, if she would retain her naval supremacy, must not supinely rest upon the laurels gathered for her by a long series of arctic voyagers, nor must it be ever forgotten that England has not been wont to fold her hands whilst other nations would press forward into new scientific regions.

Side by side with such explorations, the natural history and geology of new lands are looked up. Australia has been crossed in a new direction by Major Warburton, Africa traversed from Tripoli to the coast of New Guinea by Dr. Gerard Rohlfs, and Liéut. Cameron works on Livingstone's ground, &c.

In archæology the most notable event has been the discovery by Mr. George Smith, of the British Museum, of an Assyrian inscription, which gives an account of the genesis of the world; that is analogous though not identical with what is stated in the Bible.

In conjunction with this statement it may not be out of place to pay a tribute to the memory of Mr Samuel Tregelles, a native of Falmouth, who has recently died at the age of 62 years. To him it was a labour of love, though demanding vast diligence, and much foreign travel, to compile an edition of the New Testament in Greek, in which all existing MSS. should be represented. This he lived long enough to accomplish with such unerring discrimination that the work is, I am informed, unrivalled in its collations, notwithstanding that Tischendorf has worked on the same ground.

The latest surprise in the realms of science has arisen from some experiments devised by Mr. Crookes, who has shown that pith vanes and balances suspended, as nearly as may be, *in vacuo*, are set in motion by the action of light as distinguished from heat, arguing therefrom that light is a ponderable ether;—whether this be the true explanation or not, the phenomenon was unexpected, and is causing much speculation.

Coming back to matters in which we have a local interest, I may note that an amended edition of Sir John Lubbock's "Ancient Monuments Bill" has actually been supported by a majority in the House of Commons. In the primary schedule of monuments attached to this recast there is no mention of Cornwall, so the draught has not come under our notice: though, of

course, were such a bill enacted we should quickly find that its jurisdiction would extend thus far.

Our last year's journal, from circumstances, I need not repeat, has only just been got ready for our subscribers. Since Dr. Barham's contribution to it entitled "Remarks on Surface Temperature and the Effect of Shelter" has been, in the main, written since our last year's meeting, I would call the attention of our readers to it as a very instructive practical document.

I may add that last year I alluded to some meteorological remarks of Mr. W. W. Rundell, and that those who are interested in such questions may find his views illustrated in a paper of his, in the quarterly journal of the Meteorological Society, "On the Diurnal Inequalities of the Barometer and Thermometer," founded on observations made at the summit and base of Mount Washington. N.H."

I adverted at the same time to a paper under a similar title in reference to the climate of Bombay, by H. Chambers. There is in the last part of the Philosophical Transactions, a paper by Mr. Blanford on the "Winds of Northern India in relation to Temperature and Vapour-constituent of the Atmosphere," which singularly affirms the comment I subjoined, as to the value of steady climates in conveying to us elementary meteorological knowledge.

PLAN OF ROMAN ROADS WEST OF SILCHESTER.



VIII.—*An attempt to define the extent and nature of the Roman occupation of Cornwall.*—By N. WHITLEY, F.M.S.,
Hon. Sec.

Read 21st May, 1875.

IN the south of England, as far west as Bath, Ilchester, and Dorchester, the indications of the Roman occupation of the country are strongly marked by the remains of their well constructed roads, their noble towns, and their luxurious villas. In passing westward into Devonshire, the traces of this occupation gradually become less distinct, and almost wholly disappear in Cornwall.

In order to investigate this interesting subject, rather from a Surveyor's point of view than that of an Antiquarian, I have constructed a map of the south of England, on which the extent of each sheet of the ordnance survey is defined, and then from a detailed inspection of every portion of this accurate survey, transferred to my reduced map the Roman roads and stations which have been ascertained by actual inspection to exist at present on the ground; and where the trace of a road is doubtful or indistinct I have marked its probable course by a dotted line. Taking this map as the basis of the inquiry, I have then endeavoured to obtain further evidence of the Roman occupation of the country, from the remains of their stations, inscribed stones, coins, other relics, and from such historical fragments as have come under my notice.

Our Roman conquerors had three principal ports on the coast of Kent, nearest to the continent, for the landing of their troops. Richborough (*Ritupæ*), Dover (*Dubris*), and Lympne (*Lemanum*). From each of these ports a military road ran direct to Canterbury (*Durovernum*), where they met at a centre; and from thence the noble "Watling-street" passed through Rochester (*Durobrivis*), to London (*Londinium*), early made the most important Roman settlement, from whence seven leading roads radiated to every part of the country; that to the west crossed the Thames at

Staines, and ran in a straight course, now somewhat obliterated, to the strongly fortified station at Silchester (*Calleva*), the massive wall of which still remains, and encloses an area three miles in circuit. From Silchester three roads well defined by the ordnance map extend fan-like westward to Bath (*Aquæ Solis*), to old Sarum (*Sorbiodunum*), and Winchester (*Venta Belgarum*.)

The Roman remains now in the Museum at Bath, show that it was then a city remarkable for its Temples, its splendid edifices, and its medical baths, and the ten votive altars, lately exhumed, indicate the use and virtue of its healing waters.

From Bath the great military Fosseway ran to the N.E. almost in a straight line through Cirencester (*Corinium*), to Lincoln (*Lindum*), and on the S.W. to Ilchester (*Ischalis*), and to 12 miles beyond at Dinnington, where all traces of this western road are lost. It is highly probable that it continued westward through Honiton (*Moridunum?*) to Exeter (*Isca Dumnoniorum*.)

Returning to Silchester, another main road to the west, known as the Port-way, led direct to old Sarum, and from thence by the Achling-street to Dorchester. From Dorchester a second class way appears to have passed near the coast line to Exeter. Thus the great Roman roads to the west can be clearly traced to Ilchester and Dorchester, and from these ancient towns by patches to Exeter; westward of which all clearly defined indications of Roman roads do not exist.

It must, however, be considered that Roman roads were of five kinds, Military roads, Branch roads, Private roads, Country roads, and Bye roads, and it not only becomes probable, but a certainty, that in a partially conquered country, the ancient trackways must have been used in reaching the Stations westward of Exeter.

In the undoubtedly authentic Itinerary of Antoninus, A.D. 320, no Roman towns or stations are mentioned west of Exeter; but in the Itinerary of Richard of Cirencester (a much less reliable document), we find beyond Exeter the names of Durio-amne, Tamara, Voluba, and Cenia. These stations are supposed to have stood respectively on the Dart, the Tamar, the Fowey, and the Fal, but their actual sites remain still undefined.

Both Itineraries give the distances between the stations (with some omissions) in Roman miles; the length of such a mile is

still doubtful, and the errors of transcription have rendered the figures often unreliable, but Antoninus gives the distance from London to Rochester, in two instances, as 27 Roman miles, which is precisely the distance by the Ordnance map in British miles. Also the further distance from Rochester to Canterbury as 25 Roman miles, repeated in another table, the true distance in British miles being 26. Thus our British miles may be approximately applied to test the positions of the stations mentioned in the Itineraries.

Mr. Sopwith found the distance between two Roman mile-stones to be 1698 2-5ths yards, but the position of one of the mile-stones appears to be uncertain.*

Thus by applying this test we are enabled to fix the site of Moridunum at Honiton, and assuming Tamara to be on the Tamar, the position of Voluba cannot be further west than the Fowey. For Cenea no distance is given, but its probable site is on the Fal at Tregony, or the earthworks near Grampound.

Roman Coins have been found in Cornwall at the following places:—

Near the Hayle Causeway, 1825, 27 Roman coins were found and presented to the Royal Institution of Cornwall, by Mr. Chilcott.

A further find of copper coins was made at Hayle. Presented to the Royal Institution of Cornwall by Lieut. Hiatt.

Roman coins found in Carnon Stream-work. Presented to the Royal Institution of Cornwall by Mr. H. O. Bullmore.

More than a thousand Roman coins were discovered at Pennance Farm, near Falmouth, of A.D. 194, to 342.

Thirty Roman coins found near Carhayes castle. Presented to the Royal Institution of Cornwall by Mr. J. M. Williams.

Roman coins have been found at the following hill castles, Carnbrea, Dolberry, Cadbury, and Worlebury.

Nine Roman Brass coins found at Long Bridge, Marazion. Presented to the Royal Institution of Cornwall by Mr. J. J. Rogers.

In 1744, on the side of Carnbrea hill, Roman coins were found with socketed bronze celts.

* Survey of the Roman wall by Maclauchlan, p. 43.

In 1700, some Roman coins were found in Golvadnek Barrow, at the foot of Carnbrea hill.

Near the same place in 1749, three feet under the surface of the ground, about a pint of Roman copper coins were found.

On the tenement of Bocadzhil, in St. Just, nearly a hundred copper Roman coins were found.

At St. Agnes, near the mines, a gold coin of Valentinian was found.

Carew tells us that he had a brass coin of Domitian, found in one of the Cornish Tin-works.

At Treryn, the S.W. point of Cornwall, says Leland, there was found a brass pot full of Roman money.

Two Silver coins were found at Penrose, Helston, one is of Trajan.

In 1735, at Condora, the south entrance to Helford river, were found 24 gallons of Roman brass money, all of the age of Constantine and his family.

In 1765, forty Roman coins were found in Constantine creek, on the north side of Helford river.

In a ditch near Malpas ferry, on the Fal, 20 lbs. weight of Roman brass coins were found, all date from A.D. 259 to 284.

A coin of Vespasian was found in a stream work, at Buryan.

Many Roman coins have been found at Tywardreath, near Fowey.

At St. Minver sands, opposite to Padstow, Roman coins have been found with personal ornaments and Samian ware.

Imperfect as this list no doubt is, yet it shows a wide scattering of lost Roman money over the county, and indicates an intercourse and a traffic probably for Tin, Lead, and Cattle. It has been conjectured that the large find of small money in the fortified promontory of Condora, was intended for the payment of Roman soldiers.

Roman Relics, and Pottery.—A Brass ring found in a stream work near Penzance. Presented to the Royal Institution of Cornwall by the Rev. C. V. Le Grice.

A Brooch or a bronze fibula, found in Trelay stream work, Presented to the Royal Institution of Cornwall by Mr. Henwood.

A Roman Cuirass? or Armlet, found in a peat bog near Bodmin. Presented to the Royal Institution of Cornwall, by Rev. J. M. Murray.

Bronze socketed celts with Roman coins at Carnbrea.

Romano-British relics from Trelan, a Bronze mirror, Beads, Armlets, and other personal ornaments. Presented to the Royal Institution of Cornwall by Mr. J. J. Rogers.

Part of a "Roman Urn," from a Barrow near Newquay. Presented to the Royal Institution of Cornwall by the Rev. C. Paynter.

Fragments of pottery, decided by Mr Albert Way to be Roman, from Carminow, near Helston. Presented to the Royal Institution of Cornwall by Mr. J. J. Rogers.

From St. Minver sands, Samian ware with Roman coins and personal ornaments.

It will be observed that while Roman coins are numerically abundant in the county, personal ornaments and pottery, which more fully indicate a settled occupation, have been very rarely found.

Inscribed Stones.—These are large roughly hewn granite stones from 4 to 8 feet high, bearing sepulchral inscriptions in letters nearly resembling those of the latter Roman monuments; some of them show the Roman capital letters well defined, and also a blending of Roman and Celtic names. The stone in the parish of St. Columb Minor, according to Wright, gives to the person it commemorates the Roman title of Tribune. It is more than probable that in the occupation of a country extending over a period of 400 years, family ties would arise explaining this blending of names and written characters. Thus we find the Roman poet Martial celebrating in two epigrams, the beauty and virtues of Claudia "of the woad-stained British race," and her marriage with a noble Roman of the name of Pudens. As Martial wrote about the time of St. Paul's last visit to Rome, the Pudens and Claudia mentioned by the apostle may be the same as those lauded by the poet; and this lady, perhaps, the first British convert to Christianity.

There are few names of places in Cornwall indicative of Roman occupation, but that of Stratton leads us to infer that here there must have been a Station beside a Roman road. In fact the Roman roads may often be traced by such names as Stratton (on Foss)—Stretton—Stratford, and Street.

A review of the whole subject appears to support the following inferences.

The great military roads of our Roman conquerors extended no further west than Exeter. From thence a road of inferior construction passed over Great Haldon by Newton Abbot to the Roman Station at Totnes on the Dart, the foundations of a bridge in Roman masonry having been found at Newton Abbot. Westward of Totnes, the ancient native track-ways only were used by the Romans as far as their Stations extended. These trackways were generally carried along the crests of the hills, and therefore called Ridge-ways, thus the wooded valleys were avoided and the construction of bridges not required. The old Lands-end road from Stratton westward is a Ridge-way throughout, and passes over an open country with few impediments, with strongly built Hill castles of earthwork, about 12 miles apart from Ditchen hills near Hartland to Carn Brea castle, we must therefore infer it to be an ancient military highway of the early British period, and available either for conquest or retreat. Opposite the Roman Station of Tamerton (Tamara) there is a remarkable ridge-road which extends from Landulph, north of Callington, by Five-Lanes, to join the old Lands-end road near Davidstow; a distance of 26 miles without crossing a single valley. This may have been a branch from the main trunk. But a more direct trackway probably extended from Tamara to Voluba, and Cenia. All these stations are, however, at the head of navigable rivers, a position which would enable the Romans to reach them by water, if foiled on the land.

The Roman coins and personal ornaments found in the Tin stream works, are very suggestive of a trade with the Tanners, and of the visits of persons of quality to the works.

It appears, however, certain that the Britons of the extreme west, under their native princes and with the aid of their numerous hill castles, maintained a sort of rough independence during the whole period of the Roman occupation of Britain, and that more or less firmly they held the whole country westward of Exeter; and it was not until the reign of Athelstan, (A.D. 925) that they were driven back beyond the Tamar.

In confirmation of this opinion we find the native Princes supporting the native Bishops of the ancient British church, then existing in Cornwall, and refusing obedience to the Roman See;

but when Athelstan had over-run the whole country, and received the submission of Howel the last king of Cornwall (A.D. 936), a Bishop was appointed in communion with the Anglo-Saxon Church.*

From a review of the whole of the evidence adduced we may infer that the occupation of Cornwall by the Romans, slight as it appears to be, was rather that of friendly intercourse for the purpose of trade, than that of conquest and dominion. They may have held isolated portions of the county by their outlying forts, or headland castles fortified on the land side, like that of Condora; but the great mass of the people were unsubdued, and maintained their allegiance to their native Chieftains.†

* See Carne on the Bishopric of Cornwall, Journal of Royal Institution of Cornwall, 1866.

† After the above paper was read, the attention of the members was called, by Dr. Barham, to a Stone now in the Churchyard of St. Hilary, inscribed, as he thought, in the official form, to Constantine the Great, which he considered of great importance as evidencing the occupation of parts of West Cornwall by the Romans. His opinion that this relic is, although rude, a Roman milestone, being shared by archaeologists of authority, it has been thought desirable to get it accurately figured, and to submit it to the most competent judges of its significance, before it is again brought under the notice of this Institution.

IX.—*Notes on the Ornithology of Cornwall for the year 1874-5.*—By
EDW. HEARLE RODD, *Member of the Institution.*

Read 21st May, 1875.

THERE is not much to chronicle in the Ornithological department of our natural history in West Cornwall since your last spring meeting, but, as long as I have the opportunity, it will afford me pleasure to give your Society the benefit of my notes and observations for the year, as I have been accustomed to do, thus giving a simple account of the ornithological occurrences in the county as they have presented themselves to me, and which may be worthy of a place in your transactions, as a current record from year to year, of what may be worth noting as Cornish productions in the Avifauna of the County. I have no doubt that the sad blank that has occurred in the pursuit of the natural history science of the Scilly Isles, by the death of the late Lord Proprietor, and by the cessation of the periodical visits of some of his scientific friends, will be filled by his successor, who, I know, will be very happy to give your Society the benefit of any observations on the natural productions of the Islands, as they may occur or be presented to him. We have had very rich supplies of ornithological specimens from the Islands from time to time, which their extreme westerly position, and their being the nearest land to America, have afforded means of supplying beyond any other district in the country. Our southerly position, too, has had, no doubt, something to do with our good luck, as we are within easy reach of the main continent of Europe. This brings me at once to a very interesting occurrence of a very curious and rare British Bird, which turned up a month after the last spring meeting, from the neighbourhood of the Lizard in the "Collared Pratincole" (*Glareola*), and which I had the opportunity of examining in the flesh.

The notes I made at the time I will transcribe, without troubling you with further remarks, except by saying that it

is one of our rarest British species, and the first example that has come under my notice as a Cornish specimen.

“Pratincole at the Lizard, Cornwall.—I had an opportunity, yesterday, of handling an adult full-plumaged bird of this species, which was captured near the Lizard on Monday last. There was nothing peculiar in the colour of the plumage from the general description of the adult bird by Mr. Yarrell. I may remark, however, that instead of being ten inches in length, this bird was fully ten and a half inches, the wings exceeding the tail by at least half an inch; the exterior tail feathers taper away into almost a filament. In handling the bird in the flesh, it was quite bewildering to try to reconcile its characters to the place it ought to take in our British Avifauna; for in the character of its beak you could understand its claim to the family of Swallows; we must take leave of the forked tail as a character of the Swallow tribe, and allow this feature to claim its kindred to the Terns, with which it has been associated; but when you look at the feet and tarsi and the naked part of the tibiæ, you are at once drawn to the Stints and Sandpipers, with which it has been associated, and then, knowing that the bird is found on open-downs and dry pastures, and that it has extraordinary cursorial powers, with a tone of plumage and mode of flight not unlike the common Dotterel, you are tempted to be reconciled to the place now allotted to it by our naturalists, by the side of Plovers. There is a record of the Pratincole having been obtained in Cornwall once or twice, many years ago; but this is the first example of a bird in the flesh coming under my notice—10th June, 1874.”

“The bird was observed by a boy, who was Coot shooting, flying backwards and forwards over a large pool on the Lizard downs, exactly like the swallow tribe, and apparently hawking for insects. It alighted for a time on the margin of the pool, where it was shot. Sex, male.”

The Skuas (*Lestrís*), a family allied to the Gulls, but partaking of the propensities and nature of birds of prey, appear occasionally on our shores. Their practice is to pursue and harass Gulls and make them disgorge their food, which they seize in the act of falling. We have four species gradually decreasing in size, and the smallest is the rarest of the lot. I procured one in 1833, and Mr. M. H. Williams, of Tredrea, wrote me word

that he had shot one somewhere inland in the month of October last, which I had an opportunity of examining afterwards.

All the species have their two centre tail feathers prolonged, and this prolongation becomes more and more marked in each species the smaller it is; in the present species, the excess beyond the other lateral tail feathers is from five to seven inches. In the largest species the prolongation is scarcely an inch.

We have been visited all along the south coast by the Greater Shearwater (*Puffinus Major*), which comes at uncertain periods, and very often after long intervals. This bird is known at Scilly as the "Hackbolt." The months of December and January gave us two specimens of the Little Bustard, one obtained at the Lizard, and the other near Looe, and kindly communicated by Mr. Stephen Clogg. Every now and then they make their appearance, but I have never known them at any other season than the winter. The male bird presents a very marked difference of plumage from the summer moult. Mr. Yarrell gives figures of the bird, in both summer and winter plumage, in his "British Birds," and Mr. Gould in his "Birds of Great Britain." Although we have had an unusually protracted winter, no rare species of Duck has come under my notice. As the season passed away, we had visits from the little Garganey Teal, on its northern passage to its breeding haunts; this little duck never appears with us except for a very short time, and in the early spring months. A specimen also of the species of Wild Goose, known as the *Grey Lag Goose* (*Anser Feras*), was captured at Hayle in March. This is the parent stock of our domestic goose, and may at all times be known from its congener, the Bean Goose, *Anser Segetum* (which is our common wild goose) from the nail of the bill being white, which is black in the Bean Goose, and from the colour of the bill being otherwise different.

I will conclude my notes by giving you the substance of a communication I made to Mr. Newman, in vindication of the character of the *Ash-coloured Harrier* (*Circus Montagu*), which I have before referred to.

"Montagu's Harrier."—I have before mentioned that the frequent occurrence of this species in the West of Cornwall, and especially in the Lizard district, has rendered it not only a common bird, but decidedly the most common of all the

Circidæ; and I mentioned, on a former occasion, that there was really no need to exterminate the species, or to try to do so, as a bird of prey, as it has been ascertained, beyond any doubt, that its food is principally confined to reptiles, and not birds, and that where a solitary partridge or quail may once now and then fall within its clutches, nine times out of ten at least you will find that toads, frogs, vipers, snakes, or lizards, are its objects for food. A good many of these Harriers have been in the Lizard district this year; and my friend Mr. George Williams, on whose property they were seen, told me that his keepers have been urging their destruction as game-destroyers, deserving no credit for possessing any possible compensating good qualities. Specimens of this Harrier have been killed from the same property nearly every year, for some years, and they have in most instances come under my notice. Vipers have been found in their craws, and I had notice that these keepers of Mr. Williams's had set gins to catch them, with all sorts of bait, and the only lure that succeeded in drawing them to their fate was a *viper*, which was laid on the plate of the gin, after small birds, eggs, &c., had been in vain tried.

Two more of these interesting Harriers were sent by Mr. Williams, for preservation, to Mr. Vingoe's workshop this week—a bird of the year, with an uniform tawny breast, and a male bird in the second year's plumage. I was fortunate enough to obtain from Mr. Vingoe the result of his *post mortem* examination of the contents of the craws of these birds, and, instead of any game being detected, nothing could be seen but the remains of several lizards and only one small bird, probably a young sparrow. My object in this notice, is simply to endeavour to enlist for this beautiful and elegant Harrier, some degree of favour, and to commend it to the regard of those who, like myself, wish to see the economy of the creation in its true balance, and not treated with violence and injustice."

X.—*Notes on some habits of the Kingfisher.* By WILLIAM JORY
HENWOOD, F.R.S., F.G.S., *Member of the Institution.*

Read 21st May, 1875.

THE brook which flows from the hills of Wendron and Stythians to Restronguet Creek, an inlet of Falmouth Harbour, passes within one hundred yards of the iron-foundry, and—perhaps—about twenty of the dwellings at Perran Wharf. The highway, from Helston and Penryn to Truro and to the neighbouring quays, runs between the houses and the stream. The highest tides partially cover both road and quay; but—except at such times—the level of the rivulet is several feet lower. For safety-sake a light wooden rail has been placed on the edge of the embankment. This rail—immediately in front of an inhabited house, and within five or six yards of the road, daily passed and repassed by hundreds of persons, on foot, on horseback, and in carriages—was the favourite haunt of a kingfisher; which, seldom heeding the busy traffic carried on within so short a distance, keenly watched the trout-fry in a deepish pool below. Darting into the water on occasion, and instantly emerging, it—when unsuccessful—resumed its accustomed place; if, however, the fish caught proved a strong one, the bird crossed the brook, and devoured its prey at leisure, on the sedgy margin. On taking wing it followed the course of the stream, and seldom rose more than a very few feet above the surface. Its favourite resort was scarcely a dozen yards from the windows of Messrs. Fox's counting house;* whence, at intervals, I watched it for several seasons; but I have an impression that it did not remain with us throughout the year.

Near one of the busiest thoroughfares of Penzance—perhaps one hundred yards from, and about as many feet above, the beach—high walls and inhabited houses enclose, and shut in from view of the sea, a little lawn, in which, for some time, a minute jet of

* In this office, from 1822 to 1827, I was a junior clerk.

fresh water fell into a small bason of stone; and in this a few gold and silver fish disported. One by one these disappeared, though the cause of their disappearance remained for some time unknown; at length, however, the bason was protected by a net, and in this a kingfisher was shortly entangled.*

3, CLARENCE PLACE, PENZANCE,
1875, May 20th.

* This information was communicated by the late Mr. Richard Vinicombe Davy, proprietor of the house and grounds.

XI.—*Note on the appearance of the Grey Mullet during corresponding periods, and quantities of that fish caught at Sennen Cove, in 1874 and 1875. By MR. JOHN SYMONS, JUN. Communicated by W. J. HENWOOD, F.R.S., F.G.S., Member of the Institution.*

Read 21st May, 1875.

THE Mullet fishery begins at the end of January, and ends towards the latter part of April.

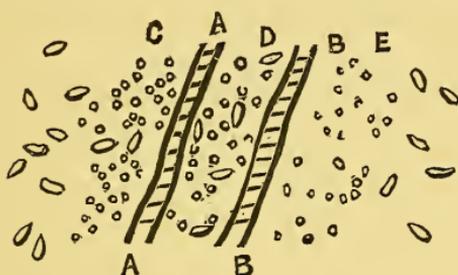
PERIODS.	1874. QUANTITIES OF FISH CAUGHT.	PERIODS.	1875. QUANTITIES OF FISH CAUGHT.
January 28	3,000	January 28—29...	7,210
February 5—13...	6,095	February 25	180
March 14—23 ...	680	March 5—31	5,070
April 20—27	1,910	April 3—22	7,971
Total.....	11,685	Total...	20,431

MAYON HOUSE, SENNEN,
13th May, 1875.

XII.—*Notes on Belowda Hill Mine.* By C. LE NEVE FOSTER, B.A.,
D.Sc., F.G.S., *Joint Hon. Secretary.*

Read May 21st, 1875.

BELOWDA Hill Mine, when I saw it some eighteen months ago, was simply an open cast working, on a so-called lode, 40-ft. wide. I am of opinion that the lode is merely altered



granite. It consists of quartz, with a micaceous mineral, and the felspar has evidently been replaced by schorl and tin. In some places small grains of tin are seen scattered through the rock, in others there are

large grains of tin in the middle of a cavity left by the decomposition of a felspar crystal. It appears to me that the granite was altered by small veins, such as A A, B B, or rather by the mineral solutions which they brought up. These veins, from 2 inches to 6 inches wide, consist either of schorl, or quartz and schorl, and sometimes a little tin. In the altered granite, you see cavities, C, D, E, shaped like orthoclase crystals, and filled with schorl, or schorl and tin.

I was told that the stuff yielded on an average about $\frac{1}{2}$ per cent. of tin.

Note on a new locality for the Mineral Pistacite (Epidote).

AT the last Spring Meeting I presented to the Museum some specimens of garnets and axinite which were found in a pit close to the cross near the old church in the sand, Perranzabuloe. I revisited the locality a few months ago, and was rewarded by finding some pistacite. The mineral occurs in the form of small prismatic crystals of an oil-green colour, some of which are $\frac{1}{4}$ -inch long.

XIII.—*Note on a recently discovered Tumulus in the parish of Cardinham. By J. H. COLLINS, F.G.S., Joint Hon. Secretary.*

Read May 21st, 1875.

AT Venn's Cross, in the parish of Cardinham, about one mile S.E. of the church, a roadside mound has been recently removed, which proves to have been a tumulus. The place has long been known as Venn's Cross, and the people of the neighbourhood speak of an upright stone which formerly stood there, and which may have been the shaft of a cross. Nothing of this, however, remains now; and the mound itself was not suspected to be a tumulus until about a month since, when some workmen employed at Welltown Farm, close by, cut into it—partly for the purpose of widening the road at that point—but chiefly for the sake of the material, which they wanted for filling, for the foundation of one of the farm buildings.

In the centre of the mound they found a grave about 4 feet deep, containing human bones—some of which are now upon the table. The greater part had been removed without attracting attention from any person interested, when one of the workmen observed a metallic ring among what seemed to be the bones of a hand. This ring was entire when first seen, but being so much corroded it has become broken into many pieces. It is no doubt made of bronze. When I saw the place about a fortnight since, the grave had been filled in up to the level of the road. I spent a few minutes in looking about, but found no flint chippings, nor anything of interest, except the small fragment of some textile fabric which accompanies the ring.

XIV.—*The Building and Ornamental Stones of Cornwall, with notes on their Archaeology.*—By R. N. WORTH, F.G.S., *Corr. Mem.*

Read May 21st, 1875.

THOUGH in a strictly commercial sense Cornwall possesses only one building stone—its granite—it abounds with stones used for building, several of which are of great local value. The Cornish Granites—from the quarries at Gunnislake, the Cheesewring, De Lank, Par, Penryn, and Lamorna—have found their way to distant parts of the Kingdom, and have aided in rearing some of the most stupendous monuments of modern engineering skill. Locally, they have been employed from the very earliest times; and their use has been continuous until the present. Next to the granite hills as the sources of local building stone, rank the elvans and trap rocks. The best known elvan is that at Pentewan, near St. Austell; but there are others of nearly equal merit, though of less note: those for example at Illogan, used at Tehidy House, Creegbrawse, and Newham, the latter much used in Truro, and strongly resembling a sandstone. Thousands of quarries have been opened, for the supply of immediate local wants, upon the elvans and traps. The most celebrated stone which the latter have produced in Cornwall, is that from the Catacleuse Cliffs near Padstow. The “killas” of the county, in some places, yields good building stone. Perhaps the best of this class is that raised at Margate near Bodmin. The laminations are thick, and the stone squares easily, and presents a fair appearance. Two other local varieties of building stone—both of very limited occurrence, remain to be noticed, the recent sandstone at Newquay; and the Polyphant stone, raised at Launceston.

We can trace the use of granite to pre-historic times. The stone circles, the menhirion, the cromlechs, are nearly all of granite. The reason is not far to seek. In the early ages when those structures were reared, far more than now, the hills and downs were strewn with detached blocks of this stone, of all shapes and sizes, from which the task of selection

according to the purpose in hand, must have been comparatively easy. And, later still, when the crosses, which are so distinctive a feature of our Archæology, began to be erected, granite was still the favourite stone. Its accessibility, in some measure, atoned for its hardness; and these were days in which labour was cheap. For ages granite was chiefly obtained from the surface blocks; hence its local name of moorstone. Carew says, that in his time it earned the chiefest reckoning for "windows, houses, and chimneys;" and Norden that it was "verie profitable for manie purposes, in buylding most firm and lasting." Borlase notes five kinds of granite—white, dove colour, yellow, red, and black, and says that they were chiefly procured in Constantine, Tregoning, and Ludgvan. He gives the palm to the Tregoning granite, which is more showy than the Ludgvan or Tregonver. The latter stone is now exhausted; it was close-grained and tough. From Tregoning and Tregonver most of the granite used in the churches of the Lands' End district of West Cornwall came.

It is to the churches of the county that we have mainly to look for the material of our archæological notes. It will be admitted that the building materials of a period or a locality have a very marked and definite influence upon its architecture. When our far-off ancestors became builders, they were, at first, content with the materials which lay nearest at hand. As they acquired skill, and art developed, they sought to supply the deficiencies of those materials by obtaining others from a distance; and hence arose a practice which has continued to the present day. There are very few parishes in the "rockie land of strangers" that do not yield rough walling stone; it is only here and there that stone suitable for finely-wrought work is obtainable—stone adapted for quoins and dressings, mullions and tracery, arcades, and decorative carvings. So far as we know the earlier churches were built entirely of stone raised on or near their sites; but it is surprising at what an early date the advantages of employing such rocks as the elvan of Pentewan, the trap of Catacleuse, and the quasi-serpentine of Polyphant were recognised. Carew mentions Pentewan and Catacleuse stone as employed in his day; but we can carry back their use to many centuries before that.

Fully half of the ancient churches of the county are partly built of stone which does not occur in their immediate locality. In fact there are very few, except in the far west, in which one may not find either Pentewan, Catacleuse, Polyphant, or St. Stephen's stone—of which more anon,—whilst for several the famous oolite quarries at Caen even were laid under contribution. I am inclined to think, however, that there has not been quite so much use made of Caen stone in Cornwall as is commonly imagined. One of the best known local building stones of Devon, that raised at Beer, and largely employed in the building of Exeter cathedral, so closely resembles Caen as to deceive a casual observer; and, since it was used so near the borders of Cornwall as the church of St. Andrew, Plymouth, it appears probable that it should have been carried west of the Tamar, as was the Roborough elvan. At the same time there is this curious fact—which shows, with the exception of the importation of Caen and the partial use of Beer and Roborough stone, how self-dependent in these matters old Cornwall was—that there are very few examples in the county of that pet ornamental stone of the mediæval architects and sculptors, Purbeck marble.

Polyphant stone was chiefly in request in the east of the county; and Catacleuse and Pentewan in its central districts. We have unmistakeable evidence of the employment of all three as early as the 12th century. There are yet extant Norman fonts in both Catacleuse and Pentewan. So too with the Polyphant; for the doorway of the White Hart, at Launceston, which once belonged to the Priory there, is in that stone. Throughout the 13th and 14th centuries, of the three the Pentewan was most largely in request. Catacleuse, however, was used for the finest work; and the noble tomb of Prior Vivian, in Bodmin church, is one of the best illustrations of its capabilities. During the Decorated period, while Pentewan and Polyphant stone were chiefly in request for ordinary dressings, Catacleuse was largely employed for window tracery, and proved admirably adapted for the purpose.

The fifteenth century swept away wholly, or in great part, most of the churches of Cornwall; and with the Perpendicular period granite, which had been somewhat in the background, came into common use again. We know now that it is capable of the highest finish; but in those days it adapted itself more

readily to Perpendicular than to Decorated forms. Moreover, the columns of the arcades were no longer built up of small pieces, as had been commonly the case in the preceding periods; and granite was the only material fitted to supply the larger blocks required. The fifteenth century was thus not only an age of church building, but of revival of granite masonry. How far that revival was carried we have abundant and interesting evidence in the ornately-wrought granite church of St. Mary Magdalene, Launceston. But there is granite and granite, and so it quickly seems to have been discovered that in the parish of St. Stephens-in-Branwell there was a granite to be found which could be worked with remarkable ease. This was very much the same as that which we now know as—indeed, in some instances quite identical with—China-stone. It speedily grew in favour, especially for the clustered columns of the period; and will be found employed in many churches, its range extending so far west even as the Lizard district. For the time it successfully rivalled Pentewan stone; and it is a curious fact that the two finest towers in Cornwall—those at Probus and St. Austell—are built, the first of St. Stephens' stone and the second of Pentewan.

Of late years, when church restorers want to make their money go as far as possible, they generally fall back upon Bath stone or Caen. St. Stephens' stone goes to the potteries; and Cataclouse is hardly ever heard of. Pentewan is still wrought on a small scale. It was employed recently in making additions to Antony House, which was originally built of that material. Polyphant, however, is rapidly coming once more to the front, and appears likely to obtain a deserved popularity. Our granite quarries, for so many centuries confined to the supply of merely local wants, have developed into one of the most important resources of the county, though, from the varying character of the demand, their operations are of necessity somewhat spasmodic.

The more specially local varieties of building stone do not call for further note; but it should be remarked with reference to the roofing slates of the Delabole district, that so far back as the days of Elizabeth, according to Carew, they were largely shipped to Brittany and the Netherlands, and that they have in no wise lost the reputation which they then enjoyed.

The capabilities of the ornamental stones of Cornwall have, in the main, yet to be developed. Nothing will ever be made of its topazes, its garnets, and its opals. They are more mineralogically interesting than pecuniarily valuable, or visually attractive. The rock crystals, however, are still employed, as they were in the days of Carew, for purposes of jewellery, and though they are not likely, as he suggests, to deceive a skilful lapidary, are yet capable of very artistic manipulation.

The granites and porphyries of the county—as all who have visited the magnificent Porphyry Hall, at Place, well know—are exceedingly beautiful, and of almost endless variety of ground and figure. But it is in the Lizard serpentine that Cornwall possesses the handsomest ornamental stone in the whole kingdom. Of the two chief varieties, the red appears to be the most popular; but some of the steatitic portions are very effective; and the green, especially where the rich-toned olive base is traversed by red veins, relieved here and there by threads of white, is incomparably the most beautiful. So far as I am aware, this magnificent decorative stone was entirely neglected throughout the middle ages. Nor is it by any means so widely known and appreciated now as its rare merits deserve. However there is much encouragement. It is gradually becoming developed; and only last year works in Cornish serpentine carried off the first and second prizes of the Turners' Company.

XV.—*Carminow of Carminow.*—By JOHN JOPE ROGERS, *Member of the Institution.*

AN attempt was made in a former number* to identify the effigy of the Carminow tomb in the Church of Mawgan in Meneage as that of Sir Roger Carminow, a crusader: and some steps in the Pedigree of that family, as given by Polwhele, were corrected from entries in original documents at Penrose.

It is now proposed to add such further information respecting the Carminows as subsequent research has brought to light; and it will be seen that whilst some erroneous statements concerning them require correction, the scanty items of their authentic history have received some accessions which it may be worth while to preserve. These records naturally fall into the following order:—

1. The origin and orthography of the name of Carminow.
2. Antiquity and pedigree of the family.
3. Arms, crest, and motto.
4. Manorial residence at Carminow.
5. Lands held by them in Cornwall.

1.—ORIGIN AND ORTHOGRAPHY OF THE NAME.

The earliest authentic document which contains the name is a fine, which is one of the title deeds of the Manor, and bears date 1 July, 12 Edward 2, (1319)—Oliver de Caermenow and Elizabeth his wife are parties to the fine, and the orthography of the name as here spelt is identical with that of the two Cornish words from which it is derived by Pryce and others, viz: *Caer-menou*, *i.e.* little castle, or fortified place, words sufficiently descriptive of the moated residence of the family, which will be more particularly noticed below. During the 14th century it was more commonly spelt *Carmynou*, *Carmynow*, *Carmino*, and did not settle down to the present form of *Carminow* until long after the absorption of the elder branch of the family into that of *Arundell* in 1396. William, of

* Journal of the R.I.C., Vol. ii, p. 143.

Worcester, in his *Itinerarium* A.D. 1478, gives the name as found by him in entries in the Bodmin Gospels thus, Kaermynaw 1299, Carmynaw 1349, Carmynaw 1369.

2.—ANTIQUITY AND PEDIGREE OF CARMINOW.

Under this head a considerable amount of romance has been allowed to take the place of proof: but when these two elements have been separated by reference to the best evidence which is attainable, it will be seen that a very respectable antiquity remains to garnish the pedigree with which so many Cornish families may claim alliance.

The earliest authority for a very remote antiquity is the celebrated Scrope and Grosvenor Roll* in which one of the witnesses is represented to have said that in the reign of Edward the 3rd, Carmynow of Cornwall had challenged Sir Richard Scrope with wrongfully bearing his arms, and that it had been found by six Knights chosen to decide the controversy (which arose in the English camp before the gates of Paris), "that Carminow was descended of a lineage armed Azure *a bend* Or since the time of King Arthur," whose death has been usually stated to have occurred in the year 542.†

The editors of the 'Visitation of Cornwall in 1620,‡ cite Cleaveland's History of the House of Courtenay, as mentioning the still more astounding tradition that one of the Carminows led a body of troops to oppose the landing of Cæsar.

Further, this family was once classed amongst those related to the blood royal.||

There seems to be no proof of this relationship, and the editors of the Visitation of 1620, appear to treat it as quite unfounded, originating in the supposition, now shown to be erroneous, that Sir Oliver Carminow's second wife Elizabeth, was the sister of John Holland, Earl of Kent, whose mother was the "fair maid of Kent," grand-daughter of Edward the first, whereas she is now shown to have been Elizabeth Pomeroy.§ The learned editors of the visitation pay the Carminows the great compliment of exhibiting a 'comparative pedigree' of

* Privately printed by Sir N. H. Nicolas, 2 Vols., ro. 8vo. 1832.

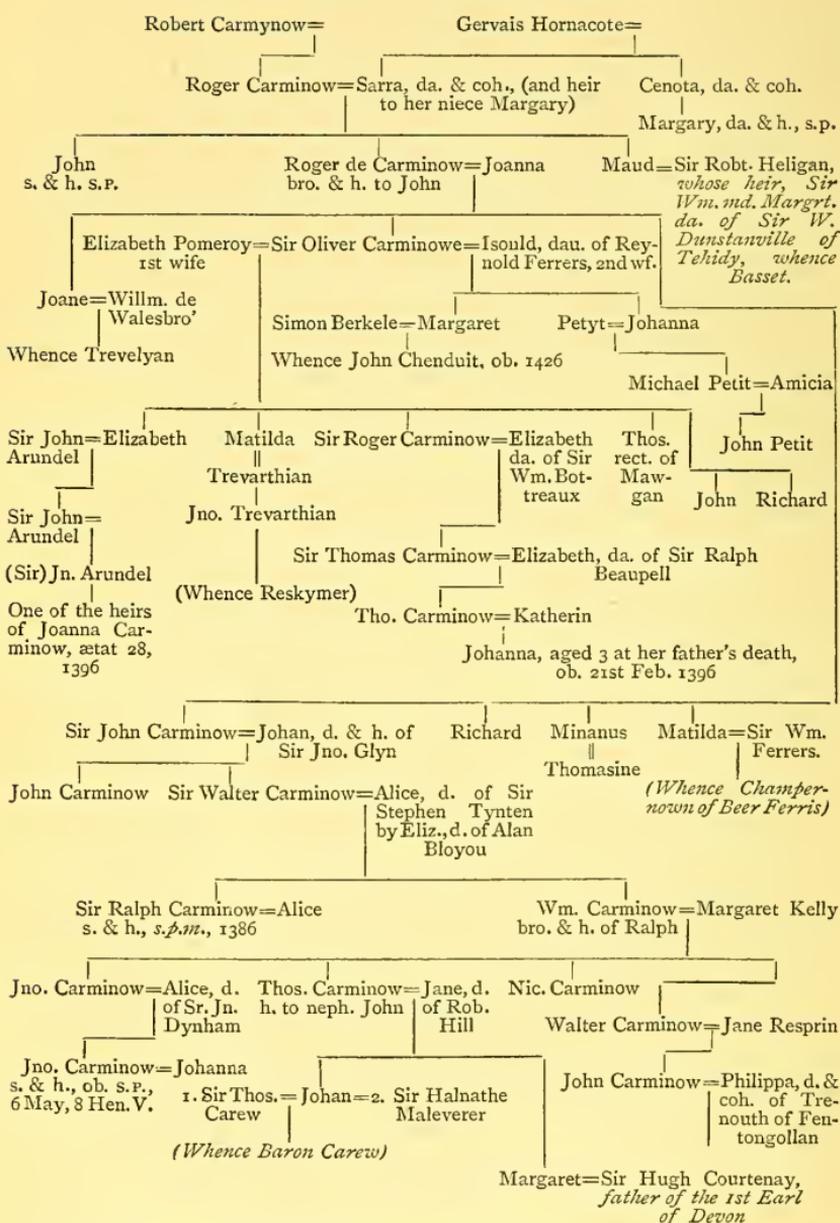
† Annals of England, 1865, Vol. i, p. 59.

‡ Vol. IX of Harleian Soc: Publ: Preface, p. vi.

|| Harl: MSS. 1074, fo. 330.

§ Vol. IX of Harleian Soc: Publ:—see Pedigree also.

PEDIGREE OF CARMINOW.



NOTE.—This pedigree of Carminow is summarised from the comparative pedigree given in the visitation of Cornwall, 1620; Harl. Socy. Publications, 1874; where the proofs can be seen in detail, with further descents.

The italics are added by J. J. R., 1875.

this family only, by means of which the errors of the Visitation pedigree may be readily observed and corrected, whilst they cite documentary evidence of the most authentic kind in proof of almost every step in the descent, from the reign of Henry the third to the death of the last heir male of the elder branch in that of Henry VI (1442).

I venture to reproduce this comparative pedigree, and it may be safely accepted by all Cornishmen who claim descent from Carminow, as the nearest approach to accuracy which is now attainable. The proofs must be studied in the volume of the Harleian Society to which reference has been made; and they well deserve the attention of all heraldic students, as shewing the great industry and care of the editors, as well as "the necessity," to use their own words, "of testing the truth of the Visitation Pedigrees by independent evidence" (Preface, p. vii). Whilst then, we must abandon the claim of relationship to the blood royal, and wait, perhaps, in vain for proof that the early valour of the Carminows was tested by the invasion of Imperial Cæsar, we may at least accept such traditions as supporting the high repute in which they were held in the days of chivalry; and if the more critical and less romantic mind of our day refuses to be satisfied with the evidence adduced in favour of their pedigree and arms being traced upwards to the time of King Arthur, Sir Harris Nicolas has at least shown that it was accepted and believed in the court of the Earl Marshal, as will be more fully noticed when we come to treat of the question of armorial bearings.

Lysons truly states that the Carminows of Carminow cannot be traced with any certainty further back than the reign of Henry III. The name does not occur in Domesday, nor in the very full index of names of places and persons in the folio Volumes of the Record Commission, "*Placitorum abbreviatio tempore Ric. I—Ed. II,*" (1189-1327). No other Public Record exists prior to the commencement of Hen. III.'s reign. Robert Carminow, who commences the pedigree, held lands, probably Carminow, by military service, 40 Hen. III,* and his son Robert appears to have inherited the adjoining Manor of Wynyantton, as well as that of Merthyn, by his marriage with the heiress of

* Visitation of Cornwall in 1620, p. 296.

Gervais de Hornacote, who had received it in exchange for the Manor of Boscyny (Bossiney) with Richard, Earl of Cornwall*—A glance at the pedigree will also shew the alliances formed with many distinguished families of Devon as well as Cornwall, whose names need not be repeated here: but a few personal distinctions may be noticed. And first and foremost stands the crusader, whose effigy, removed from the chapel at Carminow to the Parish Church of Mawgan in Meneage, as appears in Hals, † may still be seen in the Carminow aisle of that Church. In a former number, ‡ it has been shown that this was probably the effigy of Sir Roger, who in 1270 accompanied Edwd. I (then Prince) in the last crusade. His son, Sir Oliver, is stated by some writers to have been Lord Chamberlain to the King Ed: II (not Rich. II, as in Polwhele's pedigree). I find no proof of this, but he was a Knight of the Shire in 7 Ed. II, a man at arms and held £40 in lands 17 Ed. II, Commissioner of Assay 19 Ed. II, and Sheriff of Cornwall and Keeper of Launceston Castle in the following reign, as will be seen from this entry, which, however, does not mention the year.

“Rex commisit Olivero de Carmynou com: Cornub: ac castrum “Regale de Launceneton cum pert: habendum quamdiu &c.”|| About the same time (the year is again omitted), John, probably Sir Oliver's brother, was put in charge of all the Royal forests in Cornwall, thus:—“Rex commisit Johanni de Carmynou “custodiam forestarum pecorum boscorum et Warrennarum “Regis tam viridi quam de venacione in Com. Cornub. habendum “quamdiu &c.”§ Dr. Drake shews him to have been summoned to Westminster a few years' previously, 17, Ed: II, and he died in 1332.¶

Thomas, one of the younger sons of Sir Oliver, was rector of Mawgan in Meneage from 1349 to 1361.** Sir Walter, who was a minor when his father Sir John died in 1331, was in ward of John Plantagenet Earl of Cornwall.†† It may be added that

* Assize Roll, 30 Ed. I, confirmed by minutes of Duchy Council in 1353.

† Davies Gilbert, Hist: Cornwall, III, 129.

‡ Journal R.I.C., ii, 143.

|| Rot. Originalium Abbreviatio Ed. 3, Vol. 2, Ro. 16.

§ Ibidem, Ro. 8.

¶ Visitation, c. 297.

** Episcopal Register, and deed dated 16 Ed: III, at Penrose.

†† Pipe office roll, cited in Visit: 1620, p. 297.

Fig. 1.



Fig. 2.

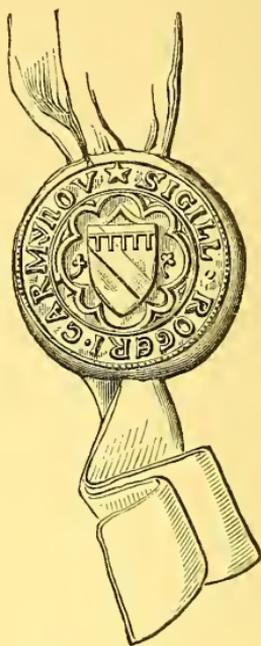
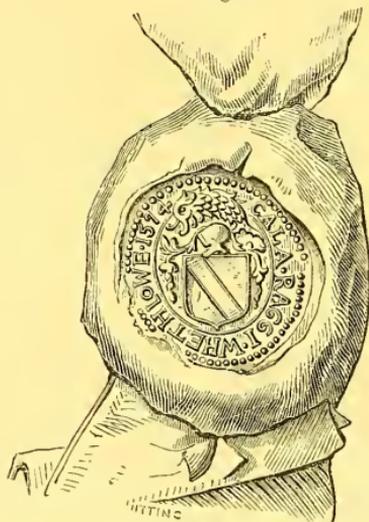


Fig. 3.



Oliver Carmynow

Fig. 1. Seal of Sir Oliver de Carmino.

Fig. 2. Seal of his eldest son, Roger Carmynou. Both slightly enlarged, from the same indenture, dated 1342.

Fig. 3. Seal and signature of Oliver Carmynow of Fentongollan, A.D. 1593. Original size.

Sir John Arundell, who by his grandfather's marriage succeeded to the manors of Carminow and Winnianton on the death of Joanna Carminow, in 1396, held the office of the King's Seneschal in Cornwall, and died in 1433. The manors remained in the Arundell family until 1801, when they were sold.

These scanty items are all that exist of the personal history of the family, and though none of them adorn the page of English history, there can be little doubt that the important alliances which they formed with other influential families, contributed to maintain their position among the worthies of our county some centuries after the failure of the elder branch.

3.—ARMS, CREST AND MOTTO.

The arms of Carminow are *Azure, a bend Or*;—crest, a Dolphin embowed; motto, *cala raggi whethlowe*, (a straw for those tales).* It has been long supposed that this coat was differenced by a label of three points, *Gules*; but it can be satisfactorily shown that this difference was never adopted by the elder branch of the family, nor, so far as I am aware, by the head of any other branch of it. C. S. Gilbert, indeed, represents the arms as thus differenced, in the 2nd Vol. of his *History of Cornwall*, plate 6, and other authors of credit and repute have treated the label as a part of the family coat. The most recent of these, Sir John Maclean, in his history of the Deanery of Trigg, shews the label, in the coat with which he illustrates a general table of Cornish descents. (Vol. i, p. 317.) The original Pedigree of Carminow also, as given in Harl, MS. 1164, fo. 81, is headed by a shield drawn for twelve quarterings, eleven of which are left blank. The first quarter is tricked *Az. : a bend or, with a label of three, Gules*; and the Carminow arms are similarly differenced in the fifteenth quartering of the Grenville coat in the same Volume, probably by the same hand.† These indications of the label cannot, however, be received as good authority, but, on the contrary, may safely be rejected as among the acknowledged inaccuracies of the MS., because the writer himself represents the two seals of the deeds which were offered in proof of the armorial bearings as having no label.‡

* See engraving of Seal of Oliver Carminow, 1593.

† A reduced fac simile of this Grenville coat forms the frontispiece of the published Visitation of 1620.

‡ See the notice of these seals below, pp. 226-7, and the Visitation of 1620, page 33.

The authority which has usually been cited for this difference is the fabulous decision of the Earl Marshal's Court, which is to be found related fully by Hals, the Historian, and adopted without enquiry by Mr. Davies Gilbert, and others. But the light thrown on the subject by later research directly contradicts this fable, whilst it can be shown from independent and original sources that the Carminows of Carminow did in fact bear these arms, without a difference, from the birth of Sir Roger the crusader until the close of Queen Elizabeth's reign, a period of 330 years at least. The proofs are arranged in order of date.

1. A.D. 1263. The shield of the knight's effigy at Mawgan Church in Meneage retains the bend distinct, whilst no trace whatever of the label can be detected. He died in 1308 (inq: p. m. 2 Ed. ii), leaving a numerous family. (See pedigree.)

Assuming that he was at least 45 years old at his death, and that he bore the same arms all his life, this establishes the year 1263 as the approximate date to which the effigy takes us back.

2. A.D. 1342. The seal of Sir Oliver, his son, attached to a grant of this date to his own eldest son Roger, has no label; and it is remarkable that the counterpart of the same indenture, also preserved at Penrose, is sealed with Roger's seal, differenced with a label, as it should be, for the eldest son. Each seal is inscribed with the name of its owner; and as if to leave no room for doubt, a second impression of each seal is preserved among the title deeds at Penrose.*

3, 4. A.D. 1338, 1357. Drawings in pen and ink of the seal of the same Sir Oliver attached to a deed of his, dated at Carminow, 1338, and exhibited in proof of Pedigrees at the Visitation of 1620, and of the seal of Thomas Carminow, who married Elizabeth Beupel, are to be seen in Harl: MS. 1164, each without a label.

5. A.D. 1383. The seal of Thomas, son of the last named Thomas, attached to a deed of this date preserved at the Record office, has no label.† A tracing of this seal was sent to me by Dr. Drake.

6. A.D. 1580. A half-length portrait of Sir Thomas Arundel of Wardour, inscribed "anno 1580, ætatis suæ 20." On the

* See plate, fig: 1. 2.

† Domestic Deeds, 7. Ric: II. No. 16.

sinister side a coat of arms quarterly, displaying Arundell, Dynham, Chideocke, and "4th Azure, a bend Or, for Carminow."

The subject of this portrait was the grandson of Sir Thomas Arundell and Margaret Howard, sister of Queen Katherine, fifth wife of Henry VIII, and was created first Baron Arundell May 4, 1605.* He died November 7, 1639.

7. A.D. 1593. The seal of Oliver Carmynowe attached to a deed which bears his signature, also at the Record Office, has no label.†

The Scrope and Grosvenor Roll has already been cited in support of the antiquity of this family; let us now see what aid it gives to these proofs of the undifferenced arms. A few words are necessary by way of introduction of this important document. The Roll contains a record in Norman French of the trial, in the Earl Marshal's Court, in the reign of Richard II, of a controversy between Sir Richard le Scrope and Sir Robert Grosvenor as to the right of the latter to bear the same arms as Scrope. The trial lasted more than four years, 1385 to 1390. Judgment was given by the King in person in favour of Scrope. Scopes' arms are the same as Carminow.‡

The parchment Roll was formerly at the Tower, and is now at the Public Record Office. It is of great length, formed of separate membranes united. It is imperfect, in having lost the judgment of the King and the depositions of many witnesses. More than 200 witnesses gave evidence in favour of Scrope, and amongst them were some of the most famous personages of the time, e.g. John of Gaunt, Duke of Lancaster, and the poet Chaucer. The depositions were taken, in part, if not wholly, at the Palace of John of Gaunt in the Friar's Carmelites at Plymouth, by Commissioners appointed by the Constable. John of Gaunt was about to set out from Plymouth in 1386 on an expedition to recover the kingdom of Castile and Leou, which he claimed in right

* This portrait was exhibited June 5, 1874. See *Journal of R. Archæol. Inst.*: Vol : 31, p. 303

† See plate, fig : 3.

‡ These particulars are gathered from Sir Harris Nicolas' handsome work the "Scrope and Grosvenor Controversy," imp. 8vo., privately printed 1832, 150 copies only, with preface, notes, and illustrations; to which he intended to add a 3rd volume relating to Carminow, &c., never printed.

of his second wife Constance. Sir Harris Nicolas supplies the final judgment of the King from a MS. which appears to be an abstract of the original Roll made when it was in a perfect state in the reign of Elizabeth. (Harl: MS. 293, p. 191).

According to this MS. the judgment of Richard II was given on May 27, 1390, in the great chamber of Parliament at Westminster, in the presence of Royal Dukes Peers, and Officers, "that th' armes shuld whollye remayne to Sr. Rychard Scroope and his heyres, and Mr. Grosvenor to have no pte thereof, bycawse he was a stranger unto the same." Five hundred marks were ordered to be paid by Grosvenor to Scroope for costs, but this was generously given up by Scroope, upon a public acknowledgement by Grosvenor "that his witnesses had lied.* After this scanty summary, we must hasten to that part of the evidence which concerns our present enquiry.

John of Gaunt was the first witness who deposed in favour of Scroope on the 16th June, 1386. He said, in the language of Nicolas, translated from the Norman French of the Roll,—

"We saye and testify, that at the last expedition in France of our most dread lord and father, on whom God have mercy, a controversy arose concerning the said arms between Sir Richard le Scroope aforesaid and one called Carminow of Cornwall, † which Carminow challenged these arms of the said Sir Richard, the which dispute was referred to six knights, now, as I think, dead, who upon true evidence found the said Carminow to be descended of a lineage armed 'Azure, a bend Or,' since the time of King Arthur; and they found that the said Sir Richard was descended of a right line of ancestry armed with the same arms, 'Azure, a bend Or,' since the time of King William the Conqueror: *and so it was adjudged that both might bear the arms entire.* ‡

Four other witnesses, Sir Thomas Fychet, § Nicholas Sabraham || and John Rither, ¶ Esquires, and John Topclyffe, ** æt. 60, one of Grosvenor's witnesses, also depose to the same effect with

* See 3rd Report of Deputy Keeper of Records, p. 191. Bibliotheca Cornubiensis, Nicolas, p. 395, 1874.

† The words are "Carmynau de Cornwale" in the original Roll.

‡ Sir H. Nicolas' Roll, Vol. II, p. 163-5.

§ Ibidem, p. 206 || Ibidem, p. 324. ¶ Ib: p. 354. ** Ib: p. 213, vol. I.

respect to Carminow, Fychet calling him Thomas Carminow. These five testimonies are given in the Norman French from the Roll, in the Preface to the Visitation of Cornwall already quoted, p. vi.

Besides these, six other witnesses for Grosvenor refer also to one Daniell as having challenged Carminow's right; but all agree in this, *that he was allowed to bear his arms entire.*

Perhaps it will be considered that a statement so circumstantial as that of John of Gaunt, supported by so many witnesses, against the label, if not strictly legal evidence to satisfy the critical spirit of the present day, may at least be accepted in proof of a general belief at the time, that Carminow bore these arms without a difference. But when we find the statement supported by effigy and seals which shew actual user of this coat by four generations prior to the death of Edward III. (1377), and two seals and a portrait since the date at which John of Gaunt is made to speak, the chain of evidence seems complete and irresistible, and the label must be expunged at once, as quite foreign to the Carminow coat. Lysons, in his *Magna Britannia*, and Burke, in his *general Armoury*, both good authorities, give the coat Azure, a bend Or.

And now having set up our new authorities, it becomes necessary to dispose of that on which the label has been assumed. It has been already stated that the authority relied on is that of Hals, as quoted by Davies Gilbert.* Hals, indeed, there asserts, in effect, that in the year 1360 Lord Richard Scrope, Lord Chancellor of England, temp. Edward III, challenged Ralph Carmenow (Sheriff of Cornwall, in 1379), with unlawfully assuming his arms, viz. :—azure, a bend or. The trial took place in the Earl Marshal's Court, arguments and proofs were offered on either side, and after a full view and hearing of what could be said and shown on either part by learned council, as to records, manuscripts, deeds and pedigrees, the Earl Marshal in Westminster Hall gave judgment for the plaintiff (Scrope) that Carminow should never more give the arms aforesaid without a label of three points gules, for a distinction—Carminow paying costs, and ever after using this difference. Such in brief is Hals' account; and he proceeds to infer that the family motto which he

* See the full account in Davies Gilbert's *Hist : Cornw* : Vol III, p. 129.

interprets "a straw for fame, or breath," was then assumed by the family to manifest their distaste for the judgment against them.* Now, although Davies Gilbert adopts this fable and erroneous motto, and quotes Lysons as referring to a *totally different* controversy on the same armorial coat, namely, that which had then recently been published by Sir Harris Nicolas, as the "Scrope and Grosvenor Controversy," it will be admitted by any one who will be at the pains to examine that famous but rare treatise, that Hals' story would be somewhat nearer the truth if *Grosvenor* were read for *Carminow* throughout. It is very possible that Hals may have examined the original Roll in the Tower, but more likely that he got his information from the abstract of the case made in the reign of Elizabeth, and now in the British Museum, Harl: 293, fo. 191.

The Scrope and Grosvenor Roll contains a reference to the previous challenge of Scrope's arms by Carminow, and thus satisfies D. Gilbert's two controversies, whilst a little carelessness in transcribing by Hals will account for almost every invention of his on the main point, namely, the order for use of the label of difference.

Hals, indeed, is known to have introduced so many inaccuracies and fables into his History, that it was mainly because of the offence given in many quarters by these very faults that the book was never completed.

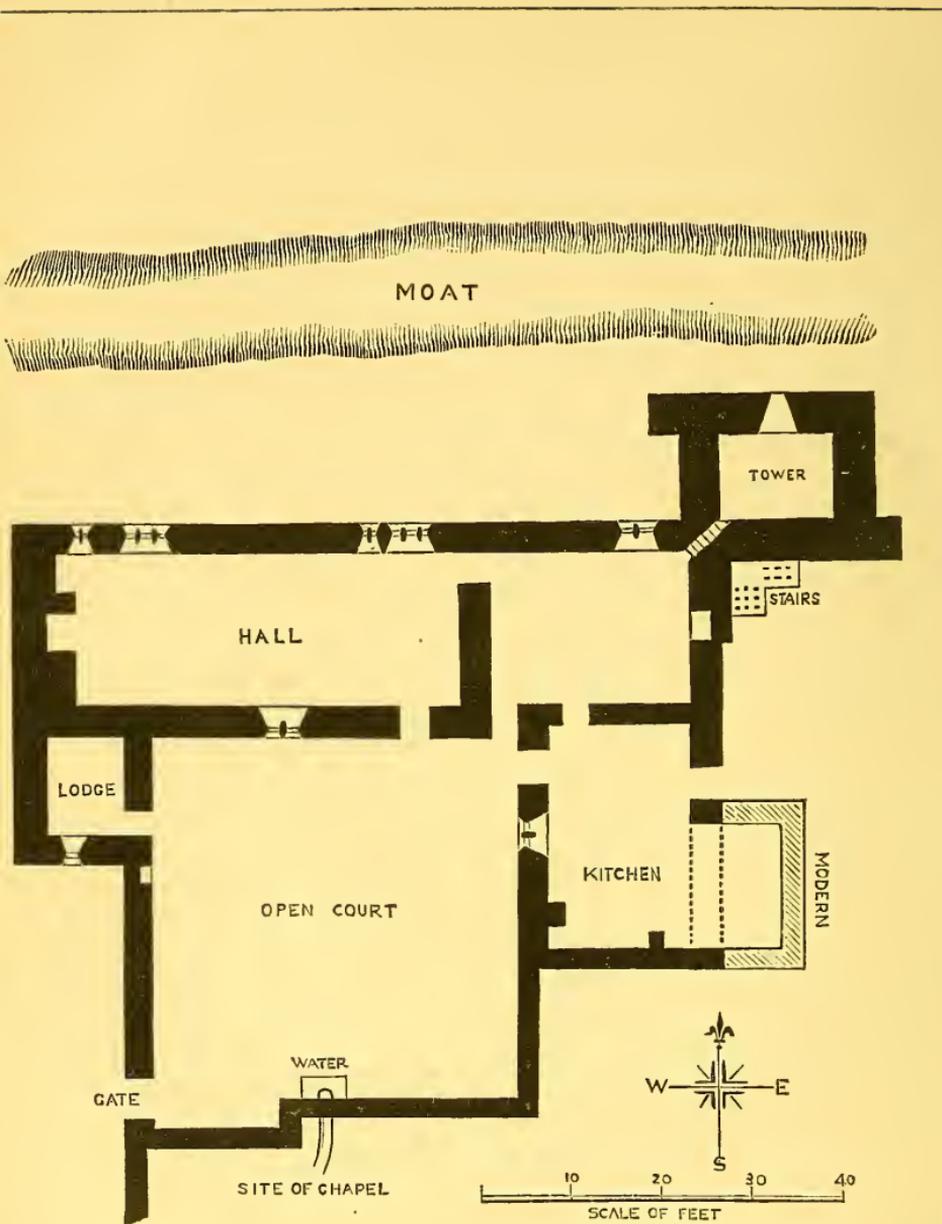
The motto used by Carminow has already been given as *Cala raggi Whethlowe*, on the authority of the seal of 1593. The words are pure Cornish, but they have been hitherto variously spelt and interpreted, owing to the carelessness of copyists, and the want of a standard authority. C. S. Gilbert has *Cala rag Whetlow*.† Pryce,‡ in his *Cornish Grammar* under the word *Whetlow*, has "*Cala rhag Whetlow*, a "straw for a tale bearer: —*Carminoe's motto*."

The reading which I have given above has, however, the better authority of the seal of Oliver Carminow of Fentongollan, discovered by Mr. Evelyn Rashleigh of Menabilly at the Record

* Hals, as cited by Davies Gilbert, *Hist*: c. III, p. 129.

† Arms, plate VI, Vol. II. of his History.

‡ *Archæologia Cornu. Britannica*, 4to, Sherborne, 1790.



Ground Plan of Carminow Manor House.

[To face Part 4.

Office in June 1874.* This seal is in an excellent state of preservation, and is attached to a signed Deed of Oliver Carmynowe, dated 10th May, 1593 (35 Eliz).

The Fentongollan branch of the family having descended from that of Carminow, we may consider this to be the correct reading of their motto, *Cala raggi Whethlowe*, and it differs so slightly from those of Pryce and C. S. Gilbert, that it is probable that those authors derived them from some authentic documents.

Rag and Rhag seem to have been used indifferently as meaning "for," gi "those," Whethlowe, according to Williams,† the most recent authority, being the plural inflection of Whethl, a tale; "A Straw for those Tales."

The origin of the motto must remain at present in obscurity; but it certainly cannot have been assumed for the reason given by Hals, because the story on which it was based has been shown to be a pure fable.

4.—MANORIAL RESIDENCE AT CARMINOW.

It has been already stated that the family cannot be traced with any certainty farther back than Henry III, but it may very fairly be assumed that they resided at Carminow some generations at least before the marriage of Roger with heiress of Gervais de Hornacote in that reign, for it is not to be supposed that an upstart would be allowed to form such an alliance: and so far as it is possible to judge from the few remains of early carved stones which exist, it is probable that a building of some pretension was erected there at least as early as the reign of Henry III ‡

Although, as has been already said, the name Carminow is not to be found in Domesday, yet the manor of *Caer* is mentioned both in the Exchequer Domesday, and in that of Exeter, from which the former is supposed by Sir Henry Ellis to have been compiled. *Caer* has been shown to have been the earliest form of the first syllable of the family name, and this name of *Caer* is entered in the Exeter Domesday next in order to that of Winnianton, which it adjoins, just as one would expect to find it placed in the original entry of the itinerant commissioners who were employed in the survey.

* See plate, fig. 3.

† Rev. Rob. Williams' *Lexicon Cornu. Britannicam*, 4°, 1865.

‡ Two stone chimney pieces are of Early English type, A.D. 1225-50.

It is very probable, therefore, that Caer may have been Carminow of the present day, and the actual residence of the family before the conquest.

The site is not ill-chosen for satisfying the modest wants of that period. Placed at the western extremity of the parish of Mawgan in Meneage, about a mile from the Carminow creek of the Loe, it is sufficiently elevated above the lake and the sea for the purpose of defence in case of attack, whilst its distance from the sea coast, also about a mile, gave it some degree of shelter from the atlantic gales; a moat, still uneffaced, on the N. and S. sides, surrounded the buildings, including the chapel, but not the burial ground, whilst an abundant supply of the purest water, good pasture, and wood within a stone's throw, afforded the necessaries of life; and the lovers of the chase enjoyed the exclusive right over some 1600 acres of land. One of them, indeed, Sir Ralph * is said to have lost his life by being pulled over the cliff by a brace of greyhounds.

An extensive northern view is obtained from the old burial ground which lies outside the moat on the south side, and at an elevation of a few feet above the level of the buildings, whilst the distant range of western land beyond Penzance is clearly seen over the Carminow creek of Loe Pool.

The buildings were arranged around an open court of forty feet square. A conduit of pure water was brought into the court from a neighbouring spring, supplying a trough of stone on the south side, and opposite to the entrance of the Hall. A large stone arched gateway of Tudor date formed the W. entrance to the court, whose north and east sides were bounded by the manor house. The house was planned in the form of a letter L, and consisted of an entrance hall 40 feet long, having a large open fireplace of granite, of early English type, in its western wall, which was six feet thick, the other walls being of an uniform thickness of three feet, built of the clay slate of the country, except the jambs of doors and windows, which were of well cut elvan. The kitchen formed the eastern wing, and two large chambers, possibly subdivided by partitions of wood, occupied the floor above the hall and kitchen. A tower of three stories projected from the N.E. angle, the lowest story being

* He died 1386, inq. : p. m. 10 Ric. : II.

rather below the level of the hall, accessible from it by steps, and forming a cellar, with a room over it for the lord's private use, and a chamber or chambers above.

These latter were only accessible by an external stone staircase, built in the receding angle on the south-east of the Tower. The Tower was buttressed on the E. and W. sides only. The cellar walls were 4 ft. thick. A small western wing attached to the S. front of the Hall served as a Porter's Lodge, with a chamber over it, which was reached from the Court by another external stair of stone; and an arched recess near the door of the lodge (always called the Porter's chair) served as his seat in summer. The only window of the lodge was a narrow light in the south wall, commanding the approach to the gate of entrance externally. On the south side tradition places the site of the chapel, which is stated in one of the Carminow deeds* to have been in ruins in 1561; and as we learn from Hals that the effigy of the Crusader was removed from its place in the Chapel to the parish Church of Mawgan in Meneage in the reign of James 1st, and that the ruined walls of the chapel were still visible in Hals' time,† it may be safely concluded that it was never afterwards restored.

The only remains of Ecclesiastical windows which were discovered in 1861 were found built into the walls of the tower, in such a way as to shew conclusively that they formed no part of its design, but had belonged to another part of the buildings, very probably the ruined chapel, and that the tower was of more recent date than the rest of the Manor House, the hall door of which was a simple equilateral arch of Edwardian type, with a continuous chamfered edge well cut in elvan. The lodge door and windows, as well as some windows of the house were, apparently, of the same date, whilst two well executed ogee trefoiled lights of a later date, now preserved in the newly erected farmhouse, were amongst the remains found within the walls of the tower. The chamber over the hall contained an Early English fire-place, of the greenstone of the neighbour-

* The deed referred to is a lease of the Barton of Carminow, by John Arundell, of Lanherne, to Isabell St. Aubyn. The chapel is thus excepted from the general covenant to repair:—"Excepting and savynge onne Chapel yn Carminow aforesaid, now yn ruyn and decaye."

† D. Gilberts' Cornwall, vol. 3, p. 132.

hood, of different size and plan, as well as material, from that in the hall below, but these were, probably, co-eval, as the same chimney served for both. Massive stone sconces, or brackets, for holding lamps or candles, projected like corbels from the western wall of the hall chamber, high up on either side of the fire. These, together with the doorways, windows, and all other characteristic fragments of earlier architecture, have been built into the different parts of the new buildings, as the best mode of preserving them. Two only of the windows of the Manor house appear to remain unaltered from their original form. These were in the north wall, overlooking the moat, and were square-headed, stone-mullioned, without labels, and quite decayed with age. The whole manor house seemed to have been rebuilt long ago out of the materials of a former house, of the date of Henry III and later reigns, the tower being the most recent part.

In modern times frequent use is said to have been made of these venerable walls for storing smuggled goods. A well-served boat was always ready in the barn for conveyance to Gunwalloe beach, and two roomy caves or cellars were found in 1861, sufficient for the storage of a very respectable number of casks. These were concealed beneath the floors of the stable and barn, one of them being furnished with a closely-fitted cover of stone sufficiently below the floor to allow the pavement of small stones to be relaid upon it, and covered with a bedding of straw for the horses, as soon as the precious contents had been safely lodged in the cellar beneath. A labourer, who died quite recently, and was employed as a farm boy at Carminow half a century ago, used to relate the hair-breadth escapes which his employer had in securing his boat and cargo here. But these days of adventure are now almost forgotten, whilst merged in the history of the past, and the caves are no longer to be seen.

Untenanted by a lord of the manor since the reign of Queen Elizabeth, the buildings were divided between the two farmers to whom the Barton was since leased, and substantial repairs ceased to be executed, until, at length, the whole became so ruinous, that it only remained for the severe storms which swept the coast in the winter of 1860-1, to unroof and destroy so much of the walls, that it was found necessary to remove them without delay. An entirely new suite of buildings, including a dwelling house, has since been erected on the site, on a plan more suited to the

requirements of modern husbandry; and the clear spring of water, the moat, and the neighbouring woods, together with the fragments of carved stones shown in the new walls, are all that remain as records of the days of chivalry.

5.—LANDS HELD BY THE CARMINOW FAMILY.

It only remains to collect the few proofs of their lands in Cornwall, and to give a list of the names of witnesses and other persons which occur in the title deeds from which these proofs are mainly taken, so far as they serve to illustrate the pedigree, or are connected with general or local history.

The lands conveyed in these deeds are supplemented by reference to other lands mentioned in the inquisitions held upon the deaths of such members of the family as were in the direct descent, and inherited the lands successively.

Eleven early deeds of title of the two manors of Carminow and Winnianton are preserved at Penrose, bearing dates from the year 1319 to 1360. Seven of these are dated at Carminow, one at Wynianton, and one at Landekye, a place which I have failed to identify. These are deeds of the Carminow family. Several deeds also of the Arundells of Lanherne, commencing with the year 1457, continue the title to more recent times. With few exceptions they are in a very good state of preservation, owing to the lands which they convey having changed hands only once in five centuries.

The first mention of lands occurs in the year 1284, when Sir Roger de Carminow, the crusader, is named as holding Estdysart and Westdysart, which seem to have come to him through his mother, as heiress of Hornacote.* These deeds were probably parcel of the Manor of Hornacote in Stratton. In 1299 the same Sir Roger is taxed for his part of Winianton, Merthyn, and Tamerton,† and again in 1303 for the same lands, on the marriage of the eldest daughter of the king, Edward III.‡ This was on the marriage of Joan of Acre, who was born in Palestine in 1272, and who, after the death of her first husband Gilbert de Clare Earl of Gloucester in 1295, married secondly Ralph de Monthermer in 1303. She died in 1307.

* Assize roll, Cornwall, 12 ed., 1.

† Scutagium Scotiæ, 28 Ed. 1.

‡ Roll of fees for marriage of King's eldest daughter, 31 Ed. 1.

In 1319 the earliest mention is made of the manor of Carminow. In this year, by a fine preserved at Penrose, Sir Oliver and his wife, Elizabeth Pomeroy, settle in tail the manors of Carminow and Trethenes, or Tredenes, with land in Wytston (Whitstone), and the advowsons of Ruan, Eglosros, and Wytston. Another fine, at the Record office, adds Kenel to these manors as held in dowry by Joan, the mother of Sir Oliver. The deeds at Penrose also shew several dealings with these manors by way of settlement and lease by the Carminows; and one of the fines at the Record office shews that in 1308, on the death of Sir Roger, the king "received the homage of his son and heir Sir Oliver" (who is described as being 30 years old at his father's death), "for the lands held by him and his father, Roger, in capite, and gave him full seizin."* Another fine records that in 1331 Sir John de Carminow, who died in that year, held his lands also as tenant in capite, *i.e.*, directly from the king, as in knight service: "tenuit in capite terras et tementa in dominico suo ut de feodo, die quo obiit."† Further, on the death of Joanna, the heiress, who died in 1396, and on whose death, Arundell and Trevarthian succeeded to all the Carminow estates, we find, by the inquisition, preserved at the Record office, that she was seized of the manors of Wynianton, Merthyn, Rosewyk, Kenel, Trethenes, with lands in Stikker, Trelewyth, Whitstone, and Eglosros, and the advowsons of S. Ruan Minor, Whitstone and Eglosros (Philleigh), and that her grandmother, Elizabeth (Beaupel), who seems to have been still alive, held the manor of Carminow, with the advowsons of S. Ruan Major and Wynwolay (Gunwalloe).‡ These were large possessions in the 14th century. Many other entries might be cited, but they only confirm the statements already made.

The manors of Wynianton, Merthyr, and Tamerton were derived from Gervais de Hornacote (sometimes spelt Hornyngcote, and Hornington), who obtained them by exchange with Richard, Earl of Cornwall, for the manor of Bosciney|| (Bossiney).

* Fine Roll, 2 ed., 2.—Inqu. p.m., 2 Ed., 2.

† Fine Roll, 5 ed., 3.

‡ Inqui. p.m., 19, Ric., 2.

|| Assize Roll, 30, Ed. 1; see also Visitation of Cornwall, 1620, p. 299, note.

Among the names which occur in the deeds at Penrose are:—

1. A.D. 1319. Five Justiciarii, or superior Judges, in the reign of Edward II, namely Johannes Bacun, Johannes de Benstede, Willielmus de Bereford,* Johannes de Mutford, and Gilbertus Roubiry.

2. A.D. 1353, 1357. Johannes Dabnoun, Seneschal of the Duchy, and Vicecomes Cornub:—Johannes Hamely, Vicecomes. A.D. 1357, Mons. Johan de Sully, chivaler. A.D. 1360, Will: Treeul, Rector of S. Ruan.

3. Persons allied to Carminow by marriage, &c.

A.D. 1585. Barkley, Edward and Elizabeth.

1429. Basset, John.

1357, 1360. Beupel, Sir Ralph.

1336. Bloyou, Ralph de.

1348. „ Thomas de.

1336, 8, 43. Botreaux, Sir Wm. and Sir Reginald.

1342. „ Master Walter.

1360. Erysy, Johannes de.

1337. Glyn, Petrus de.

1353. Hornycote, Gervas de.†

1348. Roskymer, Rogerus de, Knight.

1336. „ Ralph.

1448. „ Richard.

1319. Walebreus, Wm. de.

1340, 2, 57, 1430. Walesbreu, Sir Wm.

1430. „ Thomas.

And with these evidences of the antiquity of this once famous house, and the traditions of its connection with the history of King Arthur, may we not fancy that the creek of Carminow on the Loe Pool was the scene of the tragic and mystic ending of that King's life, and that the waters of the Loe received his sword Excalibur when cast into the lake by his faithful Knight Sir Bedivere, and bore the dying King in the phantom barge softly and silently to the realms of the dead?

* W. de Bereford was summoned to Parliament 8 Ed. 2, 1314. Nicolas Testamenta vetusta, p. 54, n.

† This name occurs in the Minutes of the Council of the Black Prince, at Mount Edgecumbe.

Our poet Laureate shall describe the scene of his last battle.

The King

Made at the man : then Modred smote his liege
 Hard on that helm which many a heathen sword
 Had beaten thin ; while Arthur at one blow,
 Striking the last stroke with Excalibur,
 Slew him, and all but slain himself he fell.
 So all day long the noise of battle roll'd
 Among the mountains by the winter sea ;
 Until King Arthur's table, man by man,
 Had fall'n in Lyonesse about their lord,
 King Arthur. Then, because his wound was deep,
 The bold Sir Bedivere uplifted him,
 And bore him to a chapel nigh the field,
 A broken chancel with a broken cross,
 That stood on a dark strait of barren land :
 On one side lay the ocean, and on one
 Lay a great water—'

Tennyson's "Passing of Arthur."

And if we follow the Poet's fancy of the barge receding into distance, as it bears King Arthur to his destiny, and watch it 'pass on and on and go from less to less and vanish into light,' we shall surely feel persuaded that the waters of the west on which the Knights of Carminow more recently looked down from their moated chamber, are the only western waters that will satisfy the poet's dream.

For if it be objected by the sceptic that the condition of the "long water opening on the deep somewhere far off," is absent here, we answer that the waters of the Loe once opened on the deep Atlantic, before the present bar of shingle closed its mouth, and why not in King Arthur's time ?

THE AUTUMN EXCURSION.

The following account of the Excursion has been taken almost *verbatim* from the *Western Morning News*, of Wednesday, August 25th, and the *Cornwall Gazette*, of Friday, August 27th. The accuracy and ability of the narrators are willingly acknowledged on the part of the Institution.

The members of the Royal Institution of Cornwall, with their friends, had their annual excursion, on Tuesday, August 24th, in the neighbourhood of St. Austell, and as the weather was delightful, the objects of interest abundant, and the arrangements perfect, they had a very pleasant trip. The party included, in addition to a number of ladies, Dr. Jago, F.R.S., *President* of the Institution; Mr. J. Rashleigh, (Menabilly), *Vice-President*; Dr. Barham, *Member of Council*; Dr. Foster, F.G.S., *Hon. Sec.*; Mr. J. H. Collins, F.G.S., *Hon. Sec.*; Sir John Maclean, F.S.A., *Corr. Mem.*; Rev. T. Bennetts, Mr. Randolph Clay, an American gentleman, who is studying mining in this country, Mr. T. A. Cragoe, Dr. Drake, Messrs. R. H. Fox, E. Heard, J. James, B. Kitto, F.G.S., T. Olver, M. Louis Pelatan, a French gentleman, from the *Ecole des Mines*, Messrs. J. Phillips, M. Quin, J. J. Rogers, (Penrose), Rev. H. S. Slight, Messrs. W. Symons, R. N. Worth, F.G.S., and others.

The district chosen for this year's excursion being more suggestive of natural science than archæology, Mr. Collins, F.G.S., was the chosen counsellor and guide, and right well he performed the task of inducting us into the mysteries of china-clay manufacture; with the aid of Dr. Foster, he made plain the constantly varying geological features of the district. But we were far from being dependent upon geology for our mental feast. The archæologist was able to revel in the contemplation of objects whose history is lost in the obscurity of far distant ages, and to form his own theories unhampered by inconvenient facts, whilst the *no-ologists*, who we fear formed some portion of the party, found interest and entertainment in the pretty and not unfrequently weird traditions which have taken the place of authentic history.

St. Austell Railway Station was the rendezvous, and thence a little after ten the party started in a series of wagonettes. The route lay through St. Austell, and by the Bodmin road, along the pleasantly wooded valley up which that road is carried for a considerable distance. The first halt was called at what was once known as Higher Blowing House, now Trethowel, where is the entrance to the charming grounds of Mr. E. Martin. These occupy the whole of the bottom and western side of the valley. Here Mr. and Miss Martin were in waiting to receive their guests, who, after an inspection of some magnificent specimens of tin stone from the clay works below Great Beam Mine, strolled through the grounds to visit the ancient holy well of Menacuddle. Pleasant, indeed, the stroll was. Rhododendrons and ferns flourish on every hand in the richest luxuriance, the turf is like a perfect velvet, and the trees verdant exceedingly. Menacuddle Well, or Baptistry, as it is sometimes called, is a low rude granite structure, with ribbed roof, built over a natural spring of pure water. It appears to date from somewhere about the Late Decorated period. To the well many traditions belong, and it is supposed to have been one of those holy wells, like the present Holiwell in Wales, to which cripples and other afflicted persons resorted for the cure of their ailment. However, if crutches were formerly hung up to testify to the healing powers of the waters they have now disappeared, and Menacuddle is no more a place of pilgrimage. Mr. Martin takes the greatest care of these interesting remains; and this fact, with his kindness in receiving the excursionists, was duly acknowledged by the President before leaving.

Up and up then wound the road; the wooded valley was quickly exchanged for the rugged moor; and we entered the region of china clay, where gaping pits yawn on every hand, where the streams all run with milk instead of water, and where large burrows of sand and rubble meet the eye in every direction. But even in this wild spot the law of compensation holds good. The heights once gained, let the eye range away from that which lies nearest, and it takes in a glorious view—stretching, mile after mile, away to the northward and eastward, over the Tregoss Moors, until it is bounded by Castle-an-Dinas and Belovely Beacon in one direction, and by the twin chief heights of Cornwall, Rough Tor and Brown Willy, clearly cut against the blue

sky, on the other. It is a view to be studied and remembered. The next halt is for the purpose of inspecting some interesting workings for felspar, which occur at the "Glass Mine" in connection with what is termed giant granite on the right hand side of the road, about half-a-mile from Roche. The granitic constituents are combined in such large masses that it is easy to select blocks of felspar of considerable size. This felspar in former times found a good market in the Potteries, but it has been of late years superseded by the felspar from Norway, which is obtainable in a state of greater purity, so that it is not worked at present. By this time the fine granitic mass which in Devonshire would be called Roche Tor, but which in Cornwall is known by the simpler name of Roche Rock, is well in view. It rises suddenly from the plain very much like Vixen Tor, on Dartmoor, and is just such another rugged, half castelated pile, though its grandeur is by no means appreciated at the first glance. Arrived at the rock ten minutes and something over (not railway fashion) were allowed for the "light refreshments," which had been brought along in sundry boxes, whereon the officials had been observed to keep a watchful eye. This done the party were ready for the serious work of the day.

Roche Rock, be it observed, is a rock with a history. Some very religious people—popular tradition says a hermit, but he must had helpers in that work—being of an aspiring mind, built a little chapel and dwelling on the very summit of the central pile; for Roche Rock is not one but a group. Weathered until in colour its walls are indistinguishable from the rock on which they are founded, and of which they are built, and nobly simple in its design; this little hermitage—it is the easiest name to use—fallen into ruins though it be, looks singularly romantic perched up aloft, especially when viewed from the eastward, when rock and hermitage together make up a picture that even Cornwall cannot beat. The chapel consists of two storeys, both of which some persons contend were used for worship, but certainly the upper one was; it has a Pointed window, and a well-formed piscina. The lower compartment was more likely a cell. The dimensions of the chapel are about 22 ft. by 10 ft. One of the Tregarrick family—John Tregarrick was M.P. for Truro in 1383,—is said to have been the last inhabitant of the cell. Nor is the element of weird association wanting. In the

upper storey of the building is a large window. That is the veritable opening through which, when the devil chases Tregagle, wearied with the task of dipping out Dozmare Pool with a hole-ly limpet shell, over the wild moorlands, the poor giant places his head, and is thenceforward till he quits sanctuary again in safety. The masonry of the building is very massive, and fitted in with extraordinary skill to the inequalities of the rock.

The rock was thoroughly "done" by the party, the majority of the ladies even surmounting the no small difficulties of ascent and clambering over the topmost boulders, some of them, indeed, being the most agile and fearless of the party.

Near by is a small rock with a hole only a few inches in diameter, known as St. Gunett's Well: it always contains water, which is said to ebb and flow as the tide. From this well, tradition also hath it, the devoted maiden, Gunett, obtained water for the use of her father, who was afflicted with leprosy, and remained for many years shut up in the cell on the rock. The water might have done for a hermit of the olden time, but its greenish hue would hardly be acceptable to the fastidiousness of our own day; and the tidal theory, it is to be feared, will hardly "hold water" in our age, when even clerics have a sceptical turn, and destroy our simple faith by suggestions of rainfall and evaporation!

When one has seen the rock, there is really nothing at Roche worthy staying for. The Church, which was shown by the rector—the Rev. R. F. Gardner in person, is a modern abomination—a wretched specimen of debased Perpendicular, with the boxed-up pews of our grandfathers—where, however, there is a good specimen of a Norman font, ornamented with foliage, interlaced with cordage, and with pillars bearing winged human heads. In the churchyard is a rude four-holed cross, no doubt of great antiquity, but of very little beauty.

Another pleasant drive brought us to the Rosemellyn china clay pits, extensively worked by Mr. Barrett. Capt. Martyn, the manager, kindly received the visitors and conducted them over the works, and the process of manufacture was explained in an interesting manner by Mr. Collins. The clay here is of very superior quality: the works are very well laid out; and the three tanks which finally receive the clay before it is dried for the

market, are each capable of holding 1,000 tons. The whole of the work has been executed in little over two years. The "dry"—a kiln in which the clay undergoes the final process of drying and is made ready for the market—will turn out about 200 tons of clay in a week; and the whole process, from the time the first pick is put into the decomposed granite till the purified clay reaches the market, occupies, as a minimum, about three months. In that time, indeed, we may have cups and saucers manufactured of this clay and returned to us from the Potteries. Why cannot the manufacture be done at home, and all this cost of transit and re-transit saved? This is a question which has been discussed before and never satisfactorily answered; surely it only requires capital and skill to succeed, and both may be obtained.

Another spin over the breezy moorland, through the little village of Bugle, crossing branches of the Cornwall Minerals Railway, soon brought the party to the heights overlooking St. Austell, where Par Bay and the whole coast for many a mile lay stretched out in panoramic loveliness, with the glancing sea beyond. It was a splendid view, and one that could be lingered over for hours. But there were other considerations than the picturesque to be observed. We had left one of the newest clay works in the county; we were now to see what is in one sense the oldest. Carclaze tin mine is one of the lions of the West. Tradition says that it was worked by the Britons; record carries back its date at least 400 years. Whoever worked it did so with a will. It is not a mine in the ordinary sense of the term; but a huge surface excavation, nearly 150 feet deep, over a mile in circuit, and occupying nearly ten acres of ground. Formerly it was worked wholly for tin. It has since yielded very large quantities of china clay, and for china clay it is now chiefly wrought by the proprietors, Messrs. Lovering and Sons, who cordially and personally made the excursionists welcome. A select few made their way to the bottom, and there learnt that all the clay and debris are washed out of the bottom of the mine through an adit level which opens at the side of the hill below, on the "drying grounds" about a quarter of a mile away. This saves all hauling. Gravitation does the work of pumps, so saving the whole expense of raising the clay or debris to a higher level. From 6,000 to 10,000 tons of clay are annually sent to market

from these works, a large portion of which is dried in the open air. There is something singularly picturesque in a narrow defile between two branches of the pit. The prevailing hue of the cliffs is white, and what with their irregular shapes and their jagged peaks, they really resemble a miniature series of snow clad Alpine peaks. By moonlight the effect is said to be fantastic in the extreme.

The return to St. Austell was speedily effected, and a visit to the parish Church brought our day's explorations to an end. This beautiful Church, which has recently undergone an excellent restoration, and is now one of the handsomest in the county, contains specimens of the Norman, Transitional, Decorated and Perpendicular styles of architecture, and some very interesting bench end carvings, which have been collected from the pig-sties and other similar erections in the parish, to which they had been relegated by our enlightened post-Reformation forefathers. We were met at the door by the Rev. F. Paul, who gave us a hearty welcome.

The chief points of interest in the edifice were pointed out by Dr. Drake, Sir John Maclean, and Mr. Freeth, of Duporth, who here joined the party. Dr. Drake pointed out the arms of the Ercedeckne and Haccombe families, and those of the Courtenays, with the fleurs de lis, which he held to indicate their claims to the French royal blood. On this point there was some controversy with Sir John. Dr. Drake also indicated the miners' tools which are figured on some of the old bench ends.

The day was pleasantly terminated by an excellent dinner at the Globe Hotel, over which Dr. Jago presided. The toast list was commendably brief—The Queen; the Duke and Duchess of Cornwall; the ladies and gentlemen who had so kindly made the Society welcome, and given information; and the chief pioneer and guide, Mr. Collins. Animated conversation on the events of the day took the place of speech-making, and dinner was concluded just in time to catch the last up and down trains.

506.42

Journal

OF THE

ROYAL INSTITUTION

OF

CORNWALL.

No. XVIII.

SEPTEMBER, 1876.

EDITED BY J. H. COLLINS, F.G.S.

TRURO:

LAKE & LAKE, PRINCES STREET.

1876.

CONTENTS.

The Papers marked thus () are Illustrated.*

	PAGE.
Spring Meeting and President's Address	245
I.—*Observations on, and additions to, the List of Cornish Polyzoa, by C. W. Peach, A.L.S. . .	265
II.—On Caryophyllia Smithii, var borealis, now C. clavus, of Sacchi, by C. W. Peach, A.L.S. . .	268
III.—Ornithological Notes, by E. H. Rodd	271
IV.—On some Pleas Recorded in the De Banco Rolls,— communicated by Sir John Maclean, F.S.A. . .	274
V.—Note on a Collection of Palæolithic Remains from the Valley of the River Vezere, by John Jope Rogers	278
VI.—A Rare Instance of Coning, by John Jope Rogers	281
VII.—Note on the Effects of the Winter of 1860-61 on Shrubs at Penrose, by John Jope Rogers . .	282
VIII.—The Tokens of Cornwall, Part II., by R. N. Worth, F.G.S., <i>corresponding member</i>	283
IX.—On some Extracts from the Ministers' Accounts, relating to the Arundell Estates in Cornwall, by George Freeth	285
X.—*The Rainfall of Cornwall, with Observations on the Flow of Streams, by H. Michell Whitley, Assoc. Inst. C.E., F.G.S.	294
XI.—Calendar of Natural Periodic Phenomena, kept at Bodmin for the year 1875, by Thomas Q. Couch, F.S.A.	306
Meteorological Notes for 1875, by Dr. Barham	312

Journal
OF THE
ROYAL INSTITUTION
OF
CORNWALL.

No. XVIII.
SEPTEMBER, 1876.

EDITED BY J. H. COLLINS, F.G.S.

TRURO:
LAKE & LAKE, PRINCES STREET.
1876.

JOURNAL

OF THE

ROYAL INSTITUTION OF CORNWALL.

No. XVIII.

MAY.

1876.

SPRING MEETING AT TRURO,

May 23, 1876.

THE PRESIDENT'S ADDRESS.

THE present position and future prospects of the Institution were never more satisfactory than at the present time.

The list of members contains the names of residents from all parts of the county, besides several who reside in other counties—thus proving the wide-spread interest taken in the objects of the Institution. The subscriptions were never more numerous than at the present time; and we may assume this to be an indication that there is a general wish that our society should continue to have an independent existence, and not amalgamate with other societies in the county.

The numerous and excellent contributions to our Journal continue to give to the publication an importance which is recognized beyond the limits of our county—and a demand is now made for early Reports of the Institution in excess of the power of supply.

The subjects treated of in the printed Reports and Journal, which have been going on for 58 years, are so varied and numerous, that great complaints are made of the want of an *Index*—which has become absolutely necessary, so that the information in the papers may be available for ready reference. I believe Mr. B. Kitto has undertaken to make a general index of the papers

contributed to the Journal: this will be useful, but a full "Index rerum" is what is really required. I hope the attention of your Council will at once be directed to this object.

We have to regret the loss by death of 4 members since our last Spring meeting, but at the same time 6 new members have joined us.

Among those whom we have lost, the name of WILLIAM JORY HENWOOD is conspicuous.

He was born at Perran-ar-worthal, January 16, 1805, and died at Penzance August 5, 1875, in the 71st year of his age.

Although his death has been a subject of notice and regret at one or two of our ordinary meetings, when his bequests to our Institution were recorded and acknowledged; and though it has been briefly noticed in the Report of the Council in November last, yet considering his eminence in the science of geology and mineralogy, and that, whether as President, or as an ordinary member of this Institution, he ever took a warm interest in its welfare, I shall be justified in making more than a passing allusion to him on the present occasion.

It is not five years since Mr. Henwood filled the office of President to this Institution, with an ability and energy which many of you will recollect: and he has left a substantial proof of the interest he took in our society by bequeathing to it two reversionary legacies, one of £100 for the general purposes of the Institution, and the other of £200, to be invested to defray the cost of a gold medal to be awarded every three years, for the encouragement of the scientific objects referred to in the Council's report.

The President of the Royal Geological Society of Cornwall (with the objects of which Society Mr. Henwood's pursuits were specially connected) has given in his address, which appears in the 62nd Report just issued, many details of the life, character, and scientific works of our deceased member, which need not be repeated by me. But that which gave value to his opinions and writings may be repeated, namely, that his statements were all founded on accurate personal observation, and his deductions were drawn from practical experience. Mr. Henwood made himself what he was by persevering industry, a quality which was detected and first utilized by the Messrs. Fox and Co., of Perran-wharf, when Mr. Henwood was at the age of 17. During the five

years he was in their service he began those investigations into the metalliferous deposits of Cornwall and Devon, which occupied his mind and pen for the next fifty years of his life, and ended in results which will cause his name to be ever associated with those subjects. In 1828 he was elected a Fellow of the Geological Society of London, and the "Murchison Medal" was presented to him by that society six months before his death; an honour that was most gratifying to him. In 1832 he held the office of Assay Master and Supervisor of Tin in the Duchy of Cornwall, until the office was abolished in 1838, when he retired with a pension.

In February, 1840, he was elected a Fellow of the Royal Society, when he contributed a paper to their publications.

In 1870 and 1871 he presided over our Institution, and although in enfeebled health he discharged the duties which he had undertaken with his former energy and ability. His address to our society in 1871 was considered so important, that the Miners' Association of Cornwall and Devon reprinted that portion of it which related to Metalliferous deposits, and this was again translated into French, and published in the "Annales des Mines." Another of his contributions to our Journal in 1874, on the Detrital Tin-ore of Cornwall, was also published entire in France, in the "Annales des Mines;" and extracts from it were published separately by M. Zeiller.

A long list of his publications is given in the volume of the *Bibliotheca Cornubiensis*, which is already published, and is therefore no doubt in the library of every Cornishman who is interested in the literature and history of his county.

Mr. Henwood had for some years been warned that his death would be sudden, and a letter to one of his first patrons and friends, dated November 11, 1872, expressed his feelings as being expectant of, and prepared for, such an end.

His bust by Burnard has been presented to our Institution by his executor, and will be placed with our collection of busts of scientific Cornishmen.

MR. DEEBLE BOGER, of Wolsdon, is another of those whose loss we have to regret, at the age of 76. Few men were better acquainted with the law and rights of the Duchy of Cornwall; and he was well informed on most matters of local history. Not

long before his death he contributed to our Journal a paper of considerable historical interest.

We have also to record the death of Mr. HENRY ANDREW, who for 22 years was one of the "Proprietors" of our Institution; also of Mr. THOMAS COODE, of Pondhu, St. Austell, who joined our institution as long ago as 1838: but neither of them contributed any paper to our Journal.

The death of such a distinguished man as SIR GARDNER WILKINSON, who for many years had been an honorary member of this Institution, calls for some notice from me. He was son of the Rev. J. Wilkinson, of Hardendale, Westmoreland, and of Mary, daughter of Richard Gardner, Esq., and was born in 1797. Having been left an orphan when 8 years old, he was sent after a few years to Harrow, to which school he became so attached, that he afterwards bequeathed to it most of the collections he had made in Egypt, except those he had previously given to the British Museum. When he had finished his studies at Exeter College, Oxford, he went to Italy, and there made the acquaintance of Sir William Gell, who persuaded him to devote himself to Egyptian antiquities. He studied Hieroglyphics under Sir W. Gell, and learnt drawing in the Museum at Naples, and thus prepared he went to Egypt, and soon after began to give proof of his talents, and at the age of 25 published his first work in "Burton's Excerpta Hieroglyphica." His writings on Egyptian and other antiquities, which are very numerous, have gained for him a world-wide celebrity. After Young and Champollion in past times, and Dr. Samuel Birch of the present time, we owe what we know of the religion, philosophy, manners and customs, arts, sciences, and antiquities of the Egyptians, to Sir Gardner Wilkinson. It is a curious fact that he should have been born only two years after the discovery of the famous Rosetta stone, the hieroglyphic inscription on which so attracted his attention, and so excited his desire to know more of that language, that he laboured in its study, and became one of the best authorities in its interpretation.

In 1839 he received the honour of knighthood, and in 1856 married Caroline Catherine, daughter of Henry Lucas, Esq. After his 5th sojourn in Egypt, his health began to fail, and on his return to England, he directed his attention to British Antiquities, and wrote a series of papers for different learned

societies. He visited the West of England, and amongst his publications about this time I may mention those which treat of subjects interesting to our western counties. The only paper which appeared in our Journal was on Carn Brea, in Cornwall (27 pages). He also wrote "On Rock basins," "On the Rock basins of Dartmoor," "On Hut Circles, and other British Remains on Dartmoor," "Ancient British walls," "On the use of granite," "On the ornamentation of granite surfaces," "On Cromlêhs in Pembrokeshire," &c.

His published works, chiefly on Egyptian subjects, though very numerous, bear no proportion to the mass of notes, maps, plans, drawings, and descriptions which are still in MSS., and which will, probably, in course of time be published to the world, agreeably to his last wishes.

Many scientific societies were favoured with his membership, and the Royal Institution of Cornwall, in which he took considerable interest since he visited the West of England, had numbered him among its honorary members since the year 1860.

Sir Gardner Wilkinson, who had for some time previously, been in failing health, died on 29th October, 1875, in his 78th year.

Foremost among the objects of this Institution should be the encouragement and advancement of literary and scientific works connected with the county of Cornwall.

The *Bibliotheca Cornubiensis* is a work in the progress and success of which every one connected with science and literature in Cornwall must take a deep interest. The persevering industry with which Messrs. Boase and Courtney are pursuing their laborious undertaking is most praiseworthy; and none but those who have attempted such a compilation can realize the enormous amount of ever-increasing work which such an undertaking entails. Our Institution is especially bound to take an interest in, and to encourage the work: for we were the first to originate the idea, and actually collected, with Mr. Chorley's help, a mass of materials for the work. These materials were accepted by Mr. Boase, who had been working independently, though subsequently to us, with the same object.

Messrs. Boase and Courtney have already published one volume; and there is also printed, though not published,

matter as far as the middle of the letter S, towards the 2nd volume.

In accepting and thereby acknowledging the value of our collected materials, the bulk of which, I fear, was deceptive from many repetitions, Messrs. Boase and Courtney could hardly have realized at the time that they were also accepting that which entailed a sevenfold addition.

The work has increased, and increases so much, that I understand it is impossible to say when it will be completed, nor whether, when complete, it will form 2 volumes or three; but it will be a work of which our county may be proud, as recording a list of authors and of works which will bear favourable comparison with any other county in the United Kingdom.

Maclean's Trigg Minor.

Within the last 12 months the IX, X, and XIth parts of Sir John Maclean's elaborate and accurate "Parochial and Family History of Trigg Minor" has appeared, and it is announced that with three more parts the work as originally designed will be completed. The parishes which I believe are still remaining to be brought out, are St. Teath and Temple; Tintagel and Trevalga; and St. Tudy. I cannot help expressing a wish, which I am sure is a general one, that the author's life may be spared to enable him to extend his labours to other parts of our county; and that the mass of general and local information which he must have gathered during his researches will some day be published under his auspices.

Since our last spring meeting some works of much local and general interest have been added to our literature. Among these I may mention

The Churches and antiquities of Cury and Gunwalloe in the Lizard district, including local traditions, by A. H. Cummings.
Mullyon: its history, scenery, and antiquities, by E. G. Harvey.
Pendennis and St. Mawes: an historical sketch of two Cornish castles, by Capt. S. Pasfield Oliver, R.A.

The West Country Garland, selected from the writings of the poets of Devon and Cornwall, by R. N. Worth. A charming collection.

History of the parish of Linkinhorne, from the MS. of W.

Harvey, written in 1727, with additions and notes by J. Polsue.

There is a work which, although published in 1874, has not been noticed in our Journal as a county work. The Visitation of the County of Cornwall in the year 1620. Edited by Lieut.-Colonel J. L. Vivian and Dr. Henry H. Drake, M.A. The work, which is interesting to genealogists and others, was printed for the Harleian Society.

There are also the two ponderous volumes containing the Returns of owners of land in England in 1873, presented to both houses of parliament. It is lamentable that this return has been so very inaccurate, and is in so many respects untrustworthy.

Besides the above, a few other works of less importance—three of which relate to the eccentric "Poet-Priest" of Morwenstow—and an amusing satirical work, "The wonderful Cornish Council," dedicated to Sir Charles Dilke, may be mentioned.

To another work, which is almost ready for immediate publication, with the permission of the compiler and editor, Mr. George Bown Millett, I venture to call your attention. It is "The first book of the parish registers of Madron, in the County of Cornwall, from 1557 to 1700." This book will give *verbatim copies of all the entries*, during the period mentioned above: and the Appendix will contain copies of monumental inscriptions, lists of incumbents, and other parochial statistics.

I notice this work particularly in order to call attention to the special value of the publication, viz.: that the copies of the registers are *verbatim*. This is, I understand, the first instance of a copy of any Cornish Register having been printed, and it is a work worthy of imitation. I hope the example will be followed in other parishes. For purposes of local history, or in case the originals should at any time be destroyed by fire or damp or dust, the value of *verbatim* copies must be manifest.

I have already alluded to the *Index* which is required to make our Journal more useful for reference: may I also suggest that some one should undertake to make an Index for *Polwhhel's History of Cornwall*. This work contains a mass of information which is almost useless for general practical purposes from the want of an Index, and considering the high price which the work fetches in London and in America, whenever a copy is found to be perfect, there can be little doubt that a careful Index would find a ready and remunerative sale. And here I am re-

mindful of the name of another, and an older Cornish author, Borlase, whose writings and character (so well-known to Cornishmen) have lately been brought before the public in a charming and able article in a recent number of the *Quarterly Review*.* We may congratulate ourselves that the original MSS. of Borlase, which contain a mass of unpublished notes and drawings, many of which are of the greatest interest to our county, are possessed by his descendant, who knows how to appreciate such a treasure, and is willing to gratify others by an acquaintance with them.

By the kindness of Mr. William Copeland Borlase you will hear read this afternoon an extract from a MS. of Tonkin which he possesses, in which that writer expresses his contempt for Hals' abilities as an historian, an opinion, however, which may, perhaps, have been embittered by a family dispute about property, to which Tonkin alludes.

Never were Cornish histories and Cornish works so much in demand as at the present time. The Royal Institution of Cornwall may, I think, fairly claim a large share in having stimulated the taste for this demand. I had hoped that during my Presidency a scheme which I had in contemplation for some time might have been carried out, by which the MS. of the curious literary work on the Parochial History of Cornwall, by Hals, might have been secured to this county, and have been placed on the shelves of the library of our Institution, or of one of our county public libraries. But it has been otherwise arranged: and we must at least be glad that, if we are not to have the charge of it, such a treasure has passed into our National Library at the British Museum, where it will be taken care of, and be accessible to all.

I have placed on the table for inspection this day a MS. which I am fortunate to possess, relating to the ancient Benedictine Priory of Tywardreath, and supposed to be written about the end of the 14th or beginning of the 15th century. It is in good condition, occupies 129 folios, and is divided into five parts.

1. The calendar, containing the deaths and anniversaries of "Professores" or religious men, on one page; and "Familiores" or lay benefactors, on the opposite page. This part is written on 36 folios.

* No. 278, Oct. 1875.

2. The service used in the Profession of monks, followed by texts, taken from the gospels for Sundays and Feast days throughout the year, beginning with the first Sunday of Advent: each text is accompanied with a short commentary.
3. Readings at Collations before Compline (or second vespers), beginning on the second Holy day of the first week of Lent, being sermons of the Holy Fathers; as St. Augustine (Bishop), St. Leo (Pope), St. Maximin (Bishop), and others. This part has 25 folios.
4. Martyrology, collected by Usuard, priest and monk, with a Prologue addressed to Charles (the Bald, according to Dr. Oliver), Lord of Kings; and a Preface, stating in what degree only the memory of martyrs is to be revered. The 1st entry is on the eve of the birth of our Lord, and goes, day by day, through the whole year. This part is contained in 18 folios.
5. The rule of Saint Benedict, giving directions as to the monastic life. Some of these directions are most amusing, and interesting as illustrative of the habits and manners of the period. This part occupies 18 folios.

I have much pleasure in exhibiting this MS. to our members, and I hope it may suggest to other persons, who may possess MSS. of similar local interest to our county, to exhibit them on these occasions.

Every Cornishman would regret that the old Cornish toast of "Tin, Fish, and Copper," which at one time truly represented the staple, if not the sole, productions of the county, should ever cease to be appropriate. It is pleasant, therefore, in the present state of depression in the commercial world, to be able to record proofs of vitality, however small, in those productions which are still left to us, and we should endeavour to encourage every effort to improve and revive them.

Some of your former Presidents have alluded in their annual address to the principal natural productions of our county. I will therefore briefly touch on some of them.

I have had no reliable means of ascertaining the present state of the tin and copper productions. Of the past year, the report would, I fear, be unfavourable, though every one must earnestly hope that the present depression is only temporary.

The pilchard fishery during 1875 has not been so prosperous as was anticipated from the result of the summer success. Unfortunately the autumn and winter fisheries, from which of late years the greatest number of fish has been supplied, were almost total failures, owing to the "shoals" of pilchards that visited our coasts having been so small. The total quantity of pilchards exported was only 7337½ hogsheads, about 6000 hogsheads of which were caught in drift nets, and the remainder in seines.* During the last 60 years, from 1815 to 1875, there have been only 13 smaller exports than last year.† The prices realized in 1875 varied from 52/6 for summer fish, to 95/- for winter fish.

It is not long since the attention of those interested in the Cornish pilchard fisheries was directed to a means of utilizing the small pilchards that are not suited for the foreign markets, and which have hitherto been turned to little account. A company was formed calling itself the "Cornish Sardine Company," whose object was to make the surplus fish profitable by curing the smaller ones in a manner similar to the French sardines,‡ and the larger ones, being treated in the same way, were sold as "pilchards in oil."

Any attempt to create a new source of employment for Cornishmen, and to produce a wholesome and cheap article of food for the people is worthy of encouragement.

The production of vegetables in the western parts of the county, especially in the neighbourhood of Penzance continues, I understand, to be as successful as ever. Some idea of the quantity of early potatoes cultivated for exportation from the neighbourhood of Penzance, may be formed from the fact that

* See Fox's Pilchard circular, and Bolitho's ditto, for 1875-6.

† FROM	Shipments.	Hogsheads sent to					
		GENOA.	LEG-HORN.	NAPLES.	BARI.	VENICE.	ANCONA
Penzance	13	4212	514½	827½	170½	82	...
Falmouth ...	7	48	16	...	...	181	34
Fowey and)	2	...	...	529	50	...	...
Mevagissey }		...	...	...	...	...	...
St. Ives.....	1	534	...	...	...	...	...

‡ Some persons suppose the small pilchard and the French sardine to be identical.

last year upwards of £6000 worth of seed potatoes was imported to this locality from Lincolnshire alone. Until very recently the Penzance gardeners had their seed potatoes generally from Somersetshire. It is to be remarked that at the present time nearly all the early potatoes are sent from Penzance to the northern markets (instead of to London), and this year a very large portion of the brocoli went in the same direction: and it is possible that in future nearly the whole of the brocoli will go northward with the potatoes, as the London market is now abundantly supplied from the Channel Islands, and from Cherbourg.* I subjoin the following statement of the acreage under cultivation, and the crops grown in the Penzance district, which I hope may be interesting.†

A new stimulus to production has been given to Cornish agriculturists by the great demand for dead meat and butter for the London market. The quantity of dead meat and butter, and other produce which is now sent from Cornwall and the western counties, to the London market, is very great.

In the present state of competition between the western railways it is not easy to obtain, nor would it, perhaps, be fair to publish, exact statistics on this subject. Some time since, when an accident occurred on the Cornish Railway which created a stoppage for several hours, it was said at the time that several hundred tons of dead meat, which were on their way to London, were accumulated at the place where the stoppage occurred. The quantity of meat exported from one small station, by only 3 or 4 butchers, amounted, in 1875, to nearly 300 tons.

* I am indebted to the kindness of Mr. John Thomas, of Gulval, for this information.

† CROPS.	Acres under cultivation	WAGES PAID		No. of hands employed altogether.	VALUE OF CROP		REMARKS.
		Per acre	Total		Per acre.	Total	
Potatoes	700	£ 12	£ 8,400	About 3 months of the year the average number of hands is above 2,000, the remainder 500.	£ 50	£ 35,000	No damage by frost to brocoli, little to potatoes.
Brocoli	1,000	5	5,000		25	25,000	
Onions	50	12	600		50	2,500	Thermometer stood at 6 degrees of frost—the maximum.
Asparagus	20	16	320		70	1,400	
Gooseberries ...	100	12	1,200		40	4,000	8 years ago it stood at 8 degrees, and destroyed nearly all the brocoli.
Raspberries ...	15	15	225		60	900	
Black Currants ...	30	12	360		50	1,000	Once only was this known —8 degrees frost.
Strawberries ...	10	15	150		60	600	

The quantity of China Clay and China Stone raised in Cornwall and Devon during the year 1874, amounted, according to Hunt's Mineral Statistics, to 226,309 tons, besides more than 60,000 tons of ordinary Potters Clay, which was raised chiefly in Devonshire, in the neighbourhood of Bovey Tracey, near Newton Abbot.

In 1806, one of the largest clay works produced only about 300 tons a year, but in 1874 one of the largest works near St. Austell produced 9,000 tons, employing about 30 men. Many works produced 6,000 tons, employing 20 men.

Uses of China Clay.

We generally suppose that china clay is only used in the manufacture of Porcelain. This is by no means its sole use; and it is said that little more than one-third of the clay now produced is thus used.

Large quantities are used by bleachers for filling up the pores of calicoes as a dressing, and still larger quantities are used by paper makers to give body and weight to their paper, especially printing papers. A great deal is used in making alum, sulphate of alumina, and ultramarine. Some is used by photographers, by manufacturing chemists, and colour makers for a great variety of purposes. It is said to have been used to adulterate flour and artificial manures, &c.*

This is the proper time to mention a subject which will be brought before us to-day, and which has an immediate bearing on our clay productions. The Rev. C. M. Edward Collins, of Trewardale, has, at much laudable pains, been at work for some time in gathering information which would enable him to bring before our Institution a scheme for establishing a manufacture of porcelain and pottery in Cornwall. We have the raw material in abundance, and he argues very naturally why should we not have the artistic manufacture also. However, I understand he has, from circumstances which he could not control, been unable to get together all the information he had hoped to receive before the meeting. Therefore, he trusts, at some future time,

* I am indebted to the able and elaborate paper on China Clay by Mr. J. H. Collins, for my information and statistics on this subject. The production since 1809 is given in the following table, which he has compiled from various sources.

to lay his scheme in a definite form before us. I am glad to see him here to-day, and he will with your permission, tell us presently something about his plans; and we must all feel that any attempt to introduce a new source of industry is most praiseworthy, and deserves support and encouragement. He has also been at considerable trouble and expense in bringing specimens to exhibit before us to-day; a kindness which I am sure is fully appreciated by us all.

A very important metallurgical process, and a comparatively recent introduction for the extraction of copper, tin, and silver from the cinder of burnt pyrites, is worthy of being noticed, as suggestive of another source of industry for Cornwall.

A.D.	CHINA CLAY.		CHINA STONE.	TOTAL.
1809	1,757		1,162	2,919
1810	1,888		1,563	3,451
1811	2,086		1,535	3,621
1812	1,252		1,530	2,782
1816	1,775		2,135	3,910
1826	7,538		5,252	12,790
1831	7,000		5,000	12,000
1834	.....		.....	12,000
1838	13,440		7,344	20,784
1839	7,600		.....	.....
1851	80,000		18,000	98,000
	Cornwall. Devon.			
1855	60,188...	1,100	19,961	81,249
1856	64,510...	4,106	7,800	76,416
1857	.....	.....	10,020	.....
1858	65,600...	5,300	21,983	92,883
1859	61,470 .	.....	20,750	.....
1860	63,250...	2,752	21,500	87,502
1861	60,750...	1,769	19,700	82,219
1862	61,550...	2,500	19,250	83,300
1863	92,500...	2,575	23,750	118,825
1864	95,750...	8,500	21,570	125,800
1865	97,750...	8,570	20,500	126,220
1866	105,000...	12,000	35,000	152,000
1867	127,000...	12,000	33,500	172,500
1868	100,000...	11,900	29,000	140,000
1869	105,700...	11,700	28,500	145,900
1870	110,520...	12,500	32,500	155,000
1871	125,000...	19,000	33,000	177,000
1872	141,000...	26,982	48,000	215,982
1873	153,000...	27,197	45,000	225,197
1874	150,500...	33,309	42,500	226,309

For 21 years, from 1838 to 1859, there was a considerable demand for iron and copper pyrites from the Cornish mines, for the purpose of extracting from it sulphur in the manufacture of sulphuric acid. It is from the residue of this kind of ore, after it has been burnt, and the sulphur extracted from it, that the copper, tin, and silver remaining in it is extracted by means of the "wet process." The value of the produce from this process has already brought into existence about 24 companies in different parts of England, 3 of which have been established in Cornwall and Devon.

To shew the extent to which this process has been adopted, it may be interesting to give a few particulars.

In the year 1875, 365,368 tons of this cinder, or residue, which is known as "burnt ore," has been treated in the United Kingdom by the "wet process," and the quantity of copper extracted in the year 1875 alone from cupreous pyrites, has been calculated to be not less than 14,000 tons, or rather more than three times the aggregate amount of copper produced by the mines of the United Kingdom; and, it must be remembered, that this 365,368 tons of burnt ore represents only about 70 per cent. of the weight of raw ore consumed each year. The annual consumption of these ores in a raw state in the United Kingdom, amounts in round numbers to 500,000 tons, which after being employed for the production of sulphur, in the manufacture of sulphuric acid,* becomes a cinder or residue, called "burnt ore."

Between 1838† and 1859 (as I have said) the mines of Cornwall, and of Wicklow, in Ireland, supplied nearly the whole of the pyrites which was used in this country to produce sulphuric acid. Since the latter year, the pyrites from Spain and Portugal has got possession of the market, in consequence, not only of the supply from those countries being more regular and abundant than from Cornwall, but their ores are besides more uniform in composition, seldom varying one per cent. in the amount of copper they contain; whereas the ores from Cornwall were too irregular in their supply to meet such a large demand. Although

* Liebig remarked, that the commercial prosperity of a country may be judged of with much accuracy from its annual consumption of sulphuric acid.

† Before 1838 it came chiefly from Sicily.

the Cornish ores contain more silver than the Spanish, yet they vary so very much in their composition that no two parcels are alike: therefore, there arises the great inconvenience of being obliged entirely to change the process with each lot, in order to treat them successfully. We hope, however, this inconvenience may be overcome, and Cornish ingenuity will surely be equal to the task.

Bearing then in mind that the Cornish pyrites is known to contain more silver than the Spanish ores, and nearly as much of the other metals; let us look at the result of the operations at the Widnes Metal Works. There about 22,000 tons of Spanish burnt ores were worked by M. F. Claudet's wet process during 1875. The auriferous silver extracted, sold for £2,600, which is equal to 2s. 3¼d. per ton, and after every expense of treatment (coals, labour, loss of iodine, wear and tear), a profit was left of £2,100 or 1s. 10¼d. on each ton of burnt ore operated upon. Although the proportion of silver recoverable from each ton of Spanish burnt ore appears small, yet if the whole amount of 365,000 tons and upwards were treated in a similar manner by Claudet's process, the silver recovered from it would alone represent at least £42,000, or a nett profit of about £33,500; and the produce of silver from a similar amount of Cornish ores would be much greater. The average Spanish burnt ore contains from 15 to 13 dwts. of silver per ton. The above calculation does not include the value of the copper, which has been shown to be considerable, and recoverable by nearly the same process.

For particulars of the process, I refer you to Mr. J. A. Phillips's able paper on the subject, read before the Chemical Section of the Society of Arts, Feb. 25, 1876, and to which I am indebted for the above facts. I had hoped to have received specimens illustrative of the process to place on the table before you, through the kindness of Mr. Mac Ivor, who so ably directs the works now in operation at the Emmens United Mines, near Callington, but from some cause the illustrative series of specimens have not arrived in time for the meeting.

Another new source of industry which we are glad to welcome, is the manufacture of Vitrified Bricks, of all shapes and kinds, from common killas; a material which abounds in this county, and which has hitherto been regarded as worthless. The killas

most suited for this manufacture is of a soft unctuous character, and useless in its raw state for building purposes; but when ground up and burnt becomes a most valuable building material, being thoroughly impervious to wet. The natural quality of the stone is such that no admixture of foreign substances is required in preparation for the manufacture, as it contains the necessary ingredients in the proper proportion, and this causes the brick when baked or fused, to become completely vitrified throughout.

This killas has another recommendation, that the bricks retain their shape during the process of vitrification, while most clay materials when vitrified are apt to swell and bulge out into misshapen forms. When tested by pressure, the vitrified bricks only slightly split at 100 tons pressure, and sustained a thrusting stress of upwards of 400 tons on the square foot.

The process of making these bricks may be seen at the Phœnix Fire Brick Works, at Gunnislake in this county, where there are at present 6 continuous kilns at work, which have been built on plans patented by Mr. Cowell. Two kinds of brick are there made from the killas, the white vitrified brick, and the blue vitrified brick.

Through the kindness of Mr. Cowell, and of Mr. T. A. Ellis, the secretary, specimens both of bricks and of the prepared material before it is baked in the kiln, are exhibited here to-day.

Mr. J. H. Collins kindly supplies me with the following analyses of the two kinds of killas used.

	White Killas.		Red Killas.
Silica	65·5	.....	53·7
Alumina	24·4	.....	24·1
Peroxide of Iron	3·4	.....	15·1
Lime	·5	.....	trace
Magnesia	·2	.....	trace
Alkalies	3·7	.....	2·4
Moisture and Loss ...	2·3	.....	4·7
	<hr/>		<hr/>
	100·0		100·0

Manganese Bronze.

This new alloy, composed of copper, tin, and a little manganese, has been proved by experiments lately made at the Royal Gun Factories at Woolwich, to possess great strength and toughness,

and offers remarkable resistance to tensional strain. It can be cast into any form required, and is said to exceed the best gun metal in toughness and strength by fully 50 per cent. It can be forged or rolled at a red heat, by which it acquires an ultimate tensile strength of from 29 to 30 tons per square inch, and stretches from 20 to 30 per cent. of its length before breaking. After being forged or rolled its strength is increased to that of mild steel, with nearly the toughness of copper.

By the courtesy of Mr. Parsons, the inventor, I am enabled to exhibit a specimen, which I saw bent into its present shape, under intense pressure and violence from blows.

The principal subjects which occupy the attention of the Royal Institution of Great Britain, in Albemarle Street, London, namely Chemical and Physical Science, have not, I believe, found many promoters amongst ourselves; and although we possess a fair laboratory, it has not, I fear, been used as much as it might have been in past times.*

The science of Botany, too, has not had many supporters in our Journal. Although we have a climate peculiarly favourable by its warmth and moisture to vegetable growth, and to the cultivation and naturalization of rare and beautiful half-hardy plants, yet there is no science which comes within the scope of our Institution which has received so little attention in the pages of our Journal as Botany.

Since the death of the lady, a connexion of mine, who for several years sent us some valuable papers on our native Flora; this branch of science has been quite neglected. I hope some of our fair members may again be induced to take it up, and compete for Mr. Henwood's gold medal. Also the Algæ of nearly 200 miles of coast in our county have never, as far I know, been noticed in our publications.

The museum of this Institution, although it has been greatly improved since it has been in the present building, hardly satisfies what might be expected of it in such a town as Truro,

* At present, however, it is usefully occupied by Mr. J. H. Collins, the public analyst for Cornwall, and during the past winter a chemical class in connexion with the Miners' Association of Cornwall and Devon, was conducted in it by Mr. Kitto.

and in such a county as Cornwall. A county containing so many local antiquities, and so rich in mineral wealth and curiosities, and having an exceptional extensive sea coast, which is visited by rare birds from all climates, by fish from all seas, and by shells and sea weeds brought hither by the gulf stream, some of which are unknown on other shores of England.

The facilities, too, for securing foreign curiosities are great, for our fleet of fishing boats and traders visit almost every country. The promoters of our museum have only to offer encouragement to bring, and to give the sailors instruction in the class of objects they should enquire for when abroad, and bring home. But that which our museum should most encourage is the acquisition of *local* specimens of every class, and our chief room should be devoted to specimens from Cornwall alone.

It is well to record from time to time any facts bearing on the natural history of our county, which may be new or interesting.

I am delighted to be able to report that *Seals* have been seen lately, for the first time, about the Gribben headland, near my own residence, Menabilly. The man who attends to my lobster pots was surprised at early dawn in March of last year, to see a large seal rise out of the water close to his boat, which was at that time not far from the Cannis Rock, and after taking a good look at the boat, dived and appeared again on the other side of the boat at a little distance, and then disappeared. My game-keeper has also noticed the marks of seals where they have been basking on the low shelving rocks under the Gribben, and upon those parts of them, which, being close to the water, are covered with short grass, where the impress of their forms are manifest. I have given orders that they shall not be disturbed, and I hope the quiet isolation of the Gribben foreland may tempt them to remain, and increase.

Another interesting event occurred in the same neighbourhood. A full grown otter was found dead in one of my lobster pots, which had been set the night before in about 7 fathoms of water; the animal had evidently entered the lobster pot, when nearly exhausted, to seize the bait or a captured fish, and being unable to extricate itself and rise, was drowned, and was found in the morning stiff and curled to the shape of the pot. My

fisherman tells me that he once saw another otter swim ashore off the Gribben, with a fair sized conger wriggling and struggling in its mouth, when it took the fish up the cliff and quietly devoured it.

There are many otters in this locality, and they generally find food enough about the cliffs and in the sea; but occasionally, when there is a continuance of rough weather at sea, they visit inland, and lately killed and partly eat one of my swans, while sleeping in the midst of the pond.

Dr. Barham, who is ever ready, with willing zeal, to work for our Institution, and to promote its welfare, has a suggestion to make on the subject of our reports on meteorology. He thinks we are in a position to summarize a body of meteorological observations sufficient to present a full and satisfactory memoir on the climate of Cornwall, and his suggestion is that these observations should be published as part of our Journal; but in such a form as to allow of its being sold separately. The Fauna of this county has been published by us in a similar manner. He has also very kindly offered to undertake the duties of editor, either alone or with the help of our friend Mr. Whitley, to whom we are already so much indebted for his meteorological labours. You will hear from Dr. Barham himself his suggestions, and we shall be most ready to accept the services he offers if the Council decide on the publication.

It will be a work valuable to those of us who are gardeners, and what is more important, it will especially be valuable to health seekers.

I think we may attribute something of the longevity of so many of our inhabitants to the mildness and salubrity of our climate. Some of you, who may not have noticed an account which was published some time since of longevity at Looe in this county, may be interested in my referring to it in connexion with our statistics of meteorology.

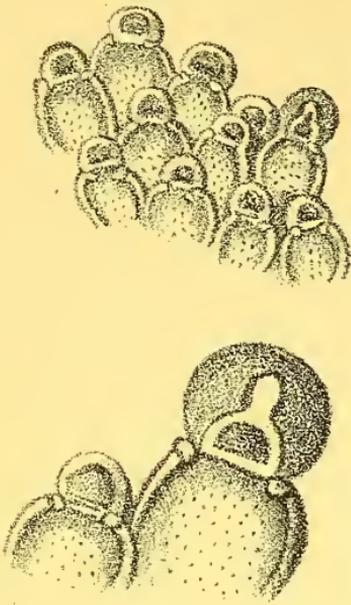
Within the year 1875, seven persons died at Looe, of the following ages, 95, 87, 87, 83, and 3 aged 81, an average of 85 each; and there are yet living at Looe 14 persons aged respectively, 95, 2 of 94, 3 of 90, 2 of 89, 4 of 88, 87 and 86, being an average of 90 years. There are also 17 others alive,

whose lives average more than 82; the united ages of 31 persons giving an average of 86, and more than 40 persons whose ages would average between 82 and 83 years. The population of Looe is 2194.

Other localities in Cornwall could, no doubt, give accounts of their longevity equally remarkable, and it would be interesting to gather statistics on this subject.

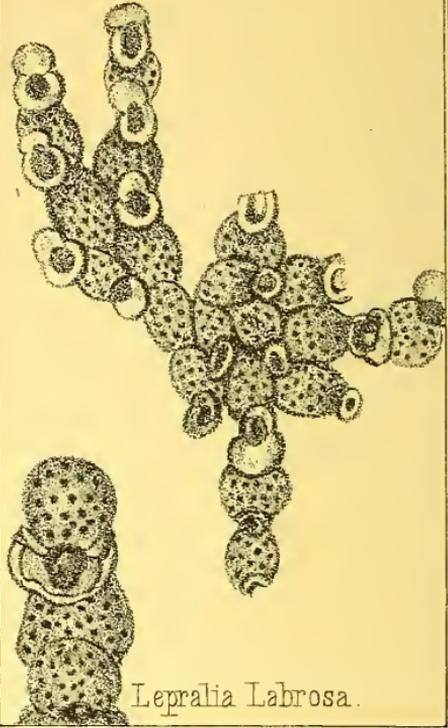
As I love Cornwall so much, I delight in praising it, when praise is due, whether for its science, or literature, or its natural productions.

FIG. 1.



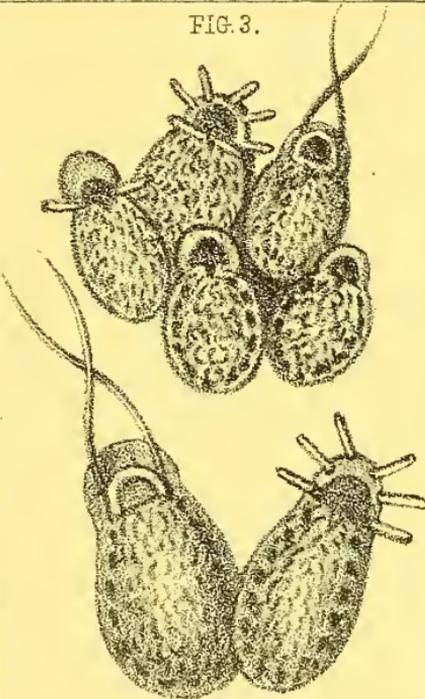
Membranipora Coriacea.

FIG. 2.



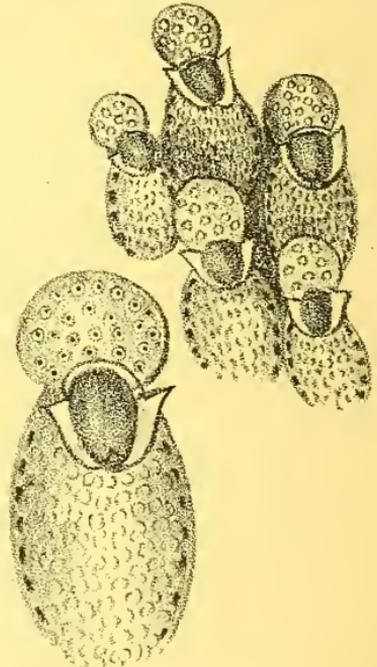
Lepralia Labrosa.

FIG. 3.



Lepralia Woodiana.

FIG. 4.



Lepralia Eximia.

C. W. PEACH.

I. *Observations on, and additions to, the list of Cornish Polyzoa.*—

BY C. W. PEACH, A.L.S.

 Read *May 23rd*, 1876.

ON looking over the Zoophytes I collected in Cornwall more than 20 years ago, and others I got there in 1869, I find that I have amongst them some new to Cornwall; and others, though known—from being able to add a little more to their history, I have thought it right to send these notes for your Annual Meeting as supplementary to Hincks's list. I have one regret, that my contribution is so small.

1. *Cabarea Boryi*—Adouin. I send you for inspection a small but characteristic specimen of this pretty species. I got it on the rib of an old crab-pot, at Goran Haven, in 1834, up to 1870 it had rested undisturbed as packed in Cornwall in 1849. Hincks and Miss Cutler got specimens off Budleigh Salterton. I find no record of its being known as Cornish, and have thus the pleasure of adding it to your list. I have no doubt of its being again soon found if those rich bearers of ocean's gems—old crab-pots—are examined; many of my best things, when I lived at Goran Haven, were got from them.

2. *Cabarea Hookeri*—Fleming, now C. ELLISII—See Hincks p.p. 36 and 93. The specimens are from the Out Haaf, Shetland, from 80 to 100 fathoms, it is abundant there; I got it in 1864 when dredging with Mr. J. Gwyn Jeffreys. These are for your museum for reference should anyone really find it in the West of England. It is no doubt a truly Northern species.

3. *Membranipora coriacea*, of Busk's British Museum Catalogue, p. 57. I got this pretty species on shell, off the Cornish coast, in 1849. It is also an addition to your list. I got it also in Shetland, Caithness, and Aberdeenshire. It is illustrated in figure 1.

4. *Lepralia labrosa*—Busk. This is also new to Cornwall. Hincks, at page 44, says, “not common, in a valve of *Cardium* from the Brixham trawl boats, on *Pecteu*, Start Bay.” Mine I got on shell off Fowey, about $\frac{1}{2}$ mile from the shore, and again in 1869 from a stone hooked up by a fisherman 5 miles off the Deadman. The cells are generally dark coloured, deeply punctured, the lip thickened and expanded, usually deficient behind and *white*, thus contrasting with the dark cells. The ovicells small, recumbent, and PUNCTURED; *mine thus differing from Busk’s*. “It occurs fossil in the Red Crag.” I got it in Shetland, and at Wick, in Caithness; Thompson, in Belfast Bay. Though wide-spread it is not common. See figure 2.

5. *Lepralia Woodiana*—Busk. Hincks’ Cat. page 42; Busk’s Crag Polyzoa, page 7. From the Deadman, on the stone I got in 1869. Hincks—“a single specimen only has been met with S.W. of Polperro from 30 fathoms.” I got only one, it showed like the Polperro one, “two long slender *vibracula*, which cross one another above the orifice;” these organs are not always shown; they have also six short, stout, blunt spines on the distal lip, rising vertically from it. The cells, like those figured in the “Crag Polyzoa,” have *a single row of punctures round the margin*; these are not often seen, in consequence of the doubling in of the lower parts of the cells, the body swells over and hides them, and they can only be seen when a single-cell is met with, or the surrounding ones broken away. I send a specimen from Shetland showing the *vibracula*, for your museum. It is rather abundant from 100 to 170 fathoms off Shetland. See figure 3.

6. *Lepralia eximia*. New to Cornwall. Hincks figures it in Zoophytology, part III, figures 3, 3a, from the coast of Antrim. Mine is another of my prizes from the Deadman in 1869. It is a well marked species. See figure 4.

7. *Cellepora-edax*. First figured by Busk, in his Crag Polyzoa, part XXII, figure 3. Mine I got off the Deadman 25 years ago, from a crab-pot. It is a rather puzzling species, covering a small spiral shell (*Nassa*), and was, when first got, bright red. It is rare, for in 5 years, I got about as many specimens, they have dwindled away to two, the one sent is for your museum. Hincks got a single specimen “on a *Turritella* (?) from Plymouth, and thus this is another addition to your Cornish list. *One of*

my shells had a Hermit Crab in it. Perhaps I ought *not* to have said *shell*, the calcareous part being probably dissolved by the *Cellepora*. It is not the only Polyzoa that decomposes shell matter. I have seen many shells scooped by Polyzoa, no doubt for the purpose of being used to build up their cells.

8. *Diastopora Sarniensis*. Another addition to the Cornish list. The Rev. Mr. Norman figured this in the Annals and Magazine of Natural History, Vol. XIII, part II, figures 4, 6. It was dredged by him off Jersey and Guernsey in 1859. He describes it as "milk-white, opaque, &c., not marked with the alternate opaque and transparent radiating lines of *Diastopora obelia*." He also mentions "a tube with a little cap, &c., as probably organs of reproduction." In this I believe he is right. Mine has them well developed, and such "little caps" are now well-known as "*ovarian vesicles*." I got my specimens in 1848, from Lantivet Bay, on a shell of *Isocordia cor*.

Thus then, I have the happiness of introducing *six new species* of *Polyzoa* to your already long list, viz. :—

- Cabarea Boryi.*
- Membranipora coriacea.*
- Lepralia labrosa.*
- Lepralia eximia.*
- Cellepora Edax.*
- Diastopora Sarniensis.*

II.—On *Caryophyllia Smithii*, var *borealis*, now *C. clavus*, of
Sacchi—BY C. W. PEACH, A.L.S.

Read May 23rd, 1876.

WHEN in Shetland, in 1864, dredging with Mr. J. Gwyn Jeffreys, I felt much interested in the “marvellous abundance” of the *Caryophyllia* got there, as I was pretty well acquainted with the animal of those found in the West of England; when I got some of the Northern ones alive, I made several sketches of the animals, and paid as much attention to their habits as time would permit. It was after all a very difficult affair; I managed to get good outlines, as to the filling up of the colouring, &c., I was fairly beaten, at least such as I did are daubs when compared with nature. Their beautiful colours were like flashing brilliant streams of golden light, and so transient, that those beautiful words of Burns well describe them, for they were

“like the borealis race
 That flits ere you can point the place.”

Those who have seen the brilliant colours of the *Alphrodita*, or Sea-mouse, may have some idea of those of the *Caryophyllia*, only they must be much more intensified and varied.

These sketches I lent to Dr. Duncan, and from them his figures were made to illustrate his paper “On British Madreporia,” in the Transactions of the Zoological Society of London, Part 5, Vol. VIII, 1873. By the close examination I had to make, I got well acquainted with the form, &c., and am quite satisfied that the Cornish and Shetland Corals are one and the same species. I send specimens from Shetland, for the inspection of the meeting, and for deposition in the Museum of the Society. I hope I shall not be considered tiresome, if I say a few more words about them. The greatest number were got in the “Out Haaf” (deep sea), from 80 to 100 fathoms,—at times by hundreds; some living.

They are generally attached to the cases of the Annelide *Ditrupa arietina*, which live in the muddy sand, and as *very few* stones or broken shells are found in it, these cases are used by the *Caryophyllia* to fix on, and thus as the foundation is *very narrow*, so arises the tapered shape of the Coral. Occasionally (these instances are very rare) specimens are met with attached to stones and broken shells, and then the base is a *little broader*, but never so much so as those from Cornwall. The examples I send will show them from youth to age on these small supports. If compared with Cornish ones, it will be seen that the arrangement of the plates, &c., agree; you will also find, occasionally, *tapered ones* in Cornwall, much like those from Shetland: they have occurred to me. Yours are often adorned with that pretty *Balanus*, *Pyrgoma anglica*; although I have examined thousands of the Shetland Corals, not one was so adorned.

Where these *Ditrupa* tubes abound, few other living things, with the exception of those I mention, are found; they, however, afford a resting place for *Polyzoa*, *Serpulae*, and a few other calcareous things, all dwarfed, and it is very interesting to note how all these accommodate themselves to their narrow abode; I send a card with some of these *Ditrupa* so laden. By way of tail-piece, I have added a list of *Polyzoa* found on the stone taken up off the Deadman, in 1869 in the hope that it may stir up some of the young who frequent the sea-side, to seize on such waifs and strays, and work out the history of its denizens—stones, old crab pots, old rope (a capital gatherer), and corks or any other comeatable turned up from the sea, and I can assure them a rich harvest awaits them.

The following species were taken from the stone (evidently volcanic ash) brought up by a fisherman's line, 5 miles off the Deadman, in 1869, which I got from a fisherman at Gorran Haven — *the only one I got there at that time*; it was less than a foot square. This shows what splendid collections may be made *from deep water if looked after* :—

- Hippothoa catenularia,
- H. divaricata,
- Lepralia Brongniarti,
- L. auriculata,
- L. reticulata,
- L. concinna,

L. trispinosa,
 L. violacea,
 L. linearis,
 L. ciliata,
 L. woodiana,
 L. vulgaris,
 L. variolosa,
 L. Peachii,
 L. ventricosa,
 L. innominata,
 L. figularis,
 L. labrosa,
 L. fissa,
 L. eximia (new to Cornwall) &c., &c.,
 Pustulopora } hispida,
 Tubulipora }
 Alecto granulata,
 A. major?
 Patinella patina, and P. patina variety
 prolifera,
 Diastopora obelia,

making together *Twenty-six* species, one of them *new* to Cornwall, others very, very rare.

Caryophyllia Smithii Stokes, *C. clavus of Sacchi*. See Transactions of Zoological Society of London, Vol. VIII, Part 5, 1873, for Professor Duncan's paper on "British Madreporia."

N.B.—The stone from the Deadman is VOCLANIC ASH.

III.—*Ornithological Notes.*—BY E. H. RODD.

Read May, 1876.

FOR several months after the last Spring Meeting there was no occurrence of Ornithological interest worth recording in the county; a passing reference was made to one or two *Golden Orioles* having made their appearance in the Scilly Isles at the usual time in the middle of May, and this has been the case so often and almost year after year, that their occurrence in more or less numbers may be looked for as a matter of course. They appear to be earlier in their arrival with us this year, for on the 2nd of May, a male and female in adult plumage were sent from the Lizard district to Mr. Vingoe for preservation, and a third, in a mutilated state, was also sent to Penzance on the same day from somewhere in the neighbourhood. I am not aware of any instance of the nest of this bird having been found in Cornwall, but they have been observed in the shrubberies of Tresco Abbey at Scilly so thoroughly paired that they seemed certain of breeding there, but it has always happened that just at the time when the fact was looked for, they suddenly disappeared and never returned. They appear in the western counties, at least merely as birds of passage to some other and probably eastern countries.

The last year has been remarkable for Cornwall having given a second example of the curious species or variety of snipe called "Sabines Snipe" (*Scolopax Sabini*), and which has afforded no ordinary amount of interest to naturalists from its doubtful claim to specific value. Some half a dozen or more specimens only have been obtained, and those of comparatively recent period, and what is singular, all these examples have occurred in the British Isles, the bird being wholly unknown in other countries, and no record of its ever having been seen in the new or old world, except our islands, made by Ornithological authors. Cornwall claims to have afforded two out of these half dozen specimens, and the last was obtained from the neighbourhood of Penzance, shot by Mr. J. Dennis, Jun., and the particulars duly

recorded in the "Zoologist" in the month of February last. Up to a very recent period, the Sabines Snipe was recognised and described in all our works on British Birds as specifically distinct from the other snipes. One of its alleged principal distinguishing characters, and the one most relied on, has been in the number of its tail feathers being 12 instead of 14, the last being the normal number of the tail feathers of the common snipe, and 16 that of the great and solitary snipe. Another character in this bird quite at variance with the other snipes, is the entire absence of the longitudinal dorsal lines which we always see in the Great, Common, and Jack Snipes. In spite of these two strong characters, there has been a very strong leaning of late on the part of our scientific naturalists to regard this bird as a mere melanite variety of the common snipe, and not a distinct species. Mr. Gould is a convert to this opinion, for in his *Birds of Europe* he gives a figure of the bird as a distinct species; but in his last work, the *Birds of Great Britain*, he has omitted to even figure the bird, or to regard it as specifically distinct. Now, in support of this newly adopted opinion as to its being only a variety and not a distinct species, it is no less interesting than true, that the two Cornish specimens, the one killed at Carnanton, and the other near Penzance, each had 14 *tail* feathers, the normal number of our common snipe's tail as before mentioned; of this fact, I am certain, as I counted them distinctly more than once. This fact, therefore, throws to the winds the 12 tail feather theory as the great leading character to be depended on of its specific value, and aids in a very substantial form the correctness of the modern opinion against it. See articles in "Zoologist," p.p. 7882, 7938, New Series, 1422, 4801. I will here remark that the opinions of Mr. Gould and other eminent naturalists had been, previous to the establishment of the fallacy of the 12 tail feather theory, strongly leaning to *S. Sabini* being only a variety and possessing no claim to specific value; and I need scarcely add that their opinions must probably now be strengthened to a conviction of the accuracy of their former conjectures, by the fact of the correspondence of the number of the caudal feathers in the two birds in more instances than one. As, however, I do not participate in a *full* conviction of the identity of the two birds, I will proceed to offer my reasons for entertaining a doubt on the subject.

1st. It is remarkable that in all the examples that have occurred in Great Britain a *perfect similarity* of plumage exists, both as to the arrangement and tone of colours. In every specimen similarity of markings prevails, and the darker and lighter shades of colouring in the different portions of the plumage above and below have been, from the descriptions of each specimen, proved entirely to correspond.

2nd. That in no one instance has there been any sign or shade of even a partial development of the longitudinal dorsal lines which appear so prominent in all the other species ;

3rd. In the *S. Sabini* the form and character of the dorsal and scapulary feathers are very different from those of the other snipes, being small, ovate, tile-like, and resembling the woodcock's feathers, whilst the scapularies and dorsal feathers of the other snipes are *lanceolate*, long, and pointed. This I consider to be a very important character in the *S. Sabini*, and appears to me to offer a stronger specific value to its distinctness than even the number of tail feathers. I am not aware that this character of the dorsal feathers has been prominently brought before the notice of scientific enquirers until Mr. J. E. Harting published his "Birds of Middlesex," where he alludes to this character ; but I think that it is a strong point in support of its claims to specific distinction, which, although weakened by the theory of the tail feathers having fallen to the ground, has this additional and quite as strong a claim for specific value by the character of the dorsal plumage. I do not see that the question can be other than an open one for the present.

We have had our usual vernal visits of the Whimbrel and Bar-tailed Godwit, the latter, with few exceptions, in their handsome summer plumage, differing so entirely from the winter plumage, as to cause them to be considered a distinct species by our older naturalists. In summer, the whole of the under parts of the plumage, from the chin to the under tail coverts, is bright tile red ; the same parts, in winter, in the adult birds, being pure white ; and in birds of the year, buff white.

Our summer migrants have been unusually late, with the most feeble expression of song I ever heard, owing no doubt to the extreme coldness of the air, accompanied by a protracted easterly wind.

IV.—*On some pleas recorded in the De Banco Rolls.*—COMMUNICATED
BY SIR JOHN MACLEAN.

Abstract Read May 23, 1876.

SOME time ago I called the attention of the Royal Institution of Cornwall to the great value of the pleas recorded in the de Banco Rolls, in tracing, as well the descent of families as the devolution of lands and advowsons of churches; and illustrated the fact by shewing the history of the advowson of the church of St. Pinnock. These important records are also most interesting as exhibiting the manners and customs of various ranks of society in the times to which they relate; so different from the state of society in our own day. As an example of the latter we will bring under notice the case of an heiress of the family of Trelawny.*

In 1468 John Trelawny of Wollyston, in the parish of St. Ive, gent.; James Menwynnek, of Trewasper, gent.; John Croft and others were attached by the Sheriff to reply to Thomas Burgh, Knt., why, at Liskeard, they had, by force and arms, abducted Isabella Trelawny, being within age, whose marriage pertained to the said Thomas Burgh. The plaintiff alleged that Richard Trelawny had died seized of the manor of Wollyston, which manor he held of Thomas Bodulgate by military service and suit at the court of Thomas Bodulgate at his manor of Hamet, and that Richard Trelawny died at Wollyston in the homage of the said Thomas Bodulgate, by which the wardship and marriage of Isabella, daughter and only heir of Richard, being within the age of 14 years, to Thomas pertained. That Thomas Bodulgate

* De Banco Roll 8 Edw. IV, Michs., m. 420.

was in full peaceful possession of Isabella, and granted her wardship and marriage to Thomas Burgh, who had her in his charge from 1st June, 1460, until the Monday after the feast of St. Mary Magdalen (22 July), 1465, on which day John Trelawny and the others, the said Isabella, being within the age of 14 years, violently took away and abducted, contrary to the will of the said Thomas.

John Trelawny and the others appeared and pleaded that they were not culpable, for that long before the supposed abduction, viz., 20 May, 1465, the said John Croft retained Isabella to wait upon him in "Houswyfrye" from 20 May, 1463, for three years at the wages of $1\frac{3}{4}$ a year, and she was in his service until the said Monday before stated, on which day she left his service, without his license, and went to Liskeard, and that the said Thomas Burgh, then and there retained her in his service, as his servant. Thomas Burgh denied these allegations, and both parties put themselves upon the country. The case was postponed, and we have not traced the result. It is not, however, very material whether the alleged hiring was *bona fide* or only a colorable pretence, as is most probable.

The above mentioned Richard Trelawny was probably Richard son and heir of Sir John Trelawny, Knt., by Agnes, daughter of Robert Tregodack. Richard's grandmother was Maude, daughter of Robert Menwynnek. Richard Trelawny is shewn in the pedigree of his family recorded at the Heralds' Visitation of 1620,¹ to have died s.p. and to have been succeeded by his brother John. It is, therefore, probable that Isabella, the subject of this trial, died unmarried.

Of the former branch of the subject the following is a further illustration. In 1462² John Fortescue, of Shete in the County of Devon, gent., and John Rytte, of Downtomas in the same county, gent., were attached to reply to Richard Ryke in a plea of trespass upon certain Closes and houses of the said Richard at Trethynnek. The defendants denied the trespass and pleaded that Edward Trethynnek was seized of one messuage and 200 acres

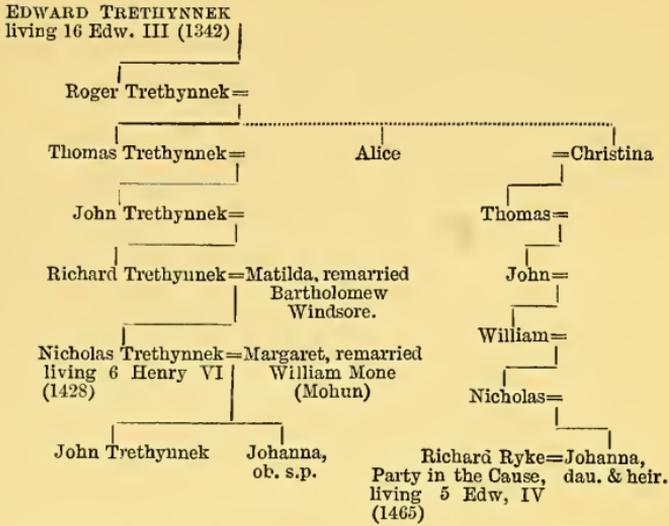
1 Visit. Cornw. 1620. Harl. Soc. Pub., 1874.

2 De Banco Roll, 3 Edw. IV., Easter, m. 403.

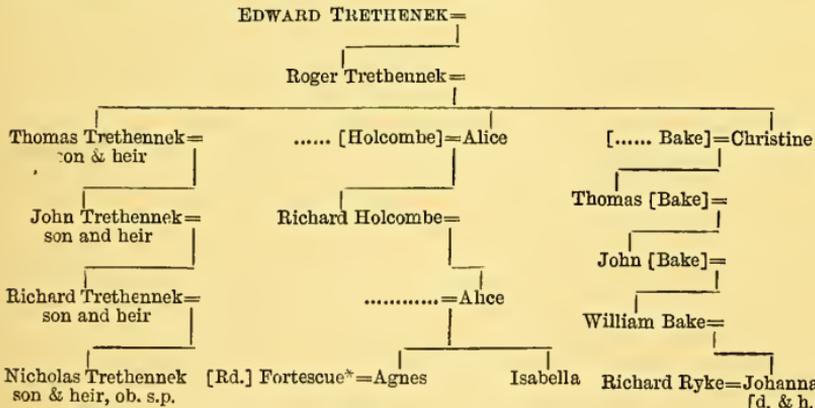
of land in Trethynnek in his demesne as of fee, whereof the Closes in question were parcel, and by his Charter, dated 4th October, 16 Edw. III (1342), produced in Court, granted to Roger Trethynnek, his son, one messuage, and lands in Trethynnek, Lawsrowell, Trewolet, Britt, Tidiford, &c., to hold to Roger and the heirs of his body, in default remainder to the right heirs of the said Edward for ever. They then set out certain pedigrees and grants of the estate, some of which were denied, and mention the names of John Talkarn, Bartholomew Wyndsores, William Mone (Mohun), and John Upton.

Afterwards the Justices sent their record to the effect that John Fortescue, being called, did not appear, but that letters from the king were produced, of protection from all suits, &c., on account of the said John Fortescue being in the suite of Sir John Wode, Victualler of the Town and Castle of Calais, for one year, dated 13th March, anno 5; and the letters were allowed, but afterwards, on 6th November following, the aforesaid Richard Ryke came into the Court and produced Letters Patent to this effect, that: thinking that "the aforesaid John Fortescue was in the "King's service, in the suite of Sir John Wode, Victualler of "Calais, and was there abiding, the King gave him Letters of "protection; but finding that he is remaining at Exeter occupied in his own affairs, as John Arundell, Sheriff of the said "County, has certified into Chancery, we revoke our said letters "of protection. Dated 5 Nov., anno 5." And Richard Ryke was authorised to summon the said John Fortescue and John Rytte before a jury in Hilary term.

As the further hearing of the case probably took place at Launceston before the Justices Itinerant, and as the Assize Rolls for this period are unfortunately lost, we are unable to state how the discrepancy in the two descents was determined by the jury. The question would, however, appear to have been, genealogically, a very narrow one, viz., whether the ancestress of Johanna, the wife of Richard Ryke was named Alice or Christina. Unfortunately the surname of Johanna's family is not given, but of the family of Trethynnek, now, it is believed, extinct, we have seven descents. In the following pedigree the disputed descents are shewn with dotted lines.



In another Case in 1465,* further light is thrown on the above descent. In it it is alleged that Roger Trethennek was the father of both Alice and Christine: that from Alice descended two coheirs, one of whom married a Fortescue, and that Christine married a Bake. In this suit John Rytte, described as late of Downtomas, gent., was attached to reply to John Moyle of a plea why, contrary to act of parliament of 8th Henry VI, he had illtreated and expelled the said John Moyle from a certain messuage in Trethynnek in the parish of Lanrake. In these pleadings the following descent appears.



* It appears from the Heralds' Visitation (Harl. MS. 1079, fo. 196, Ped. of Moyle) that John Moyle married Ann, dau. and heir of Richard Fortescue of Hollacombe. He was son and heir of Roger Moyle, by John, dau. of William Bake. John had issue Richard Moyle of Bake, represented in 1620 b, John Moyle of Bake, who was Sheriff of Cornwall, 22 James I.

* De Banco Roll 5 Edward IV, Michs. No. 604,

V.—*Note on a Collection of Palæolithic Remains from the Valley of the River Vezere.*—BY JOHN JOPE ROGERS.

Read May 23rd, 1876.

I HAVE much pleasure in conveying to the Museum of our Institution a small but interesting collection of palæolithic remains from the valley of the river Vezere, in the department of Dordogne, in France, exhumed in 1863 by the two late eminent antiquaries, Mr. Henry Christy and Mons. Edouard Lartet, and recently placed in my hands by the trustees of the Christy Museum in London, for our Museum in Truro.

I have to request that, after they have been exhibited at our Spring Meeting, they should be placed together in one of the cases of the museum, with a label indicating that they are presented by the trustees of the Christy Museum.

The special interest and value which these small objects possess are derived from the circumstance that they were all found in the same valley, in the territory known to the Romans as Aquitania, and afterwards an appanage to the English crown during the reign of several of our Plantagenet kings; and further, and chiefly, because they represent an age which was most probably more remote than any of our earliest Cornish relics; earlier than any Cromlechs and barrows, or any Celtic remains; earlier than the French Dolmens, Danish Kjökken-Möddings, and the lake dwellings of Switzerland. They take us back to the earliest period at which, at present, we have any trace of man. Who shall say how many centuries before the Christian era they represent?

The Reindeer had not become extinct in Southern Europe, as these small fragments, carved by the hand of man, declare.

Domestic animals had not yet become the companions and the pets of our race; but the men of this remote period probably lived a rude and savage life in caves, using their flint instruments, and living on herbs, roots, and the flesh of the reindeer, whose horns and bones bear the marks of their untutored art.

A few words will suffice to describe the different objects.

Flints may be had by the ton from the drift in France and elsewhere ; but here we have two small flints from le Moustier, which Mr. Augustus Franks, director of the Society of Antiquaries, considers to be specimens of the very earliest period yet known. They are from the cavern of le Moustier, whose floor now lies ninety feet perpendicular above the present bed of the Vezere. No reindeer bones have been found here, but quantities of unquestionable implements.

Next in probable order of date is one from Laugerie, near le Moustier, but a site less elevated.

Two specimens of Stalagmite are from the floor of a cave at Les Eyzies, one shewing both bone and flint, with four flint flakes from the same cave.

A small lump of black flint, and 8 flakes, are from a cave at La Madeleine.

Three bones of reindeer are from the same place, one of them being a fragment of a harpoon ; and the rest are the bones of the foot of the reindeer, 5 in number, found together, from Laugerie haute.

Carved reindeer bones and horns have only been found at three places in Dordogne, viz : Les Eyzies, Laugerie basse, and la Madeleine. Remains of the reindeer have, however, been found at Abbeville, S. Acheul, and at Bedford.

The reindeer period is especially interesting, as being enriched by no less than fifty tombs of human remains, which have been discovered since 1862. These remains have all been examined and described by Dr. J. E. Pruner-Bey, in a paper which is to found in the handsome volume, *Reliquiæ Aquitanicæ*, 4to, 1875, together with a paper by Professor Paul Broca, general secretary of the Anthropological Society of Paris. The former of these authorities considers that they belong to a race very similar to the Lappish and Finnish races ; and the latter considers them to represent a race taller than the present average of Europe, and taller than those of whom similar remains have been found in Belgian caves.

The skeletons from Dordogne have been determined to be probably coeval with the specimens of Reindeer Sculpture, by comparison of their specific gravity.

All the carvings appear to be on reindeer horn or bone, as also the spear-head harpoons, &c., which have been found here.

Reindeer horn is still used for weapons by the Esquimeaux and other savages.

The variety of weapons and implements found in these caves of Aquitania is astonishing. The following purposes are enumerated in the volume to which reference has been made, viz: implements for shooting, darting, stabbing, clubbing, cutting, chopping, flensing, scraping, smoothing, grinding, boring, drilling, and other work required in peace or war; in hunting or fishing, in domestic operations, or in designing works of art; cooking stones, hearths, mortars, bodkins or sewing needles; personal ornaments and amulets perforated for stringing, whistling instruments, musical pipes, batons, possibly suggestive of rank or dignity; owner's marks, tallysticks, and possibly even gambling tools, have been found, and are described.

The lesson which these small relics seem to teach is that they point to a greater antiquity of man than has, until recently, been assigned to him; but there is nothing in them which contradicts the idea of the unity of the human race.

VI.—*A rare instance of coning.*—By JOHN JOPE ROGERS.

IN March 1876 I sent to the Horticultural Society in London two coned sprigs of the *Picea Religiosa*, the sacred fir of Mexico, grown at Penrose. Mr. Andrew Murray, the secretary of the Arboricultural committee of that Society, believes it to be the first recorded instance of the fructification of this graceful and delicate conifer in England, and he has published a notice of it in the "Gardeners' Chronicle" of April 29, 1876, illustrated by a very accurate woodcut of one of my coned sprigs.

The fact may therefore deserve a record in our Journal. I have only two specimens of the *Picea Religiosa*; one is a seedling raised here from a cone which was brought me from Mexico, planted out in 1859, and now about 20 feet high. The other, which produced these cones, was bought by my father in 1847, and transplanted by me in 1857, into a sheltered spot in the rich soil of an ancient rookery; here it died back after removal, was cut down to a promising shoot, survived the severe winter of 1860-61, lost its head again in a gale in 1867, was pruned again, and though not now, as might be expected after such treatment, a very shapely tree, is fairly vigorous, about 25 feet high, and two feet ten inches in girth at 30 inches from the ground.

In the autumn of 1875, I observed some fifty cones had formed upon it; in December, I picked a few, which then had the purple tint of those of the *P. Webbiana*, but somewhat smaller. The finest cones, when I gathered the remainder in March, were $4\frac{1}{2}$ inches long. Loudon represents them as only $1\frac{1}{2}$ inches in Mexico: but I have observed a similar increase in the size of cones under favourable treatment of the parent tree in England, in the case of other varieties. The specimen cones have been deposited in the Museum of the Royal Botanic Gardens, at Kew.

VII.—*Note on the Effects of the Winter of 1860-61 on Shrubs at Penrose.*—BY JOHN JOPE ROGERS.

AUGUST, 1860, was cloudy and wet (21 days rain), and summer shoots of shrubs were not ripened properly. Winter began early, and half-hardy shrubs, whose young branches were still full of sap, suffered severely in Cornwall, whilst the same kinds survived the winter in the suburbs of London.

Shrubs Killed at Penrose.

Abutilon Vitifolium,	some.
Acacia lophanthos,	all.
Araucaria Braziliانا,	all.
Arundo Donax.	
Benthamia fragifera,	some.
Cineraria arborea.	
Cedrus deodara,	some.
Daphne purpurea.	
Juniporus flaccida.	
Mesembryanthemum,	all.
Olive.	
Paulovnia imperialis,	all but 1.
Physianthus albiflora.	
Pittosporum.	
Pipnanthus.	
Thuja Donneyana.	
Veronica picta,	all.
<i>Died back, but recovered since.</i>	
Acacia de-albata.	
Deciduous cypress.	
Hunea.	

Rosa Macartneyana.
Viburnum suspensum.

Injured.

Azalea, various.
Benthamia fragifera, all, and some killed.
Cedrus Deodara.
Hydrangea.
Do. Japonica.
Liquidamber.
Rhododendrons, some.

Uninjured.

Araucaria imbricata, all.
Camellia Japonica.
Juniperus, various, except flaccida.
Phygelia capensis.
Pomegranate.
Rhododendron ponticum.
Thuja Nepalensis.

N.B.—Injury to trees was not generally registered, but Pinus Austriaca suffered much more than Pinaster. Pinus Insignis suffered from snow.

VIII.—*The Tokens of Cornwall*—Part II.—By R. N. WORTH,
F.G.S., Corresponding Member.

Read May 23rd, 1876.

TWO years ago I had the honour to lay before the Society a paper on the Tokens of Cornwall, dealing specially with those of the 17th century. In that paper I described 98 of these coins—90 of which I considered certainly belonged to Cornwall, while 8 were doubtful. Since then, I have ascertained the existence of six hitherto undescribed Cornish tokens, including one variety, so that I think we have good grounds for believing that the total number issued in this county between 1656 and 1671, the earliest and latest dates recorded upon them, must have exceeded 100; whereas Mr. Boyne in his list only assigns Cornwall 41. Two places now appear upon the list which were not known to have issued tokens before, Ludgvan and St. Austell; Fowey is shown to have had three instead of one; and the four of Penzance become five. For the descriptions of Numbers 91, 92, 93, and 94, I am indebted to Mr. Rashleigh of Menabilly, in whose magnificent collection they are; 95 is in the possession of the Rev. J. Treffry, D.C.L., Place, who kindly communicated to me through Mr. Rashleigh; 96 is the property of my friend Mr. H. S. Gill, of Tiverton, to whom I am much beholden.

I cannot bring forward any additional evidence with regard to the doubtful tokens. I have carefully examined the *Overseers'* halfpenny and farthing of St. Ives, the device of which is variously interpreted as being two women washing in a tub, in which case the token may belong to either St. Ives—Huntingdon or Cornwall; or two women packing fish, in which case we could certainly claim it for St. Ives in Cornwall. I cannot, however, undertake to decide between the two.

A penny by Richard Preece, of Porthelly, assigned by Mr. Boyne to Cornwall, but which I referred to Pwllheli in Wales, has been the subject of investigation by Sir John Maclean,

F.S.A., who carefully examined registers with a view to trace, if possible, its Cornish origin. He has, however, failed to discover any evidence upon the point; and though there certainly was considerable intercourse between Cornwall and Wales, which would account for the presence in this county of so distinctively a Welsh name as Preece, to Wales it still appears this penny must be assigned.

All the tokens here described are farthings:—

FOWEY.

91. O. IOHN : GOODALL—I.G.
R. IN FOWYE—1657.
92. O. IOHN MAIOR—A shield of arms
R. OF FOYE. 1667—I.M.M.

LUDGVAN.

93. O. RICHARD. SCADDAM—1666
N. IN LUGVAN—R.S.

ST. AUSTELL.

94. O. IOHN TREFRY. OF—I.T.
R. ST. AVSTELL—1662
95. O. IOHN. TREFRY. OF :—The Mercers Arms
R. ST. AVSTELL—1669.

This is a variety of the preceding.

PENZANCE.

96. O. ANTHONY. GVBBS—A fleur de lis
R. IN. PENZANCE. 1667—A.G.
- Anthony Gubbs was mayor of Penzance in 1656.

IX.—*On some Extracts from the Ministers Accounts, relating to the Arundell Estates in Cornwall.*

BY GEORGE FREETH.

THESE accounts extend from 37 Henry VI. to 3 Jac. I 1605, and appear to me to contain much historical and interesting matter. No 1. clearly shows that 17 and 18 Henry VIII., they had a Deer Park at Lan or Nansladron; whilst No. 4, 1605, explains how the valuable timber at *Lanhadron* was got rid of. No. 2 gives the name of the manors on the Rolls, with their localities and the Reeves name in 1581; the account at the end of the Roll gives the names of Tin works then in operation, and the receipts therefrom. The *mine* tin valued at 4d. in the Marke, and *moor* tin at 5d. in the Mark, the total £13; and the value of "1000 of white tin £26 13s. 4d." Amongst the works named is *Polgooth*, close to St. Austell, which is still doing a little.

No. 5 contains the account for 1605 of Richard Tremaine in respect of Charcoal made at Killilarrett in Cardynam, for the use of the blowing houses; and also Tremaine's account of the Toll and Farm Tin received in gallons, feet, gills, and quarts from various works, of the white tin produced from it, and its value in money, and concludes with an account showing receipts from the blowing houses and stamping mills, and the expenses attending the same—£12 being specified as the blowers' wages, &c.

No. 3 gives a general account by Richard Tremaine of all his receipts for 1605, and of the monies he paid. *John Roberts* (so spelt), of *Truro, Merchant*, whoever he was, had Mr. Arundell in hand, for not only had he lent him £200 at ten per cent. interest, but had £50 in his hands "to be taken up by Mr. Arundell in wares," for which he allowed no interest. It contains items as to money paid Mr. Arundell himself, also monies for repairs of stamping and "crasing" mills, "leather and grease" for the bellows of the blowing house, stamp heads; for coal and tin sacks, for carrying and coining 5400 of Tin, &c., and various sums for

annuities, fees, and pensions. It concludes with a sum of 20s. paid "to *Wadebridge*;" why, is not stated, but it may be worth enquiry.

No. 6. This gives a curious account of the immense quantity of fish sent to Lanherne 37 Henry VI., 1458, from the Lizard country; the sum paid for the fish and for its carriage from *Tregarne to Truro*. Tregarne is (with Condorra in Manaccan), a manor in St. Keverne, near Coverick. This item does not occur again in any of Rolls.

The account for 1605 is in English, and on paper; the others are in Latin on parchment.

No. 1.—17, 18 HEN. VIII., 1526, 1527.

Cornwall.—From the account of divers Officers and Ministers of John Arundell, Knt., these from Feast of S. Michael the Arch-Angel in the year of the reign of King Henry VIII, the 17th to the same feast of S. Michael, in the year of the same king, the 18th, to wit for one whole year."—*In Latin* Commencing with the Manor of *Treloy*, it also gives the Reeve's accounts of receipts and payments for Lanheron, Tremblyth, Penles, Bodwennek, *Lanhaddron*.

Lanhaddron.*—(*Walter Nicoll Reeve*). He accounts for £19 11s. 6½d. for rents of Assize of *Lanhaddron*, as well of free as conventional tenants for the year, as by a rental there renewed 12 Jan., 14 Hen. VII., with 2d for increased rent of 1 cottage at Lanworrان, where Symon Paynter used to dwell—for 22s. 11d., perquisite of Courts, &c. Payments to Lord of Tybest, for Trewavena, the whole vill of Rescasa, suit of Court—Pengelly, and to the heirs of *Botreaux* of certain parcel of land inclosed within THE PARK of wild animals ('ferar') of the lord there."

Under the head of "defective rents" is an item of 16s., as "rent of 2 a. of meadow within the park of wild animals (? "pcu ferar Dni") of the lord, remaining in the hands of the lord. There is a charge of 4d. for parchment bought for the Rolls and Extracts of Courts held there that year. For Stewards and other Ministers of the lord there the year, for holding Courts and good management, 16s. Payments to *Walter Borlas*, receiver of the lord, at 3 terms, Birth of our Lord, Easter, and Nativity of St. John Baptist, £9 16s. 8d in all.

He is allowed 6d., paid to the *Bailiff of Blackmore*, for fine of Tin of the Park of wild animals there, and 6d. in defect of the rent of the Bede Mill, of Crukeon Wolas. And 53s. 4d. paid to *John Wodcock*, park keeper ("peario") there for his wages this year. And 10s. 1d. for divers watchers ("custubz"), and expenses done about the reparation of the Park of wild animals, as appears by Bill thereof rendered the Steward and remaining amongst the memoranda of this year. Afterwards he is charged 6s. as the rent of a certain parcel of ground inclosed within the lord's Park of wild animals, so demised this year.

Then follows Medishole (Mitchel), Eniscavyn, Truru Vian (*Thomas Polgrene*, Bailiff) Kenell, Condorowe and Tregaru, Wynnyanton, Carminowe, Penwith Hundred.

* Lanherne ?

No. 2.—MINISTERS' ACCOUNTS, 1581, 23^d ELIZ.

- 1 *Lanherne*.—Account of *John Parkyn* of Tregowstick, Reeve.
 - 2 *Treloye*.—(In St. Columb Minor), *Humphry Trevillian*, Reeve ; one the oldest possessions of the Arundells, *temp* Ed. 3.
 - 3 *Trembleth*.—(In St. Ervan), *Robert Doungye*, Reeve, by John William, *alias* Buse, his deputy. Chief seat of Arundells before marriage with Lanherne. The heiress of Trembleth, about 14 cent., brought it to the Arundells.
 - 4 *Nansladron*.—(In St. Ewe), *Edward Hambly*, Reeve.
 - 5 *Bodwanneck*.—(In Lanivet), *Ralph Clotford*, Reeve.
 - 6 *Eniskaven*.—(In St. Denis), *William Pascowe*, Reeve.
 - 7 *Penlese*.—(In St. Breock), *William Matthew*, Reeve.
 - 8 *Truro vean*.—(In Kenwyn and St. Clements), *Thomas Lewharen*, Reeve.
 - 9 *Kenell*.—(In Stithians), Pentouns, *temp*. Ed. 2, then *Carminows*, and by co-heiress to Arundells. *Henry Skinner*, Reeve.
 - 10 *Tregarne, Condorow*.—(In St. Keverne and Anthony), *John Trelyne*, Reeve.
 - 11 *Carmynowe*.—(In Mawgan in Meneague), *Simon Johns*, Reeve.
 - 12 *Wynnyanton*.—(In Gunwalloe), *Carminows, Trevarthians, Reskymers, temp*. Ed. 4., Arundell, *William Biskye*, Reeve.
- Estrays of *Kerryar Hundred*, belonging to the Lord of Manor of Wynnyanton.—Account of *George Browne* and *Robert*, bailiffs of the Manor of Wynnyanton, for estrays of hundred and Poundage of Carmynowe this year.
- 13 *Methesholl alias Metchall*.—(In Newlyn), *James Dynham*, Gent., Reeve of the *Borough*, by John Lucas, his Deputy
 - 14 *Bodardell*.—(Query in Lanlivery), *John Jollye*, Reeve. Tin works, 3 other Lords, heirs probably of Cardinhams, $\frac{1}{4}$ part. Trepper's Mill and Blount's Mill in decay.
- Treles*, in psh. of Key, *Pascatius Stephen*, rent 15s. for life hold.
St. Edye Churchtown, *Thomasine Jefferye*, rent 26s. 8d. for life hold.
15. *Connerton*.—(In Gwithian), *George Goodale*, Reeve. *Bictric*, Allan Earl of Britany, Crown Queen *Maud*, Wm. Rufus, Robert Fitzhamon, heiress of Robert Earl of Gloucester ; 1154 given Richard Pincerna, called Conarton, from living there, his grandson settled at Lanherne, and so called ; his heiress brought both estates to the Arundells.
 Tin Mills and Premises at Esterlow destroyed by sand.
- Connerton* (separate skin).—In 1581 *John Tregenna*, Gent., Bailiff of the Manor. Curious entries, wreck, &c. ; Hundred of Penwith, Marquis of Dorset, attainder of treason, also *Humphry Arundell*, allowance to tenants for planting Rushes in the sand. CURIOUS.
- Hundred of Penwith*.—In 1581 *John Tregenna*, Gent., Bailiff of Hundred, paid Queen £3 5s. 6d. Lostwithiel Exch., for $\frac{1}{3}$ pt. profits of Courts of the Hundred.
- 16 *St. Colombe*.—(In S. Columb Major), *John Thomas*, Reeve.
 - 17 *Bodbrane*.—(In Duloe), *Richard Jagowe*, deputy Reeve for *Alice Jagowe*, Widow, Reeve.
 - 18 *Resperye*.—(in Lanivet), *John Edward*, Reeve.

- 19 *Prospynnek*.—(in Sithney), *Henry Pemprase*, Reeve ; high rent paid Bishop of Exeter for high rent of Manor of *Prospynnek*, &c.
- 20 *Pengwenna*.—(In Breage), *John Thomas*, Reeve. The Roll concludes with Tin accounts, Paper B.
- 26 Manors besides Hundreds of Penwith, &c.

After the Manor of *Pengwenna* there is entered on the Roll of separate skins fastened at the head, “*Mania sex ista sequen Johes Arundell. Miles p quisiu sibi her et assign suis impvetim de Edwardo de Veere Comite, Oxon.*”

They seem to be—

- 1 *Rosworrye*.—(In Gwinear Parish), *John Hoskin*, Reeve, by Thos. William, his deputy.
- 2 *Bossneywen*.—(Bosuen in St. Columb Major), *Richard Olde*, Reeve.
- 3 *Tresythenye*.—(Tresilliny, query in St. Columb Major), *Thomas Johns*, Bailiff.
- 4 *Demellyock*.—(Dimiliock, in St. Denys), *William Pascowe*, Reeve.
- 5 *Tregennowe*.—(Tregennowe, St. Goran), *John Melhewes*, Reeve.
- 6 *Tregorreck*.—(Tregorrick, by Saint Austell), *John Randall*, Reeve.

THEN FOLLOWS, IN *English*, PAPER B.—

The accounts of *tynne* received for Toll and Farm at Midsummer and Michas. in the year aforesaid, by *Thomas John* and *George Browne*, 1581.

MIDSUMMER.

Nansladron.—Imprimis received at Polgowth for *Toll* at the 12th dish, 5 feet* 2 quarts, and 1 half quart of Tin.

Enyskaven.—Item received at Tookers work for *toll* at the 13th dish, 2 foot of Tin.

Tregorreck.—Item received at Tregorreck for *farm* at the 4th foot, 2 foots of Tin

Domelliock.—Item received at Domelliock, for *Toll* at the 13th dish, 2 foot and 1 quart of Tin.

Bossuyen.—Item received at *Engrowseworke*, in *Gavrigan*, for *Toll* at the 13th dish, 1 foot, 1 quarte, and 1 quarter of a quarte.

„ Item received at *Trevarren*, for *toll* at the 13th dish, 3 foots, and 2 quarts of Tin.

„ Item received at *Gavrigan* and *Ruthfoose*, for *Toll* at the 13th dish, 2 quarts of Tin.

Sum total of all the aforesaid Tin is 17 foots, and three quarters of a quart. vizt. 3 foots, 2 quarts, and a half quart of *Mine Tin*, and thirteen foots, and 3 quarters of a quart of *Moor Tin*, viz, the *Mine Tin* at 4d. in the Marke, and *More Tin* at 5d. in the Marke, the price of the 1000 of *White Tin* being £26 13s. 4d., amounteth in the whole unto } xiiijli.

* “Foot of Tin”—An antient Measure for Black Tin, equal to 2 Gallons, now a nominal measure, but in weight 60 pounds.

“Dish”—The antient name of a measure used for Black Tin, containing 1 gallon.

MICHAELMAS.

Item received at the place aforesaid of *Mine Tin*, 1 foot, 1 quart, and a half quart.

Item received at the foresaid places of *Moore Tin*, 2 foots, and 1 half quart, all which tin is sold at the same price as it was at Midsummer now last past.

Sum^d. of the price of this Tin amounteth to the sum of liij^s. x^d.

MIDSOMMER AND MICHAELMAS.

Pengwenna.—Item received at *Polladras More*, and *Carihallow Downe* for tolle and ferme xj gallons, one quart, and one gille.

Prespynneck.—Item received at *Nandrisacke* for Tolle and ferme, 7 gallons, and 1 quarte, wh is sold at 8 shillings the Gallon.

Sm^a To^{lis} xvij gallons, ij quarts, and j gille, the whole pce vij^{li} jx^s

Kenall.—Item received at *Kenall B owing house* and “*wroste*” † upon the “*casalts*” (?) there 3 Gallons, and is solde unto *Raffe John*, of *Kenall* aforesaid, at vij^s ye Gallon, and ij^d above the vij^s. which is in all xxiiij^s; and farther received there one pottell and 1 pint w^{ch} was solde for ye like pce, and then the whole of this Tynne is xxjx^s jx^d.

Sm^a To^{lis} of ye whole receipts, xxiiij^{li} xij^s vij^d

(END OF ROLL.)

No. 3.

The acco^t. of *Richard Tremaine*, gent., of all the receipts within the Countie of Cornwall, to the use of *John Arundell*, of *Lanherne*, Esquire, for one yere ended the 27 of October, 1605.

The following notices relating to tin occur.—

Stamping Mill—Also for the pfts of the Stamping Mill this yere, xij^l

Tyne—Also of 5400 of White Tyn made this yere, of all the black Tyn according to a particular accounte thereof, clj^l iiij^s

Blowing—Also for 60 Tydes of blowing this year, besides 12 tides of Mr. Arundell's, wch would have coste 6^l 12^s. And besides } 33^l
10 Tydes of blowing Scinder, wch wold have cost you 5^l 10^s

Also for expenses about the Stamping Mill, and reedyfying and new making of the crase mill as followeth :—

For Masons wages and their attendants... ..	3 ^l 10 ^s
For Carpenters wages	4 ^l 10 ^s
For Stampers hedds and Lifters	3 ^l
For thatching and reede... ..	40 ^s
ffor Grates for the Mill	6 ^s
ffor Nayles and Iron worke	20 ^s
ffor lether and gresse for the billowes of the blowing house ...	10 ^s
ffor Coale sakes 29 ^s 4 ^d	29 ^s 4 ^d
ffor Tyn sakes 10 ^s	10 ^s
The Blowers wages and their attendants, with 24 ^s given the Mr Blower for rewarde ffor Carrying and Coyning of the 5400 of Tyn 46 ^s 8 ^d	46 ^s 8 ^d
ffor the Carrying and Coaling of 379 Packes of Coale yet remaining in the House, with much other olde Coale, all made and coaled at Killibarrett in Cardyna	15 ^s 6 ^d

† Qy. roasted.

ffor Coyning of 2 slabbs of Tyn at Godolphin blowing house, in February, and for carryage thereof to Truro 13^s 4^d 13^s 4^d
 Also for Carrying of Tyn black from Gwendron and St. Agnes 3^l 6^s 8^d
 Wch he prayeth to be Respited untill Candelmas coynage, for that the Tyn of Michelmas coynage is not yet paid for, albeyt accounted for in the charge afore-said.

NO. 4.—PAPER BOOK.

From the account "of all *the Reeves and Bayliefs* of John Arundell, of Lanhern, Esquire, within the said Countie (Cornwall) for one year, ended at the Feaste of St. Mich^{el} tharch^l, in the yeres of the Raignes of our Souvaigne Lorde James, by the Grace of God, 3^d," &c. 1605.

After all the manors is "accounte of *William Crofte*, Bayliet of the *Tymber of Lanhadron*, sold and delivered from November, 1604, to November, 1605.

Fyrst.—He yeldeth accot of iiij^s received of parte of the 30^s of, respited the laste yere upon the "*driller*," (?) of St.
 Tue iiij^s
 " Also of x^l xvj^s viij^d, the price of 9 Okes solde to the Captyns of St. Margetts myne x^l xvj^s viij^d
 " Also of xv^l v^s viij^d of the price of xxj Okes sold to the Capten of Polgoothe Myne, wth xxvi^s viija of the ffales of iiij okes cutt for the repaying of Polgoothe Myll... .. xv^l v^s viij^d
 " Also of xlij^s of the price of vj little drye Okes sold to the Captens of *Vean Vean*... .. xlij^s
 " Also of xxvj^s x^d of the price of 6 litel dry Okes sold to Richard Werren xxvj^s x^d
 " Also of iiiij^s of the price of iij litel scrubbs sold to John Bunny iiiij^s
 " Also of vij^s vj^d of the price of ij litle Scrubs sold to John Mitchell vij^s vj^d
 " Also of v^s of the price of a dry Tree sold to Charles Crocke v^s
 " Also of iiij^l of the price of iij Oks geven by the Lordes appointm^t to *Otwell Hill*, Esq... .. iiij^l
 " Also of iiij^l of the price of 3 Okes sold to the said Mr. Hill iiij^l
 " Also of iiij^l of the price of ij okes geven to Richard Smyth of St. Colombe by the Lordes appointm^t... .. iiij^l
 " Also of xxxiiij^s iiij^d of the price of a Tree sold to the said Richard Smyth xxxiiij^s iiij^d
 " Also of xiiij^s iiij^d of the price of parte of the iiiij trees employed about *Polgooth Mill*, sold to John Whetter... .. xiiij^s iiij^d
 " Also xvj^s of the price of ii scrubbes solde to *John Jagowe* and also of xij^s of the price of a dry scrub and 2 lymes of a tree sold to Richard Cocke xxvij^s
 " Also of v^s iij^d of the price of 2 small windfalls sold to Raulf Edwardds v^s iij^d
 " Also of v^s iiij^d of the price of a drye Tree sold to Will^m Perm... .. v^s iiij^d
 " Also of v^s vj^d of the price of iij Windfalls sold to Richard Tomkin v^s vj^d

- „ Also xiijs viij^d of the prices of Bowes and half a home (query Holly) sold ^{12d.} namely, to Walter Jenkin, ^{3s. 4d.} to Hierom Darte, ^{3s. 4d.} to Rauf Neugh, ^{12d.} to George ffurstman, ^{3s.} to John Jenkin, ^{8d.} to Thomas Rye, and ^{16d.} to John Maye ... xiijs viij^d
- „ Also of xxvijs vj^d of the price of ffu wood sold to the Parson of *St. Tue*... .. xxvijs vj^d
- „ Also of the price of iiij trees ymploye about Polgooth Mill, besides xxvjs viij^d sold thereof to the CAPTAINS of Polgooth, ut supra And besides xiijs iiij^d thereof sold to Mr. Whetter ut supr^a xxxiijs iiij^d
- Sm. totalis lijⁱ iiij^s viij^d

Whereof he is allowed of viijⁱ for the Trees given to Mr. Hill & Smyth as before. And of xxxiijs iiij^d for the trees bestowed upon Polgooth Mill.

And so he oweth xlijⁱ xjs iiij^d

Whereof he is respited of xijs upon Cocke, and vs iiij^d upon Edwards. And xxvijs vj^d upon the Parson of *St. Tue*, not yet received. And so he oweth xlⁱ vjs x^d

Whereof he is allowed of vjs viij^d paid to the feod. of Cornwall for the fine homage of Lanhadron this yeare. And of vjs viij^d for the same for the late yeare.

And so he oweth xxxixⁱ xiijs vj^d

Where unto add for Rasters out of *Stickar* ix^s ij^d.

And so he owethe xlⁱ viijs viij^d

NO. 5.—FROM THE PAPER BOOK OF THE ACCOUNT OF ALL THE REEVES AND BAYLIEFS OF JOHN ARUNDELL,* OF LANHERNE, ESQ., WITHIN THE COUNTY OF CORNWALL FOR ONE WHOLE YEAR, 1605.

“The account of *Richard Tremaine*, of the *Coale* made at *Killibarrott* within the Manor of *Cardynam* this year.”

He yeldeth acco^t of 379 *packes* of Coale made there this yere whereof 247 are brought to the Blowing house, and 132 are sold to *Sampson Rescasa* for xijⁱ ijs, after xxij^d the sack yet unpaid for. And of iiijⁱ vjs for the *Rist* solde there this year.

Sm. of the whole valew of the Coale and *Rist* xxxixⁱ xxij^d. Whereof paid for Coaling and carrying after x^d a packe xvijⁱ v^d, and given them besides xl^s in there resteth xxⁱ xvj^d, whereof xijⁱ ijs in the hands of *Sampson Rescasa*, ut supra. And there resteth vijⁱ xix^s iiij^d, for which there lyeth 247 packes of coal in the Blowing house worth xxijⁱ x^d, at xxij^d the pack.

THE SAME BOOK, 1605, AND IMMEDIATELY FOLLOWING, IS

“The Acco^t of the said *Richard Tremaine* for all the *Tynne* this yere.”

First he yeldeth acco^t of 68 Gallons and one Gille of Black Tin received from *Thomas Tomkyn*, of the Toll of *Helston Manor*, besides ij slabbes of Whyte

* Arundell must have been Lessee of Duchy of Toll Tin in Helston and Tywarnehale.

Lord de Dunstanville, page 45 says “there were as many men as doles in a work, & the lord allowed to put in 1 in 15 for himself.”

The Measure of Black tin (in the Eastern Mines) was by

The Gill, equal to 1 pint.

The Top Cliff, equal to 1 pottle

The Dish, equal to 1 Gallon.

The foot equal to 2 Gallons.

Tynne weh he blewe at *Godolphin blowing house*, waying 250^l of White Tyn, (lxvij Gallons, one Gill, and 250 White Tynn.)

Also of 53 Gallons, one quart, one gille, and iija in money worth Received of Peter Prideaux of the *Toll of Tywornhaile*, (liij gallons, quarte, Gill, and iij^d)

Also of iiij gallons, quarte, and iij^d pte of a quarte received of Peter Pridis, of the *Toll of Cosgaren*, (iiij Gallons, quarte, iij pte of a quart.)

Also of xiiij gallons, iij quartes received of Willim Otes, of the *Toll of Connton Manor*, (xiiij Gallons, iij quartes.)

Sm of the *Toll* cxxxix Gallons, half Gallon, thirde part of a quarte, and iij^d in money worthe And 250^l weight in White Tynne, worth vij^l.

Also of 25 ffoote iij quartes, iij quarters of a quarte for the *Toll of Polgoothe* being the 13th of the whole Tyn, (xxv ffoote, iij quartes, iij qters of a quarte.)

Also of 2 ffoote, half ffoote, half quarte, half a qter of a quarte, and iija in money worth for the *Toll of Veau*, being the 13th of the whole Tyn, (ij ffoote, half ffoote, half quarte, qter of a quarte and iij^d.)

Also of 2 ffoote, half ffoote, for the *Toll of Baldue*, being also the 13th of the whole. (ij ffoote, half ffoote.)

Sm of this *Toll* ys xxxj ffoote, half quarte and iij^d.

Also of 5 ffoote half for the ferme of 4 doles, and half being the Lo. whole right in *St. Margetts* wrought at the vijth. And so this accountant ov. reckned a half dole the last yere, (v ffoote, half ffoote.)

Also of 20 ffoote, 3 quartes, half quarte for the ferme of 5 *Doles half* wrought at the 5th, being the *Lo: whole right in Polgooth* worke, (xx ffoote, iij quartes, half quarte.)

Also of one ffoote, half quarte for the ferme of 2 *Doles* wrought at the vijth in *Veau Veau*, being the *Lo: whole right*, (ffoote, half quarte.)

Also of half ffoote for the ferme of one *Dole*, wrought in *Baldue*, at the vijth, being the *Lo: whole right*,—half ffoote.

Sm of these ffermes xxvij ffoote.

Sm of the whole feete lxx ffoote, halfe quarte and iij^d

139 Gallons and odd.—These 139 Gallons and odd made 3000 of

White Tyn, worth in money with the 2 Slabbes 91^l 4^s 0^d

59 ffoote.—And these 59 ffoote and odd, made in White Tyn,

1500, worth in money 42^l

1050.—And the blowing house made in *Scynder* 426. In *clensing*

200. And in *Pillian* 434 worth in money 29^l 8^s 0^d

Whereof abate for the pillian 27^s 6^d, and there resteth
28^l 10^s 6^d.

Sm 161^l 14^s 6^d.

Whereof allowed for poste grotes 10^s

Remayneth 161^l 4^s 6^d

357.—Whereof remayneth a block at the *Blowing house uncoyned*
weighing 357^l, and worth in money 10^l

So remayneth due 151^l 4^s 6^d

Then follows:—

“ The acct of the said Richard Tremaine, of the blowing house
and Stamping Mills.

First he yeldeth account of money received for 60 Tydes blowings
this yere after xj^s for ev’y Tyde xxxiiij^l

Also of 416^l weight of *Scynder Tyn* blowen this yere, worth in
money xj^l xij^s vij^d

Also of the 200^l weight of Tyn of the *clensing of the house* this year, worth in money v^l xij^s
 Also of 434^l weight of *Pilliam Tyn*, this year, worth xj^l iij^s vj^d
 Sm totales lxj^l viij^s, besides xij Tydes blowing of the Lo^{ds} Tyn, weh would have coste v^l xij^s. And besides x Tydes blowing of Seinder; weh wold haue coste v^l x^s

And so the whole profit amounts to lxxij^l x^s

Also Received for 34 Weecks stamping and ij days after, vijs the Week xij^l

Sm total of the blowing house and Stamping Mill, lxxxv^l x^s

Whereof deduct xij^l ij^s for the blowing of the Lordes Tyn and Seinder and there resteth due lxxij^l viij^s

Weh 33^l for the 60 Tydes blowing, and xij^l for the stamping is unsevered in this accountants gen'all acc^t. And the rest is by him answered in his said acco^t in the total of Tyn.

Out of 73^l 10^s aforesaid of the pffitt of the blowing house you must deduct for the *blowers wages* xij^l. And for Coale for the 82 Tydes after, v sacks to ev'y Tyde 402 Sacks, weh are worth in the house 40^l 4^s, and vj^s for other small at ij^s the pack. So. . . *
 you may accounte the blowing xxj^l

The stamping house this yere was so fallen in decay as yet yielded little pfiitt de claro. But this yere following yet will yeld more then this yere.

At the end of the book is "the account of Richard Tremayne, Gent. of all the receipts within the County of Cornwall to the use of John Arundell of Lanberne, Esquire, for one year ended the 17th of October 1605" The items are specified and their "charge." The total charge is "mlvj^l xvij^d — 2^l and half of pper," —say £1056 1 6 and the pepper.

Of this "prays to be allowed" various items of payments and expenses amounting in the whole to £987 19 2, so that with £3 6 8 allowed for Black Tin from Gwendra and St. Agnes, he accounted for £991 5 10 and the 2½lbs of pepper, and was debited as owing £64 15 8.

NO. 6.—MINISTERS ACCOUNT, 37 H. 6, ARUNDELL.

Tregarne, Condorra.—In St. Keverne and St. Anthony. Account of *Richard Wille, Reeve.*

Sum of all payments, expenses, and discharges, 107^s 8^d. And he owes £6 4 5½. And thereout he is allowed £4 8 8, paid viij, xij (query scores or hundred) *Congres* purchased, and for vij^s xxx (query 730) *Haddokes* bought and ij^s (200) *Whitynges* with carriage of the same, and 16d. paid for carriage of fish from Tregarne to Truro, in the past year, and 8^d paid John Chemound.

He is charged 33^s 9½^d, and afterwards with 6^s rec^d as price of a horse, as heriot from John Tregan.

* Illegible.

X.—*The Rainfall of Cornwall, with Observations on the Flow of Streams.*—BY H. MICHELL WHITLEY, Assoc. Inst. C.E., F.G.S.

Read November 6th, 1875.

PART I.—RAINFALL.

THE amount and fluctuation of the rainfall of a district, associated as it is with the climate, is a question intimately connected with the welfare of its inhabitants, and whether we consider its bearing on the water supply of the towns, or its effects on the nature of the cultivation of the country districts, it appears desirable that it should be ascertained as correctly as possible.

For some years past numerous rain-gauges have been established in various parts of the county, some have been at work for short periods only, whilst the register from others is still continued, and in some cases extends over a considerable length of time. It is my purpose in this paper to collect and tabulate these various observations in a convenient form for reference, and from them to deduce the Mean Annual Rainfall in the different districts of the County—and to add some data on the proportion of rainfall which flows off the surface by streams.

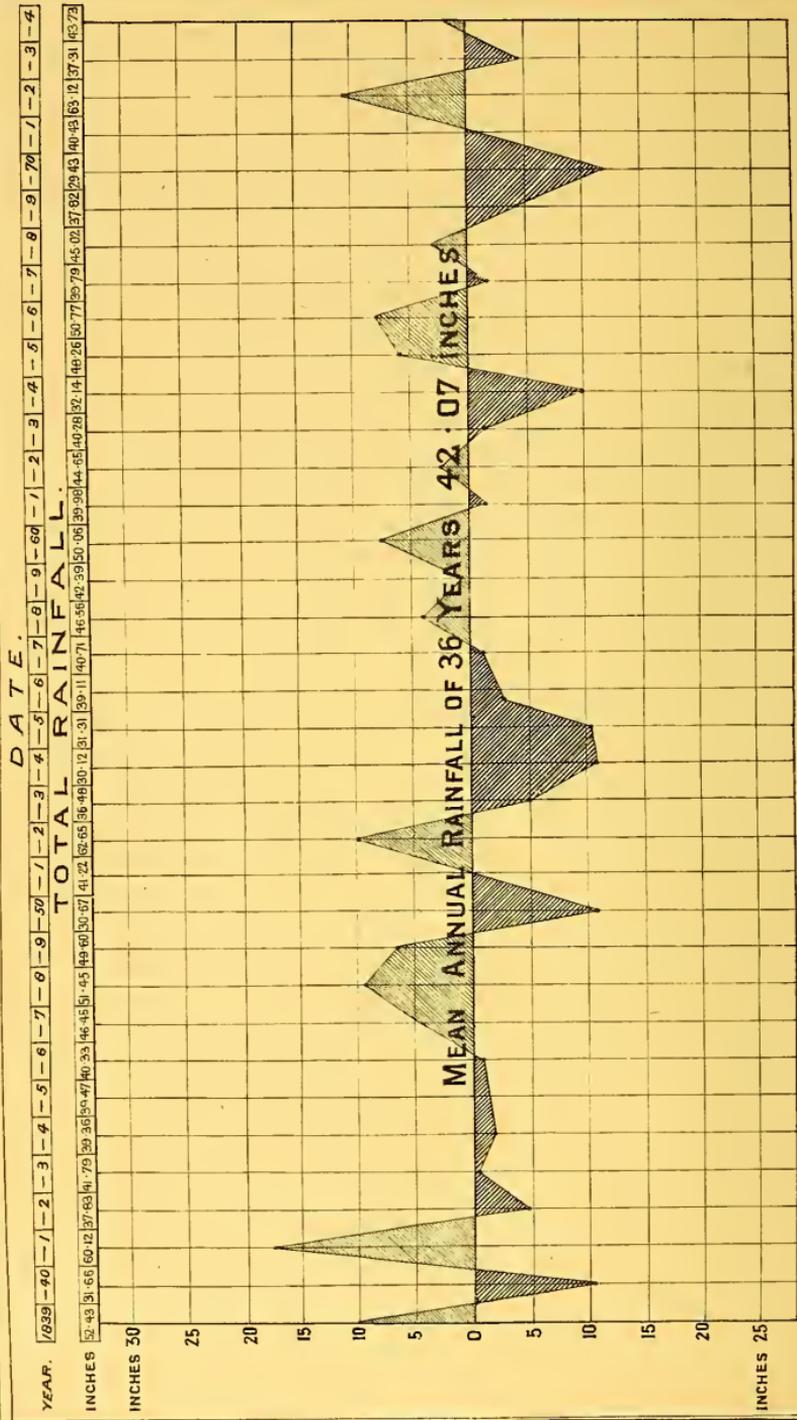
The first observations taken in Cornwall of which I believe any record is published, are those by Dr. Borlase for Ludgvan, from the years 1767 to 1771, given by Dr. Dalton in his paper submitted to the Manchester Literary and Philosophical Society in the year 1799.* The amount of rain for Ludgvan is there given as 41·00 Ins., and Dr. Dalton adds “Another place in Cornwall 29 Ins.” but gives no further particulars. Mr. Symons adds the year 1762 to Dr. Dalton’s five years.† The next measurements are those of Mr. Giddy, taken at Penzance between the years 1821 and 1828.‡ Beardmore in his Synopsis of British rainfall gives Penzance 1825 to 1833, Mean Rainfall 43·10 Ins. at a height of

* Transactions Manchester Literary and Philosophical Society, Vol. 5, p 148.

† Reports British Association 1865, p 196.

‡ Reports British Association, 1865, p 196.

ANALYSIS OF RAINFALL AT THE ROYAL INSTITUTION, TRURO.



*Number of Years above } 42 per Cent.
The Average fall.*

*Number of Years below } 58 per Cent.
The Average fall.*

40 feet above sea level.** No guage seems from that time to have been at work until 1835, but in that year the record for Kimberley Place, Falmouth commences; in 1837 and 1838 the St. Breock and Royal Institution returns begin, and in 1840 the Helston Guage was established; these two last being the largest continuous records in the county, the former extending over 36 years and the latter over 33. After 1840 Observers gradually increased, until now they number more than 40, whilst numerous registers have been kept for short periods although now discontinued.

It is, however, essential that to obtain trustworthy results a register of the rainfall should have been kept for a sufficient length of time, that is for a period of about 20 years, but the number of guages which have been at work for that length of time bears only a small proportion to the number from which I have collected returns. I have, therefore, in deducing the mean Annual Rainfall, taken the observations of this Institution as a standard; calculated the proportion with the average rainfall of the years during which each guage was at work bears to the Mean Annual Rainfall of the 36 years of the standard, and reduced the various returns accordingly; thus obtaining a much nearer approximation to the Rainfall at Stations at which observations have only been taken for a very short time, which otherwise would be practically useless in determining the average fall of rain in the districts in which they are situated.

Table No. 1. gives the details of the Monthly and Annual Falls of Rain for the last 36 years at the Royal Institution of Cornwall, and the diagram, Fig. 1 shows an analysis of the yearly falls for the same period.

The Mean Annual fall for 36 years is 42·07 Ins., whilst the maximum and minimum falls are 60·12 and 29·43 Ins., occurring respectively in the years 1841 and 1870. The variations in different years are clearly shown in the diagram; and in the Table No. 2. the fluctuations at Truro and Greenwich (which I have added for comparison) are expressed in percentages of the Mean Annual Rainfall.

** Beardmore's Manual of Hydrology, p 298.

TABLE No. 1.

*Details of Monthly falls of rain at the Royal Institution, Truro.
Gauge 56 feet above high water—spring tides.*

Year	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1839	3.01	3.17	3.80	2.93	2.78	4.20	5.27	2.38	5.48	3.46	7.18	8.77	52.43
1840	5.63	3.70	0.20	0.75	1.65	1.08	1.38	1.90	3.40	2.21	7.70	2.01	31.66
1841	4.62	4.41	5.34	2.67	3.49	3.13	1.95	3.87	9.47	5.84	8.45	6.83	60.12
1842	4.13	2.81	4.22	1.40	1.49	1.84	1.96	2.51	2.97	3.02	8.24	3.20	37.83
1843	4.40	4.05	2.41	3.65	4.81	3.23	1.78	4.00	1.05	7.53	3.97	0.87	41.79
1844	4.32	4.71	3.85	0.61	0.18	3.79	2.22	3.66	1.58	3.32	7.33	3.76	39.36
1845	5.74	3.64	0.83	2.87	1.05	2.70	2.40	3.30	4.53	1.76	6.73	4.06	39.47
1846	6.21	2.36	4.78	2.55	3.06	1.92	3.65	2.00	2.56	4.49	3.46	3.29	40.33
1847	5.17	2.40	4.46	3.43	5.10	2.08	1.77	1.41	1.95	5.84	4.42	8.42	46.45
1848	3.46	6.73	4.54	4.83	0.58	4.00	3.05	5.48	3.85	3.39	3.66	7.88	51.45
1849	3.97	1.72	2.33	4.59	2.66	2.93	2.89	4.07	9.45	3.83	5.18	5.98	49.60
1850	2.95	2.78	1.16	4.84	2.02	0.84	1.53	1.62	1.70	2.48	5.16	3.59	30.67
1851	9.58	1.42	7.11	2.8	1.46	1.46	3.29	2.93	0.65	3.89	3.59	2.96	41.22
1852	7.83	1.13	1.72	1.70	3.93	4.15	0.83	4.57	4.13	6.74	10.51	5.41	52.65
1853	3.83	2.38	1.32	4.04	1.04	2.68	3.59	2.50	2.60	4.70	4.90	2.90	36.48
1854	6.02	1.46	1.08	0.22	3.26	3.35	1.67	0.88	1.23	4.91	2.55	3.44	30.12
1855	0.65	3.08	4.14	0.26	4.35	3.72	2.73	2.05	0.40	5.10	1.07	3.76	31.31
1856	3.98	3.21	1.85	4.81	3.32	1.51	1.90	1.86	3.61	4.22	3.15	5.69	39.11
1857	4.67	1.99	4.71	5.19	3.07	1.34	2.26	3.02	2.79	6.38	3.42	1.87	40.71
1858	1.70	3.63	2.25	5.51	2.33	0.53	3.83	2.67	3.55	3.69	3.28	6.11	46.56
1859	3.82	2.18	3.55	3.98	2.20	0.67	0.89	4.35	5.20	6.10	3.60	5.85	42.39
1860	6.91	1.69	2.78	1.26	4.04	7.38	1.59	5.78	3.39	3.14	4.26	7.84	50.06
1861	1.12	5.84	2.74	0.86	1.72	3.19	6.71	1.46	3.31	2.70	6.39	3.94	39.98
1862	5.10	1.51	5.07	2.44	2.87	3.61	5.01	2.04	4.69	6.34	3.82	4.15	44.65
1863	5.00	1.10	2.60	1.60	2.40	4.40	1.60	4.00	4.50	5.10	3.80	4.20	40.28
1864	3.62	2.36	2.42	1.22	1.27	1.45	0.74	1.14	3.64	4.31	4.63	5.34	32.14
1865	6.40	4.28	2.79	1.07	2.58	1.79	4.31	5.33	0.65	9.09	4.97	5.00	48.26
1866	6.92	5.41	4.63	3.94	2.45	3.27	0.85	4.69	7.88	2.63	3.06	5.04	50.77
1867	6.74	3.37	5.44	3.46	3.53	1.13	3.81	0.99	1.33	5.70	1.39	2.90	30.79
1868	7.15	2.42	2.48	3.61	1.69	0.54	1.04	2.99	4.03	5.00	5.81	8.26	45.02
1869	6.84	3.88	2.46	0.97	5.42	0.26	0.35	0.48	4.46	2.27	4.81	5.62	37.82
1870	3.19	3.61	2.45	0.18	1.72	0.32	1.49	2.25	1.49	5.79	4.13	2.81	29.43
1871	4.29	2.19	1.57	4.14	0.55	1.19	5.24	1.85	8.50	5.19	2.28	3.44	40.43
1872	8.13	6.98	3.98	2.77	2.79	2.77	2.69	1.99	3.26	5.67	5.96	6.13	53.12
1873	5.32	5.03	4.05	0.51	1.49	1.38	3.69	4.81	2.41	3.34	4.05	1.23	37.31
1874	4.80	4.35	1.17	1.96	1.34	1.84	1.60	3.71	5.90	4.59	4.43	8.04	43.73
Mean of 36 years.	4.88	3.22	3.09	2.57	2.44	2.35	2.32	3.18	3.90	4.50	4.70	4.70	42.07
Minimum Fall.	0.65	1.10	0.20	0.18	0.53	0.26	0.35	0.48	0.40	1.76	1.07	0.87	29.43
Maximum Fall.	9.58	6.38	7.11	5.51	5.42	7.38	6.71	5.78	9.47	9.09	10.51	8.77	60.12

TABLE No. 2.

Fluctuations of the Rainfall at the Royal Institution, Truro & Greenwich.

	Truro.	Greenwich.
Period of Observation—Years	36	53
From	1839 to 1874	1820 to 1872
Mean Annual Rainfall	42·07 Ins.	25·04 Ins.
Percentage of years above the Average	42	45
Do. below do.	58	55
Mean Annual Fall of all the wet years	1·18	1·17
Do. do. dry do.	0·88	0·85
Do. Three driest consecutive years	0·77	0·81
Maximum Fall	1·42	1·45
Minimum Fall	0·70	0·67
Extreme Range	0·72	0·78
Proportionate Number of Periods of Three consecutive dry years per hundred years	14·8	22·6
Greatest number of consecutive dry years	5	5
Mean Annual Fall of the greatest number of consecutive dry years	0·84	0·81

The results of this table show a remarkable agreement in the fluctuations between stations so widely apart, and with rainfalls so different. The only noticeable variation being in the proportionate number of periods of Three consecutive dry years per hundred years, and this result would be expected, in contrasting a station on the western coast, with one so far removed from the influences of the more uniform condensation of moisture from the clouds of the Atlantic.

The Monthly means may be grouped as follows:—

April, May, June, July,	2·42 Ins.	Average Monthly Rainfall.
Feb., March, Aug., Sep.,	3·35 ,,	do. do. do.
Jan., Oct., Nov., Dec.,	4·69 ,,	do. do. do.

It will be thus seen that the Monthly rainfall is above the average from September to January, and below it during the remainder of the year.

It is a well ascertained fact that where the rainfall is small, the principal fall takes place during the summer months; and where large, in the winter; a gradual retardation of the maximum and Minimum epochs falling on an increased fall.

Table 3 gives the months in which the maximum epoch occurs in the Central Eastern and Western parts of England.

* Minutes of proceedings Inst. Civil Engineers, Vol. 39, p 27.

TABLE No. 3.

Mean Annual fall Epoch 1860-9.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
	15·20	20·25	25·30	30·35	35·40	40·45	45·50	50·55
	Months in which Maximum fall occurred.							
*Central England	Aug.	Aug.	Sep.	Sep.			Oct	Oct.
Eastern England	Aug.	Aug.	Oct.	Oct.	Oct.	Oct.	Oct.	Jan.
Western England	Sep.	Aug.	Sep.	Oct.	Oct.	Jan.	Oct.	Dec.

The copious supply of rain during the Autumnal and Winter months shewn by these monthly tables, being caused by the prevailing westerly winds at those periods, carrying the vapour-laden air warmed by the waters of the Atlantic over the colder land, thus condensing it into Rain.

In table 4 are collected the returns from 67 Stations whose positions are indicated on the accompanying map.†

At the Scilly Islands the fall of rain is about 31 Ins. per annum, the whole group lying low and having no elevations to precipitate the moisture in rain.

The Lands End district is intersected by a range of hills beginning at Chapel Carn Brea, 640 feet above sea level,‡ and terminating at Trecobben Hill, near Lelant, 652 feet, some parts of the range rising to about 800 feet above the sea. To the north the land slopes steeply to the coast line, whilst on the South the fall is much more gradual; the general elevation of the land varying from 200 to 300 feet. The geological formation is mostly granite. The rainfall varies from 34·13 Ins. to 30 Ins. at the Lands End and Sawah, St. Levan respectively, to 42 Ins. at Penzance; whilst on ascending the hills to Poltair, below Madron Church, the very heavy fall of 56·79 Ins. occurs.

* Report Brit. Assoc. 1873, p 287.

† In the preparation of this table I have been indebted to numerous correspondents, whilst I have also availed myself largely of the valuable yearly returns collected by Mr. Symons, the Reports of the Royal Institution of Cornwall, the Royal Polytechnic Society, and other sources.

‡ The heights given are obtained from the Report on the Geology of Cornwall, Devon, and Somerset, by Sir Henry De La Beche.

TABLE No. IV.

No.	STATIONS.	Gauge.			Years of Observations.	No.	Rain-fall.	Reduction to Truro Observations.	Concluded Mean Annual Rainfall.
		Dia.	Ht. above ground	Ht. above Sea.					
		Ins:	ft: ins	ft.					
1	Scilly Islands	—	—	30	1856-7 59 60	4	31·64	-0·72	30·92
2	Tresco Abbey.....	—	—	—	1859	1	32·38	-0·60	31·78
3	Land's End.....	5	3·0	308	1866-74	9	34·01	+0·12	34·13
4	Sawah, St. Levan	12	1·0	—	1855-9 62	6	31·41	-1·41	30·00
5	Penzance, R., Parade ...	12	3·0	94	1852 55-74	21	42·16	-0·10	42·06
6	„ St. Clare..	5	1·0	218	1874	1	45·35	-1·71	43·64
7	Poltair	5	1·0	243	1870-4	5	55·08	+1·71	56·79
8	Antion Lodge, Helston..	5	5·11	285	1869	1	37·32	+4·19	41·51
9	Helston	5	5·0	115	1842-74	33	37·75	+0·50	38·2
10	Crowan.....	5	1·2	419	1870 74	5	46·55	+1·45	48·00
11	Camborne	11	1·0	230	1870-74	5	49·20	+1·53	50·73
12	Tehidy	5	0·6	100	1859-74	16	41·92	-0·12	41·80
13	St. Ruan Major.....	8	3·0	100	1870 1874	2	30·92	+4·68	35·60
14	St. Agnes.....	5	1·2	278	1863-74	12	41·23	+0·56	41·79
15	Carclew	5	0·6	—	1870-2 74	4	48·85	+0·46	49·31
16	Falmouth, Kimby. Place	—	—	120	1835-60	26	40·87	-0·27	40·60
17	Devoran	12	1·0	60	1866	1	51·32	-8·84	42·48
18	Royal Inst., Truro	12	40·0	56	1838-74	36	42·07	—	42·07
19	Alverton do.	—	0·0	70	1839-42-44 48 } -54 57 58 }	13	43·86	+0·50	44·36
20	Strangways Ter., Truro	8	2·0	71	1869-70 72-74	5	40·75	+1·76	42·51
21	Penarth do.	12	1·0	190	1858-74	17	41·30	-0·43	40·87
22	Parade do.	12	1·0	30	1855-57	3	37·34	+4·66	42·00
23	Newquay	6	1·9	90	1862-74	13	36·61	+0·23	36·89
24	Trevoze Head	12	1·0	—	1857	1	23·76	+0·80	24·56
25	St. Petroc	—	2·0	96	1855-6 60-1	4	39·50	+1·91	41·41
26	St. Columb	—	—	—	1870-1	2	36·90	+8·55	45·45
27	Retyn, St. Enoder	8	2·6	—	1872-4	3	44·93	-2·66	42·27
28	Trethruffe	12	1·0	—	1855	1	28·78	+9·89	38·67
29	Lamellyn, Probus	5	0·6	—	1874	1	44·86	-1·70	43·16
30	Grampound.....	12	1·0	70	1855-6	2	39·56	+7·71	47·27
31	St. Mewan	5	1·0	275	1872-4	3	54·01	-3·21	50·80
32	St. Austell, Trevarna ...	5	0·6	300	1865-74	10	47·83	-0·55	47·28
33	„ Cosgarne ...	5	1·0	194	1872-4	3	53·77	+3·18	50·59
34	„ Trevarrick..	5	1·0	169	1869-74	6	48·39	+2·12	50·51

TABLE No. IV—Continued.

No.	STATIONS.	Gauge.			Years of Observations	No.	Rain Fall.	Reduction to True Observations.	Concluded Mean Annual Rainfall.
		Dia.	Ht. above ground	Ht. above Sea.					
		Ins.	ft. ins	ft.					
35	St. Austell, Polcarne.....	5	1·0	206	1869-74	6	48·26	+2·12	50·38
36	St. Breock	—	—	—	1838-43	6	42·16	-1·63	40·53
37	Wadebridge	8	2·6	23	1869-74	6	39·76	+1·75	41·51
38	„ Trehanock ...	5	3·0	303	1854-73	20	36·57	+1·00	37·57
39	Treglenis, St. Minver ...	10	3·0	140	1869-74	6	33·97	+1·49	35·46
40	Endellion	—	—	—	1869-71	3	27·10	+4·67	31·77
41	Roscarrack, Port Isaac..	—	3·0	210	1860-67	8	39·58	-1·11	38·47
42	Pencarrow	—	3·0	230	1841-3 60 1 63-6	9	45·22	+4·14	49·36
43	Bodmin, Fore Street.....	8	2·6	336	1865-74	10	51·47	-0·59	50·88
44	„ Castle Street....	5	1·0	338	1850-74	25	47·22	+1·6	48·48
45	Lanteglos.....	5	1·10	460	1863-8 73-4	8	48·31	-0·08	48·23
46	Camelford	—	—	580	1862-4	3	47·15	+3·68	50·83
47	Penhellick, Par	5	0·9	280	1871-4	4	40·20	-1·45	38·75
48	Boconnoc.....	12	1·0	—	1855-6	2	39·83	+7·49	47·32
49	Warleggan	8	2·6	650	1860-1 63-74	14	54·35	+0·06	54·41
50	Gt. Roughter Consols ...	12	1·0	1200	1856	1	61·03	+4·62	65·65
51	Jacobstow	5	1·0	200	1872-4	3	49·35	-11·87	47·48
52	Poughhill, Bude	5	1·0	170	1872	1	48·37	-0·06	38·31
53	Kilkhampton	5	0·6	475	1864-68	2	37·50	+3·39	40·89
54	Altarnun	5	1·0	570	1864-74	11	61·46	+0·66	62·12
55	St. Cleer	5	1·1	375	1870-4	5	51·08	+1·59	52·67
56	Liskeard	5	1·1	620	1864-74	11	49·87	+0·54	50·41
57	Hexworthy, Launceston	5	2·7	410	1869-74	6	50·61	+2·22	52·83
58	Landue.....	—	—	—	1851-2	2	50·45	-5·23	45·22
59	Hingeston Downs	11	1·0	850	1865-74	10	63·81	-0·75	63·06
60	Callington ...	5	3·0	490	1867-73	7	54·94	+2·30	58·24
61	Harewood	5	2·0	120	1866-7	2	45·44	-3·22	42·22
62	Catchfrench, Menheniot	8	0·6	270	1869	1	44·17	+4·96	49·13
63	Tideford, St. Germans...	—	0·4	750	1862-3	2	40·94	-0·38	40·56
64	Port Eliot	—	—	—	1867	1	49·94	+2·86	52·80
65	Pentillie	5	1·3	150	1865-74	10	52·55	-0·60	51·95
66	Saltash	12	1·0	—	1855-6	2	30·82	+3·46	34·28
67	South Petherwin	5	0·4	470	1874	1	55·67	-2·11	53·56

The Lizard district viewed from Penzance presents the aspect of a table land, gently sloping southwards from about 367 feet at Dry Tree, Goonhilly Downs, to 236 feet at the Lizard Town. The geological structure is Serpentine and Diallage rocks, with no hills rising above the table land, the rainfall is, of course, slight, nearly the same as that at the Land's End, 35·60 Ins., being the amount of fall at St. Ruan Major.

To the west of Helston lie Godolphin and Tregoning Hills, formed by a boss of intrusive granite, the former 495 feet, the latter 596 feet above the sea. The Rainfall is 38·25 Ins. at Helston and 41·51 Ins. at Antron Lodge.

The stations grouped around Camborne, lie on the west and north west side of the Carn Brêa, and Carn Menalez district. The latter hill (about the centre) is 822 feet high; the country sloping gradually towards the Falmouth Estuary and Helford River, but being in places somewhat broken. To the north of Carn Brêa the land falls gently to the sea, whilst on the west there is an undulating country of a height not much exceeding 250 feet which extends towards Hayle; Crowan (419 feet), and Camborne (230 feet), on the west of this granite Boss, have a rainfall respectively of 48 and 50·73 Ins., whilst at Tehidy (100 feet), nearer the coast, the fall is 41·89 Ins. Eastward of this district lies the Estuary of the Fal with an undulating country around it, the hills nowhere rising much above from 200 to 300 feet, and gradually sloping upwards to the Watershed Line) which has here approached the North Coast, and attains a height of between 400 and 500 feet, the average rainfall in the district being from 40 to 45 Ins. The geological formation is Devonian Slate. The Hensbarrow boss of granite hills lies further east, and to the north and north west of St. Austell, Hensbarrow Hill, the highest, being 1034 feet above sea. Sloping northwards to the dreary tract of the Goss Moors and further north, an undulating country extends at places attaining the elevation of more than 700 feet; whilst southwards the fall is more marked towards St. Stephens and St. Austell, the low country reaching to the English Channel. The Rainfall on these southern slopes is about 50 Ins., and at St. Columb to the north 45·45 Ins. The centre of the county is occupied by the extensive rugged wild upland tract known as the Bodmin Moors, where some of the hills

rise to considerable elevations. The twin hills of Roughter and Brown Willy, the former 1296 the latter 1368 feet high lie on the north western boundary near Camelford, whilst the eastern edge rising boldly from the surrounding Lowlands, is crowned by Trewortha Tor (1050 feet), Sharp Point Tor (1200 feet), and Caradon Hill (1208 feet); and on the south and west the hills bounding the district vary from 700 to 1100 feet in height, being generally at about the same elevation. Between the Camel and the Sea the land in places attains a height of from 300 to 600 feet, and on the north the descent is more gradual, the high land approaching closely to the sea coast at Tintagel and Boscastle, the great bulk of this Moorland district consisting of an elevated boss of granite.

A considerable number of stations are grouped around these moors, Bodmin, Pencarrow, Lanteglos, and Camelford, on the west, Gt. Roughter Consols on the north, Alternun and St. Cleer to the east, and Liskeard and Warleggan on the south east border. No station exists in the centre, but the rainfall at Great Roughter Consols, 65·66 Ins., may be taken as indicating the Mean Annual Fall. The rainfall varies at the western stations from 48 to 50 Ins. but a larger fall is shewn by these stations of Liskeard, St. Cleer, and Alternun. At the former the fall at an elevation of 620 feet, is 50·41 Ins., at St. Cleer, more nearly approaching to the south east of the hill district; although the height above sea level is diminished to 375 feet, the rainfall rises to 52·67 Ins.; whilst at Alternun, 50 feet lower, the rain registered 62·12 Ins. per annum.

The district lying in the east of Cornwall is undulating, but the hills generally attain no great elevation, with the exception of Kit Hill on Hingeston Downs, which is 1067 feet above the sea; here the fall is 63·06 Ins., but the ordinary amount varies from about 40 to 52 Ins. at the various stations; with the exception of Saltash, which has, according to the observations, the small fall of 34·28 Ins. I am inclined, however, to think that some exceptional cause must have been at work to give this result.

The belt of land fringing the North Coast has the smallest rainfall in the county. At the Land's End 34·13 Ins. The station at St. Agnes is high, and on ground to the east of the Beacon (621 feet), which accounts for the relatively large amount

of 41·97 Ins. At Newquay 36·89 Ins. is the annual fall, and at Trevoze Head, the lowest rainfall in Cornwall appears to take place of 24·56 Ins., which seems a little below what might be expected at that point. Further up the coast, the yearly fall lies between about 35 and 38 Ins., and on the country inland around Wadebridge, from 37 to 41 Ins.

The rainfall in the various districts may be grouped as follows:—

	Rainfall.	
The Scilly Islands	31	inches.
,, Land's End District	30 to 42	,,
,, Lizard District	35	,,
Helston and Neighbourhood	38 to 42	,,
Camborne ditto	42 to 51	,,
Truro and Valley of the Fal	42 to 45	,,
St. Austell and Neighbourhood ..	48 to 50	,,
Bodmin Moors	50 to 65	,,
East Cornwall	40 to 52	,,
North Coast	30 to 38	,,

PART II.—THE FLOW OF STREAMS.

The proportion of rainfall which flows off the surface by brooks and rivers, varies with the nature of the ground on which it falls; on steep moorland ground with primary rocks, very little loss is sustained by absorption, the rainfall almost in its entirety flowing off the district in the form of streams: whilst in a chalk country the absorption reaches its maximum, and the streams their minimum flow, and the contrast is a marked one between the swift clear brooklet of the former, and the rounded bowl shaped hollow without the trace of a stream, in the latter formation.

The gaugings given in the Table No. 5 were mainly taken in the years 1865-6, at Truthan on the River Allen, 4 miles to the north of Truro.

The basin lies on the southern slope of "The Backbone of Cornwall," and is of an area of 1·76 square miles; the gauge itself was situated at a height of 185 feet above Ordnance Datum (or Mean Tide Level), and the hills around attain in some places the height of 470 feet above the same Datum.

TABLE No. V.

Details of Flow, Truthan Basin, 1865-6.

Month.	Rain Fall.	Discharge at Truthan.			Discharge per square mile.	Depth run off.	Propt. run off to depth fallen.
		Max.	Min.	Mean.			
		Cubic feet per minute.			cub. ft. p. mi.	Ins.	
January 1866	5·72	—	—	370·00	236·80	4·46	·76
February „	5·13	520·00	200·00	407·00	260·50	4·91	·96
March „	4·65	224·00	142·00	182·00	116·50	2·91	·47
April „	3·80	—	—	180·0	115·00	2·17	·57
May „	1·43	—	—	28·8	18·43	·35	·24
June 1864	1·45	—	—	26·4	15·00	·28	·19
July 1865	4·19	18·00	13·00	16·00	10·25	·20	0·47
August „	4·88	45·04	20·12	32·00	20·50	·39	·08
September „	0·74	52·98	23·90	39·00	25·00	·48	·64
October „	8·83	220·70	162·42	191·56	122·59	2·31	·22
November „	4·65	251·00	172·00	211·50	135·36	2·55	·54
December „	3·50	936·00	190·00	190·00	121·60	2·27	·65

The geological formation is Devonian, which, unaccompanied by flat boggy land, is very favourable to the rapid flow of water.

It will be seen by an examination of the table, that the maximum and minimum flows occur in February and July, and are respectively 260·50 and 10·25 cubic feet per square mile per minute.

Comparing this with other observations made for me at Wrafton Weir, North Devon, in the same years, with a basin of an area of 6·8 square miles, the Weir being 20 feet above the Ordnance Datum; the hills around rising to 300 to 600 feet above that level, and of the same geological formation; the maximum and minimum flows gauged were, in January and July, 231 and 29 cubic feet per minute per square mile.

The ordinary summer flow (not the minimum) of the Plym at Sheepstor, with a drainage area of 7·609 miles, at an elevation of 800 feet, with hills around rising to 1500 feet, is 71·4 cubic feet per minute per square mile.*

The amount of evaporation and absorption shewn as taking place in the Truthan basin, is 16 Ins. per annum. The remaining rainfall flowing off the ground by streams. Comparing this

* Beardmore's Manual of Hydrology, p 138.

with other districts, evaporation and absorption vary between the limits of 10 and 18 Ins; the former amount applying to steep precipitous mountains of non-absorbent rock, whilst the latter takes place on flat spongy moorland or cultivated ground. At Rivington Pike, Lancashire, a steep moorland district, it is 15 Ins., at Glencoose 17 Ins.,† at the Manchester Waterworks Reservoir 17 Ins.‡ and at Paisley Waterworks 15 Ins.§

From these observations it appears that the mean Summer flow of a stream in Cornwall from the Devonian strata, may be roughly taken at one tenth of its average winter flow, exclusive of exceptional floods, for in these cases the discharge of water is enormous, the average summer flow often being not $\frac{1}{300}$ th of what a flood will bring down in a day. Taking the heavy fall of 2·30 Ins. at Truro, on May 18th, 1852,|| and assuming such a fall to have occurred after a period of continuous rain, it is probable that at least 1·50 Ins. would run off the ground in 24 hours, giving a flood of 2420 cubic feet per square mile per minute, or about 240 times the average July flow.

As cultivation increases, and more attention is paid to field drainage, and river courses are straightened and improved, these floods are brought down more quickly and in greater volume into the lowlands; and it then becomes necessary that additional precautions should be taken to guard against the consequences that may ensue therefrom.

† Beardmore's Manual of Hydrology, p 137.

Ditto ditto. p. 310.

‡ Bateman.

§ Leslie Proc. Inst. C.E. Vol. 31 p 33.

|| Beardmore's Manual of. Hydrology, p 320.

XI.—*A Calendar of Natural Periodic Phenomena kept at Bodmin for the year 1875.*—BY THOMAS Q. COUCH, F.S.A.

“Il semble, en effet, que les phénomènes périodiques forment, pour les êtres organisés en dehors de la vie individuelle, une vie commune, dont on ne peut saisir le phases qu'en l'étudiant simultanément sur toute la terre.”—QUETELET.

N.B.—The names printed in *italics* indicate plants and animals marked for special observation. fl. means flowers; fol., foliates; defol., defoliated.

The time of flowering is to be noted when the flower is sufficiently expanded to shew the anthers; of foliation, when the leaf bud is so far open as to shew the upper surface of the leaves; of fructification, at the period of dehiscence of the pericarp in dehiscent fruits; and, in others, when they have evidently arrived at maturity; of defoliation, when the greater part of the leaves of the year have fallen off.

THE year 1875 was ushered in by cold weather, rapidly alternating between frost and thaw. The cold was not so severe as in the north of Bodmin where heavy rains and a sudden thaw inundated our rivers, raising them within a few inches of the flood of 1865. January was very rainy throughout, with only one, or at most, two days on which no rain could be recorded. February entered with fine, dry, and calm weather, becoming cold as it proceeded, keeping back a vegetation which was becoming too exuberant. March brought with it slight snow, and sleet or cold showers, until the middle, when we had fine mild weather. Vegetation was still sluggish, and so continued through a cold, wet and windy April. May was sunny and hot, with now and then refreshing showers. June was very wet, and sometimes cold, much delaying the hay harvest; but July introduced us to some good hay-making weather for a short time. The continuous rain made the aftermath quite rank between the “pukes,” and the weather became very wet and unpropitious for the blossoming and kerning of the cereal crops, and the heads of wheat were largely abortive. July ended with fine and sunny weather, and so began August; but in its second week we had lightning, thunder, and torrents of rain. The corn fields had not their usual rich yellow hue, but were of a dingy brown colour. September was variable, but generally very rainy, as were also the two following months. The year ended with a mild but humid December.

I append the remarks of Mr. Olver, of Trescowe, on the crops of the year; and also Mr. Abraham Hambly's account of the rainfall of Bodmin for this year.

CROPS IN THE BODMIN DISTRICT, 1875.

Wheat at one time promised to be a good crop, but in consequence of the wet and stormy summer, at harvest, it proved to be a great crop of straw, with a small and inferior yield of grain, generally saved in good condition.

Barley is a heavy crop, well saved, but in consequence of the wet summer, rather a small grain.

Oats, which generally do best in damp, cool weather, are a good crop both of straw and grain, well saved.

Potatoes were a good crop, but in consequence of the wet, very much diseased, so that there will be a small supply of sound tubers.

Mangolds started badly, but have grown well at the end of the season, and are now an average crop.

Turnips have generally done well, and are above an average crop, except where they have been affected with the *finger and toe* disease, which appears to be increasing annually, probably from being grown too frequently on the same land.

Hay was an average crop, but much of it badly saved.

Grass has been, up to March, plentiful through the season.

Apples have been a good crop, and being the third good crop in succession, has caused cider to be very plentiful and cheap.

Plums, a very good crop.

Hazel Nuts, plentiful.

Blackberries and Sloes very plentiful, which is said to foretell a severe winter.

Live Stock have done well, and have been very free from disease, again showing that a damp season with plenty of grass is what the stock-farmer requires.

Several Woodcocks have been shot early in October; and Starlings (which now breed regularly at Pencarrow) have arrived at the same time in great numbers, and much earlier than usual. Partridges and Pheasants have been very scarce, in consequence of the wet breeding time.

RAINFALL OF BODMIN, 1875.

Months.	Total Depth.	Greatest fall in 24 hours.		No. of Days on which 0·1 or more fell.	Remarks.
		Depth.	Date.		
January	10·84	1·37	1st	29	The average for 11 years, 49·20; and 211 wet days. 1872 was the wettest year, 71·34; and 255 wet days. 1864 was was the driest year, 38·42; and 202 wet days. The 17th Sept., 1875, was the wettest day for the 11 years. Very mild at Christmas.
February	1·71	0·64	11th	11	
March	1·80	0·73	5th	10	
April	2·17	0·43	4th	13	
May	3·26	0·68	6th	15	
June	3·53	0·44	13th	21	
July	3·57	1·38	14th	18	
August	3 00	0 92	11th	14	
September	7·36	2·57	17th	19	
October	8·81	1·74	26th	26	
November	7·20	1·08	13th	19	
December	2·86	0·87	18th	18	
Total	56·11			213	

January 2nd.—*Snowdrop, galanthus nivalis fl.*

„ 5th.—Barren strawberry, *Potentilla fragariastrum fl.*

„ 13th.—*Hazel, Corylus avellana, fl.*

„ 16th.—*Cardamine hirsuta, fl.*

„ 18th.—*Honeysuckle, Lonicera Periclymenum, fol.*

„ 30th.—*Pilewort, Ranunculus ficaria, fl.*

February 2nd.—*Gooseberry, Ribes grossularia, fol.*

„ 8th.—*Lent-lily, Narcissus, pseudo-narcissus, fl.*

„ 13th.—*Blackbird, Turdus merula, begins song.*

„ 17th.—*Sparrow, Fringila domestica, builds.*

March 3rd.—*Yellowhammer, Emberiza citrinella, commen-*
ces song.

„ „ —*Rook, Corvus frugelegus, builds.*

„ 14th.—*Skylark, Alanda arvensis, begins song.*

„ 18th.—*Sulphur butterfly, gonopteryx Rhamni, seen.*

„ 24th.—*Caltha palustris, fl.*

„ 25th.—*Dog violet, Viola canina, fl.*

„ 28th.—*Larch, Larix communis, fol.*

„ 29th.—*Lilac, Syringa vulgaris, fol.*

„ 30th.—*Whitethorn, Cratægus oxyantha, fol.*

„ „ —*Stellaria holostea, fl.*

„ 31st.—*Privet, Ligustrum vulgare, fol.*

„ „ —*Gooseberry, Ribes grossularia, fl.*

April 7th.—*Wood anemone, Anemone nemorosa, fl.*

„ 9th.—*Swallow, Hirundo rustica, arrives.*

„ 15th.—*Cardamine pratensis, fl.*

- April 15th.—Ground Ivy, *Glechoma hederacea*, fl.
 „ „ —Sycamore, *Acer pseudo-platanus*, fol.
 „ 18th.—Birch, *Betula alba*, fol.
 „ „ —Beech, *Fagus sylvatica*, fol.
 „ „ —Cornerake, *Crex pratensis*, first heard.
 „ „ —Hyacinth, *Hyacinthus non-scriptus*, fl.
 „ 20th.—Hazel, *Corylus avellana*, fol.
 „ 21st.—Lime, *Tilia Europæa*, fol.
 „ „ —Early purple Orchis, *Orchis mascula*, fl.
 „ „ —Cuckoo, *Cuculus canorus*, first heard.
 „ „ —Orobous tuberosus, fl.
 „ 23rd.—Sauce alone, *Erysemum alliaria*, fl.
 „ 26th.—Lilac, *Syringa vulgaris*, fl.
 „ „ —Brook-lime, *Veronica Beccabunga*, fl.
 „ 28th.—Yellow Loosestrife, *Lysimachia nemorum*, fl.
 „ „ —Woodruffe, *Asperula odorata*, fl.
 April 30th.—Lotus corniculatus, fl.
 „ „ —Tormentilla officinalis, fl.
 „ „ —Milkwort, *Polygala vulgaris*, fl.
 May 1st.—Oak, *Quercus robur*, fol.
 „ 2nd.—Swift, *Cypselus apus*, arrives.
 „ 3rd.—Broom, *Cytisus apus scoparius*, fl.
 „ 5th.—Whitethorn, *Cratægus oxycantha*, fl.
 „ „ —Horse-chestnut, *Æsculus hippocastanum*, fl.
 „ 8th.—Ash, *Fraxinus excelsior*; fol.
 „ 10th.—Bugle, *Ajuga reptans*, fl.
 „ 12th.—Bees, first swarm.
 „ 13th.—Elm, *Ulmus campestris*, fol.
 „ 22nd.—Earth nut, *Bunium flexuosum*, fl.
 „ 24th.—Elder, *Sambucus nigra*, fl.
 „ 25th.—Plantago media, fl.
 „ 27th.—Fox-glove, *Digitalis purpurea*, fl.
 „ „ —Mountain Ash, *Pyrus aucuparia*, fl.
 „ 29th.—Sanicle, *Sanicula Europæa*, fl.
 „ 30th.—Dog-rose, *Rosa canina*, fl.
 „ „ —Forget me not, *Myosotis palustris*, fl.
 „ „ —Yellow rattle, *Rhinanthus crista-galli*, fl.
 „ „ —Columbine, *Aquilegia vulgaris*, fl.
 June 1st.—Wild guelder rose, *Viburnum opulus*, fl.

- June 2nd.—*Silene inflata*, fl.
 „ „ —*Stellaria graminea*, fl.
 „ 3rd.—Red Poppy, *Papaver rheas*, fl.
 „ „ —Cow-wheat, *Melampyrum pratense*, fl.
 „ „ —White Stone Crop, *Sedum Anglicum*, fl.
 „ „ —Honeysuckle, *Lonicera Periclymenum*, fl.
 „ „ —Blackberry, *Rubus fruticosus*, fl.
 „ „ —Tutsan, *Hypericum Androsemum*, fl.
 „ 4th.—Heath, *Erica cinerea*, fl.
 „ 5th.—Bog heath, *Erica tetralix*, fl.
 „ 9th.—*Valeriana officinalis*, fl.
 „ „ —*Habenaria chlorantha*, fl.
 „ 11th.—*Wheat in ear*.
 „ „ —*Cotyledon umbilicus*, fl.
 „ 13th.—*Lotus major*, fl.
 „ „ —*Briony*, *Tamus communis*, fl.
 „ 14th.—*Vicia cracca* fl.
 „ „ —*Privet*, *Ligustrum vulgare*, fl.
 „ 15th.—*Wild Thyme*, *Thymus serpyllum*, fl.
 „ 18th.—*Lapsana communis* fl.
 „ „ —*Geum urbanem* fl.
 „ „ —*Millfoil*, *Archillea millefolium*, fl.
 „ 21st.—*Sheep's scabious*, *Jasione montana*, fl.
 „ 25th.—*St. John's wort*, *Hypericum perforatum*, fl.
 „ 28th.—*Horsefly*, first seen.
 „ 29th.—*Glow-worm*, *Lampyris noctiluca*, shines.
- July 1st.—*Self-heal*, *Prunella vulgaris*, fl.
 „ „ —*Disease in Potatoes* appears.
 „ 3rd.—*Greater plantain*, *Plantago major*, fl.
 „ 4th.—*Scabiosa arvensis* fl.
 „ 7th.—*Meadowsweet*, *Spiræa ulmaria*, fl.
 „ 15th.—*Hard-head*, *Centaurea nigra*, fl.
 „ 21st.—*Golden Rod*, *Solidago Virgaurea*, fl.
 „ 26th.—*Mentha arvensis*, fl.
 „ 29th.—*Barley harvest* began.
 „ „ —*Hemp Agrimony*, *Eupatorium cannabinum*, fl.
- August 5th.—*Blackberry*, *Rubus fruticosus*, ripens fruit.
 „ 7th.—*Inula dysenterica* fl.
 „ 9th.—*Ling*, *Calluna vulgaris*, fl.
 „ 10th.—*Serratula tinctoria*, fl.

- August 12th.—*The wild guelder rose, Viburnum opulus; Mountain Ash, Pyrus aucuparia; ripen their berries.*
- „ 13th.—*Hedge Sparrow, Sylvia modularis, assemble in flocks.*
- „ 16th.—*Viola canina, second flowering.*
- September 3rd.—Capt. Hext, of Tredethy, says that this year there has been a remarkable scarcity of wasps, and in those nests destroyed, a large proportion of queen wasps.
- „ 10th.—*Swallows congregate for flight.*
- „ 22nd.—*Ash, Fraxinus excelsior; and Sycamore, Acer pseudo-platanus, defol.*
- „ 28th.—*Lamium album, fl.*
- October 9th.—*Beech, Fagus sylvaticus, defol.*
- „ 14th.—*Migratory Starlings seen in flocks.*
- „ „ —*Teal and snipe arrive.*
- „ 16th.—*Aspen. Populus tremula, defol.*
- „ 19th.—*Lime, Tilia Europæa, defol.*
- „ 20th.—*Woodcock, Scolopax rusticola, arrives.*
- „ „ —*Swallow, Hirundo rustica, seen.*
- „ 22nd.—*Ulmus campestris, defol.*
- November 16th.—*Hazel, Corylus avellana, defol.*
- „ —*The wall moss, tortula muralis, in fruit.*
- December 4th.—*Lesser Perriwinkle, Vinca minor, fl.*
- „ 19th.—*Grey wagtail, Motacilla boarula, appears.*

METEOROLOGICAL NOTES FOR 1875.

The publication of the Report of the Institution, together with the Meteorological Tables for 1875, in the early weeks of this year, made it impracticable to append to them any fair comparison of the results of the observations made at the different Cornish stations, either with each other or with those from other parts of the country. Now, there is some risk that delay may have deprived the inquiry of much of its interest; but it may nevertheless be desirable to preserve in our pages a continuous record of this class of natural facts, and I will notice the particular features of each month as in regard to former years.

January was very mild and very wet everywhere; at Truro the freezing point (32°) was only once reached; the mean temperature of the month was 48.8 ; the average of 16 years being 43.9 ; the mean of the maxima (52.3) being 3.5 , and that of the minima (45.4), 6.3 above the average. At Penzance, the lowest temperature was 37° , and the mean of the minima 46.27 . At Bodmin, the mean temperature of the month was 47.4 , the average being 43.0 . Even at Altarnun, 28° was the minimum on the stand; and on the same day, the 22nd, which was the only cold day at all the stations, the grass temperature was 18° . The snow which remained from December had disappeared from our highlands on the 4th and 5th. In the neighbourhood of London the same mildness prevailed. Mr. Glaisher remarks that "the severe cold period which set in on November 21st, 1874, and continued to 1st January, 1875, was followed by a very unusually warm period, beginning on 2nd January and ending on 30th; the mean daily temperature of these 29 days was $6\frac{3}{10}$ in excess of the average of 60 years. On several days this excess was as large as 10.0 , 11.0 , and 12.0 , and the direction of the wind was mostly S.W., or S.S.W., or W.S.W. On the only day, the 22nd, that the wind was from N.E. or N.W., the mean temperature was $2\frac{1}{10}$ below its average."* Turning to wetness, the rainfall at Truro was 7.98 inches, the average being 5.24 , and the rainy days were 29 instead of 21.3. At Penzance, the excess was still larger, being as 9.54 to 5.85 . The rain at the Scilly Islands (6.97) was, as usual, much less than at Penzance, but not, as commonly, less than at Helston, where it was 6.94 inches; at Land's End it was 6.54 . At Bodmin, the fall was 10.52 , and at Altarnun 12.75 , the averages for January being respectively 6.03 and 8.78 . Mr. Tripp says of the latter station "it was the wettest month on record here." In further evidence of the extreme dampness of the month, the wet bulb therm. was on the average only 1.5 below the dry, the mean humidity of the atmosphere was 93 (saturation being 100); and of 2 daily observations, the sun was overclouded 51 times, and only 11 times visible.†

* It is worth noting that at a place so near us as Taunton the minimum was as low as 9° .

† The thunderstorm on the 24th lasted at intervals from 1 p.m. till midnight, and was experienced throughout the whole county.

The weather continued mild in the first half of *February*, but was cold and dry afterwards. Frost was registered 11 times in the stand and 6 other nights on grass. The mean of the daily maxima (46·1), was 6·2 lower than January, that of the minima 8·2; and the mean temperature of the month (42·6) was 2·6 below the average. The rainfall was less than the average, but not greatly.

March was still more strongly characterised in the same way. The mean of the maxima was 1·4, that of the minima 1·1 below the average. The mean temperature was still nearly 5₀ below January, and sharp frosts were frequent. At Altarnun there were 27 frosty nights. The rainfall (1·39) was little more than one third of the average, and it only occurred at all on 10 days. Mr. Glaisher's summary for the Greenwich centre for these two months will apply with some slight differences to this county: "On the last day of January a cold period again set in, and continued very nearly to the end of the quarter, the direction of the wind was almost continuously east or a compound of the east till March 24th, and the average deficiency of temperature for the 54 days ending March 24th, was more than 3₀ daily." He adds, what will not apply so closely to our season, the cold of December having here been less intense, "taking into account the very severe weather from 21st November to 1st January, and from 31st January to the end of the quarter, with the long continuance of east wind, this winter has been one of most unusual severity."

April followed suit, being generally cold, dry, and bright. Although still 1·7 below the average, there was a material rise in the mean of the maxima, which reached 56^o, 3·7 higher than in January,—but the mean cold of night (40·6), 2·1 below the average, exceeded that of January (45·4) still more. The rainfall was a good deal below the average at Truro and Bodmin, but above it at Penzance and Helston. The number of rainy days was less than usual everywhere. The last four days were marked by a rise of temperature, and ushered in a genial *May*. The mean of the maxima was 63·3, 1·3 above the average; that of the minima 46·5, 0·8 above the average; the highest temperature being 76^o, the lowest 37^o. At Bodmin, the mean temperature of the month 60·5, was nearly 5^o above the average. The rainfall at Truro, as at Helston and Plymouth, was rather below the average; but the proportion was just reversed at Bodmin and Altarnun; the number of rainy days was a little in excess at all stations.

June began fairly, but was generally a wet month and rather ungenial, although the mean temperature was about the average, owing chiefly to cloudy nights, the mean of the maximum (65·2), being 1₀ below the average, that of the minimum 52₀, being just equally above it. The rainfall was only slightly in excess at Truro, but just double the average at Altarnun, "the wettest June on record here," and even more in excess at Plymouth, where the number of rainy days, which was above one-third greater than the mean at all the Cornish stations, was 2½ times in excess of it. Mr. Glaisher remarks for the country generally, "that up to the 26th April, vegetation was between 2 and 3 weeks late. On the 27th, a warm period set in and continued, with few exceptions, throughout the whole month of May, which was fine and dry till the 10th of June; the average excess of mean temperature for these 45 days was 3₀ daily; vegetation, which had made great progress in May, was as forward on the 10th of June as in the average of seasons." This account is fairly correct for Cornwall. The hay harvest was rather late, but abundant.

July was cooler and wetter than usual here, but not so much so as to the east of Bodmin. The mean maximum was 2·4, the mean minimum 1·4 below the average for the month. At Altarnun, Mr. Tripp notes, "on 20th a heavy local rain; a waterspout burst on the "West Moors," causing a destructive flood in the S. branch of the Inny." On the 14th there was a rainfall of 2·42 inches at Liskeard, and 2 inches in 16 hours at Plymouth. Heavy and very destructive floods occurred in various parts of England.

August was on the whole a fine month for the harvest, which was generally well saved. The mean temperature was 62·1, being just 1° above the average, that of the maximum (70·2) 1·5 in excess; of the minimum (54·4), only 0·2. There was no extreme heat, the maximum registered being 77°; nor great cold at night, the lowest point reached being 42°. At Penzance, the maximum was 70°; Helston, 78; Bodmin, 74, the mean temperature of the month there being 65·3, exceeding the average by 3·7. At Liskeard, the maximum was 73°, and at Plymouth, 72°. At Altarnun, as usual, the heat was greater, the shade temperature was over 80° on 3 days, and the mean of the 16th, the warmest day of the summer, was 71°, the average of the maxima of the whole month being 73·68. At Truro and Helston the rainfall was slightly above the average of the month, owing mainly to an exceptional flood on the 8th, amounting at Truro to 1·36 inch; but at Bodmin distinctly below it, and much more so at Altarnun. There was a smart thunderstorm throughout the county on the 8th; more partial ones occurred on the 3rd, 7th, 10th, and 15th.

September was decidedly a summer month till towards its close. The mean temperature (61·4), was 2·8 above the average; the mean of maxima (68°), was 2·3 above; the mean of minima (54·8), was 3·4 above; the absolute maximum was 76°, and the greatest cold 41°. At Bodmin the mean temperature (63·3), was 3·9 above the average; and the other stations present little difference. The latter part of the month was still warm, but wet, and the rainfall considerably exceeded the average of the month at all our stations. This was chiefly caused by some heavy floods, especially those of the 17th and 21st, when about 2½ inches fell at Truro and Plymouth; no less than 2·74 inches having been recorded at Bodmin for the 17th alone.* The following remarks on the weather during the quarter, by Mr. Glaisher, are interesting in regard both to points of agreement with and of difference from the history of our own climate. "Following a period of warm weather of 45 days duration, ending 10th June, one of cold began, and continued throughout the month of July, and till the 5th of August, being of 56 days duration, for which the average daily deficiency of temperature was 3·1. On 6th August, a warm period set in, and with very slight exceptions continued till the end of the quarter; for a few days about the middle of August, and for a week following the middle of September, the weather was very warm. The average excess of mean daily temperature for these 56 days was 3·2. It is remarkable that in the interval beginning 11th of June and ending 30th of September, there should be two periods of equal length, viz., 56 days each, one of warm, and the other of cold weather, and that their respective departures from their averages should have been to almost the same extent."

* Nuts, berries, and most fruits were plentiful. Wasps were unusually few.

October was a very wet month; the rainfall at Truro was 7·17 inches, the average being 4·81; and the number of rainy days was 27, whilst it averages 20·3. There was less difference from the ordinary quantity at Helston; and Altarnun had even less rain than its average, and 1·74 inch less than Bodmin, instead of exceeding it as usual. But, though the rainfall there was less than the mean, the number of wet days (27) was much greater; and Mr. Tripp remarks that there was no opportunity of sowing wheat or for raising and securing the potatoe crop. Cornwall escaped, however, in great measure, the disastrous floods which fell in several parts of the country, more especially in the Midlands. The temperature was equable, never having fallen at Truro below 36°, nor risen above 66°; but the mean of the maxima was nearly a degree below the average, and the weather was chilly from its dampness.

During the first half of *November* the same wet and gloomy weather continued, and heavy falls of rain raised the total considerably above the average, although the number of wet days was below it. This was most strongly marked at the eastern stations. At Bodmin, for instance, where rain fell on 12 days only instead of 21, the mean there for November—the quantity gauged was 7·12 inches instead of the average 4·64; and at Altarnun, where the mean is 5·72, the rainfall was 9·76 inches. The temperature up to the 19th was, with little exception, above the average throughout the country; but the 20th ushered in a very cold period, equally generally, with prevalence of E. and E.N.E. winds. At Truro frost was recorded every night from November 22nd to December 11th, and the thermometer fell to 21° on two occasions. At Penzance the lowest point was 29°, whilst at Altarnun it was 17°; the night of the 26th being everywhere the coldest.

Severe frosty weather continued during the first half of *December*. Snow fell on four days, but not heavily in this county. The second half of the month was mild and open, though generally overcast. The total rainfall at Truro (2·21 inches) was less than half the average, and it fell chiefly from the 17th to the 22nd, and the total number of days with rain was only 12, in place of 20, the usual proportion. The same ratio prevailed at the other stations. Mr. Tripp remarks for Altarnun, that it was the driest December on record, except 1873; and he contrasts thus the mildness of the end of the month with the severe cold of its beginning, “the mean of the 7th and 8th was 27°, of 24th, 47·5!”

Taking the Greenwich Observatory as his standpoint, Mr. Glaisher makes the following remarks on the severity of the weather: “On November 20th, a bitterly cold period commenced and continued till December 16th, the average daily deficiency of temperature being 7·4. The temperature on several days together was more than 10° in defect; on December 4th and 5th, it was about 15½°, and the average daily defect from November 30th to December 7th, was 12°. During this period the sky was almost always overcast, snow fell all over the country, and drifted in some places to a great depth; the wind was N. and N.E., and the air was very cold, and owing to the cloudy state of the sky the general deficiency of temperature was chiefly due to the want of heat during the day-time.” “The severity of the weather fell more upon the Midland Districts than on either the extreme Northern or extreme Southern Stations.”

Mr. Glaisher states in a tabular form the highest temperature of each day during the coldest weather at a large number of stations. I will extract a few of these for comparison with our own climate. The average maximum at the beginning of December is at Greenwich, 46°; at Truro, 50°.

STATIONS.	Maximum Day Temperature from Dec. 1st to Dec. 8th, 1875.							
	Dec. 1.	Dec. 2.	Dec. 3.	Dec. 4.	Dec. 5.	Dec. 6.	Dec. 7.	Dec. 8.
	0	0	0	0	0	0	0	0
Guernsey	37.5	38.5	39.0	40.5	36.5	37.5	41.0	42.5
Truro	37.0	43.0	40.0	41.0	38.0	38.0	36.0	41.0
Bristol	36.0	37.4	35.5	36.4	33.9	33.0	34.4	38.4
Hastings	31.7	32.2	31.6	33.9	30.5	30.4	31.4	37.5
Greenwich	32.3	33.5	32.5	31.0	31.7	33.1	35.9	36.8
Oxford	35.0	35.0	34.2	35.8	33.0	34.0	35.8	37.0
Birmingham	37.6	36.0	38.0	37.8	31.2	37.2	37.4	37.8

C. BARHAM.

506 42

Journal

OF THE

ROYAL INSTITUTION

OF

CORNWALL.



No. XIX.

NOVEMBER, 1877.



EDITED BY J. H. COLLINS, F.G.S.



TRURO:

LAKE & LAKE, PRINCES STREET

1877.

WALLINGFORD
LIBRARY

CONTENTS.

—o—

*The Papers marked thus * are Illustrated.*

	PAGE.
Spring Meeting	XLV.
Climate of Cornwall	XLVII.
Cornish Ornithology	L.
President's Address	317
I.—*Tomb of Prior Vivian, by the Rev. William Iago, B.A.	342
II.—The last Will and Testament of Thomas Wandsworth, last Prior of Bodmin, with a prefatory notice, by Sir John Maclean, F.S.A., <i>Hon. Member of the Royal Institution of Cornwall</i>	349
III.—*Cardinham: its Inscribed Stones and other Antiquities, by Rev. W. Iago, B.A., <i>Westheath, Bodmin, Hon. Sec. for Cornwall of the Society of London Antiquaries</i> ,	358
IV.—*The Inscribed Roman Stone at St. Hilary, by C. Barham, M.D., <i>Cantab., Vice-President Royal Institution of Cornwall</i>	366
V.—*Observations on Zoophytes from the Cornish Coast, by C. W. Peach, A.L.S.	376
VI.—The Ancient Styles and Titles of the Cornish Boroughs, by R. N. Worth, F.G.S., <i>Cor. Mem.</i>	380
VII.—Alluvium in Par Valley, by Richard Symons	382
VIII.—Note on Carbolic Acid, its Preparations and Derivatives, communicated by R. Le Neve Foster, F.C.S.	385
IX.—Note on the Underground Temperature at Dolcoath Mine, May 1st, 1877, by J. H. Collins, F.G.S.	389
X.—Notes on the Prices of Provisions, the Rates of Wages, &c., at St. Agnes a hundred and fifty years ago, by J. H. Collins, F.G.S.	391
XI.—The Cornish Fauna, MAMMALIA, revised by J. Brooking Rowe, F.L.S.	396
XII.— Ditto, AVES, revised by E. H. Rodd	404

Journal

OF THE

ROYAL INSTITUTION

OF

CORNWALL.

No. XIX.

NOVEMBER, 1877.

EDITED BY J. H. COLLINS, F.G.S.

TRURO:

LAKE & LAKE, PRINCES STREET.

1877.

JOURNAL

OF THE

ROYAL INSTITUTION OF CORNWALL.

No. XIX.

MAY.

1877.

SPRING MEETING AT TRURO,

May 11th, 1877.

THE PRESIDENT'S ADDRESS.

IT now becomes my duty as your President—according to a custom observed at our Spring Meetings for the last 15 of our 59 years of existence—to address to you a few words on the position of our Institution; noticing also anything remarkable which, coming within our scope, may, I think be interesting to you, or demand some remark from me.

Generally, I may congratulate you on the flourishing state of the Institution, especially with respect to the increasing interest taken in our work: and our list of new subscribers exceeds the number of those we have lost by death.

Finances.

I am glad to say that the debt which was incurred in the purchase of the freehold land on which our museum is built, and in the building of the museum, has been reduced to £50; but this has I fear been somewhat increased by the outlay this year in necessary repairs and in painting, to the extent of £120.

Our list of subscribers has increased little by little during the last few years, and some of those members who have succeeded

to the shares of the original Proprietors, but who had not hitherto given us any annual subscription, have also kindly consented to become annual subscribers. May I hope that others of those members will be induced to follow such a good example.

Obituary.

Of the 9 members whom we have lost by death a few require more than a passing notice.

The REV. J. J. WILKINSON, rector of Lanteglos-cum-Advent, near Camelford, who died in December, 1876, took a lively interest in our Institution. He joined it in 1872; but before that year he had contributed to our Journal, and indeed was interested in our work from the time he came to reside in Cornwall. He was a zealous and painstaking antiquary, and became a trustworthy authority on all historical matters connected with his neighbourhood (Camelford), and with the County of Cornwall. The first article which he wrote for our Journal was in 1865, when he gave some very interesting "Notices of the Borough of Camelford." Again in 1871 he published an elaborate paper, with illustrations, on Tintagel Castle. In 1874 he published, in a volume of the Camden Society, a very important series of documents, being contemporary records of the 15th century of the building of Bodmin Church, extending from 1469 to 1472. These records were found about 50 years ago neglected in an old chest in Bodmin Church, and the original documents, which when first found were rapidly decaying from damp, mildew, and dirt, have been preserved and are carefully interleaved, and in good custody in the town of Bodmin. But to Mr. Wilkinson the credit is due of publishing these valuable records to the world, with explanatory notes, so that archæologists of other counties can become acquainted with them. Mr. Wilkinson always took a lively interest in the meetings and excursions of this society, and acted as leader and chief exponent of everything interesting about Tintagel, when our members made an excursion to that Castle in 1870, on which occasion he very hospitably entertained them at his Rectory, and in the evening read a paper on Tintagel Castle. Only last autumn, when the Congress of the British Association visited Tintagel, he again acted as cicerone and host, and during their visit to Launceston read a paper on the old Castle, which was much appreciated.

His kind and genial manner made him a general favourite with rich and poor, and a testimonial to his worth is about to be raised to his memory in his church of Lanteglos.

He was born at Whitehaven November 28, 1818. Became a scholar of Queen's College, Oxford, in 1838, and in 1842 was ordained deacon and became curate of Owston-cum-Butterwick. In 1845 was ordained priest, and became incumbent of Butterwick. In 1849 he removed to the vicarage of Erith, in Kent; and in 1852 became rector of Lanteglos-cum-Advent, on the presentation of the Duke of Cornwall. (Attached to this living is the valuable library left to it by Daniel Lombard). Mr. Wilkinson was chosen Rural Dean. On 24th January, 1858, he preached the University sermon at Oxford. His popularity at Camelford caused him to be elected a member of that ancient municipal corporation, and he became an alderman in 1853, mayor of Camelford, 1854, 1860, 1866, and 1873, and a magistrate for Cornwall, 1855. He married in 1850, Miss Gertrude Blanche Walpole, and died at Lanteglos, December, 3rd, 1876.

MR. SAMUEL HOCKING, C.E.—The late Mr. Samuel Hocking, who, although a member of this Institution, contributed nothing to our Journal, nevertheless was a Cornishman of note, and claims some notice from me. He was born near Carn Brea on 6th February, 1807, his parents being poor but most industrious. At a very early age Samuel went underground, and worked with his father in Dolcoath mine, and in some other mines in the neighbourhood. He used to trace his success in life to his mother's teaching, and to the judicious way she encouraged his fondness for mechanics.

The steadiness of the boy and his eagerness to learn attracted the attention of Mr. John Rule, and he took Hocking with him to Mexico in 1824. Here he was much noticed by the late Col. Colquhoun of the Royal Engineers, and it was mainly on the advice of that gentleman that Mr. Rule was induced to place Hocking with Mr. Woolf, in 1828, after their return from Mexico, to learn mechanical engineering. Under Mr. Woolf, with whom he was a great favourite, he gained much practical knowledge of the principles involved in using steam power. We next find him in the fitting shop of the Copper-house Company at Hayle, where he remained some years. This Company supplied iron chains for the Clifton Suspension Bridge; and Hocking was chosen to

superintend the erection of the bridge. The scheme, however, then failed, and the chains were sold to the Hungerford Bridge Company, and Hocking was sent to London, and under the direction of Brunell he superintended for the Copper-house Co. the erection of that Bridge. (It is a curious fact that when the Railway Co. bought Hungerford Bridge and Market, they sold back to the Clifton Co. the Hungerford chains, and these now form the suspendors of Clifton Bridge.)

Mr. Hocking was appointed the London agent for the Copper-house Co., and for them he superintended the erection of the pumping engines at Old Ford, at Brentford, at Battersea, and at the Croydon Water works. He also put up the fine pumping engine at Leek in Staffordshire, and some others. When after years of success the Copper-house Co. was brought to a close, the services of Mr. Hocking were secured by Messrs. Bickford Smith and Davey in the construction of machinery for their safety-fuse manufactories in Cornwall, in Lancashire, in France, in Prussia, in Spain, and in America. This necessarily required much travelling, and for many years he was almost constantly abroad. Like many men of ability he was very retiring in his habits, so that the extent of his knowledge and the goodness of his heart, were but imperfectly known. Mr. Hocking died suddenly of apoplexy, aged 71, at his residence of Rosewarne, on Friday, 16th February, 1877.

The late REV. JAMES FORD was a younger son of Sir Richard Ford, chief police magistrate of Bow street and Under-secretary of the Home-office, and a younger brother of Mr. Richard Ford, the well-known author of the "Handbook to Spain," and was the father-in-law of Mr. Thomas Hughes (the author of "Tom Brown"), who married his eldest daughter Fanny in 1846.

The Rev. James Ford was born in 1797, and was educated at Rugby and Oriel College, Oxford. He took his B.A. degree in 1818, and M.A. in 1821. Was ordained a deacon in 1822, and a priest in 1823, by Dr. Marsh, Bishop of Peterborough. From 1822 to 1824 he was curate of St. Peter with Upton rectories, Northampton, and of St. Giles in the same county, and Chaplain of the General Infirmary in the county town, from 1824 to 1827. About this time he married Jane Frances, daughter of Edward James Nayle and Anne Cranmer Beauchamp. Soon after his

health broke down from over work, and he went abroad with his wife and two daughters to Geneva, and the following winter to Pisa, where he took the service at the English Church. On returning to England he took for some months a curacy at Canterbury, and afterward went to Exeter as curate of St. Lawrence, 1831-33, and was chaplain of the Devon and Exeter Hospital, 1834-35, chaplain of the Livery Dole Almshouses, Heavitree, 1835-37. At this time his cousin, Dr. Goodenough, Dean of Wells, presented him to the living of Combe St. Nicholas, Somerset, 1837-40, when he was obliged to resign it from ill health. He was appointed a Prebendary of Exeter by Bishop Phillpotts in 1849; in 1850 became vicar of St. Mary Church, Devon, which he resigned in 1851, and resigned his Prebend's Stall in 1872, from ill health, and died at Stanley Villa, Weston, Bath, 18th February, 1877, in the 80th year of his age.

The Rev. Prebendary Ford was an accomplished scholar, with a large and generous heart, and the parts of Cornwall where his property was situated largely partook of his charities.

Although the late Prebend became a member of the Royal Institution of Cornwall in 1861, he was too much occupied in works on Theology to have time to contribute to our Journal. But the town of Truro possesses good proof of his liberality and of his interest in Cornwall, from the present of the large addition of books which he made to the Bishop's Library in this town, in 1872, and which will ever be associated with his name.

The Rev. James Ford was the author of numerous theological works.

1. The gospel St. Matthew, illustrated from ancient and modern authors, 8vo, 1848.
2. The gospel of St. Mark, ditto, 8vo, 1849.
3. „ St. Luke, „ „ 1851.
4. „ St. John, „ „ 1852.
5. Sermon—Holy Communion at a Visitation, 1851.
6. Book rhymes, or the order of Morning prayer explained in verse, 1853.
7. The Acts of the Apostles, illustrated, 1856.
8. Sermons by R. Segneri (translated) 1857.
9. Steps to the Sanctuary, or the order of morning prayer explained in verse, 1858.

10. Sermons, preached in the Chapel of the Livery Dole Alms-houses, Exeter, 12mo, 1861.
11. St. Paul's Epistle to the Romans, illustrated, 1862.
12. The Inferno of Dante (translated), 1865.
13. Thoughts in verse on private prayer and public worship, 1867.
14. The Divina Comedia of Dante (translated) 1870.
15. "Ult Pictura Poesis," or an attempt to explain in verse the Emblemata Horatiana of O. Voenius, 4to, 1875.
16. Four Gospels, Illustrations, &c., a reprint, 6 vols 8vo, 1862.

Of the other members whom we have lost, are the Hon. George M. Fortescue, of Boconnoc, who was deservedly beloved and respected by all who knew him.

Mr. William Rogers, of Falmouth, a proprietor, 1856.

Mr. William Phillips, Falmouth.

Mr. Thomas Solomon, of Truro, 1856.

Mrs. Roberts, of Southleigh.

Mr. William Coulson, an eminent surgeon, and formerly high sheriff for Cornwall.

The Rev. James Ford, by his marriage with Miss Jane Frances Nayle, co-heiress of the Beauchamps, became possessed of property in the parish of Gulval and in other parts of Cornwall.

REV. JOHN ADAMS.—The recent disastrous fire at the "Southern Hotel," in the town of St. Louis, America, has caused the death of the Rev. John Adams, a Cornishman of considerable ability, and one who has contributed several excellent papers to our Journal. He was born at Morwenstow on 31st August, 1822, and was the son of Mr. Henry Adams, who died at Kilkhampton, 1857. Having been educated at Magdalen Hall, Oxford, he won the Newdegate prize in 1847, the subject of his poem being "Prince Charles Edward after the battle of Culloden." He took his B.A. degree in 1848, and the same year was ordained a deacon by the Bishop of Oxford. In 1850 he took priest's orders, and in 1852 his degree of M.A. His first parochial work was at Tregony, where he was curate from 1848 to 1851. In the latter year he removed to Grampound, where he remained until 1857. In the following year the Bishop of Oxford presented him to the living of Stock Cross, Berkshire.

Mr. Adams's tastes as an antiquarian and geologist led him to join several learned societies, and he sent several papers to our publications. The first appeared in our report of 1855,

being an "Account of the opening of Veryan Beacon." "Chronicles of the Cornish Saints" appeared from time to time in our Journal, that of St. Cuby in 1867, St. Petrock in 1868, St. Constantine and St. Sampson, in two separate notices in 1869, St. David, 1870, and St. Burian, in 1873. He was also the author of a "Geological sketch of the valley of the Kennet," Wilts, in 1869, and of a paper on "Pauperism and its causes," read at Newbury, in 1871; also of an article in the *Gentleman's Magazine* in 1873, "On the sarsen stones of Berkshire and Wilts. For some time he acted as secretary to the Oxfordshire Poor Curates' Augmentation Fund.

Some of us may remember that in the early edition of the life of the late Rev. R. S. Hawker, of Morwenstow, by the Rev. S. Baring Gould, there were some extracts from Mr. Hawker's papers reflecting unfavourably on Mr. Adams. These were at once repudiated as unjust and untrue by those who knew Mr. Adams, and consequently several of Mr. Adams' friends wrote to contradict the statements, and the result was a corrected edition in which the objectionable passages were withdrawn. Partly in consequence of these reflections, and to vindicate his character, Mr. Adams published in 1876 a volume with the title "St. Malo's Quest, and other Poems."

Sometime ago he started on a tour in America, with one of his parishioners, Mr. Edward Sutton. On April 10, only last month, they arrived at the town of St. Louis, on the Mississippi river, and stayed at the Southern Hotel, which was built to accommodate 700 persons. During that night a fire broke out in the basement, and the building, built of slight materials, was rapidly enveloped in flames, and among the many who perished, one unhappily was the Rev. John Adams.

Literary works.

Following the order which I observed in my last address, I will now call your attention to some of the chief literary works in connexion with this county which have appeared, or are in the press, since our last spring meeting, and the list contains no less than 24 publications.

You may remember that I pressed upon your notice the great want of an *Index* to our Reports and Journals, and I am glad to be able to announce that the *Index*, which has been undertaken

by Mr. B. Kitto, of Camborne, will be ready for the printer probably next month, and I trust it will be found to be a full one, and to add much to the value of our publications, by making the mass of information contained in them more readily accessible to readers.

Bibliotheca Cornubiensis.

Since last May upwards of 150 pages of the *Bibliotheca Cornubiensis* have been printed, completing the alphabetical arrangement nearly to the end of the letter T. It is now hoped that Vol. II will be ready to issue early in the spring of 1878. It will be considerably larger than the first volume, and will contain a large amount of Cornish family history not to be found in any other work. The third and concluding volume, which will be immediately proceeded with, will be occupied with—

1st.—A supplement of anonymous works.

2nd.—Such matter as has accumulated during the progress of the undertaking.

3rd.—An extensive index to the three volumes.

Maclean's Trigg Minor.

Of the History of Trigg Minor, by Sir John Maclean, Part XII, containing St. Teeth and Temple has been issued some months. The penultimate part of the History is in the press, and will contain the parishes of Tintagel and Trevalga, profusely illustrated. I understand that the MS. of the last part containing St. Tudy is in an advancing state.

I trust that a full general Index will be added to complete the work.

1876.

“In the beginning,” some remarks on certain modern views of the creation, by Richard Hill Sandys, 8vo.

Official Guide to Penzance, edited by G. B. Millett, and compiled by himself and T. Cornish, W. C. Borlase, W. W. Smyth, J. Ralf, and Rev. W. Iago.

The Madron Register, by G. B. Millett, is nearly ready, 12mo.

Penzance, past and present, by George B. Millett, 8vo. (A useful book, full of information, with accurate facts, and exact dates.)

A Guide to Bude Haven: anonymous, 12mo.

The River Fal and Falmouth Harbour, by Thomas Adolphus Cragoe, 8vo.

- St. Fimbarrus Church, Fowey, by Dr. Henry H. Drake, 4to.
- Day by Day: being Scripture texts for every day in the year, by Lovell Squire, of Falmouth, 8vo.
- The child's own daily text book, by George Bettany, 8vo.
- Records of a rocky shore, or annals of our village, by Rev. F. C. Hingeston Randolph, of Truro, 8vo.
- The Westminster Abbey Registers, by Col. J. L. Chester, published by the Harleian Society, contains much information about the families of Boscawen, Carew, Godolphin, Killigrew, Tredenham, and other Cornishmen, 4to.
- From out the deeps, a story of Cornish life, by an old Cornish boy, with introduction and notes by the Rev. S. W. Christophers, 8vo.
- Lascare: a Cornish tale, anonymous, but now known to be by Mr. Charles Tregenna, of East Looe, 3 vols., 8vo.
- Pendower: a story of Cornwall in the reign of Henry VIII, by M. Filleul, 8vo.
- Edina: a (Cornish) novel, by Mrs. Henry Wood, 3 vols, 8vo.
- Caxtonia's Cabinet. Also, the Rector of St. Judy, a novel, by W. R. Soleman, master of Veryan School.

1877.

- Greek Testament, by Rev. F. H. A. Scrivenir, late of Gerrans, 8vo.
- Zoological classification, by Francis Polkinghorne Pascoe, of Penzance, 8vo.
- The bona-fide pocket Dictionary of the French and English language, on an entirely new system, by John Bellows, of Liskeard, 32mo.
- A Sermon: by the Right Rev. the Lord Bishop of Truro, preached in Truro Cathedral on the occasion of his Enthronement, on May 1st, 1877, with an account of the proceedings and ceremonies attending the Enthronement.
- A Catalogue of John Opie's paintings, with a memoir of the artist, by John Jope Rogers, Esq., of Penrose, is in progress.
- A Compendium of the History of Cornwall, published by Mr. Netherton, of Truro. This is really a second edition of "A Geography of Cornwall," by Rev. John J. Daniell, late curate of Probus, and master of Probus school. Now thoroughly revised, enlarged, and nearly re-written and brought down to

the present time, by one of our excellent secretaries, J. H. Collins, F.G.S., and author of the Handbook to the Mineralogy of Cornwall and Devon.

Mr. J. H. Collins is also preparing a work on the Petrology of Cornwall and Devon, uniform with his work on Mineralogy above alluded to; and another on the Hensbarrow granite district.

There is also nearly ready by the same author a translation of Professor L. Moissenet's "Observations on the rich parts of the Lodes of Cornwall."

A work published in 1833, entitled "Visions of the Western Railways, and dedicated to Sir Charles Lemon, was long an anonymous work, but a writer in *Notes and Queries*, 5th series, of this year, has proved that the author was Richard Edward Austen Townsend, of Doctor's Commons, and Springfield, Norwood, Surrey.

A new edition of Couch's Fauna of Cornwall, part i, containing Vertebrates and Crustaceans, is a publication now in progress under the auspices of our Institution, and, as we are promised the assistance of such accomplished naturalists as Messrs. J. Brooking Rowe, C. Spence Bate, E. H. Rodd, T. Cornish and C. W. Peach, it is sure to do credit to our society.

Natural productions of Cornwall.

I will now call your attention to a few facts relating to the most important natural productions of Cornwall.

The first subject under this head is that which used to be most characteristic of this county, namely, the production of mineral ore, and the statistics under this head are, I regret to say, not very cheering.

In the production of TIN in Cornwall the mineral statistics shew a lamentable falling off, and a still more alarming falling off in price.*

* Minerals produced in Cornwall in 1876, and previous years.

TIN.

Tons.		Tons.	Mean average price.		Total value of ore
Black tin, 1876...	£13,688	White tin, 8,500	1876 ...	£43 18 0	£593,859
„ 1875...	13,995	„ 9,614	1875 ...	52 11 6	735,606
„ 1874...	14,039	„ 9,942	1874 ...	56 3 0	738,310
„ 1873...	14,885	„ 9,972	1873 ...	78 1 0	£1,056,835
„ 1872...	14,266	„ 9,942	1872 ...	87 7 0	1,246,135

Our importations of copper have not increased for some years, hence our Standard has gone up.

In 1872 there was raised of *black tin* 14,266 tons, and of white tin 9942 tons.

In 1876, 13,688 tons, or 578 tons less of black tin, and of white tin 8500 tons, or 1442 tons less.

But observe the enormous falling off in value. The *mean average price* of tin ore in 1872 was £87 7s.; while in 1876 it was only £43 18s., or £23 9s. per ton less, *i.e.* less by very nearly half.

And the *total value* of ore sold in 1872 was £1,246,135, while in 1876 the total value was only £593,859, or less by £652,276, *i.e.* considerably less than half.

COPPER.

Ores sold (Tons.)	Produce Fine Copper.	Value.	Average prices.	Produce.	Standard.
1876...42,603	3005 tons	£200,158	1876... £4 17 0	6½	£113 8 0
1875...50,949	3509 "	259,548	1875... 5 0 0	7	110 0 0
1874...48,729	3517 "	228,298	1874... 4 5 0	7½	97 16 0

TIN FROM AUSTRALIA.

Imports of Metallic Tin from the Australian Colonies.		Total imports of Tin.	
	Tons.	Ore—Tons.	Metallic tin—Tons.
1876.....	7,138	not yet returned	15,222
1875.....	7,210	391	16,788
1874.....	5,800	4,305	9,218
1873.....	2,990	5,612	7,791
1872.....	150	1,024	8,342

The rapid increase in imports of tin from *Australia* and from the *Straits* and other parts, will account for the reduction in price of our Cornish tin.

Our stocks of foreign ores in January of this year (1877) amounted to 10,228 tons. They were at their maximum in May, 1876 (10,283 tons.), so the reduction has been very slight.

Tin plate swallows up the largest quantity of our tin, and for some time past that manufacture has been exceedingly low.

IRON.

ORE.	VALUE.
1876..... 18,703 tons .....	.....(not yet known)
1875..... 11,403 " .....	.....£6,891
1874..... 45,055 " .....	.....£34,076

LEAD.

ORE.	LEAD.
1876..... 2,808 tons .....	.....(not yet known)
1875..... 2,566 " .....	..... 1,932 tons
1874..... 3,119 " .....	..... 2,337 "
1873..... 3,909 " .....	..... 2,923 "

I will now show you the production of COPPER for the last three years, with the prices, produce, and standard.

In 1874, copper ore sold in Cornwall was 48,729 tons, producing 3517 tons of *fine copper*, of the value of £228,298.

In 1876, copper ore sold was 42,603 tons, or 6126 tons less, producing 3006 tons of *fine copper*, or 511 tons less, of the value of £200,158, or £20,140 less.

In 1874 the *average price* of copper ore was £4 5s. per ton, produce $7\frac{1}{8}$, and the standard £97 16s., while in 1876 the average price of copper ore was £4 17s. or 12 p.c. more, producing $6\frac{6}{8}$, and the standard £113 8s., or £15 12s. more.

Although the average price of copper ore was greater, and the standard considerably higher than in 1874, yet the advantage thus gained was nullified by the enormous *falling off in the QUANTITY* of copper ore which was sold.

The production of IRON ore for the last 3 years is as follows :

In 1874, 45,055 tons, of the value £34,076.

In 1876, 18,703 tons, or 26,358 $\frac{1}{2}$ tons less, the value of which is not yet known, but in 1875 there was a falling off in value of £27,175.

Of LEAD ore, was raised in 1873, 3909 tons, producing lead, 2923 tons ; in 1876, 2808 tons, or 1101 tons less ; the produce of the lead ore of 1876 is not yet known.

Of *Zinc ore*, and *Manganese*, *Arsenic* and other minerals, the returns of the quantities for 1876 are not yet reliable.

China Clay.

Although I have no very accurate returns of the china clay produce for 1876, it is believed that it is not more than the quantity returned for 1875, which shewed a falling off from the 1874 returns of about 50,000 tons.

The facts above given must of course cause great anxiety to the mining interests of Cornwall, and many persons take, perhaps, a too gloomy view of mining prospects in the future. But I desire to allude to a point to which the attention of the mining interests of Cornwall has been called, at a meeting held towards the end of April last, by the Mining Institute of Cornwall, viz., the necessity for greater economy in the dressing of tin. The waste which has taken place from neglecting economy in this respect in former times has been enormous, and is at present very

great. The necessity of the study of Hydro-dynamical laws by the tin-dresser has been somewhat overlooked. The real points for experimental examination are, *first*, the specific gravity of the tin ore (black tin) and of the gangue in which it is found; *secondly*, *sizing*, or the regulation of the flow of water to the *size* of the particles which are to be retained, remembering that, the specific gravity being the same, it will require a larger flow of water to move a large particle than it will to move a smaller one. These are points which have not been attended to with sufficient exactness by our tin-dressers; at present the great cost of tin-dressing is in the human labour, and in labour which is often done by young and unskilled persons. It would not be difficult to construct machinery, which should allow of stuff flowing on to it from the stamps grate, and of passing onwards, over buddle after buddle, frame after frame, until tin at all events fit for the "burning house," passes off from the last table or buddle-frame. I would earnestly call the attention of mine-agents to this important point.

Whilst I am on the subject of economy in mine labour, allow me to mention the *Barrow Rock Drill*, as a boring machine of much value in diminishing the cost of labour. This drill has in this respect been very successful at Dolcoath mine, where it has been in operation for about ten months, and that continuously since the drill first used was shortened, while other drills, which have been tried in various parts of Cornwall, have soon ceased to work, from not having been found to be satisfactory.

The Barrow Drill has the recommendation of being a strong, portable, and handy machine, simple in construction, can be worked for a small sum, and while at work it actually improves the ventilation of the level. Its *simplicity* is in having few moving parts, and it is so handy that it can be made to bear on any point in the back, end, walls, or floor of the level. The rotation of the borer as it works is effected by hand.* The machine itself weighs, including the bed plates and gudgeon, only about 115 lbs., and the wrought iron bar or column for fixing the machine for working weighs about 120 lbs. more. Some of the other machines that have been tried weigh several tons. The comparative lightness of the Barrow machine is important for

* The *Borers* now used are $1\frac{1}{4}$, $1\frac{1}{8}$, and 1 inch diameter. The length of stroke is 4 inches, and gives 300 blows a minute.

facility of removal, and for re-adjustment to suit the work in hand, and thus to economise time in working.

The *cost* of working with the Drill is much less than by hand. The Barrow drill can be worked by 2 men and a boy. The *work done by the drill** at Dolcoath was 30 fathoms, 3 feet 9 inches, in 6 months, giving a monthly average of 5 fathoms 7½ inches.†

The *work done by hand*, in the same ground was 30 fathoms, 3 feet 2 inches, in 22 months, or a monthly average of 1 fathom, 2 feet, 4 inches.

The *cost of labour by hand* was £28 5s. 3d. per fathom; *cost by Drill*, for everything, per fathom, £20 18s., thus shewing a gain by the boring drill of about *five times as much work*, done in considerably *less than ½ of the time*, and with a *saving in cost of £7 7s. 3d. per fathom*. The machine will admit of 3 or 4 drills being worked together, and if more than one drill is used, the cost will be again diminished in proportion.‡

* Work performed at Dolcoath Mine by Barrow drill:—

	Fms.	Feet.	Inches.
1st month	4	0	6
2nd ,,	5	0	8
3rd ,,	5	4	7
4th ,,	5	2	0
5th ,,	6	0	0
6th ,,	4	2	0
Six months' total ...	30	3	9
Monthly average.....	5	0	7½

† Holes are bored (depending on the nature of the Rock) at an average rate of about 1 inch a minute. Each hole for blasting being about 20 inches deep. Boring and fixing about 20 holes, and removing the debris, occupies about 10 hours.

‡ Cost by boring machine—an old one, with some waste in fuel.

Coals (18 tons)	£15
Repairs	5 4s.
2 Enginemen	6
2 Smiths	6
Wages	3 men at £5
	3 do. £4
	3 do. £3—£36
Underground cost—30 ft. at say 25s. per ft.....	£36
Cost for 5 fathoms.....	£104 4s.
Cost for 1 fathom	£20 18s.

Fish.

Turning to another of our old traditional productions "Fish," the exports of pilchards in 1876 exceeded that of the previous year by 1571 hogsheads, and it is remarkable that the price realized, though for the month of November only, was 100s. per hogshead, but at a time when there were unfortunately only about 500 hogsheads in the county. This price had not been obtained for 61 years, for the last time such a price was reached was in 1815. The total exports however, only amounted to 9,908 hogsheads, a number far short of the quantity exported only 5 years before, when 45,683½ hogsheads were sold, which was, however, the largest number exported within this century.

During August and September of last year about 1,800 hogsheads were cured. In October only 50 hogsheads (this month has heretofore generally produced the greatest quantity.) In November, December, and January 8,000 hhds. This year about 2,000 hogsheads were landed in Devonshire and brought to Cornwall to be cured. This was a most exceptional fact, and so large a number had never before been, for this purpose, sent to us from Devon.*

The returns from the West Cornwall Railway Stations for the transport of fish is as follows:—

	Tons.	Value.	
1875.....	3,132.....	£16,814....	} Shewing an increase of 1,273 tons, and £2,751 more in value.
1876.....	4,405.....	£19,565, or	

Vegetables and Fruit.

The demand for our early vegetables and produce continues to increase; although the extent of land in cultivation has for the last few years increased regularly, quite ten per cent. per year, and the supply is yet much below the demand.

The crop of *potatoes* last year was good, and entirely free from disease. Large profits were realized by the growers, nearly 500 acres were "tilled," and made nearly £60 per acre.† Formerly the greater quantity of potatoes were "tilled" before Christmas, and rarely escaped frost, but now, except small quantities, they are not set until March, and thus generally escape frost, the sets being sprouted, mature quite as early as formerly, and the crops

* I am indebted to the valuable Fish circulars of Messrs. Fox & Co., and of Messrs. Bolitho & Co. for this information.

† I am indebted to Mr. J. Thomas, of Gulval, for this statement.

are better. *Seed potatoes* are sent from Lincolnshire, and this season they cost the large sum of £9 per ton; blight having destroyed large quantities, otherwise £6 per ton would have been considered a fair average price. It is computed that 300 tons of seed potatoes have been brought to Penzance this year. Our vegetables still mostly go northward, except the earliest crops of potatoes from Scilly, and these are sent to London, as the crops in Scilly are earlier than either Jersey or Cherbourg, which places principally supply the London market with early vegetables. In consequence of this the Channel Islands produce and export nearly double the quantity that we do, and their supply is increasing, as the cost for carriage of our vegetables to London is 15s. per ton more than from the Channel Islands.*

The Cornish crops of *brocoli*, which followed the potatoe, matured prematurely, and consequently the flower was not good, but a large lot bought by one firm† for pickling enhanced the price, and so made the season a good one, upwards of £30 per acre was paid by this firm.

Large quantities of *fruit* were sent from Penzance last year, realizing upwards of £4,000. The Keswick Codling apple does well, and our raspberry crops were the best in the kingdom, and reached the high price of £50 per acre.‡

* The figures as returned by the Railway Company show rather a decrease in the transports over their line.

		Tons.	Value.
POTATOES.			
1875.....	5,106	.....	£10,842
1876.....	4,942	.....	10,406—or 164 tons less, and £436 less in value
BROCOLI.			
1875.....	5,389	.....	£11,349
1876.....	5,365	.....	11,065—or 24 tons less, and £284 less.

† Crosse and Blackwell.

‡ Crops from Penzance District.	Acres under cultivation.	WAGES PAID.		Number of hands employed.	VALUE OF CROP.	
		Per acre.	Total.		Per acre.	Total.
Potatoes	800	£ 12 0 0	£ 6,000	1,500 to 2,000 during 3 months, May, June & July. About one quarter last part of the year.	£ 60	£ 30,000
Brocoli	600	3 10 0	1,700		20	12,000
Onions	50	10 0 0	500		40	2,000
Asparagus	15	15 0 0	225		50	750
Gooseberries	50	12 0 0	600		40	2,000
Raspberries	30	12 0 0	360		50	1,500
Black Currants	30	12 0 0	360		30	900
Strawberries	No account in our district				Very little grown.	
Apples	100	2 0 0	200		Saltash for Strawberries	
					40	4,000

Vineyards in Cornwall.

I have lately received from Mr. Pettigrew, the gardener at Cardiff Castle, an account of the vineyards which Lord Bute has planted in Glamorganshire, and the experiment has proved that the vine will there grow and bear grapes fit for making wine; I mention this because it is probable that there are many places in Cornwall, sheltered from the north, and with a south facing, too steep for ordinary arable cultivation, stony, and thus with a natural drainage, where vines would do well, and return a profit. The vines near Cardiff have done amazingly well. The growth last year was equal to that of any of the vines in the best wine districts of France. It takes about 4,840 plants per acre, and about 15s. per 100 was paid for the vines by Lord Bute.

Dead Meat.

Last year I remarked on the large quantity of dead meat which is now annually sent from this county to the London and other markets, In consequence of the fear of an increase of disease among cattle, the subject of the traffic in dead meat all over the country will receive increased importance. After giving you a few facts shewing the extent of our exports of dead meat from a few places in Cornwall, I will mention some of the recently adopted modes for its preservation, both during long journeys and while in storage; which may act as suggestions both to our farmers and to our railway carriers.

It is difficult to get from the railway authorities any general statistics on this subject throughout Cornwall. But the following statistics may be relied upon as given to me by large dealers, of the export of dead meat from three stations in my own neighbourhood. From one was sent 355 tons 10 cwt.; and from another, 46 tons 14 cwt. But from Lostwithiel alone, 1,248 tons 13 cwt. and 19 lbs., composed of 2,618 sides of beef, 29,944 sheep and lambs, 73 pigs and 7 calves.*

* Dead meat sent from Lostwithiel, Cornwall, to the London Market.

	Sides of Beef.	Sheep and Lambs.	Pigs.	Calves.	WEIGHT.			
					Tons.	Cwts.	qrs.	lbs.
January	255	1185	13	0	80	2	2	24
February	196	755	4	0	52	8	1	8
March	332	528	7	0	65	1	1	1
April	342	308	1	0	55	5	2	4
May	454	1,619	6	3	109	4	2	5
June	558	4,432	0	0	175	10	3	26
July	298	4,541	2	1	145	4	3	6
August	26	2,133	0	0	66	11	3	15
September	24	3,278	2	2	102	2	1	3
October	64	4,900	1	0	169	6	2	12
November	36	3,712	17	0	129	5	3	6
December	36	2,463	20	0	91	11	1	21
Total	2,618	29,944	73	7	1,248	13	0	19

It is curious to see how the quantity varies with the London seasons.

Cold storage.

These facts suggest that the adoption of cold storage chambers may be useful to slaughterers and large butchers, and probably farmers, who may in time find it profitable to be their own slaughterers. There is every indication that traffic in dead meat will almost supersede that of live animals for consumption, and the importance of plans for cold storage, where meat can await the demand of the market, so as not to glut it, must be apparent.

The chambers used for cold storage in America and elsewhere, are simple, and are said to be economical. The room selected is lined at its sides and top with wood, having a space of about 10 inches between it and the outer wall, and the space between the two is filled with sawdust, or spent tan bark, or granulated charcoal, and the floor covered with some inches of sawdust. Double doors complete the insulation; across one end of the room, near the top, is fixed a trough for holding ice, made tight, and provided with a waste pipe to carry off the water from the melting ice. This trough is kept supplied with ice, the low temperature of which creates a constant current of air in the room, and produces a uniformly low temperature. The amount of ice consumed must be considerable, but the advantage gained is said to warrant the outlay, for this system is now largely adopted in many parts of America, and is being used by one or two of our large meat dealers, near the Farringdon market. I give you this account as bearing on a subject that may become one of great importance to us, and with a hope that Cornish ingenuity may invent some plan of cold storage which may cost less than the plan just described.

I will now describe Captain Acklom's patent refrigerating meat vans, and his plan for preserving meat during its transit over long distances, whether by road, or rail, or ship. By this plan the meat placed in a van at the slaughter house shall not be removed or touched, during the journey. It has somewhat the shape outwardly of an ordinary furniture van, the sides of which are made of felt, and double, with a space of about 2 or 3 inches between. The outer side of felt is kept saturated with water during the journey by an automatic and natural action, the inner side of the felt being perfectly dry, thus producing a dry cold circulating atmosphere in its interior, by means of rapid external evaporation during its passage through the air.

The carcases are hung vertically, without any packing cloths, on horizontal bars which run on a rail the length of the van, capable of bearing 48 hooks for carrying 12 carcases of beef in quarters, besides 60 double hooks suitable for carrying 5 sheep on each bar, one side of the bar being intended for beef, and the other side of the bar for mutton, according to the consignment. The tare of the van is 50 cwt. ; the load is 90 cwt. in 12 oxen, or 60 sheep, or a mixed cargo, as required, and each carcase is separated from the other by strong horizontal laths, to prevent any swinging or motion, and a fresh current of dry cold air circulates freely around the carcases.

The Great Western Railway Company, has since September, 1874, been working one of these meat vans between Windsor and the Metropolitan meat market, Smithfield, which has given complete satisfaction to the trade, and last year the van made a trial trip to Barnstaple and back with a cargo, with complete success. I place on the table photographs of the van, and a section of its construction.

Preservation of iron from rust.

I now invite your attention to the process of magnetic oxidation of iron, to preserve it from rust, which has been discovered by Mr. F. Barff, professor of chemistry to the Royal Academy, and which promises to be an invention of the greatest importance, not only to this county but to the world at large. By this process all kinds of iron work, however much exposed to weather, or even to corrosive liquids may be made practically indestructible.

To enable you better to understand the value of Professor Barff's invention, let me first describe the operations of the enemy, rust, against which we have to guard.

When a piece of iron, whether polished or rough, is exposed to the action of moist air or water it begins to rust, and is soon covered with a film of *ferrous oxide* or *protoxide*, which consists of 56 parts by weight of iron to 16 parts by weight of oxygen. This ferrous oxide, from contact with the atmospheric oxygen, is by degrees turned into another oxide, the ferric oxide, or sesquioxide, which contains twice 56 parts of iron, to three times 16 parts of oxygen. This ferric oxide now begins to act like a sponge, and conveys some of its oxygen to the as yet unoxidized iron beneath it, which thus soon becomes ferrous oxide, again to be converted into ferric oxide, having become accessible to air

through the spongy surface of rust which covers it. In this way the rust acts and re-acts, ever becoming a carrier of atmospheric oxygen to the innermost parts of the iron, until the whole of it is completely corroded and eaten through.

All the attempts which have hitherto been made to protect the outer surface of iron from the beginnings of rust, whether by paint, or varnish, or cement, or other substances have, only been partially successful, because these substances never really amalgamated with or inseparably adhered to the metal on which they were placed. Therefore, the smallest flaw in the covering, either from its scaling off, or wearing off immediately admitted the enemy, atmospheric moisture, to the exposed spot. The mischief then began, and rust spread laterally as well as inwards.

You will now understand how rust works, and how rapidly iron may be, and is, destroyed by it.

Besides the protoxide, and sesquioxide, both of which cause iron to corrode, there is a third oxide of iron, called *magnetic* or *black oxide*, containing three times 56 parts by weight of iron, and four times 16 parts by weight of oxygen. Some chemists call this *ferroso-ferric-oxide*; but this oxide undergoes no change whatever when acted on by moisture or by atmospheric oxygen, or by acids, or corrosive substances, except such as pure hydro-chloric acid; nor does any temperature to which it can be exposed in any ordinary use, either decompose it, or produce its further oxidation.

Professor Barff has discovered that if any iron surface is exposed to a high temperature by the action of superheated steam, it will become covered with a film of this magnetic black oxide. The thickness of this film is determined by the degree of temperature, and by the length of time to which the object is exposed to it. The magnetic or black oxide is harder than the original iron, and adheres to it even more firmly than the particles of iron adhere to each other, so that the iron gains somewhat in mechanical strength, as well as in chemical resistance. By heating the operating chamber to 500 degrees of Fahrenheit, and by exposing the iron surfaces to this temperature for 5 hours, a surface or coating is obtained which will not rust from any indoor moisture, or even a moderate degree of outdoor exposure, and will resist considerable friction from emery powder. But if the oxidizing process be carried on at 1,200 degrees of Fahrenheit,

and be continued 6 or 7 hours, the surface becomes so hard as to resist a rasp file, and will bear any amount of exposure to weather. This oxidizing process does not affect the surface in any other way than by turning it black, so that even polished surfaces retain their smoothness. But if there should be the slightest flaw in the film or coating of oxide, rust will be formed at that spot, but at that spot only, for the rust does not spread laterally under the black oxide, as it frequently does when the iron surface is covered with paint, or varnish, or cement, nor has the rust the least tendency to detach the magnetic oxide film from its subjacent parts.

The application of this process for preserving iron will no doubt in time extend to almost everything for which iron is used, and it can be conducted at a *very small cost*. The muffle in which Professor Barff has carried on most of his experiments hitherto measures about 4 feet deep, 3 feet wide, and about 3 feet high. This and the adjoining apparatus for the superheated steam, both of which are of simple and inexpensive construction has been worked at a cost of about 3s. for fuel, and you can understand how many dozens of small things may be operated upon at one time, in the chamber I have described, and upon which small articles the extra cost of oxidizing will be quite unappreciable.

Among the uses to which this process may be applied, I may mention the preservation of mining pumps, water mains, water connecting pipes, the lining of which with the magnetic oxide would resist friction, gas pipes and nipples, and the substitution of oxidized iron pipes for lead pipes. It will be valuable for architectural purposes, both in the construction of buildings, and for decorations; for railway girders and bridges, railings, lamp posts, iron safes, for this oxide coating if exposed to great heat expands and contracts with the iron without leaving cracks for the rust to enter. Need I mention its value for screws, rivets, and bolts. Experiments are being made for gun barrels, and for the protection of steam boilers, and for the plates of iron ships, both outer plate and inner, for sometimes certain cargoes have been known quickly to corrode ships' plates, and thus have led to the sudden loss of iron trading vessels. The power of this magnetic oxide to resist the effects of salt water may be learnt from specimens of magnetic iron ore from New Zealand and

elsewhere, for upon them, after exposure to the action of salt water for centuries, the surface remains completely unchanged.

Of course where great friction occurs, such as that to which rails and iron wheels are exposed, not only the coating, but the material itself will necessarily wear away.

The Telephone.

The discovery of that wonderful sound-transmitting instrument, the *Telephone*, is one of the most remarkable of the present age. Professor A. Graham Bell, of Salem, Massachusetts, America, has the credit of the first discovery; and has proved that the intonations of the human voice can be transmitted to a distance of 143 miles by his last experiments.

Mr. Bell is a professor in the Boston University, and one of his departments is said to be "vocal physiology." It is five years since his attention was directed to the subject, and nearly two years since he made experiments on a wire from Boston to Cambridge, 2 miles apart; and he took out his patent about 15 months ago. In October, 1876, conversation between the operator and the professor, 2 miles apart, could be distinctly heard, the dialogue being carried on in the ordinary tones of voice. The next experiment was made 18 miles apart, from Boston to Salem, when not merely words in sound were transmitted, but distinct tones and inflexions, so that the various voices of the speakers were recognized, and songs were heard with distinctness, the same effect being produced as if the listener were at the rear of a large concert hall. The latest achievements by Professor Bell's instrument is the transmission of music and various sounds between Boston and North Conway, in New Hampshire, a distance of 143 miles.

I will now endeavour to describe this wonderful instrument, and to illustrate it with a drawing, which description and drawing, through the kindness of Dr. Le Neve Foster, I have taken from an American Engineering Journal.

The transmitting instrument consists of a horizontal electro-magnet, attached to a pillar about 3 inches above a horizontal mahogany stand. In front of the poles of this magnet, or more correctly speaking, magneto-electric-inductor, is fixed to the stand in a vertical plane a circular brass ring, over which is stretched a membrane, carrying at its centre a small oblong piece of soft iron, which plays in front of the inductor magnet whenever the

membrane is in a state of vibration. This membrane can be tightened like a drum by three mill-headed screws. The ends of the coil surrounding the magnet terminate in two binding screws, by which the instrument is put in circuit with the receiving instrument. This instrument is nothing more than one of the tubular electro-magnets invented by M. Nicles in 1852. It consists of a vertical bar electro-magnet enclosed in a tub of soft iron, by which its magnetic field is condensed, and its attractive power within that are increased. Over this is fixed, attached by a screw at a point near its circumference, a thin sheet-iron armature, of the thickness of a sheet of cartridge paper, and this when under the influence of the transmitted currents, acts partly as a vibrator and partly as a resonator. The magnet with its armature is mounted on a little bridge, which is attached to a mahogany stand, similar to that of the transmitting instrument. The action of the apparatus is as follows: when a note or a word is sounded into the mouthpiece of the transmitter, its membrane vibrates in unison with the sound, and in doing so carries the soft iron inductor attached to it backwards and forwards in presence of the electro-magnet, inducing a series of magneto-electric currents in its surrounding helix, which are transmitted by the conducting wire to the receiving instrument, and a corresponding vibration is therefore set up in the thin iron armature sufficient to produce sonorous vibrations, by which articulated words can be distinctly and clearly recognized.

In all previous attempts at producing this result the vibrations were produced by a make-and-break arrangement, so that while the number of vibrations per second as well as the time measures were correctly transmitted, there was no variation in the strength of the current whereby the quality of tone was also recorded. This defect did not prevent the transmission of pure musical notes, nor even the discord produced by a mixture of them, but the complicated variations of tone, of quality and of modulation which make up the human voice required something more than a mere isochronism of vibratory impulses. In Mr. Bell's instrument not only are the vibrations in the receiving instrument isochronous with those of the transmitting membrane, but they are at the same time similar in quality to the sound producing them, for the currents being induced by an inductor vibrating with the voice, differences of amplitude of vibrations cause differences in

strength of the impulses, and the articulate sound as of a person speaking is produced at the other end.

Another American, Mr. Elisha P. Gray, of Chicago, who since Professor Bell first called attention five years ago to the telegraphy of sound, has been working in the same direction, has succeeded, by a different instrument, and proceeding upon different principles from Professor Bell's, in transmitting sound to a distance of 284 miles, thus operating to a greater distance than Professor Bell.

Mr. Gray's telephone *produces the sound it transmits*, and is a sort of telegraphic piano. It does not, like Professor Bell's telephone, transmit the various tones and articulations of the human voice over wires, after the manner of telegraphic transmission, but aims at producing sounds by a sort of telegraphic blow; and he is now at work on an instrument designed to make every tone print a letter; if the letter A is sent, A will be printed at the receiving end. Analysis of sound is said to be the governing principle. If successfully completed, printed messages will probably supersede the instruments now in use, since they will be more rapid.

We are living in days when "many run to and fro, and knowledge is increased," and each new discovery ought to make us wonder that we are permitted to know so much, and humble because we must as yet know so little.

British Association.

The approach to the borders of this county of such an important body of scientific men as the British Association in August next, is a fact to be noticed as one which must in many ways be an advantage to the objects of our Institution, and our members should exert themselves to help forward the success of such a meeting in every way, and should prove that Cornwall still maintains its old love for every branch of mechanical skill and practical science, and can display a marked advance in science, art, and literature, and in the appreciation and use of its natural resources since the British Association visited Plymouth, 37 years ago, in 1841, and we must give a hospitable welcome to the scientific men who may honour us with a visit.

I must apologize for the length of this address. When this Institution was established 61 years ago, only one other society, the Geological, existed in Cornwall. Lately several new societies and Institutes, with special objects, have come into existence, so that it may become a legitimate subject for consideration, whether or not it will be desirable in future to confine the objects of our Institution within narrower limits.

I.—“*The Tomb of the Suffragan Bishop Vivian, of Cornwall, Prior of Bodmin, and the Heraldic Arms connected with St. Petroc’s Monastery.*”—(By REV. WILLIAM IAGO, B.A., *Westheath, Bodmin, Honorary Secretary for Cornwall of the Society of Antiquaries, London.*)

Read May 11, 1877.

THOMAS* VIVIAN was the “last but two” of the Bodmin Priors. His contests with the townspeople form the subject of certain curious documents† now in the custody of the Bodmin Corporation. They would be very amusing, did they not exhibit a deplorable state of feeling, and contain expressions bordering upon irreverence.

Vivian ruled with a high hand. He had been sub-prior, was elected prior April 13, 1508, and was confirmed by the Bishop of Exeter,‡ at Clyst. He held preferments, was made a Suffragan Bishop, died on Pentecost Sunday, June, 1, 1533, and, as Leland writes, was buried before the high altar of his priory church, “in a high tumber of a very darkesche gray marble.”

On the Dissolution of monasteries, Bodmin Priory (under Thomas Munday, alias Wandesworth) surrendered in 1538-9. Subsequently its church was destroyed; and only a few stones in Col. Gilbert’s garden now indicate the locality of the site. Its bells were sold to Lanivet, and were there re-cast for the church

*Bp. Vivian’s signature to an award made at Bodmin in 1519, Dr. Oliver states, is as follows, “p. me Thomam Megarenssem Epm.” The seal appendant (representing him supplicating the Virgin Mary and divine infant), bears the legend “Sigill^m. Thome Megarensis.”

The tomb inscription gives his name as “Tomas Vivian.” From some records it seems that he had a brother also named Thomas, who was vicar of Bodmin, and with whom the town had serious differences. The prior had a brother named John. In Bodmin Church nave is a large floor slab containing metal rivets, and incised in memory of John Vyvyan, who died in 1545. It gives besides other devices, monograms of the initials T. V. and H. V. also 2 shields of arms—one identical with the prior’s, the other “3 birds (martlets?) in fess.”

†See late Rev. J. Wallis’s “Bodmin Register,” pp. 298-314, and the appendix to this paper.

‡Bishop Oldham’s Regr. fo. 22.

of that parish, but the tomb of Thomas Vivian, bishop and prior, was preserved; for to the west of the priory church (which was dedicated* to St. Mary and St. Petrock), and across the road, stood, and still stands, the largest church in Cornwall, viz. : the parish church of S. Petroc, Bodmin; to it, on the demolition of the priory church, the tomb was transported, and there it is now, in the north chancel aisle, with its head towards the west. The skull and several other bones of Bishop Vivian are within it. † They were discovered in an irregular cavity when the tomb was repaired some years ago, and were replaced. The date of this is given in the following inscription, engraved upon a brass plate affixed to the upper part of the memorial.

“This Tomb, which originally stood before the High Altar, † was repaired in 1819, by Sir Vyell Vyvyan, Bart., the legal representative of the Prior.”

The monument may be thus described in detail,—

It is an inscribed, smoothly sculptured, high tomb; formed of very dark grey stone (resembling marble), brought from the cataceluse quarries, in the parish of St. Merryn, near Padstow. It is about 7 feet long, about 3 feet high, and supports a recumbent effigy of the deceased, habited in episcopal vestments. His hands are joined in the attitude of prayer. His left arm lies across his pastoral staff or crook, which is placed against his left side. A vexillum, or double streamer, fringed at the ends, is entwined in opposite directions (so as to cross and re-cross) down the whole length of its shaft or pole. He wears a mitre (sculptured as if jewelled) with *infulæ*; an alb, with orphrey; stole, with fringed ends; fringed dalmatic or tunicle (strange to say, only one, not both), chasuble with border; amice; fringed manipule over left wrist; gloves, opening widely from the wrists, and having a jewelled rosette sculptured on the back of the hand; several finger rings, worn outside the gloves; shoes on the feet.

*See their effigies on Priory Seal in “Oliver’s Monasticon”; and reproduced by present writer in an illustrated sheet relating to the “Cornish Bishopric,” published by Lake, Truro, 1877.

†Hals wrote, “He lies entombed, with his bust or skeleton within a costly and curious stone chest or monument, . . . above ground.”

‡ “of the *Priory Church*.” Should have been added.

||On this question see Sir John Maclean’s “History of Trigg Minor,” vol. I., pp. 133-4, 307-8, pedigree: and also the descent of the family of “Vivian, of Truro, Cornwood, Cardinham, and Torquay,”—by whom the priors’ arms are now used.

His head rests on a pillow, and there are about him four small figures of angels, each kneeling on one knee, near the corners, on the top of the tomb. These have one hand laid upon his vestments, and the other hand holding an armorial shield of single bearing. They display* alternately the priory arms, and Thomas Vivian's personal arms. The angel supporting the right side of the bishop's mitred head, holds the shield of Bodmin Priory. The angel at the left, the shield of Vivian. The alternation is continued on the remaining shields, held by the angels near the feet of the effigy.

The charges are distinctly given in relief, but no tinctures are shewn. These may be seen in the stained glass windows of some neighbouring churches, and in the glass at Rialton (in St. Columb), a residence of the prior, which he adorned with rich sculpture, &c. The heads and upper portions of the images of the guardian angels on the tomb have been ruthlessly broken away. The nose of the chief effigy has been in like manner mutilated.

The upper edge of the tomb is chamfered and ornamented with mouldings. On it the inscription is incised in Lombardic capitals, filled with metal which is now much corroded.

Commencing at the right side of the prior's head, and continuing along the whole extent of the 4 bevelled edges, ending by the dexter corner at the head, where it commenced, are the words† :—

“HIC. TVMILATV[E] VENERABILIS: PATER. TOMAS: VIVIAN: MEGARENSIS. EPVS HVIVSQUE DOMVS PRIOR QVI OBIT ANNO DNI: M.D.XXXIII. PRIMO DIE IVNII CVIVS [ANIME PROPI] CIETVR DEVS AMEN.”

*Very incorrect accounts of these arms have been published. Hals (whose statements are nearly always erroneous and inaccurate) describes them as “3 thigh bones in saltire, for Megara.”(!) See Davies Gilbert's *Cornwall, &c.* No such arms could ever have been sculptured on the tomb. Those clearly cut upon the original stone, are the following :—

Bodmin Priory—“ Azure, 3 fish (salmon ?) naiant, in pale.”

Vivian—“ Or on a chevron azure 3 annulets of the field between 3 lion's heads. On a chief gules, 3 martlets argent.”

On a stone shield now built into the wall over the east window of the chancel of Bodmin Church (exterior) are “the Priory Arms impaling the Arms of Vivian,” but on the tomb they are displayed separately.

†Incorrectly given in Oliver's “*Monasticon Diocesis Exoniensis,*” p. 17.

‡Bishop Vivian held ordinations in Exeter Cathedral, Bodmin, &c. Consecrations at Launceston, &c.

From this it will be seen that Prior Vivian was enabled to act as a suffragan† assisting the Bishop of Exeter, through having been consecrated Titular Bishop of Megara in Greece (“in partibus infidelium”) without being required to proceed thither.

The upright sides and ends of the tomb are divided by small renaissance pillars into 8 compartments; one at head, one at foot, and 3 at each side. They are filled with sculptures. The panel at the foot is occupied by an angel, bearing on his breast a shield of the arms assigned in mediæval times* to king Edgar. The panel at the head contains the Tudor badget‡ and the arms‡ of King Henry VIII. The middle panel, at the side of the monument, beneath the right hand of the recumbent effigy, is occupied by an angel supporting on his breast Vivian’s shield. The corresponding panel, on the opposite side of the tomb, has the priory shield similarly upheld. The 4 final compartments at the sides contain within circular panels, the 4 Evangelists, one figure in each, boldly carved. They are represented in Tudor costume, writing their gospels, and are accompanied by their respective emblems—angel, lion, ox, and eagle. Some of the ornamental carving is very rich and elaborate. On the whole, whatever debasement may be observed in the details, the aspect of the tomb is one of solemn grandeur. The design, as Wallis has remarked, much resembles that of the tomb of King Henry VII., erected not long before in Westminster Abbey.

*“A cross flory, crowned, resting on an orb.” At Rialton are some beautifully sculptured shields and inscriptions. We there find a shield with the same arms as these, and the name “Edgarus” accompanying it.

On an adjoining stone at Rialton is another shield thus charged “between a hound and a lodged stag, a sword erect, crowned on the point, and debruised on the blade by a bugle horn.” It is labelled “S. Petrocus.” I am not aware that *these last arms* have previously been noticed by any writer. Beside it, is also the monogram of T. V. (Thomas Vivian).

†“Rose” and “Portcullis.”

‡“France and England quarterly, with royal crown above; supporters, a greyhound and griffin.”

APPENDIX.

[ABBREVIATED EXTRACTS FROM DOCUMENTS IN THE POSSESSION OF THE CORPORATION OF BODMIN, RELATING TO BISHOP VIVIAN, THE PRIOR, AND HIS SUCCESSORS.]

A.D. 1524—5.

“A testimonyell from the mayor and burgesses of bodmyn agens the prior and covent, &c.”

“To alle true christen people to whom this presente writing shal cumto, here, se, or rede. We Nicolas Opy, Maier of Bodmyn, [&c., &c.], sende dewe gretynge in oure lord god everlastyng. It is a meritorious and a cheritable dede to testefy the truthe.

The Prior of Bodmyn nowe of late doth wylle and clayme that alle the Kynges free Burges of the towne be sensours and suters to his lawe courtes holden too times by the yere—where as he, neyther none of his predecessors, oute of tyme of no mynde, hadde suche seryyce of the Burges, but oonly suche as byth his ffreeholders. We say and testife that Burges of Bodmyn be the Kynges free Burges and noman els.

If therbe any ffelonye don or comytted within the towne, the felon takyn, the Maier and Burges er charged with him, and if the felon have any goodes, the Pryor and his officers seasith theym and takith hit away to the Pryor is use—and if the felon by chance do escape, the Maier and the Burges paieth to the Kyng the forfeite and not the Pryor; and also if any ffray or bloudewyt be comytted, the maier, burges, and constables, be the conservatours of the Kynges peas, and now the Pryor will have all the profettes...[many other grievauces are stated]..... We pray you to yeve credens to this oure writing, and in wetenes hereof to this oure letter Testimonyall have setto the Comyn Seale of the Towne of Bodmyn, for the seales of us the abovesaide persones be unknowen to maney men. Yevyn at Bodmyn the xiiijth day of Aprile in the xvth yere of the raigne of Kyng Harry the viijth.”

[Attached to the foregoing.] “Also we Thomas Boscarnan, Maier, [&c., &c.] now being of the Hedde Burges ratefie by oure assurance to god and the king, affermeour testimoniall to be in every article and poynte true. Also we say... [&c., &c.]...and never herde nor knew of no Prior that ever solde, coled, or cutt any woode in Dymnure to any other intente then is rehersed saving oonly this now Prior. Yevyn at Bodmyn in the ffest of the Aposteles Seynte Symon and Jude in the xvijth yere of the raigne of our Sovereaigne lord Kyng Harry the viijth.”* [Signed by “Roger Arundell.”]

[Memoranda.] “The Prior is a great farmer of benefices and of other temporal lands, and a great encloser.”

“The Prior is a great meddler with black tin and white tin, and that converteth into merchandise, and maketh coal, and hath a blowing house of his own and bloweth tin.”

“The Prior doth misuse himself in speaking of slanders and opprobrious words against the Township.” [&c., &c.]

* The foregoing Testimonials are printed much more fully, but in modern spelling, by Wallis. The extracts which now follow are condensed from his version of them, adopting the ordinary style. (Cornwall Register, pp. 293—314.)

A.D. 1529—39.

“There be in the Town 2 chapels, one of St. Thomas, and the other of St. Leonard. There hath been lands given to the predecessors of the Prior that they should maintain and cause masses to be sung there. Now this Prior receiveth the profits and findeth no priest to sing there at no time; contrary to the intent of the giver of the said lands.”

The Vicar of the Parish, brother to the Prior, is departed from his Vicarage by the labour of the Prior, and lieth in London—where he, by citation, otherwise procureth unjust vexation against the inhabitants of the town. The Prior in the absence of the Vicar, knowing of one Sir Thomas Hayly, a priest of ill-living and disposition, put out of the said cure, as out 3 or 4 other parishes for his vicious living; the same Prior of a forwardness appointed the same to serve the cure of Bodmyn because he perceived the parishioners would murmur against the same Sir Thomas Hayly—for his ill and vicious living was known amongst them, and by their will they wyld not have him to be their curate. All this the Prior did uncharitable to bring the Parish in unquietness. Sir Thomas contented to depart because the people abhorred him and his living. The Prior received him into his priory and the next day following of a cruel malice mind, send him gayne into the Church to serve in despite and discumberance of all the whole parish and town.

The servants of the said Prior knowing the malice that the said Prior beareth to the town, cometh daily into the town and to bring the commons in a fury and wonese, and to do something against your Highness's Laws, whereby the Prior might the better work his malice on them, the same servants saying unto them that the Prior will cause all the inhabitants to be hanged, and that they should wear halters as their predecessors did at Blackheath Field, and the Prior's Porter said rather than they should be unhanged, he would be hangman himself. The said poor commons never gave such cause to the great unquietness of the town.

The inhabitants used to have common pasture with all manner of beasts, and fuel in Dymure Wood—with hook and crook to lop and crop and carry away upon their backs. The Prior hath caused the wood to be inclosed and gates locked and caused his servants to lie in await of the said poor inhabitants—they cruelly oftentimes have beaten them and cut their ropes. Some of the poor women have been brought in great danger of their lives. Divers of the poor people pulled down part of the hedge. The Prior of malice intending to be avenged on them, sent a general commandment to his friends and servants of the Manor of Bodmyn to come to his Priory of Bodmyn with such weapons as they had—there to do as he and his council should advise them, and by this means he gathered unto the Priory, by estimation, 100 persons and above, and charged 5 cart load of ordnance with pellets to shoot into the town, to destroy the town, and so shot into the town 20 pellets or thereabouts, which unlawful purpose the Prior had maliciously fulfilled to his power if by the counsel and advise of Goodman he had not been stayed. By reason of which dealings and malicious purpose the poor commons standeth greatly in dread of the said Prior, and was thereby greatly unquieted.’

Abstract of a letter from some one in London, dated

“EMANUEL, Ao.Dni. 1529.

(To the Right Worshipful Mr. Flamank, Mr. Opy, Thomas Boscarnan, &c., &c.,
Burgeses of Bodmyn yn Cornwall).

Right Worshipful, I commend me to you in my best manner. I have had communication with Mr. Thomas Vivian, your Vicar, at good length at Paul's,

and willed him and desired him oftentimes to take some good reasonable way with his Parishioners, whereunto he answered and said he hath been at all times content to be ordered according to good reason and conscience, saving always the rights of his Church whereunto he is sworn, but ye be so unreasonable and so full of malice and dissimulation that no man can trust you, for ye speak fair words and think otherwise in your hearts and he hath proved you many days, and he saith furthermore that ye be so full of craft and so full of malice that if Christ were here again and dwelling with you, ye would [put] him on the cross and crucify him again, and he said moreover ye have not handled him like your Curate, nor like no good ghostly children. He said, once he sued a process against certain persons for the duty of his Church—at your request the matter was had in communication, and also in arbitrament, and nothing came of it. So by your subtle means and fair words he lost all his costs, which he purposeth never to do no more after this, but assuredly and fastely to stick and abide by the process, as ever did any priest in the right of his Church. And whereas ye malign and grudge against his priest that serveth his Church, he purposeth not to change him for your pleasures, for he payeth him his wages, and also he is admitted by the ordinary to serve there; ye may complain to the ordinary. Of envy and malice, ye cannot be content with no one. He could not tarry among you. He could open and shew some things that would put some of you to [shame.]

Shewed Mr. Vicar of mine own mind: If he be disposed to go to law and to vex and trouble his poor parishioners, he should be answered, and have trouble enough his handfull.

The Vicar shewed me he would shortly send down a letter of his mind to you all that sent him a letter, he told me also he could never bring you to no good purpose, and thus I commit you all to God. From London the 22nd day of February, with the hand of your heartily loving friend, to my poor power.

...After I had spoken at good length with Mr. Vicar and perceived no fruit nor towardness in him, nor that he would be as me thought conformable to no manner, peace, and unity, as good charity required, I delivered your letter to Mr. Middleton for the defence; and delivered him *iiij^s viij^d* for his procuracy, and he hath promised me to look substancially at every court for your cause. Doubt ye not. I have retained Mr. Doctor Feytor in your cause, and given him *vi^s viij^d*. He is called a cunning man, and as soon as the Vicar hath put in his libel and declaration, ye shall be ascertained of the copy of the same with diligence."

Pedigree of Munday,

NOTE.—The portion of this Pedigree which is printed in *italics*, and the Arms, are recorded in the Heralds' Visitation of Cornwall, 1620. The dates of Baptisms, &c., are taken generally from the Register of the parish of Saint Columb Minor.

WILLIAM MUNDAY
of Wycombe, Co. Bucks

SIR JOHN MUNDAY
Lord-Mayor of London 1522:
bur. at St. Peter le Chepe.

*Thomas Munday,
Prior of Bodmin temp.
Henry VIII, will dated
27 Feb., 1548, prov. 6
Feby., 1554, P. C. L.
(Harrington 56).*

*who being a younger brother
in the County of Derby, came
years since, and lived at Rialton
means of his brother Thoma.
Lease of the Manor of Rialton
named in the Prior's will. B*

*Roger Munday, = ELIZABETH?
2nd son de Rialton, bur.
5 October, 1574, named
in the Prior's will.* bur. 3 April, 1609,

*William Munday, = Katherine,
son and heir of John, of
Rialton, bur. 24 April,
1569, named in the Pri-
or's will.* dau. of Wilcock
Com. Cornwall,
20 October, 1588

Robert Munday. JOHN, bur. 11 June, 1562. JANE, bur. 8 Mar., 1574. MARY, bur. 6 July, 1568. Katherine, mar. to Marose Tredinick, of Brege. dau. of Thoheniot, 2 Jan.

John MUNDAY = MARY, 3rd son, at. 20, of Tretherise. da. .. Anne, 4 at 21, bp. 14 Jan. 1598, bur. 2 May, 1628. Richard, 4 at 18, bp. 5 Sep., 1602, bur. 29 Jan., 1645. (2nd) GILLIAN, = Thomas Munday, = Barbara, (1st de Rialton, in Com. Corn., bp. 7 Dec., 1585, bur. 14 Aug., 1636. da. of — Carnsewe, mar. 4 Feb., 1625; re-mar. 9 Feb., 1642, John Andrew. da. of John de Little Dart in Com. Devon 1 March, 1602

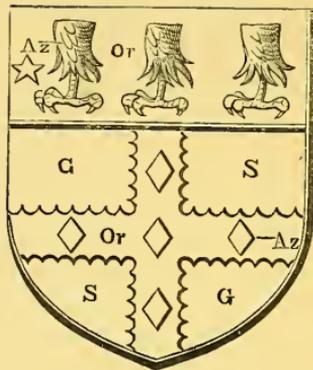
JOHN, born 29, bap. 29 Aug. 1624. LITTLETON, bap. 22 Jan., 1625, bur. 31 Jan., 1626. MARY, bap. 30 Mar., 1628, bur. 2 May, 1628. CHARLES, bap. 13 Sep., 1635, bur. 13 July, 1636. WILLIAM, bur. 5 Aug. 1648.

1 Mary, Barburne mar. lic. 9, mar. 29 Apr. bp. 11 July, 1633 Nich. 1613, bur. 1 Ap. 1616, Langmaid, of East Allington, Co. Devon. *2 Dorothy, bap. 17 Dec. 1609, mr. 22 Sept., 1634, Roger Carne* *Dulsabella, bap. 20 April, 1612, bur. 29 Dec. 1635.* *John Munday, = MARY, fil primo genitus at 12, born at Little Dartmouth, Devon, 24 Aug. 1607, of Trewolock, b. 16 Jan. 1665-6. Will dated 19 Jan., 1664-5, prov. 1 April, 1666. — Arch. Cornwall.* da. of bur. 26 May, 1672. *Ambrose, = ELIZABETH, at 9, bn. 3, bap. 11 Sep., 1611, bur. 23 Mar. 1661, named in bro. William's will, adm. June, 1662, in Arch., Corn., granted to Mary Symons, wid. da. of deceased, during minority of her brother Ambrose.* bur. 1649.

MARY, bap. 17 May, 1629. ANNE, bap. 21 Aug., 1631, mar. — Stephens. Named in wills of uncle William and father, MAGDALEN, named in uncle William's will. AMBROSE, bap. 30 Nov., 1645. MARY, bap. 20 Mar., 1640, mar. — Symons. AMBROSE, bap. 11 Aug., 1643. BARBARA, bap. 20 At mar. 16 Ju Joseph M

Rialton, Co. Cornwall.

John Munday, = *JOAN*, da. of J.....
Man, of
family of Munday,
Cornwall about 80
to came through the
of Bodmin. Had
is brother the Prior,
Dec., 1571.



Richard Munday,
3 fil. de Rialton,
named in the Prior's
will.

KATHERINE,
mar. Laurence Kendall, who
had from the Prior a lease of
the Manor of Withiel. Nam-
ed in the Prior's will.

JOHANNA,
mar. William Prideaux,
son of Humphry Prid-
eaux. Named in the
Prior's will.

(2nd wife) Anne, = *John Munday,*
mar. at Men-
de Rialton.
bur. 14 August, 1603.

John Munday, = *Emelyn,* (1st wife)
dan. and coh. of William Wey,
of Lestithell, in Com. Cornwall,
bur. 9 Sept., 1595.

Joan,
mar. to Ric. Tregolse,
of Tregolse.

1 Dorothy,
mar. to Francis
Rawle, of S. Gilt,
of Bodmin, bap.
Nov., 1582, mar.
29 Oct., 1605.

2 Gartred,
mar. to John Ede,
of Bodmin, bap.
27 Dec., 1584, mar.
7 Feb. 1601.

3 Loveday,
mar. to Rich.
Kensham, of
St. Kevern,
bap. 14 Aug.,
1617.

4 Philip
mar. to John Mar-
tin, of St. Erven,
Corn., bap. 3 Oct.,
1589, mar. 10 Nov.
1607.

5 Margery,
bap. 24
April,
1591.

6 Emilin,
bap. 18
Septem.
1595.

William,
2nd son, at
30, bap. 8 Sep.
1588, bur. 11
May, 1618?

NICHOLAS,
o. 1 May,
1627.

FRANCIS,
bap. 18 Jan.,
1628.

ANNE,
bap. 14 Dec.,
1629.

GRACE,
bap. 25 Sep.,
1632.

EMBLEM,
bap. 2 Oct.,
1633.

JULIAN,
bap. 26 May,
1635.

3 Thomas, =
at 8, bap. 7
Aug., 1614,
bur. 30 Oct.,
1643.

4 Antonie, = *MARY,*
at 8, bap. 1
Nov., 1615.
dau. of — Jol-
liffe of St. Tho-
mas by Laun-
ceston, mar. lic.
13 Oct., 1640.

5 William,
bap. 3 Nov., 1617,
bur. 14 May, 1650?
will dated 4 Feby.,
1649, pro. 29 Nov.,
1650, P.C.C. Pem-
broke. 1811.

6 Benjamin,
bap. 8 April,
1618.

7 Francis
3 menses,
bp. 6 Aug.,
1620, bu. 14
July, 1622.

FRANCIS,
bap. 18
Jan.

DOWSABELL,
bap. 27 May,
1648, mar. 11
April, 1678.

JOANE,
bap. 19 Aug.,
1649, mar. 30
Jan., 1674.

MARGARET,
bap. 30 Oct.,
1644.

JOHN,
bap. 27 Mar., 1642.
Named in uncle
William's will.

THOMAS,
bap. 21 Oct., 1643.
Named in uncle
William's will.

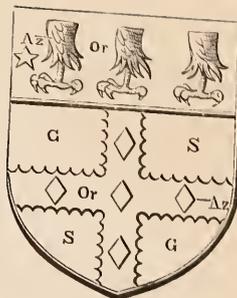
ANTHONY,
bap. 15 Dec.,
1641.

William Pitts.

Roger Martin

Pedigree of Munday, of Rialton, Co. Cornwall.

NOTE.—The portion of this Pedigree which is printed in *italics*, and the Arms, are recorded in the *Heralds' Visitation of Cornwall, 1620*. The dates of Baptisms, &c., are taken generally from the Register of the parish of Saint Columb Minor.



WILLIAM MUNDAY, =
of Wycombe, Co. Bucks.

SIR JOHN MUNDAY, =
Lord-Mayor of London 1522,
bur. at St. Peter le Chepe.

*Thomas Munday,
Prior of Bodmin temp.
Henry VIII, will dated
27 Feb., 1548, prov. 6
Feb., 1554, P. C. L.
(Harrington 56).*

*John Munday, = JOAN, da. of J.....
Man. of
who being a younger brother of the family of Munday,
in the County of Derby, came into Cornwall about 80
years since, and lived at Rialton, who came through the
means of his brother Thomas, Prior of Bodmin. Had
Lease of the Manor of Rialton from his brother the Prior,
named in the Prior's will. Bur. 21 Dec., 1571.*

*Roger Munday, = ELIZABETH?
2nd son of Rialton, bur.
5 October, 1574, named
in the Prior's will.*

*William Munday, = Katherine,
son and heir of John, of
Rialton, bur. 24 April,
1569, named in the Pri-
or's will.*

*Richard Munday,
3 fil. de Rialton, nam-
ed in the Prior's
will.*

KATHERINE,
mar. Laurence Kendall, who
had from the Prior a lease of
the Manor of Withiel, Nam-
ed in the Prior's will.

JOHANNA,
mar. William Prideaux,
son of Humphry Pride-
aux. Named in the
Prior's will.

Robert Munday.

JOHN,
bap. 11 June,
1562.

JANE,
bur. 8 Mar.,
1574.

MARY,
bap. 6 July,
1568.

*Katherine,
mar. to Marose Tredin-
nick, of Brega.*

*da. of Tho. Myrove, of Trey, mar. at Men-
heniot, 2 Jan. 1596, bur. 14 August, 1603.*

(2nd wife) Anne, = John Munday, = Emelyn, (1st wife)
de Rialton. dan. and coh. of William Wey,
of Lestithell, in Com. Cornwall,
bur. 9 Sept., 1595.

JOAN,
mar. to Ric. Tregolse,
of Tregolse.

*John Munday = MARY,
3rd son, et. 20, of
Trehese.*

*Anne,
4 et 21, bp.
14 Jan. 15-
98, bur. 2
May, 1628.*

*Richard,
4 et 18, bap. 5
Sep., 1602, bur.
29 Jan., 1645.*

(2nd) GILLIAN, = Thomas Munday, = Barbara, (1st)
da. of — Carnsew, da. of John Roupe,
mar. 4 Feb., 1625; of Little Dartmouth
re-mar. 9 Feb., 1642, in Com. Devon, bur.
John Andrew. 1 March, 1622.

*Thomas Munday, = Barbara, (1st)
da. of John Roupe,
of Little Dartmouth
in Com. Devon, bur.
1 March, 1622.*

*1 Dorothy,
mar. to Francis
Rawle, of S. Gilt,
Cornw., bap. 9
Nov., 1584, mar.
29 Oct., 1605.*

*2 Gartred,
mar. to John Ede,
of Bodmin, bap.
27 Dec., 1584, mar.
7 Feb. 1601.*

*3 Loveday,
mar. to Rich.
Kensham, of
St. Kevern,
bap. 14 Aug.,
1517, 1607.*

*4 Philip
mar. to John Mar-
tin, of St. Erven,
Corn., bap. 3 Oct.,
1589, mar. 10 Nov.
1607.*

*5 Margery,
bap. 24
April,
1591.*

*6 Emilin,
bap. 18
Septem.
1595.*

*William,
2nd son, et
30, bap. 8 Sep.
1588, bur. 11
May, 1618?*

JOHN,
born 29, bap.
29 Aug. 1624.

LITTLETON,
bap. 22 Jan.,
1625, bur. 31
Jan., 1626.

MARY,
bap. 30 Mar.,
1628, bur. 2
May, 1628.

CHARLES,
bap. 13 Sep.,
1635, bur. 13
July, 1636.

WILLIAM,
bap. 5 Aug.,
1648.

NICHOLAS,
bap. 1 May,
1627.

FRANCIS,
bap. 18 Jan.,
1628.

ANNE,
bap. 14 Dec.,
1629.

GRACE,
bap. 25 Sep.,
1632.

EMBLEM,
bap. 2 Oct.,
1633.

JULIAN,
bap. 26 May,
1635.

*1 Mary,
Barburne mar.
lic. 9, mar. 29
Apr. bp. 11 July,
1633 Nich. 1613,
bur. 1 Ap. 1616,
Langmaid,
of East Allington,
Co. Devon.*

*2 Dorothy,
bap. 17 Dec.
1600, mr. 22
Sept., 1634,
Roger Carne*

*Dulsabella,
bap. 20 April,
1612, bur. 29
Dec. 1635.*

*John Munday = MARY,
fil primo genitus et
12, born at Little Dart-
mouth, Devon, 24 Aug.
1607, of Trewolock, b.
16 Jan. 1665-6. Will
dated 19 Jan., 1664-5,
prov. 1 April, 1666.—
Arch. Cornwall.*

*at 0, bn. 3, bap. 11 Sep.
1611, bur. 23 Mar. 1661,
named in bro. William's
will, adm. June, 1662,
in Arch., Corn., granted
to Mary Symons, wid.
da. of deceased, during
minority of her brother
Ambrose.*

*Ambrose, = ELIZABETH,
da. of
bur. 19 Aug.
1649.*

*3 Thomas, =
at 8, bap. 7
Aug., 1614,
bur. 30 Oct.,
1643.*

*4 Antonie, = MARY,
at 8, bap. 1
Nov., 1615,
da. of — Jol-
life of St. Tho-
mas by Launce-
ston, mar. lic.
13 Oct., 1640.*

*5 William,
bur. 3 Nov., 1617,
bur. 14 May, 1650?
will dated 4 Feb.,
1649, pro. 29 Nov.,
1650, P.C.C. Pen-
broke. 1811.*

*6 Benjamin,
bap. 8 April,
1618.*

*7 Francis
3 menses,
bp. 6 Aug.,
1620, bur. 14
July, 1622.*

FRANCIS,
bap. 18
Jan.

MARY,
bap. 17 May,
1629.

ANNE,
bap. 21 Aug., 1631,
mar. — Stephens.
Named in will of
uncle William and
father.

MAGDALEN,
named in uncle
William's will.

AMBROSE,
bap. 30 Nov.,
1645.

MARY,
bap. 20 Mar.,
1649, mar. —
Symons.

AMBROSE,
bap. 11 Aug.,
1643.

BARBARA,
bap. 20 Aug., 1643,
mar. 16 July, 1662,
Joseph Martine.

DOWSABELL,
bap. 27 May,
1648, mar. 11
April, 1678,
William Pitts.

JOANE,
bap. 19 Aug.,
1649, mar. 30
Jan., 1674,
Roger Martin

MARGARET,
bap. 30 Oct.,
1644.

JOHN,
bap. 27 Mar., 1642,
Named in uncle
William's will.

THOMAS,
bap. 21 Oct., 1643,
Named in uncle
William's will.

ANTHONY,
bap. 15 Dec.,
1641.

11.—*The last Will and Testament of Thomas Wansworth, last Prior of Bodmin, with a prefatory notice.*—BY SIR JOHN MACLEAN, F.S.A., *Hon. Member of the Royal Institution of Cornwall, &c.*

Read May 11th, 1877.

THOMAS Munday, *alias* Wansworth, whose last will and testament I have the pleasure of bringing under the notice of the Members of the Royal Institution of Cornwall, was the second son of Sir John Munday, Lord Mayor of London in 1522.* Sir John Munday had three sons: Vincent, who founded the family of Munday of Derbyshire; Thomas, who on 10th May, 1534, was confirmed Prior of Bodmin; and John, who followed his brother into Cornwall, and settled at Rialton, in St. Columb Minor, in the circumstances presently to be noticed.

In what way Thomas Munday acquired the *alias* of Wansworth, or Wansworth as he wrote it, does not appear. Probably he was either born or baptised, perhaps both, at Wansworth in Surrey, and hence derived his name, not an unusual thing with the *Religious* of that period. He appears to have been a modest, quiet, good sort of man, desirous of performing the duties of his office in an unostentatious manner. His lot was, however, cast in troublous times. On his appointment as Prior he found his house in a state of disorder and confusion, which he set himself at once to reform. Writing two years after he became Prior, he complains that his Canons had for long continuance lived unthriftilly, and against the good orders of religion, to the great slander of the same, as all the country could tell; and he states that for the reformation of those abuses the Bishop at his late visitation had given certain injunctions, which he had commanded the Prior strait to see observed; but which, the Prior remarks, are no harder than the brethren are bound to by their own rule

* Sir John Munday was son of William Munday, of Wycombe Co. Bucks, and, being a member of the Goldsmiths' Company, was appointed Sheriff of London and Middlesex in 1514, Alderman of the Ward of Aldgate 1517, and Lord Mayor 1522.

and profession. The time was at hand, however, when the Prior and his House and all that pertained to it would be swept away, and the Priory Church, which, according to the dimensions given by William of Worcester, measured 95 feet by 50 feet, as well as the domestic buildings, levelled with the ground.

The Prior, however, saw the storm approaching, and, with worldly wisdom, as early as Midsummer, 1537, assembled all the Canons in the Chapter House, and declared to Richard Oliver, the sub-prior—"and the other bretherne there assembled to gither, "that he did here that the King^{es} Ma^{tie} would take his pleasure "upon theire house, and, therefore, he thought it good to give "vnto suche as beene good to the house some leases, or other "preferments, to thintent they shoulde be the better to them "hereafter."*

Accordingly the Prior and Convent granted, in the Autumn of 1537, a lease under the Convent Seal to John Munday, the Prior's brother, for a term of 99 years, of the Manor of Rialton, which Manor had not before been let, but was kept in the hands of the Priors and Convent for the maintenance of the hospitality of the house. A lease was also granted on 20th Sept. in the same year, for a like term, of the manor of Withiel, together with the advowson of the Church, and the common fishing throughout the whole water of Aleyn and Eyle, to Lawrence Kendall and Katherine daughter of the said John Munday. On 20th October in the same year, a similar lease was granted to William, second son of Humphry Prideaux of Theuborough, and Johanna his wife, daughter of the said John Munday, of the manor of Padstow, with all its appurtenance, together with the Advowson of the Church of the same manor. On 20th Sept., in the same year, the Prior and Convent granted to Sir John Chamond, Knt., and Richard Chamond his son, the office of Seneschals and Supervisors of all the Priory Lands; and about nine months before the dissolution of the Priory the Priory Seal was affixed to a deed granting the manor of Bodyniel to the said Sir John Chamond and his heirs in fee simple, but the King having procured the passing of an Act of Parliament making void all grants of Abbey lands in fee simple, or fee tail, made within a year before the surrender of the house, a lease of the said manor was

* Deposition in the Court Augmentation.

granted to the said John Chamond for the term of 99 years.* To John Tubbe was granted a lease of the Advowson of Lanhydrock, and of certain lands; and William Bere, gent., deposed that he had been under-Steward of the Priory Lands, and had been "displaced because he would not be party to writings craftily made with ante dates," and that the said John Tubbe was appointed in his place; and he referred to the above-mentioned leases as those so made.

There is also a curious incident relating to the wood of St. Margaret in the parish of Bodmin, deposed to by Mr. Glynne. Between Midsummer and Lammas, 1537, Mr. Glynne was in treaty with the Prior for this wood, in which the Prior offered the greatest and best parte for £5 an acre. The negotiation was broken off in consequence of the Prior requiring payment for the same to be made most parte in hand, and the remainder before the following Christmas. Mr. Glynne not liking the bargain departed, and met one Nicholas Prideaux, gent., who said unto him—"Syr I perceyve ye have bene wth my lord the prior for Saynt Margaretes Woode;" and asked him whether he had bought the wood. Mr. Glynne replying that he had not, the said Prideaux said that "yf my lorde hadde bene as honest a man as I toke him for, the bargayne hadd bene myne." Mr. Glynne answered: "Sir, take it in Goddes name for me, for as yet I have not concluded wth hym nor I will no more meddle wth all," and deponent saith he well remembereth, "the house surrendered the lent following." Mr. Prideaux afterwards offered Mr. Glynne a part of the wood, who answered "I am afraid to bargayne for fear of the statute, for you know Mr. Prideaux, that I do know how the same stonde the."

It is impossible to say whether the conscience debt of "a greate some of mony" owing by Nicholas Prideaux to the Prior had any relation to his transaction, but the circumstances above related would seem to be illustrative of the Will. We have,

* Sir John Chamond was son and heir of Thomas Chamond, son and heir of Alexander Chamond of Launcels, by Elizabeth daughter of Thomas Treughans. He was knighted in 1529 at York Place, now called Whitehall. He was twice married; first, to Jane, daughter of Sir Thomas Grenville, Knt., and relict of Sir John Arundell, Knt.; and secondly, to Margaret, daughter and coheirress of Thomas Tregarthen. He died in 1552, leaving his son Richard his heir. Will dated 1st Jan., 1547-8; proved at Exeter, 9th March, 1552-3.

however, hitherto failed to discover for what cause the Prior was condemned to die. Possibly it may have been on account of some of the proceedings mentioned above, or, perhaps, for denying the King's supremacy. We are making further researches upon this point, which we hope will be successful, and that hereafter we may be enabled to explain the circumstances.

On the 27th February, 1537-8, the Prior, the Sub-Prior, and nine others surrendered the Priory into the King's hands, and were assigned small pensions for their subsequent support, the Prior being granted £66 13s. 4d. per annum.

At the date of his Will the Prior held the benefice of St. Martins, but what St. Martins, or in what diocese, is not stated. Little need be said here of the descendants of John Munday. All his children will be found named in the Prior's Will. The projected marriage, however, between his eldest son William and Elizabeth Prideaux never took place. William married Katherine daughter of William Cock, and the said Elizabeth became the wife of Robert Drake of Wiscombe, Co. Devon.

The family is traced in S. Columb Minor for five descents from the Prior's brother. Though they became very numerous in the beginning of the 17th century, they seem to have disappeared, at least from the rank of gentry, after the middle of that century. We find the name, however, in other parishes in the county, but whether or not of the same family we are unable to say. A William Munday married at Fowey, in 1574, Jane Withiel, and had a large family, whose descendants re-married in that town in the beginning of the 18th century. A John Munday, gent., was living in St. Allen in 1636. Nicholas Munday, of Mawnan, gent., was married at Constantine on 9th Nov., 1657, to Mary daughter of Samuel Trefusis, gent., of that place, and they had a daughter, named Constantine, baptized there on 3rd June, 1665. Possibly this Nicholas was the eldest son of Thomas of Rialton by Gillian Carnsewe.

“ In dei nomine Amen. I Thomas Mundaye alias Wansworth In the yere o^r Lorde God a Thousande five hundred fortye and eight the xvij daie of february beinge of hole minde and perfitt remembrance and memory doo make my testament and last will

in forme and manor hereafter followinge. ffirst I bequeathe my sowle to the blessed trinite and my bodie to be buried howe and wheare my Executors shall thinke conueniente. Item wheare Ser Water Preston prest owithe me xv^s I will he geue to the fellows and Company of holmes College v^s to praie for me and in so doinge I geue him the rest to praie for me and to saie for my sowle tenne mass and tenne dirges and commendacions. Item where Ser Henry Hall vecar of Grenewith owith me vj^{li} and odd moneye I geue him thereof xx^s to praie for my soule and woll that he pay to my executors the resdewe to bestowe as I shall appointe them. Also wheras William Geynfforde gent and gailor of the towre of London hathe a dede of gifte of my owne hande wrytinge for foure pound out of a bill of dett whiche Xpofer Hole owithe me I will that the said Gainsford have the same and the other xl^s I geve the saide Xpofer also wheare as Richard Chamonde Esquire and my lady his mother in the Cowntie of Cornwall executors to Ser John Chamonde Knight owe me by his dede obligatory xl^{li} ster' whiche dede remainethe in the hondes of Nicholas Pridioxe and Roger Pridioxe gentelmen of the whiche xl^{li} I confesse that I have receaved x^{li} by the handes of Ser John Chamonde aforeseid. Also the Executors of John Tobby gentilman in the parishe of Saincte Niott owe vnto me by ther bill obligatory xl^{li} sterling whiche bill remainethe in the hondes of the said Nicholas and Roger Pridioxe as the said executors have testified. Also Vmfry Loues Gent of the parish of Hartley in the Cowntie of Devonshere owethe me by a bill obligatory xvij^{li} ster' whiche dede was made to me and to Mr. George Rolles and remainithe in his hondes of the which I confesse to have receaved ix^{li}. Item wheare there hathe ben diuers contracts and bargaines of marriage betwixte Vmfry Pridioxe of and also I haue debursed and Laide oute for the saide Vmfrye and his commodities at diuers times the somme of cxlv^{li} as it did appere by certaine obligations and a certaine booke declaringe the particulars of the same hit was agreed betwixte him and me at my last being withe him at his house at feboroughe that I shulde remit all the saide somme of mony vnder this condicion or condicions that my neuwe William Mundy shulde marrye with his dawghter Elizabeth Pridioxe when and as soone as she came to lawfull age accordinge as I certified to the Kinges Cownsell by my wrytinge what time I was judged to dye and also as it apperethe

by a paire of Indentures made at Bodnam to John Mundy the elder father of the saide William Mundy and to Elizabeth Pridioxe. Also it was agreed betwixte the said Vmfrye and me in a paire of Indentures of Couenantes that the saide John Mundy sholde enioye the Manor of Rialton with his appertinances without any interruption of the saide Vmfry, William, Elizabeth. Item Whereas Nicolas Pridioxe brother to the saide Vmfry oweth me a greate some of mony as he knowithe in conscience and was the setter forthe of all theis forsaide Bargaines I require him to certifie the truthe in all theis thinges and to helpe to see them sett forwarde accordinge to the truthe and consciens and also that he make one annuities of xxx^s by the yere vnto Richard Vele, Mason, sometime my true seruante, for the terme of his life as he in conscience is bounde to doo and in soe doinge I clerely forgeve him and discharge him and his conscience of all his debte and other matters betwixte him and me. Also Thomas Oppy tanner of Bodmyn owith me ix lbs. odde monye as he knowithe by his conscience and divers of his neighbowres witnes I will that the said Thomas paie to Elizabeth Rossemonde widowe yerely during her life vj^s viij^d for the rent of a Chamber which I promised her during my life. Item Wheare Robert Sturgyn of Bodmin owithe me certaine mony upon a reckoninge I will the saide Robert paie vnto John Bleight of Bodmyn Draper vj viij^d the which I owe him for a Cote Clothe for Peter my man, and also I desire him to be good to poore Hewe Seaton my olde Seruant and to Roger Torrell. Also I bequeath all suche debtes as my prest and farmer owithe me to Lawrence Kendall my newewe and Katerin his wife Excepte xx^s which I geue him to praie for me, also I geve the said Lawrence xl^s which I lent to Master Markam, and xl^s that I lent to Master Trelvelion his sonne and heire Vmfrey treuelion and xx^s which I lente to Ser Will^m Braye preste of the which I geve him xx^s to praie for my sowle. All other debts oweinge to me in that parisshe or any other there aboute I forgeue them desiringe them to praie for me And I bequeathe to Richarde Mundy out of xxx^{li} that Master Charnon owethe me x^{li} to be paide to him or his assignes by xl^s by the yere and will they paie out of hond x^{li} to my executors and so doinge I forgeue them the other x^{li} also I bequeathe to my newewe Roger Mondy xx^{li} out of the xl^{li} that John Tobbe owithe me and the other xx^{li} to Thurstans hickmans preste whiche hath

ben my keper all the time of my sickness. Also I bequeath to to Master George Rollys which Master Roollys and Thurstance hickmans I make my executors and geue them all the residewe of my goodes and debtes equally to deuide betwixte them excepte that I geue to John Mondy and his wife xx^s whiche remainethe in the hands of my Curate of my benefice in Seinte Martins. And also I geue to Master Clarke Proctor of the Arches to help to se my Will performed fīue markes. Also I geue to John Chambers xxxiijs^s iiiij^d. In Witnes whereof I have caused this to be made the daie and yere aboue rehersed and delivered it in the presence of Richard Staueley John Withall George Rolle withe other.

Sexto die februarij Anno dni Millesimo Quingentesimo quarto emanavit Commissio Ricardo Mundy Consanguineo predicti defuncti ad administrandum bona jura et Credita eiusdem defuncti juxta vltimam suam hujusmodi voluntatem ad viam intestati decedentis eo quod Georgius Roll Executorum vnus ab hac luce Migravit antequam onus Executoris in se assumpsit et Thristramus (*sic*) hickman alter Executuam onus Executionis testamenti huinsmodi renuciavit de bene et fideliter administrando eodem ac de pleno Inventorio inde Exhibendo necnon de plutoe Computo inde reddendo ad Sancta dei Evangelia Jurat. (Harrington, 56. P. C. C.)

Since the foregoing was set up in type we have obtained further information respecting Thomas Wandsworth, which tends to confirm our conjecture as to the derivation of his name of Wandsworth, and shews the circumstances in which he became Prior of Bodmin. It illustrates, also, in a remarkable manner, the connection which existed between him and Nicholas Prideaux.

On 4th June, 1576, a Commission was appointed to administer certain Interrogatories concerning leases granted by Thomas Wandsworth, alias Monday, of the Tithes of St. Minver, Padstow, and Cubert, on behalf of Roger Prideaux, Esq.

It will be better, we think, to give the depositions, made in reply to these interrogatories, so far as they relate to the circumstances connected with the Election of Prior Wandsworth, verbatim. John Tiler, of the County of Devon, Yeoman, aged 66 years, sayeth: that he knew Thomas Monday alias Wandsworth, late Prior of Bodmin, and Nicholas Prideaux: and,

"That one Thomas Vivian, beinge somtymes prior of the seid priorye of Bodmyn aforeseid, to whome the seid Nicholas Prydeaux was Servant, and Master vnto this deponent, In his Deathe beadde dyd declare vnto the seid Nycholas Prydeaux that none of his bretherne, beinge chanons of the seid priorye, was meate and able to be prior ther and to succede him, and thervppon commended the aforeseid Thomas Monday then a chanon of Martyn Abbey in Surrey, neare London, to be prior after him ther, and moued and desired the seid Nicholas Prydeaux to procure that the same Thomas Monday might succede the seid Vivian and to be prior of the seid priorye of Bodmyn. After the deathe of w^{ch} prior Vivian the said Nicholas Prydeaux so labored and dealte in the seid cause wth the Lord Cromwell and others that by the special Travayll of the seid Examinants Master one John Symons (by great labor of Sir John Arundell of Lanheron, Knight, and others beinge placed Prior of Bodmyn aforeseid) was removed, put oute, and displaced of his seid Office, and the seid Monday placed and stalled prior ther, w^{ch} this deponent knoweth to be trewe for that he, onlye, wayted on the seid Nicholas Prydeaux, and rode to and from London and Martyn Abbey and Bodmyn priorye, and so knew the deviseing of his seid master in this aforeseid cause, and doth thinke that the seid Thomas Monday was made prior of the aforeseid priorye abowte the 25th yere of Kinge Henry the viijth."

The deposition of Robert Hill, Esquire, aged 72 years, taken at Helligan, in the parish of St. Mabyn, 16 June, 1576.

"This deponent sayeth : that he doth well knowe that by the Especial Labor, Sute, and travayll of the seid Nicholas Prydeaux, the same Thomas Monday, alias Wansworth, was made prior of the late priorye of Bodmyn in Cornwayll, abowte the 25th yere of King Henrye theight, w^{ch} he, this deponent, the better vnderstood for that he dyd then dwell wth in three miles of Bodmyn and muche ffrequented the said priorye, and was uery familiar wth the seid Nicholas Prydeaux, and when the seid Thomas Mondaye was orderlye Elected prior of the seid late priorye of Bodmyn by the Chanons of the said priorye, by the great sute of the seid Nicholas, he, this deponent, rode from Bodmyn, in companie with the said Nicholas Prydeaux, with the instrument of the same Election to Martyn Abbey, in

“Surrey, of whiche late Monasterye, the seid Thomas Mondaye
“was Chanon, and he saw the seid Nicholas Prydeaux delyver
“vnto the said Thomas Mondaye the same wryting of Election,
“wherebye he was made prior Elect.”

(Depositions taken under Special Commissions, Cornwall, 18 Elizabeth, Trinity, No. 1).

We may add that John Symons was one of the canons of the priory of Bodmin, and having, upon the death of Prior Vivian, been elected prior by his brethren, was instituted and confirmed in that office by the Bishop of Exeter, on 6 July, 1533 (Hist. Trigg Minor, Vol. I, pp. 134, 135). According to Dr. Oliver he resigned in the spring of the following year, upon a pension of £40 a year (Mon. Exon., p. 17). He died before the surrender of the priory in 1538, for his pension is not shewn to be a charge upon the revenues of the house.

III.—*Cardinham*:—*Its Inscribed Stones and other Antiquities*.—
By REV. W. IAGO, B.A., *Westheath, Bodmin*; *Hon. Sec.*
for Cornwall of the Society of Antiquaries, London.

WITHIN the picturesque region of rocky tors, steep hills, thickly wooded valleys, and rushing streams of the parish of Cardinham in central East Cornwall, are many interesting objects of antiquity.

Ancient entrenchments within sight of each other, and numerous tumuli, crown the hill summits; many stone crosses of early date are found, and a Romano-British inscribed stone; there are ruins of old buildings; a venerable church, with inscriptions within its precincts of Anglo-Saxon and Anglo-Norman times; antique holy-wells and chapelries.

Points of modern interest, too, are not lacking:—Glyn,* now the mansion of the Lord Lieutenant of Cornwall (Lord Vivian), and other residences worthy of notice are within it. The old Deer Park of Pinchla, formerly belonging to the Earls of Radnor, and the site of the Race Course† patronized by many county gentlemen of the past generation.

CARDINHAM.

The first part of the name Car-din-ham is held to be derived from *Caer* or *Gaer*—the Camp, Castle, or War-place; (compare “*Tre-geare*” and the Gaulish “*guerre*”) and it seems likely that the remainder of the name may in like manner be descriptive of the nature of the position. There are other places to which the name *Dinham* or *Denham* is applied. Whether all

* Glyn is mentioned in Domesday.

† The “*Taunton Courier*” of July 27, 1809 (Price 6d. to the inhabitants of Somerset and Devon except those of Plymouth, Stonehouse, and Dock, who with those in Hants, Dorset, and Cornwall were to pay but 5d. (!) published a long advertisement announcing the Bodmin Races to be held on this ground, on August 22nd and 23rd, postponed from 15th and 16th, on account of the Assizes, Lords Mount Edgecumbe, Falmonth, Eliot, and De Dunstanville, with many other gentlemen, were the promoters. A plate of £50 and a Ladies’ Plate also of £50 besides many other prizes were offered. The notice was signed by the Earl of Mount Edgecumbe and Charles Lenion, Esq., as stewards, and by Mr. John Wallis as clerk of the course.

these were originally so denominated from local considerations, or derived their title (as some have concluded) from a settler arriving from Dinan on the continent, is doubtful. It is more likely that those settling here took the name Dinham, Dinan, or De Cardinan, from the spot, than that they (whether Britons or Bretons) gave the name of some other place to this locality; and it must not be forgotten that identically significant names of similar sound were, in many instances, independently acquired by places in northern Gaul, Corn-Wall, and Wales, though their being occupied by kindred races carrying on frequent intercourse and using similar terms of description in language. Thus we find many places called by like names on both sides of the channel, and we have a name formed of Gaer and Din, viz., that of Din-gerrein Castle in a western part of Cornwall which no writer has ever suggested had any reference to Dinan in Normandy. Din being a form of Dinas. However, this may be, soon after the Conquest a family of note, whose ancestor is supposed to have come over with the Conqueror, was residing at Old Cardinham Castle, which stronghold we shall presently describe; but first we must observe that further to the north in this parish is the great entrenchment called

CARDINHAM BURY.

This structure is even older, to all appearance, than Old Cardinham Castle. This extensive camp of Cardinham Bury is nearly round, and consists of several circumvallations or ramparts, some of them concentric. It appears to be one of a strong chain of British circular earthworks, fortifying the hills across this part of Cornwall, and is 840 feet above the level of the sea.

To return to the before-mentioned

OLD CARDINHAM CASTLE.

This stands on a hill of less elevation, and is about a mile south by west of the Bury. Whatever may have been its early character, it is found to afford evidence of comparatively late occupation. Many writers have noticed it.

C. S. Gilbert stated—"With respect to Cardinham Castle, "anciently the seat of the Lords Dinham, *not a single vestige now remains*—it stood near the utmost point of a singular ridge of "land which shot out into the midst of a deep valley, and commanded a winding perspective view of flourishing wood scenery.

“The site of the castle has been converted into tillage ground, and the sides of the mount are covered with furze and ancient trees.”

Mac Lauchlan wrote—“The Castle of Old Cardinham resembles neither in position nor construction the ancient Camps of the country, and seems of a late period. It was probably formed by one of the Dinham family, and may have been a Norman Castle, though *no marks of mortar remain* to support the supposition. The form of the foundations, which have been much disturbed, is rather quadrangular than circular, the sides being about 150 by 100 feet. This part is raised above the outer Court, which is on the south, and measures about 330 by 260 feet. The outer court had a rampart and ditch.”

The Rev. J. Wallis observed—“Cardinan Castle was built probably after the Conquest by one of the family of Dinan.” He also tells us that Robert de Cardinan’s charter to Lostwithiel is still preserved, which was made about 1196, according to privileges which his ancestors granted to that town “when they founded” it.

Mr. J. Polsue has noted—“Cardinham Castle the seat of the Dinhams was situated on a considerable eminence—the site is still called the Castle, and *traces of the foundations are yet to be seen.*”

The truth of this last remark has just been proved.

Any recognizable masonry was hidden beneath the turf until quite recently, but Mr. S. Jenkin, acting for Lord Robartes, in causing some farm buildings to be erected near, on proceeding to use the abundant supply of stones fit for walling, which were procurable from the Castle Mounds, unexpectedly discovered that the ramparts were formed not only of loose earth and stony rubbish, but that the foundation of a large thick wall was brought to light. This mass of masonry within the mound contained distinct proof that a stone building had once been reared upon the spot—verifying what had hitherto been but vague tradition. *Lime mortar was found to have been used* in some parts of this wall. The stones were generally rough, irregularly built together, and much debris was mixed with them; but *some finely dressed and chamfered pieces of freestone*, such as might have been brought from St. Neot, were also discovered. These had been cast in with the rest, but had previously been so cut as to form, if built together, part

of a door-jamb and quoin. The stones measure about a foot each way. The bevel on them is $3\frac{1}{2}$ inches in width. They seem to indicate an Early English style of structure. Mixed with the earth between the stones—not thrown into a pit, but filling the interstices of much of the wall,—were broken bones, &c. of fish, flesh, and fowl. Oyster shells and boars' teeth being numerous.

On visiting the excavations (by Mr Jenkin's invitation) in April, I dug out several scattered pieces of a vessel composed of plain, rough, unglazed reddish-brown pottery; perhaps a water pitcher, but in texture more resembling a cinerary urn. It appears too coarse and rough on the inside to have been fit for culinary purposes. Externally it is smoother and blacker. The nature of the fragments does not admit of the shape of the vessel being determined. In curve and thinness they resemble coker-nut shell. It has yet to be ascertained whether any of the bones found near it are human remains. The presence of the bones, shells, and pottery* in the wall may be accounted for on the supposition that the stones were built together with earth already containing them. Human remains laid in graves, and now decayed, were disclosed when the workmen dug for stone at another part of the castle. The excavations yielding the dressed stone have been conducted in that rampart or mound which abuts upon and separates it from "White Hill," the adjoining great lower enclosure, which seems to have been the Castle yard or Base Court, and which (now a cultivated field) would have made a good parade ground. It is related that opulent members of the Dinham family lived at the Castle in the 12th and 13th centuries, and later. The stones now discovered confirm the probability of this.

At a distance of about half a mile is

CARDINHAM CHURCH.

This, it is alleged, was founded by one of the same Dinhams at some time subsequent to the conquest. In illustration of the early history of this edifice, I have been able to decipher some curious Latin inscriptions, which the Rev. G. H. Smith, late rector, found hidden under the plastering of the chancel wall.

* Specimens of the various relics found by Mr. Jenkin and the members of his family, by Mr. J. R. Collins, and myself, are now deposited (properly labelled) in the Museum at Truro, and some in the Museum at Bodmin.

At the time of their discovery I briefly referred to them in this Journal*.

INSCRIBED TABLETS.

The three stones† upon which the inscriptions occur, are mutilated portions of two tablets of different lengths. One tablet contained an inscription in 4 lines: the ends of these remain. The other contained a longer inscription, 4 entire lines of which are preserved; two of them being the concluding lines. The original position of the tablets is not known, as they have been utilized by Early English builders in constructing the triple sedilia, and have been cut up for that purpose.

One is placed aslant to form part of the arch of the easternmost recess; the other two are set on end as mullions between the recesses of the sedilia. Most of the letters have been destroyed without compunction in making the chamfer required upon them as building stones in their altered position. The consequence is, that few of the words remain, and these are so placed that it is difficult to obtain a reading of them.

All that have been found, however, I have succeeded in copying accurately, and they are the following:—

.....V	:	VESTIARI	|	.....	.....	.....	.....				
.....	SCI	:	IOR	ITVTVS	:	IN	:	ECCA	:	DE	:	CARDINA	:		
.....	ET	:		DIE	:	SCE	:	FIDIS	:	AN	:	DNI	:	MCC	:
.....	S	:		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
				TAM	:	SCI	:	MEVBREDI	:	MART	:				
				PATRONI	:	PRELIBATE	:	ECCE	:		:				

Extended, these words would be

“ . . . †v vestiari § . . . sancti Jor || . . . et . . . s.”

and these

{ “ . . [? ins] titutus in ecclesia de Cardina [n ?] die Sanctæ Fidis, ¶
 Anno Domini MCC.
 “
 “ tam Sancti Meubredi Martyris Patroni prælibatæ Ecclesiæ.”

* Vol IV, p. 58.

† Illustrations of these stones, which I drew on the wood, were published by the Society of Antiquaries, London, in their Volume of “ Proceedings ” for 1872-3.

‡ Perhaps u ; or : IV :

§ “ Vestiarium ” would be wardrobe, or “ Vestry.”

|| Perhaps “ Jordani : ” (See Sanctus Jordanus, Feb. 13, Germ. Cal. Husenbeth, p. 251) but as the latter part of the name has been destroyed, identification is uncertain.

¶ St. Faith or Fides, Virgin, and her companions : Martyrs, 4th century, Oct. 6 (Chamb. Bk. of Days).

All the letters are Lombardic capitals, beautifully cut. Several of them are conjoined. Incised lines separate the lines of letters. The words are divided by vertical triplets of dots.

The first tablet relates to some vestiarian arrangement, and mentions a holy man's name not easily recognized.

The longer tablet refers apparently to some foundation, gift, right, or endowment, established in the Church of Cardinham on St. Faith's Day, A.D. 1200 [in honor of God] as well as of the Church's patron Saint, Mewbred the martyr.

A figure of St. Mewbred appears in the stained glass of St. Neot's Church. He is there shewn wearing a brass skull-cap, and carrying in his hands a head to signify that he was martyred by decapitation.

William of Worcester about 1478, wrote* :—

“The body of St. Mybbard the hermit,
(son of a King of Ireland) otherwise called Colrog,
lies in a shrine in the Church of Kardynan,
2 miles from Bodmin. His day is kept on the
Thursday next before Pentecost.”

Inscriptions more ancient than those just described have yet to be considered, but it is noteworthy that so early a date as A.D. 1200, should here be found cut upon stone. Probably there is not another† such instance in the county, although older dates written upon parchment, at the times they specify, are not unfrequently met with.

In the churchyard are evidences which seem to confirm the statement that Christianity was established at this spot before the Conquest, and consequently long before any Anglo-Norman Dinham founded the present Church fabric.

Most worthy of notice is

AN INSCRIBED CROSS.

This is a handsome cross of the Anglo-Saxon type, and was found in two portions imbedded in the chancel wall. Head and shaft are now re-united, and the cross stands opposite to the south porch.

* “Sanctus Mybbard heremita, filius regis Hiberniæ, aliter dictus Colrogus, ejus corpus jacet in Scrinio ecclesiæ de Kardynan, distat per duo miliaria de Bodman.....secundum relationum uxoris.....ecclesiæ qui fuit natus in parochia, et ejus dies agitur die jovis proxima ante festum Pentecostes” (Itin :). Concerning St. Mewbred see also Bothes Reg., fo. 22.

† On the Hayle stone, “D^o” has been read by some for A.D. 500, but the letters can be taken in quite a different sense, not in any way referring to a date.

It is a fine specimen of a four-holed cross, that is, one which combines the emblems of redemption (cross) and eternity (circle). It is adorned with interlaced ornaments and scroll work.

Upon one face is a panel, near the upper part of the shaft, containing incised crosses and letters, apparently $\tau^+ h^+$ perhaps in commemoration of a person whose name is represented by the initial T. The second letter, H, may stand for HIC, and the whole may be equivalent to

“ + T. Hic [jacet] + ”

or we may suppose that another common formula is most briefly signified thus

“ + T. [fecit] Hanc [crucem] + ”
[pro anima sua].

The form of the letters and the braid-work ornamentation upon the stone, agree in style, as both belonging to the Anglo-Saxon period.

Two other ancient sculptured stones were found during the rebuilding of part of the Church, and are now placed outside. One was made apparently for standing erect at the head of a grave. It is very massive, cut to shoulders, its upper part is formed as a disc on which is a cross, and there are also cross-limbs projecting beyond the disc. The other stone is a horizontal granite slab somewhat rudely incised with a long-stemmed cross and other devices. Outside the churchyard leans against the hedge or wall a huge granite monolith, smoothed on its four sides like a gigantic cross shaft. It is very ponderous.

Much older than any of the lettered memorials so far described, is the

WELL-TOWN INSCRIBED STONE.

This was partially deciphered and figured by Mr. Blight* some years ago, and Mr. T. Q. Couch prevailed upon the owner of the property to have the stone protected by iron bars: consequently it is now so guarded. It stands against the wall of a farm-building. Two holes made for the fixing of hinges in the inscribed face shew that it has been used as a gate-post. The words run lengthways down the face of the stone, in 2 lines. They are in Latin, and are prefaced by a curved line, brace or bracket.†

* Crosses of East Cornwall, p. 126.

† There is a very similar curve used in the same manner upon the Lanivet and Doidon (Endellion) inscribed stones.

Some of the letters are similar in form to those which the Saxons derived from the Romans, but the names are Romano-British.

The inscription is

(VAILATHI
FILIUROCHANI

“Vailathi fili Urochani” would signify the grave stone of Vailathus son of Urochanus; but if we disregard case, and consider that instead of R we should read a “hook S” accidentally conjoined to a following horizontal stroke, we have “Vailathi filius Ochari,” the grave-stone of Vailathus son of Ochanus. The former reading is better. It has not been suggested before, but it agrees exactly with the marks upon the stone.

KENKETH AND PINCHLA.

This paper should not be concluded without noticing that Mr. Jenkin has made some other excavations in this parish, amongst some grass grown heaps of old walls at Kenketh or Kenkeese, and has discovered a fine granite newel staircase in the ruins. Its circular winding is broken away at several feet from the ground. Just by the foot of the stairs is a doorway, and there is also a very small chamber, cellar, or store. The building is close to the beautiful vale Pinchla Deer Park,* now owned by Lord Robartes, and must have been a house of some consequence. Possibly the owner of the Park may have stayed in it occasionally, or “the Pinchley Parker” may have been here lodged. Mr. Jenkin points out that the Ordnance Map is in error concerning this place, the names of the Pinchla Park buildings and Kenkeese being interchanged.

* Disparked not so very long ago, as shewn by Sir J. Maclean from the following entries in the Bodmin Mayors’ accounts,—

1699—1700. Gave Pensley Parker when he brot a venison—.10s.—

Gave Lanhydrock Parker for the same—.10s.—

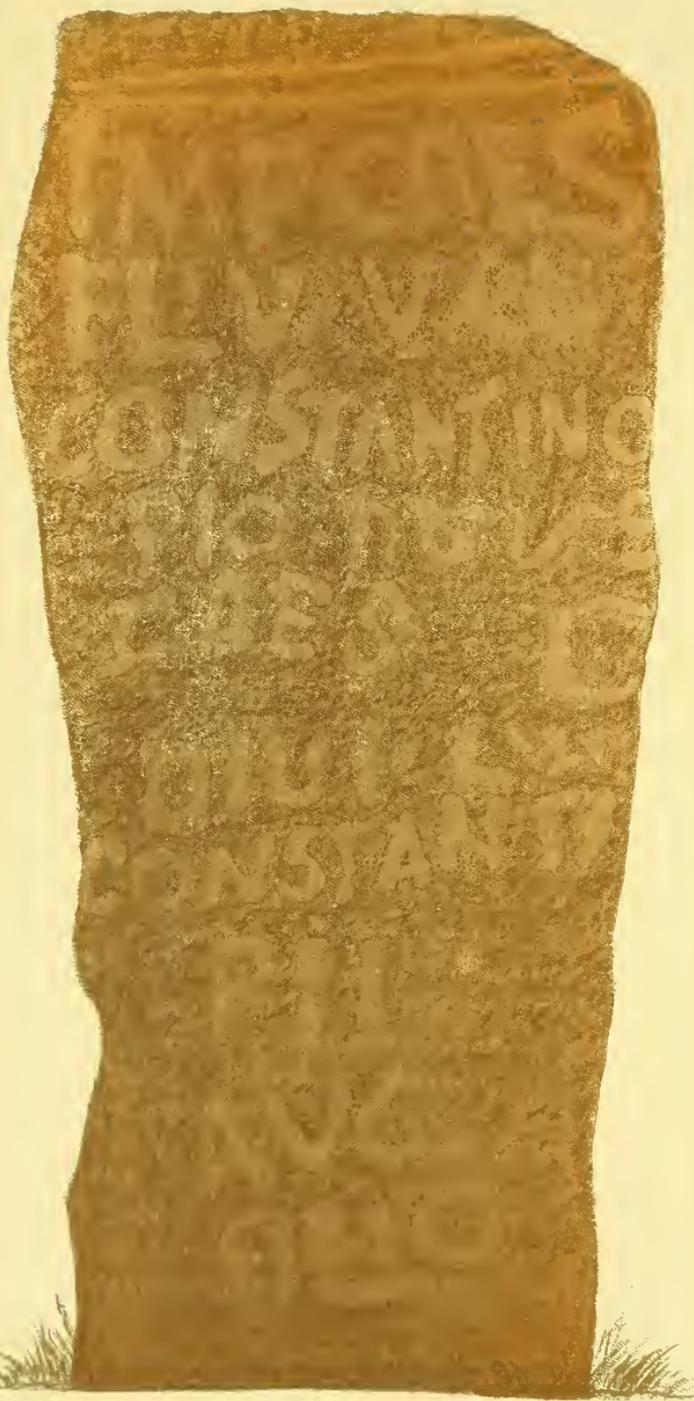
1702-3. Given Pincheley Parker for a venison—.10s.—

Mr. Jenkin mentions that the name “Deaths Corner” which is given to a place here, just by a trying ascent, conveys a tradition of the hunting held in former days—evidently referring to the deaths of many deer, the victims of the chase.

IV.—*The Inscribed Roman Stone at St. Hilary.*—BY C. BARHAM,
M.D., *Cantab.*, *Vice-President Royal Institution of Cornwall.*

THIS inscribed stone may be justly considered the most important monument of the sort hitherto found in this county. It is valuable as one of only four or five such monuments of the same Emperor found in Great Britain ;* especially interesting as being the only record yet discovered in Cornwall, and that a dated one, of settled occupation of our western district by Imperial Rome ; and, perhaps, still more interesting from its character as a milestone, and the inferences to be drawn from it, of which I shall say something presently. These circumstances may excuse my occupying your attention in its consideration at rather greater length than would be usually warranted. “On the 25th March (Lady-day, 1853, which was also Good Friday), the church of St. Hilary was burnt down, the fire having been occasioned by the corroded state of the pipes near the stove. In the course of the following year, on digging up the foundation, a slab of granite, about seven feet long and two feet broad, was found, with an inscription on the under side. It had been used as a foundation stone in the north wall of the chancel. The letters have been obliterated in many places by weathering : it is, therefore, difficult, if not impossible, to restore the inscription with certainty.” Such is the account communicated by the late Canon Rogers to the Archæological Institute on the 1st June, 1855 ; and it is followed by the reading of the inscription agreed upon by him in conjunction with two excellent antiquaries, Dr. Collingwood Bruce and the late Mr. Albert Way. This reading is here shewn,

* Prof. Hübner enumerates forty of these military stones found in Britain, distributed among eighteen Emperors, from Hadrian to Constantine the younger.



52 inches

23 inches

LANE & LANE TRUST.

THE INSCRIBED ROMAN STONE AT ST. HILARY.

together with those subsequently arrived at by Mr. Blight and Mr. Edmonds :—

<i>Canon Rogers.</i>	<i>Blight.</i>	<i>Edmonds.</i>
N.....P.....LS	P	|||||
FLAV.....VS.....	FL - IV	FL IV |||||
CONSTANTINO	CONSTA |||||	CONSTANTINO
PIO AVGVS	PIOA	PIO I
5 CAES.....	CAES	CAES
DVCI	DICCI	D/ACI
CONSTANTI . .	ONSTANTI	ONSTANTI
PII	PII	PII
AVG	AVG	AVG
10 FILIO	FILIO	FILIO

The latter enters on a somewhat elaborate argument in a paper in *Archæologia Cambrensis* (vol. iv, 3rd series, p. 176), in favour of the opinion that the Constantine referred to was Constantine the younger, the son of Constantine the Great. It does not appear that either of these gentlemen had rubbings of the stone such as those before you, of which one was taken by Mr. Alexander Paull and myself in 1862; the other by me, last summer, with the aid of Mr. Whitley and of the present vicar, Mr. Kingsford. This method appears to me to furnish most satisfactory results in the case of obscure and weatherworn inscriptions; besides that it has the great advantage of presenting—as photography does when it can be favourably used—an authentic copy of the lines instead of an interpretation of them—a fac-simile, as far as it goes, which can be submitted to any number of experts, at whatever distance. In this instance, with Mr. Paull's permission to make free use of his rubbing, it was submitted to Prebendary Scarth, a very competent authority. He has satisfied himself that the inscription should be read as follows :—

	IMP. CAES
	FLAVI [O VAL]
	CONSTANTINO
	PIO[F.]INVIC[TO]
5	CAES . . . G
	DIVI
	CONSTANTI
	PII
	AVG
10	FILIO.

He gives the following extended reading as what he believes to be indicated :—“ Imperatore Cæsare Flavio Valerio Constantino Pio Felice Invicto Cæsare Filio Augustorum Divi Constantii Pii Augusti Filio.” The date is probably A.D. 306 or 307.

This reading may be quite correct ; but it seems to me in part conjectural. In the second line I only see clearly FL and V, and I incline to the opinion that the V stands alone, as an initial. There is a short vertical stroke falling within the margin of the L, considered by Mr. Edmonds to indicate I, and associated with the V to be first letter of Julius, one of the names of the younger Constantine. But this reduced form of I, often found in the middle of words, as it is in FIL'IO at the end of this inscription, is not, as far as I am aware, found as an initial of a name. I rather suspect that the mark is of accidental origin and of no significance. The space between L and V is hardly sufficient for an A, the letters being here on a rather large scale. What follows the V seems to me quite conjectural, except perhaps another V ; and I must say the same with regard to all but the word PIO in the fourth line, where Canon Rogers's original reading AVGVVS may be as plausible as any other proposed. It seems questionable whether the fifth line has any lettering beyond CAES, the stone presenting no decided marks between this and the indentation close to its margin, which has been guessed to be G, but may be independent of a tool. The reading of this line, CAESARE FILIO AVGVSTORVM, adopted by Prebendary Scarth, was suggested to him by Dr. McCaul, President of University College, Toronto, who thinks “ it may have been cut in 306 or 307 A.D., before “ Constantine was acknowledged as Augustus, *i.e.* while he was “ yet Cæsar ;” but Mr. Scarth is rather inclined to attribute the repetition of that title to a mistake of the stone-cutter, a view to which Prof. Hübner also inclines.

The word CONSTANTII, in the seventh line, will probably be accepted as conclusive evidence that Constantine the Great, the son of Constantius, is commemorated above, as that word is perfectly distinct and occupies the whole width of the stone to its margin.

The publication of the great work of Professor Hübner, *Inscriptiones Britannicæ Latine*, exhibiting all similar inscriptions hitherto discovered, has, no doubt, made it easier to arrive at a

true interpretation, by showing what is to be looked for; the official style of reciting the names and dignities of each Emperor being pretty closely uniform. Thus the following inscription on a similar stone found at Ancaster, in Leicestershire, is almost identical with ours :—

IMP. C
FL. V.
CONSTANTINO
P. F. INV
AUG
DIVI
CONSTANTI
PII AVG
FILIO.

Date A.D. 308—337.

This may have suggested the heading of the legend, which was not conjectured by the previous enquirers, although really quite the clear. It is not of great moment to which of the Constantines stone belongs, as far as its more important bearing is concerned, but the father is the great figure in our minds in his association with Christianity and the Eastern Empire. It is something too that the date is thrown back some 25 years.

Some portions of the lettering must be admitted to be very obscure, but all that is of much importance seems to me quite clear; the accompanying print represents the rubbing very faithfully; and there can be no longer any hesitation in assigning the inscription to the reign of Constantine the Great, early in the fourth century. The stone is considered by Professor Hübner to be, without question, a Roman milestone; and, while expressing his wonder that in a district certainly much frequented by the Romans so few traces of their occupation should have been found, he adds that this miliary stone clearly proves the existence of roads. This brings me to the consideration of this evidence.

It would appear strange that so very few of these milestones, which are believed to have been fixed under the Empire, after Hadrian, along the whole line of principal roads, should have been discovered; and, if they were indeed so numerous, their present rarity must be attributed, in great part, to the convenience of their form for building and farming purposes—the introduction of a new scale of measurement having made them useless for their original intention. The inscription would also be generally all but effaced by weathering; as it has been entirely in

some few found standing where they were originally placed. It is indeed only owing to the protection of the letters, in this instance, by the stone having been placed with its face downwards in the foundation of the wall of the church, that they have not been obliterated long since.* There is no evidence as to whence the stone was taken; but there can be little doubt that it stood originally by a Roman road close at hand; and it was not treated with the respect shown elsewhere, as at Tregoney and Cubert, to the sepulchral stones of the Romanised Britons, which have been securely built into the walls of the sacred edifice, so as to exhibit their inscribed faces, as mural monuments, to be read of all. It has been conjectured, with some probability, that there was at St. Hilary a church or chapel of very early date, possibly of the fifth century, and if this stone had formed part of that structure the letters would be still in good preservation; but the church, in whose walls this stone was found, was built in the fourteenth century; and the wear and tear of a thousand years had already brought the inscription nearly to its present state, when it would attract no notice from the unlettered builder of the day, or would not certainly be regarded with an archæologist's reverence. If other such miliary stones are discovered, it is probable enough that they will have received like protection with this one, through being turned to account as handy and ready-worked material for the foundation of some early structure, ecclesiastical or secular.

At Bosence, on the east of St. Hilary, are the remains, in process of gradual obliteration, of a camp of generally rectangular form, about 50 yards long and 45 broad, more distinctly Roman in its character than any other in the west. Within its enclosure a well was discovered, about a century since, 36 feet deep, in which were found two Roman vases—one inscribed by the maker to the god Mars—a large jug (both the latter deposited in the Ashmolean Museum), a millstone, and two stone weights. This camp was, no doubt, regularly occupied, especially in summer, and, with numerous finds of Roman coins in the same neighbourhood, serves to corroborate the conclusion that the miliary stone was placed on a great western road, and that the

* The interval of fourteen years between the first and second of our rubbings had, I think, distinctly, if slightly, lessened the clearness of the letters.

country was under the settled government of the Empire.* This stone was, of course, unknown to Dr. Borlase; but even without its decisive evidence, he favours the same inference, and says that the fort is situated in a direct line from Truro to Mount's Bay and the Land's End. In fact, this one Roman road, as it will be described, presently in its course through the county, may be said to be fully established, and it is laid down as the only one into the far west by Professor Hübner. Mr. Whitley has lately marked its course, as an engineer, from point to point.

In a recent letter, it is remarked by Preb. Scarth, now fully occupied on the Roman roads of Somerset, that "the Roman roads in Cornwall need special examination, as in some of the old maps no Roman roads are marked there at all!" It must, I think, be admitted that, notwithstanding the large amount of curious investigation and sound inference bearing in the opposite direction, for which Cornish archæology is indebted to Dr. Borlase, Polwhele, and others, belief in the existence of Roman roads in our midst has little hold on the educated public; and yet it may be at least plausibly maintained that all our old and principal roads are essentially Roman roads. As the strongest reason for believing that the Phœnicians got their tin from Cornwall is the fact that very little of that commodity could be got elsewhere, so the fact that at no period of Cornish history, since the Roman empire, until modern times has their been in active operation any power adequate to the work of covering the county with a network of roads, makes it at least probable that we must go back to that great road-making people for their original construction. A glance at the early history of the Cornish shews them, long before the coming of the Romans, as a people civilised by trading intercourse with foreigners, and there is neither evidence nor probability that they made any serious opposition to the Latin forces. On the withdrawal of that firm, but well ordered, government, three or four centuries were passed rather prosperously under their own chiefs, followed

* It is not meant to assert that Roman civic life was established in Cornwall in the fulness and luxury customary in the Colony; but the all but universal use of Latin words and forms in our monumental inscriptions of præ-Saxon date, an use much more general than in other parts of England, and the extensive incorporation of Latin into the old Cornish language, may serve to shew how largely the native mind had been moulded by the rule of Rome.

by a rather shorter term of frequent conflict with the Saxon till their final conquest by Athelstan. Assuredly this was no period for the construction of great roads had there been any motive for it; and I am not aware that at any subsequent period any large scheme for the laying down of such lines was adopted or any great expenditure incurred. In fact there was little occasion for it. The general use of carriages, or even of carts, is comparatively recent in Cornwall. I myself rode in the first public conveyance from Penzance to Truro, and I well remember the arrival at church of the dame seated on the pillion, behind her man-servant, and alighting and mounting by the aid of the hepping-stock everywhere provided, without needing to support her dignity the example of good Queen Bess, going in like fashion to Westminster. Strings of mules were also then in general use for the carriage of ores, as indeed in some districts they have continued to be more or less.

But we must revert for a moment to the condition of the county in the first centuries of the Christian era. There is sufficient evidence that many ages earlier St. Michael's Mount the *Ictis* of *Diodorus Siculus*, was preeminent as a mart for tin; but there is little doubt that, almost concomitantly, trading communities were established about the heads of our chief tidal estuaries along the whole line of our coast, being for the most part in connexion with tin producing districts. These villages were hardly of such importance as to be noticed by the ancient geographers; but the Voluba, and Uxela of Ptolemy, probably Gram-pound and Lostwithiel, may serve as examples. It may be remarked, by the way, that the extension of the villages naturally followed the line of road, so that they crept up the hills from the water side.

The question arises, of course, whether many of these roads were not used as lines of communication and traffic by the Britons before the Roman invasion, and it must, I think, be admitted that this was the case in a good many instances. The tumuli found at intervals in close juxta-position to some of the main lines of ways, and even, as in the case of the great ridge-way called the Four Burrows road, giving name to them, belong almost certainly, as well as stone monuments similarly placed, to an earlier age; but it will hardly be contended that these tracks

formed parts of any great system of intercommunication at that time, although they might be conveniently incorporated in such a system by a power making provision for holding the country at large in subjection.

Looking, then, at the Romans as the makers of our roads, as they were the great roadmakers through all their wide dominion, we have to consider how far the lines of construction tally with their established systems. Two great classes of roads were made, on a principal akin to that of through and traffic lines of railway; one class, which may be called strategic, having reference to the great divisions of the country at large, and the movement and concentration of troops; the other class formed for communication between station and station, with an eye to efficient military action primarily, but also to the requirements of civil life, and of agriculture and commerce. The former were mostly carried along the backbone of the country, where there was one, and well deserve the name of *ridgeway*, where, as in hostile borders like Cumberland and Westmoreland, they follow the almost inaccessible crests of the mountain chain; the latter styled *viæ diverticalæ* or branch ways, with their subdivisions of *vicinales*, *agrariæ*, *deviæ*, &c., although laid down on the same principle, were not so rigidly bound by it, deviations being often rendered necessary for the sake of convenient access to particular places; rough and ready modes of construction were also allowed here. One characteristic belongs to all these classes of roads as compared with our modern ones—they are carried straightforward, uphill and down dale, to the point aimed at.

Let us now take a brief survey of some of the chief roads of old Cornwall, and see how far their direction squares with these rules. We may begin doubtfully with the road from the Land's End district, as it comes straight through Penzance, there meeting the way from Newlyn and the steep hill west of it to join the littoral road to Marazion, thence proceeding by St. Hilary, Bosence, Townsend, Bluestone, and Blackwater to the Four Burrows, and thence to Mitchell; over the bleak Goss Moors to Bodmin, and onward through a still higher and rougher tract to Launceston. This may be called the main *ridgeway* of the county, from which other great roads diverge, having again their own *bye-ways*. Thus, not far from Marazion, is given off

a road leading straight to Helston and right up its long and steep street, and thence over high ground, down a like hill at Penryn, an important seaport in very early times—ages before Falmouth existed. Another secondary road passes from Hayle, north of Camborne, right down hill and up again through the old town of Redruth, to fall in with the trunk line not far from Scorrier, where it gives off the road which went down into Truro by Chapel-hill, and sent branches to the Four Burrows road up Kenwyn-hill to Zelah, up Mitchell-hill to the old town so-called, and possibly in the opposite direction by Carnon to Penryn—the southern line proceeding up St. Clement's hill to Gram-pound, probably Voluba, which the tide once approached, where the breasting of the long hill is equally marked; straight to St. Austell, and again up hill out of it; thence over high ground to the head of the Fowey estuary at Lostwithiel, the Uxela of Ptolemy, and right up the eastern hill to the elevated station at Liskeard, to terminate, as far as Cornwall is concerned, in a roof-like descent at Saltash, and by the branch through Callington, at the head of the tidal water of the Tamer on the road to Tavistock. It would be tedious to enter into detailed illustration of the same go-ahead plan of road-making from the branch lines, as in the instances of Tregony, Fowey, and Looe, or from the main north line given off near the Blue Anchor to St. Columb, Wadebridge, Camelford, and Stratton, which place was in direct communication with the Roman roads through Devon, and the large camp at Clovelly Dykes.

Enough has been said, I think, to show that the opinion is at least tenable that the old roads of Cornwall were essentially Roman works. The deviations, which make their original straightness and steepness less obvious now, have, with scarce an exception, been effected within my own recollection; but a wholesome expansion of lung, *super antiquas vias*, may serve pleasantly to impress my argument.* It seems to me, indeed, although it may sound paradoxical, that the Roman roads in Cornwall have been overlooked by over looking for them.

* These old roads are often, and oftener were, agreeably marked by a large space of uninclosed ground on each side of the roadway, allowing a gallop on the turf.

Hunting about for bits of dykes and stonework, which the Roman engineer would no more than one of to-day dream of making on firm, well-drained ground, the antiquary failed to notice the plain fact that the common highway bore the impress of the Roman system. A good many scraps of the peculiar work referred to have, however, been found, and others may yet be discovered;* but they must always be insignificant by the side of the great system of internal communication which, if my reasoning is sound, marked the complete, and, in many respects, beneficent occupation of Cornwall by the Romans, the greatest of administrative powers.

* Dr. Borlase satisfied himself that he found various portions of Roman road between Lostwithiel and Liskeard, and between the former town and Fowey, by Castle Dour, a fort most judiciously placed, and occupied as lately as the Great Rebellion; and I doubt not that he is generally correct, as to the lines of way at any rate. Whether his opinion is equally well founded in assigning to the Romans the great work, half road, half fortification, which extends from Looe to Lerrin, a distance of seven miles, called the Giant's Hedge, may be open to question. The minute examination and discriminating criticism of Mr. McLauchlan (Report R. I. C., 1846) incline him to believe that the ground was occupied, and the works chiefly constructed by some powerful Celtic tribe long before the Romans visited the island.

V.—*Observations on Zoophytes from the Cornish Coast.*—BY C. W. PEACH, A.L.S.

Read, May 11th, 1877.

Sertularia gracilis.—Hassall.—This delicate zoophyte I got first on the Norfolk coast in 1826, and again in Cornwall from deep water. Specimens from both localities I sent to Dr. Johnston, when he was publishing his 2nd edition of British Zoophytes, and at page 67 he mentions it as “a very pretty and delicate variety” . . . owing “its delicacy to the circumstance of growing in deep water.” Of its being a good species I never had a doubt, but quietly bowed to authority. When, in 1868, Hincks’s “History of British Zoophytes” came out, I was pleased to find at page 262, on the authority of Hassall, that it was described as a new species, and figured at plate 53, fig. 2. He has also noticed it in his “Catalogue of the Zoophytes of South Devon and South Cornwall” at page 12, as “of much slenderer habit” than that of *Sertularia pumila*; his specimens were from Torbay, mine were got off the Deadman, and is now first added as a *species* to your list. Unfortunately I have not a Cornish specimen by me, but have much pleasure in sending for your Museum, a portion of the one I first got in Norfolk, half a century ago. It is very pretty, and if examined under the microscope, its delicacy and a peculiar twisting or fold, where the internodes taper off below, may be seen well marked in the specimen sent. I also send a small but characteristic specimen of *Sertularia pumila* to compare with *S. gracilis*.

Plumularia siliquosa—Hincks, see Magazine of Natural History, vol. XIX., No. 110 Hincks has figured and described this very delicate species. His came from Guernsey.

As may be seen by the specimen sent with this, I got it off Goran Haven, 8th December, 1843, and sent specimens to Dr. Johnston, these he has noticed in his 2nd edition of British

Zoophytes, p. 98, "stem simple, or rather where there is no stem but a developement of branches from a root-like fibre," and calls it a variety of *Plumularia Catharina*. It occurred to me, from deep water again, off Peterhead and Wick, N.B. I may mention that I got, in all the places above mentioned, *Plumularia Catharina* with single stems; I could, however, always see sufficient difference to make me feel that the now *P. siliquosa* was a good species. It agrees, in every respect, with Hincks's figure in having large pear-shaped ovarian vesicles (capsules); shoots clustered simple not plumose, resembling ordinary pinnæ, but rising directly from the creeping stolon, and not born on an erect stem regularly jointed, the joints oblique. The specimen sent for your acceptance unfortunately has no capsules, in every other respect it is pretty good. The one I have reserved for myself has capsules very fine, *two* such spring from under one of the *calyces*, the only instance of such I have ever seen.

This, then, is another addition to your list.

Scrupocellaria scruposa.—Although this is a common species and well known, I have been fortunate in adding a little more to its history, I think of sufficient interest to communicate to your Society. On the 10th of June, 1876, I obtained this species at Newhaven attached to a sponge. *Isodictyia (Halichondria) panicea* and as I felt anxious to know *how* it moored itself to this sponge, I carefully examined and dissected it, and soon found, as I then thought, curious *sponge spicula* differing from all I had before seen. On tearing the *Scrupocellaria* out from the sponge, I at once saw that what I took for sponge spicula, were actually the "tubulous root fibres" of the Polyzoa; here, then, was a *new fact to me*—hitherto I had always considered these "root fibres," *smooth*, but in this case they were furnished with stout hooked spines, buried in the sponge, the points bent towards the zoophyte like the flukes of an anchor pointing to the bow of a ship when it kept the cable tight. These hooks—or probably hooklets—are shaped like the thorn of a rose tree, and surround the "root fibres," and when dragged out, they hold in their grasp numbers of the sponge spicula; this at once explained why these "root fibres" were armed with hooks, and the points bent towards the zoophyte.

In March, of the present year, I got another specimen similarly attached and find that these hooked spines are constant under such circumstances.

Feeling great interest in this discovery, I resolved to follow it up, and fortunately turned up from my hoards a specimen of *Canda reptans*, collected in Cornwall before 1849 (the year I left); it is also attached to a sponge. On examination, it too shows similar hooked spines on the "tubular root fibres." In the hope of confirming this with a Scotch specimen, I got *Canda reptans* from Newhaven, unfortunately not on a sponge, but on *Flustra foliacea*, here the hooks are absent, however the tips of the "root fibres" are furnished with short radiating processes, spread out at right angles to the root fibres, and from these short disc like pieces are inserted into the opening and body of the cell of the Flustra, and thus they have a firm grip on this larger fan-shaped and firm Zoophyte, and ride safely in a storm. Here then we have curious instances of things low in the scale, so well accommodating themselves to changed circumstances for their safety and preservation.

This curious fact I find not mentioned in any work I have on *British Zoophytes*. Busk has figured in the British Museum Catalogue of Marine Polyzoa, part I., p. xxiv, a specimen of *Scrupocellaria Macandrei*, from the coast of Spain, and described at p. 24, as having "Radical tubes hooked." At page 25 of the same work he also describes *Scrupocellaria ferox*, from Bass's straits, "hooked" like *S. Macandrei*. These are the only instances I know of; however, they are not British*. I cannot let this go, without asking my Cornish friends to help me to work out this curious and interesting discovery, and when so working they will no doubt be rewarded with many more equally pleasing revelations in this still rich and beautiful field.

* I am ashamed to say, that since my paper was read, I find that I overlooked the figure of *Canda reptans*, p. xxiii, fig. 3, of Couche's Cornish Fauna, part 3, where he had figured "hooked spines," and mentioned at p. 127 "at the joints where they come into contact with the substance on which the polypidum grows, a few slender tendrils arise, with hooks, by which the animal is firmly rooted," and here he stops. The hooks are only useful when inserted in sponges, when on harder substances the hooks cease, and the "tendrils" are held by disks or short arms at the foot of them, as shown in fig. 4 of the plate, illustrating my paper. I hope by this confession to be forgiven this apparent slight to my late friend's accuracy of observation.

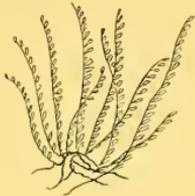


Fig. 1.

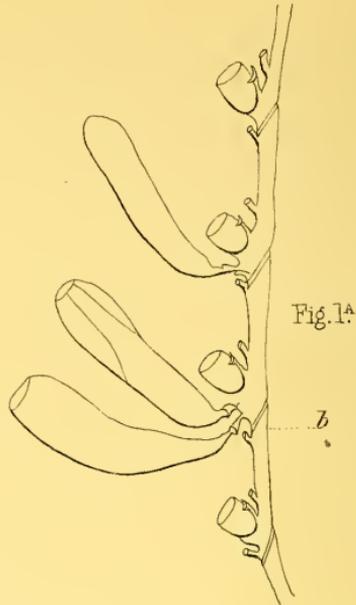


Fig. 1A

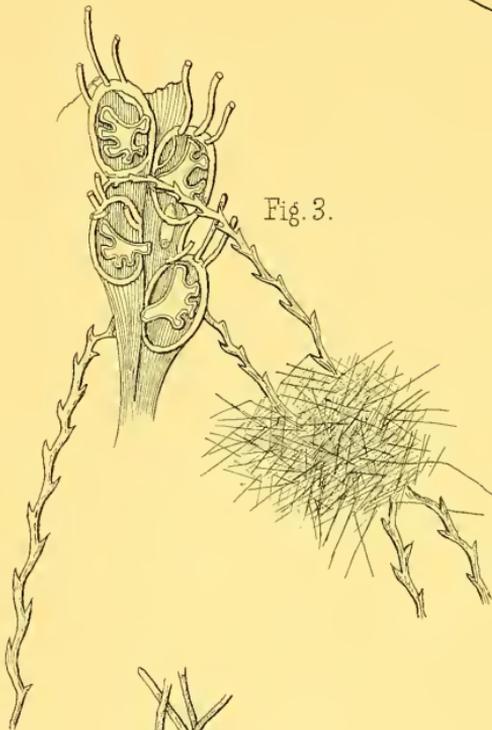


Fig. 3.

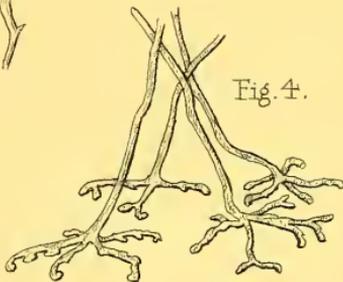


Fig. 4.

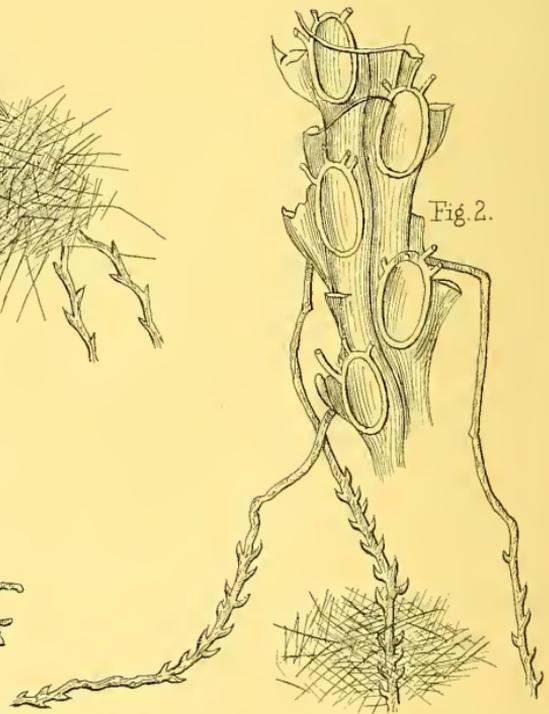


Fig. 2.

List of specimens and sketches forwarded with this paper.

Sertularia gracilis enclosed in glass from Norfolk.

Sertularia pumila to compare with the above.

Scrupocellaria scruposa in glass from Firth of Forth with a piece of the sponge.

Canda reptans, specimen of, attached to *Flustra foliacea*, from the Firth of Forth.

REFERENCE TO PLATE

- No. 1. *Plumularia siliquosa*, natural size.
- 1a. A portion of ditto to show, at *b*, two capsules on one calycle, magnified.
2. *Scrupocellaria scruposa* with "radical tubes curiously serrated," and with spicula of *Isodictya panicea* entangled in the hooks.
3. *Canda reptans* with ditto.
4. Radical tubes of both species, with root-like ends, for grasping *Flustras*, stones, or any other hard object they come in contact with. All of these latter ones much magnified.

VI.—*The Ancient Styles and Titles of the Cornish Boroughs.*—
 BY R. N. WORTH, F.G.S., COR. MEM.

A LITTLE while since an old law book treating of the laws and customs of English corporations, printed in 1702, and enriched by numerous M.S. notes, came into my hands. Among other things it contains a list of the official titles of the various municipal corporations; and from this, as a small but quaint contribution to our local history, I extract the passages which refer to Cornwall.

BODMIN.—Majori et Communi Clerico burgi nostri de *Bodmyn* in com. *Cornubiæ*.

BOSSINEY.—Ballivo et Burgensibus burgi sui de *Bossyn* in com. *Cornubiæ*; or

Majori et Burgensibus burgi *Trevena*, als *Bossiney*, in com. *Cornubiæ*.

CAMELFORD.—Majori et Burgensibus burgi sui de *Camelford* in com. *Cornubiæ*. Majori et Burgensibus burgi de *Tintagel*.

CALLINGTON.—Majori Aldermani et liberis hominibus burgi de *Callington* in com. *Cornubiæ*.

EAST LOOE.—Majori et Burgensibus burgi sui de *East Looe* in com. *Cornubiæ*.

FOWEY.—Præpositis et Burgensibus burgi sui de *Fowey* in com. *Cornubiæ* salutem.

GRAMPOUND.—Majori et Burgensibus burgi sui de *Grampond* in com. *Cornubiæ*.

HELSTON.—Majori et Burgensibus burgi nostri de *Helston* in com. *Cornubiæ*.

ST. GERMANS.—Preposito et Senes callo burgi de *St. Germans* in com. *Cornubiæ*.

ST. IVES.—Prepositis et Burgensibus burgi sui de *St. Ives* in com. *Cornubiæ*.

LAUNCESTON.—Majori et Communitatis burgi sui de *Launceston* als *Downheved*; or

Majori, Aldermani et knowdatori (?) burgi de *Downheved* als, *Launceston*.

LISKEARD.—Majori et Burgensibus burgi de Liskeard.

LOSTWITHIEL.—Majori et Burgensibus burgi sui de *Lostwithiel* in com. *Cornubiæ*.

MICHAEL.—Prepositis et Communitatis burgi sui *Michaelis* in com. *Cornubiæ*, salutem.

ST. MAWES.—Majori villæ nostræ de St. Mawes als St. Mary's.

NEWPORT.—Senescallo et Ballivo Cur feod Castri nostri *Launceston* parcel Ducat nostri *Cornubiæ*. [This, although put under the head of Launceston alias Newport, seems, as an MS. note remarks, to refer to the castle as distinct from the town.]

PENRYN.—Majori et Burgensibus burgi de Penryn.

PADSTOW.—Majori et Burgensibus burgi nostri de *Padstow* in com. *Cornubiæ*.

RILLATON.—Senescallo, Decemar' et Preposit. ac liberis tenentibus manerii sui de *Rillaton* parcel Ducat sui *Cornubiæ*.

ROYALTON.—Seneschallo et Ball cur Manerii de Royalton.

SALTASH.—Majori et liberis Burgensibus burgi de Saltash.

TREGONY.—Senescallo et Ballivo H.P. manerii sui de *Tregony* in com. *Cornubiæ*.

TRELLOCK.—Majori et Ballivis W. com. *Pembroek* villæ suæ de *Trellock* in com. *Cornubiæ*.

TRURO.—Majori et Burgensibus burgi sui de *Truro* in com. *Cornubiæ*.

WEST LOOE.—Ballivis villæ de *West Looe*.

I have modernised the names throughout, as there is nothing really distinctive in the spelling adopted. The list omits some of the boroughs in the county, such as Marazion, Penzance, and Millbrook, unless, which is possible, the latter may be intended by Trellock. The Earl of Pembroke was, at the time the list was written, Lord Warden of the Stannaries. Rillaton and Royalton are, of course, no boroughs, but duchy manors.

VII.—*Alluvium in Par Valley.*—BY RICHARD SYMONS.

IT is well known that most of the valleys and estuaries in Cornwall, where mining and clay-works are so numerous, are being filled up with silt and sand, carried down by the streams from stream-tin and china-clay works. Carnon valley is a specimen amongst many. At Bissoe bridge, on that river, about 70 years ago (I have been told) a man on horse-back could ride through it. At present the space between the top of the deposit in the river and the arch of the bridge, is only two or three feet.

Par valley—lately an estuary—is another instance. The area of this estuary I take to be about 500 acres, the whole of which was formerly tidal, and the greater part covered by the sea at all times, over which vessels rode to Ponts' Mill, 2 miles from Par. Proofs of this were known to exist by the fact that mooring posts have been found there. It is said that vessels of from 70 to 80 tons burthen went up so far as that place.

The depth of the alluvial deposit in Par valley has been ascertained at several points. The depth varies from 12 fathoms at the beach, to 4 fathoms at Ponts' Mill. At the base of this deposit, and resting on the rock, (called by miners "the shelf,") was a stratum of granular tin, such as is common in tin stream works. The miners called it "float tin." Two or three several companies, at different periods, in order to extract this tin, caused to be constructed iron tubes or shafts, which they sunk in the sand as deep as the layer of tin. One was sunk in Par beach about 65 years ago. It was 11 fathoms in length or depth. From the bottom, drifts were made in different directions to clear away the tin. A steam engine pumped the water. This was done before Par Works were commenced by the late Mr. Treffry.

The next iron shaft was put down near the site of Par New Wesleyan Chapel. It was 11 fathoms deep, and below that the Company sunk through the rock 30 fathoms. From the bottom (41 fathoms from surface), a cross-cut was driven southward to

a point nearly under Par stack. This was to cut Par Consols lodes. A 50-inch engine was on this shaft, and the work was called "Tywardreath Mine."

The 3rd shaft was about 100 fathoms nearer St. Blazey village, and was 10 fathoms in depth. The engine on the 2nd shaft pumped the water, by a flat rod connection, out of this 3rd shaft. There was a cross-cut extending southward to No. 2 shaft for intersecting lodes. The works on the 2nd and 3rd shafts stopped about 25 years ago.

The 4th iron shaft (Wheal Maudlin) was close by the Cornwall Minerals Railway Station. It was 9 fathoms deep, and was placed there 35 years ago. There was an engine on it which also pumped water out of West Fowey Consols Mine.

The 5th iron shaft was opposite the Hammer Mill used by Messrs. West & Co., near the Canal, and opposite Wheal Union. There was also another iron shaft, 7 fathoms long (deep), sunk in East Crinnis valley, where the alluvial deposits are also very deep.

When Mr. Treffry was excavating for the Canal, near Ponts' Mill, at a depth of 22 feet below the surface, the labourers found a bridge formed of 3 granite blocks, each 12 feet long and 6 feet wide. These blocks were carried by canal boats to Par, and afterwards cut up for use in building, except one which is now on Par wharf.

The alluvial deposit is said to be, on an average, 9 fathoms deep, from Par beach to St. Blazey bridge. The lowest part of St. Blazey village stands on ground where the tide used to flow very few feet beneath.

Opposite Mr. Henry Tregaskis's house, at Par, there was a flight of 17 steps leading down to the beach.

About 100 years ago, between the "Sloop Inn" and "Par Inn," a vessel stranded and was wrecked. Mr. Lark, now at Sloop Inn, knew the man who saw it. The man (named Henry Marks) died 30 years ago, aged 88 years.

From these incidents it will be clear that within the past century there has been a rapid accumulation of sand, &c., in Par valley, late estuary. It is said that nearly the whole has occurred within the last 150 years; consequently, chiefly, from the clay and stream works at Roche. Now that these works are

more extensive than at any former period, and still on the increase, it is probable that at no distant date, the navigation to Par wharves will cease, unless measures are taken to keep off the sand. Mr. Lark says that during his 9 years absence from England, the water at Par decreased several feet in depth at the entrance to the harbour.

Fifty-five years ago Tywardreath side of Par contained only 13 houses, and St. Blazey side 8 houses. *Now* Par contains 150 houses, and a population of about 800 persons.

VIII.—*Note on Carbolic Acid, its Preparations and Derivatives.*

COMMUNICATED BY R. LE NEVE FOSTER, F.C.S.

TO procure crude Carbolic Acid coal tar is distilled and collected in various portions. The portion of the distillate which usually contains the highest proportion of Carbolic Acid, is that known as the "Light Oil." This is agitated with a solution of Caustic Soda, the mixture is allowed to settle, and the clear liquid run off from the undissolved oil. The alkaline liquid is then neutralized with an acid, which separates the impure Carbolic Acid as an oily layer.

The impure carbolic acid thus obtained, consists of carbolic acid, cressylic acid, their homologues, and a variety of impurities.

By proper treatment and fractional distillation these impurities are removed, and certain portions of the distillate being properly cooled, the carbolic acid (though still in an impure state) crystallizes out, and the uncrystallizable portions, consisting of cressylic acid and its liquid homologues, is drained from it.

The impure crystallized carbolic acid is subjected to further rectification, and is separated almost entirely from the liquid homologues till an acid having a fusing point of 35°C is obtained, which corresponds with the acid produced by Laurent.

By further purification it is obtained chemically pure, C_6H_6O , fusing at 42.2°C, boiling at 182°C, and soluble in 20 parts of water.

This pure acid is almost entirely free from tarry taste and smell. It is used almost exclusively for internal medicinal administration, and the production at Messrs. Calvert and Co's works at Manchester amounts to several tons annually.

The carbolic acid, fusing point 35°C, is soluble in 33 parts of water, and is used exclusively for surgical applications and for the manufacture of various carbolic acid colors, &c.

Cressylic Acid.

Cressylic Acid, boiling point 203°C, soluble in about 80 parts of water, is always found in more or less quantity in the impure

carbolic acids of commerce, and is used extensively as a disinfectant, and for this purpose is frequently sold under the name of "Crude, or liquid Carbolic Acid."

I may mention that at the present time, mixtures of "Tar Oils," containing sometimes no carbolic acid, and usually a small percentage of carbolic acid, are being sold under this name to the public, and from their general appearance and odour are not to be easily distinguished from the genuine acid. As the value of the liquid for disinfecting purposes depends entirely upon the quantity of carbolic acid and cressylic acid it contains, as well as its being free from tar oils (these latter being comparatively valueless for disinfection, even if containing a small percentage of carbolic acid); as tar oils are insoluble in water, and hinder, when present, the solubility of the carbolic acid, therefore, it would be well if every purchaser should insist upon the seller guaranteeing the percentage of real acid contained in any "liquid carbolic acid" he purchases.

Messrs. Calvert and Co. guarantee all the "liquid carbolic acid" they send out to contain not less than 85 per cent. of carbolic and cressylic acids, and to be free from "tar oils" and sulphuretted hydrogen, another body frequently found in the impure acids.

A ready method of testing the "liquid carbolic acid" to ascertain its genuineness, is to measure off a given volume in a graduated glass, and then to add to it twice its volume of a caustic soda solution, 14° Twaddell's hydrometer @ 60° F. Upon shaking this mixture together, the liquid acid, if genuine, should dissolve entirely; all others should be rejected.

Carbolic Acid Disinfecting Powder.

This is composed of an inert base containing either 15 or 20 p.c. of carbolic and cressylic acids.

The acid is consequently free, thus allowing it to act by direct means or by evaporation.

In order to readily detect the amount of real carbolic acid in a disinfecting powder, I have devised the following rough method—

Weigh out 1,000 grains of the powder, and place it in a small tubulated retort.

Heat the retort gradually, until the liquid distillate ceases to drop (a brisk heat is required towards the end of the operation).

Collect the distillate, which will condense in the tube of the retort, in a graduated cylinder grain measure, and allow it to settle for one hour, when the amount of oily liquid and water may be read off.

The oily liquid should represent the amount of carbolic acid; to ascertain if this is so, to one volume of it add two volumes of a solution of pure caustic soda, 14° Twaddell's hydrometer, temp. 60° Fahrenheit, which will entirely dissolve the carbolic acid.

If any remains undissolved, it will probably consist of either heavy or light oil of tar, the most frequent adulterants of carbolic acid, and, in some cases, entirely substituting it.

The above process will, if carefully worked, give within $\frac{1}{2}$ per cent. of the amount of carbolic acid really contained by the powder.

Carbolised Tow.

A preparation of tow with carbolic acid, for preventing all offensive odours from wounds, sores, &c., is strongly recommended in the "*British Medical Journal*," of Nov. 26th, 1870, page 582, in the following terms.

"The carbolised tow we can recommend in decided and unqualified terms to the use of surgeons. It is a fine long-fibred clean tow, impregnated with definite quantities of carbolic acid. Soft as a dressing, antiseptic and deodorizing, it may with advantage be used for most of the surgical purposes to which lint, sponge, and cotton wool are now applied."

Picric Acid, Paste, and Crystals.

Picric acid is manufactured by acting with nitric acid upon sulpho-carbolic acid, the paste thus produced being dissolved in boiling water, which, on cooling, deposits the picric acid in beautiful crystals.

Picric acid $C_6H_3(NO_2)_3O$ is also called carbazotic acid and trinitrophenic acid.

It is used extensively for dyeing silk and wool.

The salts of picric acid are very explosive compounds, especially the picrate of potash, which explodes by detonation.

The ammonia salt has been used medicinally in cases of ague with success.

Aurine, or, Rosolic Acid.

Prepared by heating carbolic, oxalic, and sulphuric acids together in certain proportions. A dark mass is thus obtained which is washed freely with hot water till all excess of acid is removed, and then dried.

It is used for dyeing silk and also in calico printing.

The calcium lakes of aurine are used largely by paper stainers.

Sulpho-Carbolates.

When sulphuric acid is mixed with carbolic acid, a definite compound, called sulpho-carbolic acid, $C_6H_6SO_4$ is formed, freely soluble in water, and capable of forming definite salts with various oxides.

The most important of these salts is the sulpho-carbolate of soda, which is recommended for internal administration in cases of scarlet fever, and also as a preventive when epidemics prevail.

IX.—*Note on the Underground Temperature at Dolcoath Mine, May 1st, 1877.*—BY J. H. COLLINS, F.G.S.

ON the 1st of May, 1877, I found myself at the bottom of Dolcoath Mine, which is now 370 fath. deep. I had with me a good thermometer and observed the following temperatures.—

WATER coming from the footwall in the 248 fath. level	
near the bottom of the man-engine	68°F
,, Western feeder into the sump below the 338 fath. level, 370 faths. from surface	87·8
,, Small stream coming from the hanging wall in the bottom level	90·5
AIR in great stopes above the 326 fath. level, 358 faths. from surface	75·

This I regard as the normal temperature of the mine, as the open space is so large that the temperature cannot be much affected by the candles and the breathing of the men.

AIR, 314 fath. level going west from engine shaft . .	77·
. ,, from exhaust port of boring machine in the western end of the same level	71·5

Considering the great depth of the mine and the high temperature of the water coming into the fissure from the surrounding "country," I think these temperatures speak well for the general ventilation of the mine. The observations in the 314 fath. level also demonstrate the great value of a boring machine worked by compressed air as an aid to ventilation, since it supplies a constant stream of pure water exactly where it is most wanted, viz:—in the end where the men are at work, and this air is several degrees cooler than that of the level into which it is discharged.

On the occasion of my visit, twelve men were in the end with the machine for about $\frac{3}{4}$ of an hour, most of us with lighted candles, and although the temperature rose to 94°, no inconvenience was felt from the vitiation of the air.

Taking the temperature of the great open spaces at 358 faths. from surface as the normal temperature of the mine at that depth, and 52° F as the mean temperature of the surface, it appears that the temperature increases downwards at the rate of 1° F for each 93 feet, which is, I believe, a considerably lower rate of increase than has been hitherto observed.

X.—*Notes on the prices of provisions, the rates of wages, &c., at St. Agnes a hundred and fifty years ago.*—By J. H. COLLINS, F.G.S.

THE history of a people at any given epoch is largely made up of two very common-place elements, the cost of provisions, and the rate of wages. As throwing light on this, I have extracted from an old account book—which has been placed in my hands for that purpose by Mr. F. G. Enys—a number of entries which relate to these important conditions, in the neighbourhood of St. Agnes, about 150 years since; thinking they might be interesting for comparison with similar facts in other districts and other times.

The book in question is entitled “Mr. Benj. Hingstone*—Acc^t with Sam^l Enys, Esq^{re} begun 1 Feb. 1719. to July 1784. It is kept with extreme neatness, the paper and ink being remarkably good; the latter having been made on the spot as was then usual, has withstood the lapse of time and the dampness of a damp climate without material injury.

The contents of the book are as follows:—

Acc^t of all the Mon’ys Rec^d of Samuel Ennys Esq^{re} for Trevaunance use.

Acc^t of all the Mon’y Rec^d for Rents & Fines.

Acc^t of all the Mon’y Rec^d for Tin Proffitts & Copper Oare

Acc^t of what proffitts is made of the Land in hand

Acc^t of the proffitts of Tiths

A p^ticular Acc^t of Sundry Sums of Mon’y Rec^d by Mr. Ennys

Acc^t of Sundry Disburstments p^d by Ben. Hingeston on the Estate w^{ch} was formerly Mr. Tonkins

A p^ticular Acc^t of Sundry Disbursments (paid by ‘Mr. Ennys’s own hand) on the Estate w^{ch} was formerly Mr. Tonkins.

I will now proceed to draw attention to the substance of some of the entries.

* Nov. 8, 1734, Mr Hingeston is styled Cousin Hingeston by Mr Saml. Enys. The spelling of the name varies in different parts of the book.

PRICE OF CATTLE, &c.—This is given as follows, in many places.

	£	s.	d.	£	s.	d.	
Heifers	1	5	0	to	2	10	0 each.
Young Steers ..	1	10	0	„	2	4	6 „
Cows	2	2	6	„	3	5	0 „
Bulls	2	0	0	..	..	..	„
A Young Bull ..	1	0	0	..	..	..	„
Calves	0	4	0	„	0	4	3 „
Sheep	0	6	0	„	0	7	6 „
Lambs	0	3	3	..	..	..	„
A Colt	2	4	6	..	..	..	„

These prices sound very low, but the cost of “keep” was also low. Thus, 20 acres of common were let for 6s. 8d. per annum or 4d. per acre, the grass for a cow was only charged 14d. per week, and the keep of a horse for $2\frac{3}{4}$ years was charged £6 17s. 6d. or something less than 1s. per week. Hay was worth about 2s. per cwt., and oats from 3s. 6d. to 4s. per bushel or 12s. per hogshead. Straw for making “clob,” cost 1s. per bundle.

PROVISIONS.—There are some few entries of the cost of provisions, thus: butter was 5d. per lb., and “tallow,” by which term I suppose fresh mutton fat was then as now understood in Cornwall, was $3\frac{1}{2}$ d. per lb.

The prices of bread and milk are not exactly stated, but the milk of a cow was charged 2s. per week, and sixpenny loaves are mentioned

Cider, no doubt, varied much in price from year to year as it does now, but $1\frac{1}{2}$ hogsheads we charged £1 15s. in 1721. Brandy cost 4s. 6d. per gallon, and must, I should think, have been smuggled.

We have a clue to the general cost of living in the fact that “Mr. Benjamin Hingeston’s diet” for one year is charged £12 or rather less than 8d. per day.

Among general household requisites, soap is charged 4d. per lb., coals, which were probably not much used, 1s. per bushel (94 lbs.), and faggots 4s. per 100.

WAGES.—With such charges for provisions, &c., it is to be expected that wages were very low. Accordingly, we find the labour of two women in “loading dung,” is charged 4d. per day

each; two women bring home 900 faggots on their backs for 7s. 6d., and Elizabeth Lawrence the "count-house women" gets £2 10s. per annum as wages. At the stamps the laborers got about 30s. per month, besides from 15s. to 18s. for "working in sleeping time;" boys get 6s., and 3s. 6d. for working in sleeping time.

Skilled labour was also obtainable at low rates. The charge for shearing 30 sheep is 1s.; a mason received 1s. 6d. per day; a smith put "two shoes to the grey mare" for 11d.; a surveyor measured three fields for 3s.; and a lawyer, Mr. Wm. Pearce, conducted prosecutions for trespass against 4 men, and charged only 13s.

Horse labor, too, was cheap, being charged 1s. per day per horse.*

LAND CARRIAGE.—Notwithstanding these low charges for the labor of men and horses, the cost of land carriage was rather higher than at present, indicating, no doubt, the bad state of the roads, and the use of trains of mules instead of carts or waggons. As an example, I may mention that the "carriage of oare to Truro Key" from St. Agnes cost 6s. per ton, and to Calenick Smelting house 6s. 8d. per ton. The present cost is about 5s, notwithstanding, the fact that the labor of a horse costs from 3s. 6d. to 6s. per day, and that of a driver 2s. 6d. instead of about 9d.

MINING MATERIALS.—There are some interesting entries relating to mining materials. For instance, it appears that stamp heads weighed from 50 to 112 lbs., and cost from 2d. to 3d. per lb., while the old ones were sold for 1½d. or 2d. per lb.; brasses cost 1s. per lb., 6d. being allowed for old ones; tin kieves were 4s. 6d. each; shovels 1s. to 1s. 11d., shovel staves 2d. each; a kibbal, 13s.; fourpenny nails, 4d. per 100; a diluing sieve, 4s.; candles, 6d. per lb.; rope, 4d. to 5d. per lb.; powder, £3 13s. per cwt. or near 8d. per lb.; lime 1s. per bushel.

* In the account of receipts and expenses of rebuilding Bodmin Church, 1469 to 1472, we find the following rates of wages were paid:—

Masons	6d per day.	Laborers	3d per day.
,, Assistants	4d. ,,	Quarrymen	3d. ,,
Helyers or Slaters	5d. ,,	Lime was 3d. per bushel,	1s. per
Plasterers... ..	5½d. ,,	barrel, 1s. 4d. per quarter,	4s.
		to 4s. 5d. per pipe,	12s. per last.

I note that in 1734, "white tin" was worth 55s. per cwt. or £55 per ton, a considerably better price than the present, if we take into account the low rates of wages and the shallowness of the mines; this will account for the abundance of old tin-workings in places where it would certainly not pay to work now. For Wheal Rose oare the Lord's Dues were $\frac{1}{4}$ th.

MISCELLANEOUS CHARGES. Among these I find "2 packs of cards," for use after the monthly pay, charged 1s., which is cheap enough, and 4 quires of paper, bought at Truro, for 3s., which does not seem to be cheap.

A good deal of money was received by Mr. Ennys in payment for the use of his different stamps and the rent of Grist Mills. Sometimes the stamps were let absolutely, thus we find "Harris's Stamping Mill, in Trevaunance Coomb" let in 1722 for £15 per annum; "Porth Chapel Coomb Stamps" £13; "Lenobrey Stamps" £5; "Hill Stamps" £14 10s.; "Little Stamps" £7; and Feb. 10, 1725, "Cash received of Nch. Daddow for ye use of Mr. Ennys's Stamps for a fortnight ye sum of £1.

Frequently, however, the stuff was brought to be stamped in sacks, the charge being from 6s. to 8s. per hundred sacks (approximately 10 tons, but varying in weight with the richness of the stuff), a small allowance being made for the "leavings."

Trevaunance Mill, in 1719, was let for £36 10s. per annum. Incidentally, we find that the mill owner used to build up the millstones from "cane stones" purchased at 3s. each, for that purpose. These were fastened together with plaster of paris, which was burnt from gypsum on the spot.

There are several entries, one as early as 1722, of charges made to "strangers" for landing "slat stones," probably from Delabole, and Mr. Ennys seems to have had a taste for natural history, for May 30, 1720, is an entry "expenses on John Harris and others on sending them to the Gull Rock at w^{ch} time they brought home 4 young Gulls, 1s.

A good many entries occur with reference to the "driving of the Wheal Trevaunance adit, in the Estate w^{ch} was Mr. Tonkins;" the last being Nov. 1st, 1721, when "the additt was holed (to the eastran dipper)," and N. Bennett and his partners were paid for 5 fathoms, at £4 10s. per fathom, so that the ground must have been hard.

The driving of the adit was, however, afterwards resumed, for £16 19s. 3d., was paid for driving it from March to June, 1739.

There are a few peculiarities in the mode of making the entries. Thus the months after August are 7^{ber} 8^{ber} 9^{ber} X^{ber}

Again, the columns for pounds, shillings, and pence are headed as usual £ s. d., but £9 2s. 6d. would be written 009 02 06 three places being always kept in the pounds column and two in each of the others.

I will conclude these extracts by giving the following list of farms mentioned in the book in the year 1745.

Wheal Deer Gentle Farm	Wheal Cleath	Farm
Tollandrize	Great Wheal Widden	„
Wheal Hawke	Park Croas	„
Great Dodnall	Wheal-an-Arrance	„
Wheal Kine	Great Wheal-an-Starran	„
Wheal Egles	Wheal Fatt	„
Puckrel	Wheal-an-Larke	„
South Pell	Wheal-an-Crean	„
Parkandrea	Wheal Horbor	„
Wheal John Avery	Wheal Heckah	„
Carraclose	Wheal Trezen	„
Wheal Gwyn	Conmerneisan	„
Wheal-an-Leane		

These names indicate clearly that mining in St. Agnes was carried on before farming was introduced—the farms taking the names of the mines in their vicinity, and not *vice versa*.

XI. — *A Cornish Fauna.* — BY THE LATE JONATHAN COUCH,
F.L.S., &c.

VERTEBRATA—*MAMMALIA.*

*Revised and corrected by J. Brooking Rowe, F.L.S., Fellow of the Society
of Antiquaries &c.,*

AT the request of the Council of the Royal Institution of Cornwall, I have revised that part of the Fauna relating to the Mammalia. The author included the Domestic Animals in the original work, but in this edition it has been thought well to omit them, as they are not true members of the Fauna. The parts within inverted commas are in Mr. Couch's own words.

CHIROPTERA. (BATS.)

“The Cornish name of these animals is Ary-mouse or Rery-mouse, from the Saxon word “*ræran*” “*aræran*” to raise or be lifted up, that is to fly.”

Since the first edition of the Cornish Fauna was published, much attention has been paid to this interesting order. The investigations of Kuhl, as well as those of Count Keyserling, and Professor Blasius, while productive of much information, have not resulted in confirming the belief, generally entertained some years since, that further research would increase the number of European species. The last edition of Bell's British Quadrupeds has reduced the number of indigeneous species from seventeen to fourteen. Further information will be found in the two editions of Bell's Quadrupeds, Lord Clermont's “*Guide to the Quadrupeds and Reptiles of Europe,*” 1859, and the “*Naturgeschichte der Säugethiere Deutschland*” of J. H. Blasius, 1857.

GREAT BAT.—*Vespertilio noctula.*

Jenyns, p. 23; Bell, p. 12, 2nd edition, p. 17; Blasius, p. 53; Clermont, p. 8.

In the county generally, this species may be said to be rare, but in some localities it appears to be frequently met with,

especially on the Devonshire border. At Falmouth Mr. Cocks says "not uncommon." With the exception of *V. Murinus* it is our largest British species.

PIPISTRELLE.—*Scotophilus pipistrellus*.

Jenyns, p 24; Bell, p 23, 2nd edition, p 34; Blasius, p 61; Clermont, p 15.

"This is our commonest species, and flies at all seasons of the year if the thermometer be not much below 50°. It awakes in a few hours after the weather has become mild, and is not uncommonly seen abroad in the middle of a fine day." The *V. pygmaeus* of Leach, (Bell, 1st ed., p. 31) is the young or a small individual of this species. Some references by Mr. Couch on the flight of this species in the day-time, are recorded in the Zoologist, 1843, p. 343; and in the same periodical, 1853 and 1854, pp. 3936 and 4157, will be found some interesting observations by him on the habits of some species of bats.

REDDISH-GREY BAT.—*Vespertilio Natterveri*.

Jenyns, p 23; Bell, p 42, 2nd ed., p 54; Blasius, p 88; Clermont, p 10.

Two individuals of this species were obtained by Mr. Couch, from Looe, in Sept., 1852, Zool., 1853, p. 3937. I can find no other instances of the occurrence of this bat in either the peninsula or channel province.

DAUBENTON'S BAT.—*Vespertilio Daubentonii*.

Jenyns, p 26; Bell, pp 45, 47, 2nd ed., p 60; Blasius, p 98; Clermont, p 20.

Mentioned by Mr. Couch as *Vespertilio emarginatus*, Zool., 1853, p. 3942, and Zool., 1854, p. 4157, but without giving the date of capture or the locality. The specimen weighed 79 grains, and the extent of its wings was 10½ ins., a greater expanse than the measurement given by Bell and others. Dr. Bullmore gives three instances of its occurrence in and near Falmouth, and Mr. Cocks says "not uncommon" in the same neighbourhood.

LONG-EARED BAT.—*Plecotus auritus*.

Jenyns, p 27; Bell, p 53, 2nd ed., p 72; Blasius, p 39; Clermont, p 33.

Common in most places.

BARBASTELLE.—*Barbastellus Daubentonii*.

Jenyns, p 28; Bell, p 63, 2nd ed., p 72; Blasius, p 43; Clermont, p 35.

Rare; found in a cave, west of Mainporth Bay, Mr Cocks. It has been taken in the adjoining county.

GREATER HORSE-SHOE BAT.—*Rhinolophus ferrum-equinum*.

Jenyns, p 19; Bell, p 18, 2nd ed., p 89; Blasius, p 31; Clermont, p 4.

Much rarer in Cornwall than the smaller species next to be mentioned. In Devonshire the reverse is the case.

LESSER HORSE-SHOE BAT.—*Rhinolophus hipposideros*.

Jenyns, p 20; Bell, p 28, 2nd ed., p 96; Blasius, p 29; Clermont, p 4.

Common in some localities. "In the neighbourhood of Trelawny house this species abounds, almost to the exclusion of every other." Falmouth, Dr. Bullmore.

INSECTIVORA. (INSECT EATERS.)

HEDGEHOG.—*Erinaceus Europæus*.

Jenyns, p 19; Bell, p 76, 2nd ed., p 102; Blasius, p 152; Clermont, p 46.

Called in some place in Cornwall the Hedge Boar and Sow. "The female is of a much more timid character than the male, and in captivity has been known to devour her own young." Common.

MOLE.—*Talpa Europæa*.

Jenyns, p 17; Bell, p 85, 2nd ed., p 115; Blasius, p 109; Clermont, p 48.

"In Cornwall generally the Want. Moel, in Welsh, signifies a little hill, and a moel implies a small tumour, but mould also means the earth or soil, and mould-warp, another name of the animal, implies one that bends or works the soil. The Want is one that disappears, as to want is to be absent, to disappear." Common. A mole catcher, in six winter months, took twelve hundred moles in the county.

COMMON SHREW.—*Sorex Vulgaris*.

Jenyns, p 17; Bell, p 109, 2nd ed., p 141; Blasius, p 129; Clermont, p 37. Common.

LESSER SHREW.—*Sorex pygmaeus*.

Bell, 2nd ed., p 148a; Blasius, p 133; Clermont, p 38.

This species, although not hitherto recorded as occurring in Cornwall, will be probably found there, as it is generally distributed throughout the country.

WATER SHREW.—*Sorex fodiens*.

Jenyns, p 18; Bell, p 155, 2nd ed., p 149; Blasius, p 120; Clermont, p 40.

Common. *S. remifer* is a permanent variety of this species.

CARNIVORA. (FLESH EATERS.)

BADGER.—*Meles taxus*.

Jenyns, p 10; Bell, p 122, 2nd ed., p 158; Blasius, p 237; Clermont, p 59.

“The word badger was anciently used as equivalent to trapper or pedler, that is one that walks on his feet, which is applicable especially to this animal, that was placed by Linneus in his Genus *Ursus*, and distinguished from such as walk only on their toes. Ray Syn, p. 185, who gives an account of its structure, omits to mention that its jaw cannot be displaced from the sockets but by breaking the bone, a character not so decidedly found in any other British animal.” It is generally common, and in a locality in the neighbourhood of Falmouth, Dr. Bullmore says that it is found in considerable numbers.

OTTER.—*Lutra vulgaris*.

Jenyns, p 13; Bell, p 129, 2nd ed., p 167; Blasius, p 237; Clermont, p 59.

“By far the greatest portion of these creatures, in Cornwall, derive their food from the sea, where they may be seen diving for fish even where the waves are very tempestuous. Several instances are known of their being drowned in crab-pots, into which they had entered in search of prey and had not afterwards been able to find the opening.” It is common in the many caves around the coast.

COMMON WEASEL.—*Mustela vulgaris*.

Jenyns, p 12; Bell, p 141, 2nd ed., p 182; Blasius, p 231; Clermont, p 55.

Common.

STOAT.—*Mustela erminea*.

Jenyns, p 13; Bell, p 148, 2nd ed., p 191; Blasius, p 228; Clermont, p 56.

Common.

POLECAT.—*Mustela putorius*.

Jenyns, p 11; Bell, p 156, 2nd ed., p 203; Blasius, p 222; Clermont p 53.

Common in some parts.

MARTEN.—*Martes foina*.

Jenyns, p 11; Bell, p 167, 2nd ed., p 208; Blasius, p 217; Clermont, p 58.

“Rare and local.” I do not know of any recent notices of its capture, and Mr. Couch, writing in 1854, believed it to be no longer an inhabitant of the county. “The last specimen,” he says, “I have been informed of, was killed near Liskeard in the first quarter of the present century, and its loss (for it was in ancient times classed with animals of the chase, and its

fur was in high esteem) may be ascribed to the change of habits in society, by which the common use of mineral coal was introduced among farmers. Before that time a large number of pollard trees were permitted to grow in the neighbourhood of *town-places* or farm yards, for the purpose of supplying the house with fuel, and the cavities which most of them contained afforded a safe shelter to these, and the others of the weasel tribe. When such fuel became of less importance these hollow trees were gradually cut down, or suffered to fall, to the great diminution of the numbers of the weasel tribe." Report Royal Cornwall Polytechnic Society, 1854, pp 25, 26.

FOX.—*Vulpes vulgaris*.

Jenyns, p 14; Bell, p 252, 2nd ed., p 225; Blasius, p 191; Clermont, p 62.
 "Common, especially in cliffs near the sea."

CARNIVORA PINNIPEDIA. (SEALS.)

COMMON SEAL.—*Phoca vitulina*.

Jenyns, p 15; Bell, p 263, 2nd ed., p 240; Blasius, p 248; Clermont, p 73.
 Not frequently found. Otters are often mistaken for these animals. One Whitsand Bay, 1861.

GREY SEAL.—*Halichærus gryphus*.

Bell, p 278, 2nd ed., p 262; Blasius, p 256; Clermont, p 80.
 "Mr. Bell's figure and description go far in deciding this to be the species taken in a net near Padstow, in 1832, and of which some account is given in London's Mag. Nat. Hist., Vol. 7, p 208."

RODENTIA. (RODENTS.)

SQUIRREL.—*Sciurus vulgaris*.

Jenyns, p 29; Bell, p 291, 2nd ed., p 276; Blasius, p 272; Clermont, p 116.
 Common in some parts of the county, rare or unknown in others.

DORMOUSE.—*Myoxus avellanarius*.

Jenyns, p 30; Bell, p 295, 2nd ed., p 281; Blasius, p 297; Clermont, p 122.
 Frequently called "Dorymouse." Common.

HARVEST MOUSE.—*Mus minutus*.

Jenyns, p 29 ; Bell, p 299, 2nd ed., p 286 ; Blasius, p 326 ; Clermont, p 116.
Common.

LONG-TAILED FIELD MOUSE.—*Mus sylvaticus*.

Jenyns, p 30 ; Bell, p 305, 2nd ed., p 93 ; Blasius, p 322, Clermont, p 101.
Common.

COMMON MOUSE.—*Mus musculus*.

Jenyns, p 31 ; Bell, p 308, 2nd ed., p 297 ; Blasius, p 320 ; Clermont, p 100.
Common.

BLACK RAT.—*Mus rattus*.

Jenyns, p 32 ; Bell, p 311, 2nd ed., p 302 ; Blasius, p 317 ; Clermont, p 98.
Scarce generally, but occasionally found in some localities.
Not uncommon at Falmouth.

BROWN RAT.—*Mus decumanus*.

Jenyns, p 32 ; Bell, p 315, 2nd ed., p 308 ; Blasius, p 313 ; Clermont, p 97.
Common. *M. rattus* and *M. decumanus* are the only British species. *Intermedius* and *domesticus* are apparently slightly varying individuals.

WATER VOLE.—*Arvicola amphibius*.

Jenyns, p 33 ; Bell, p 321, 2nd ed., p 316 ; Blasius, p 344 ; Clermont, p 83.
Common.

FIELD VOLE.—*Arvicola agrestis*.

Jenyns, p 33 ; Bell, p 325, 2nd ed., p 323 ; Blasius, p 369 ; Clermont, p 90.
Common.

RED FIELD VOLE.—*Arvicola glareolus*.

Bell, p 330, 2nd ed., 327 ; Blasius, 337 ; Clermont, p 91.

Dr. Bullmore says "not uncommon," and Mr. W. P. Cocks gives two localities, near Falmouth, where it is found.

HARE.—*Lepus timidus*.

Jenyns, p 34 ; Bell, 333, 2nd ed., p 331 ; Blasius, p 412 ; Clermont, p 129.

Common. "In Loudon's Magazine of Natural History, vol. VII, p 504, there is an account of a white variety of common hare, which, from the year 1829, has continued on Morval estate, the seat of John Buller, Esq., and was still to be found so lately as Christmas, 1836. As several of them have been killed at different times through this series of years, it is clear that the peculiarity has been propagated in the race, whilst their not being found at any considerable distance from their original haunts is a proof of the little disposition evinced to wander from a favourite district."

RABBIT.—*Lepus cuniculus*.

Jenyns, p 35; Bell, p 428, 2nd ed., p 343; Blasius, p 427; Clermont, p 129.

Common. "A black variety is sometimes seen, but this peculiarity is not propagated as in the white hare above mentioned."

CETACEA MYSTACOCETI.

COMMON RORQUAL.—*Balænoptera musculus*.

Jenyns, p 47; Bell, p 520, 2nd ed., p 343; Blasius, p 534; Clermont, p 160.

"Specimens of the Razor-back are seen upon the Cornish coast every year feeding upon the smaller gregarious fishes. A specimen was cast up at Falmouth, in 1863, and the skeleton is now, or was recently, at the Alexandra Palace, Muswell Hill. Another at Plymouth, in 1831, which had been observed frequenting the Cornish coast in pursuits of herrings for some time previously.

SIBBALD'S RORQUAL.—*Balænoptera sibaldi*.

Bell, 2nd ed., p 402.

"Rare." One at Cadgwith, near the Lizard. It was 65 feet long, 24 inches in circumference, and the breadth of the caudal fin 13 feet. Dr. Bullmore.

BEAKED WHALE.—*Balæna rostrata*.

Bell, 2nd ed., p 411; Jenyns, p 47; Blasius, p 535.

A specimen brought into Polperro, by the mackerel boats, May, 1850. Dr. Bullmore.

ODONTOCETI.

SPERM WHALE.—*Physeter macrocephalus*.

Bell, 2nd ed., p 415; Blasius, p 532; Clermont, 157.

A whale, supposed to be of this species, is sometimes seen off the Cornish coasts, says Mr. Couch, sailing rapidly along at a uniform elevation in the water, with its slender but elevated fin above the surface, while the body is concealed below.

HUMPED BLOWER.—*Physeter polycephalus*.

As to this species I can only quote what is said by Mr. Couch. "I have unfortunately omitted to note the proper reference to any authority for the use of the trivial name here given, and which I had an opportunity of verifying, in a volume belonging to the Library of the Zoological Society of London. One specimen ran itself ashore in pursuit of small fish several years since; and another was seen and minutely described to me by an intelligent

fisherman, but it would appear that the number of humps on the back is variable. It is probably the *Balaena monstrosa*, Ruyssh's Theat. Anim., vol I. tab 41."

DOLPHIN.—*Delphinus delphis*.

Jenyns, p 40; Bell, p 463, 2nd ed., p 462; Blasius, p 516; Clermont, p 146.

Common. Visits Mount's Bay in large shoals during the summer.

GRAMPUS.—*Delphinus orca*.

Jenyns, p 42; Bell, p 477, 2nd ed., p 445; Blasius, p 522; Clermont, p 150.

Occasionally captured.

PORPOISE.—*Phocæna communis*.

Jenyns, p 41; Bell, p 473, 2nd ed., p Blasius, p 520; Clermont, p 149.

Common. "The sniffer of the Cornish fisherman. It is sometimes caught in drift nets, and I have known it take a bait, though it commonly proves too strong for the line. The rolling motion of this and some other of the smaller species is caused by the situation of the nostrils on the anterior part of the top of the head, to breathe through which the body must be placed in somewhat of an erect posture from which to descend, it passes through a considerable portion of a circle. They rarely congregate into a herd, like the other Delphini, and commonly no more than a pair is seen together."

RISSE'S GRAMPUS.—*Grampus griseus*.

Bell, 2nd ed., p 450; Blasius, p 523; Clermont, p 152.

A beautiful specimen of this cetacean, an adult female 10 feet 6 inches long, was caught in the mackerel nets, off the Eddystone, 28th Feb., 1870. It is now in the British Museum. See Journal of Anatomy and Physiology, Nov. 1870, and Professor Flower's Memoir, Trans. Zool. Soc., VIII. 1.

PILOT OR CA'ING WHALE.—*Globicephalus melas*.

Jenyns, p 42; Bell, p 483, 2nd ed., p 453; Blasius, p 521; Clermont, p 42.

One or two have been taken, but I have no record of the times or places. One was brought into Plymouth in April, 1839.

[See some notes by Mr. Couch "on the time and manner of the procreation of some species of Whales;" Zoologist, 1845, p 1161.]

VERTEBRATA—AVES.

Revised and corrected by E. H. Rodd.

THE following is a statistical summary of the birds at present included in the Cornish Fauna. It may be remarked that Cornwall and the Land's End locality, including the Scilly Isles, have been singularly fortunate in rendering specimens of our rarer birds, and this may be in a great measure attributed to its extreme westerly position, and other influences which climate and other causes arising from its maritime and peninsular characters are calculated to aid.

RAPTORES. (BIRDS OF PREY.)

Spotted Eagle, *Aquila navia*, Trebartha and Carnanton. One specimen killed at Trebartha in 1861, and another shortly after at Carnanton, both in immature plumage.

White-tailed Eagle, *A. albicilla*, sometimes seen on the sea-coast.

Osprey, *Pandion Haliaetus*, several examples obtained. One example killed at Scilly in Sept., 1849.

Greenland Falcon, *F. Greenlandicus*; very rare in the southern parts of England: one killed at the Lizard, another at Port Eliot, in St. Germans.

Peregrine Falcon, *F. peregrinus*; frequently observed at Scilly, where they breed.

Hobby, *F. subbuteo*; rare: summer visitor.

Red-footed Falcon, *F. rufipes*; rare. Wembury, near Plymouth, within a few miles of Cornwall.

Merlin, *F. Aesalon*; winter visitor: not uncommon. Frequents the outskirts of moors, bordering on cultivated land. The old male with a light blue back is the Stone Falcon of Bewick.

Kestrel, *F. tinnunculus*; generally distributed.

Sparrow-hawk, *A. nisus*; generally distributed: the female of this species is at least one-third larger than the male.

- Kite, *Milvus furcatus*; lately obtained from Trebartha. This species has been almost exterminated in the west of England: two examples in the Truro Museum of the Cornish Institution, labelled as Cornish.
- Common Buzzard, *Buteo vulgaris*; the most common of the larger *Raptors*. It has been observed that an extensive and regular migration of the common buzzard takes place in the autumn, when large numbers are seen together in the moors in the eastern part of the county, and throughout the county to Scilly.
- Rough-legged Buzzard, *B. Lagopus*, Cornish; once seen on Bodmin moors.
- Honey Buzzard, *B. apivorus*. The honey buzzard has lately been captured in Cornwall. Two specimens obtained from Carclew, and one from Trereife, near Penzance. This species is remarkable for having the lore covered with small feathers, which in the other *Raptors* is nearly bare.
- Marsh Harrier, *Circus rufus*; rare throughout the whole county.
- Common Harrier, *C. cyaneus*; not a numerous species: a proportion of 4-5ths of the examples captured have been in the "ringtail" or brown plumage.
- Montagu's Harrier, *C. cineraceus*; not rare: observed at Scilly. There are four distinctions in this species from the last: viz.,—its inferiority of size; the black bars on the secondary feathers of the wing of the male; greater length of wing; and in the under parts of the adult male having longitudinal rufous streaks, whilst the immature males and females have the under parts of an uniform rufous brown, characters not observable in the common harrier.
- Scops-eared Owl, *Scops Aldrovandi*, Trevethoe and Scilly Isles.
- Long-eared Owl, *Otus vulgaris*; commonly distributed.
- Short-eared Owl, *O. brachyotus*; common winter visitant.
- White Owl, *Strix flammea*; rather rare in the western part of Cornwall, but more numerous in the eastern part.
- Tawny Owl, *Syrnium aluco*; generally distributed.
- Hawk Owl, *S. funera*. The first recorded British example of this owl was taken on board a collier, a few miles off the coast of Cornwall, in March, 1830, in an exhausted state.
- Little Owl, *Noctua passerina*; rare: one obtained near Helston, and in the collection of the late Mr. Magor, of Redruth.

INSESSORES. (PERCHERS.)

- Great Grey Shrike, *Lanius excubitor*; rare: occasional visitant in some parts of England, and generally, though not always, in the winter. One killed at Gweek, near Helston.
- Lesser Grey Shrike or Rose-breasted Shrike, *Lanius minor*, Cornish; Scilly Isles. A specimen of this Shrike was killed at Scilly in the month of November 1851. (See Corr. and notices in "Zoologist" for the year 1867. See also further particulars of this new British species in Gould's "Birds of Great Britain," Article *L. minor*.)
- Red-backed Shrike, *L. collurio*; summer visitant, not numerous, and at uncertain intervals; nest large for the size of the bird, and much exposed.
- Woodchat Shrike, *L. Rufus*; very rare: an adult bird caught in a boat, near Scilly. In the autumn of 1849 several examples of the young of the year were captured on the Scilly Isles.
- Spotted Flycatcher, *Muscicapa grisola*; generally distributed.
- Pied Flycatcher, *M. luctuosa*; not recorded as a Cornish species till the autumn of 1849, when one was captured at Alverton, Penzance; others have since been taken at Scilly.
- Red-breasted Flycatcher, *M. parva*; Carwythenack, Constantine, and Scilly. (See Gould's "Birds of Europe.")
- Common Dipper, *Cinclus aquaticus*; East Cornwall: frequents rocky mountain streams.
- Missel Thrush, *Turdus viscivorus*; generally distributed.
- White's Thrush, *T. Whitei*. A specimen of this rare thrush, in very perfect plumage, was killed near Trewithen, in Probus, a short time since.
- Fieldfare, *T. pilaris*; winter visitant: after severe frost there is always a great accession of numbers throughout this and the western counties, from their retreating as far southward and westward as possible for a less rigorous climate; a short duration of severe frost appears to prostrate the powers of this and the following species.
- Redwing, *T. iliaca*, Cornish; winter visitant. (See previous remarks on the fieldfare.)
- Song Thrush, *T. musica*; generally distributed.
- Blackbird, *T. vulgaris*; generally distributed.
- Ring Ouzle, *T. torquato*; summer visitant. More common on the eastern moors, where they breed.

- Golden Oriole, *Oriolus galbula*; not uncommon in the spring months, and observed nearly every year at Scilly.
- Hedge Sparrow, *Accentor modularis*; generally distributed.
- Redbreast, *Erythaca ruticilla*; generally distributed.
- Redstart, *Phœnicura ruticilla*; very rare westward of Exeter. At Trebartha woods, in the parish of North-hill, nest and eggs were also found and secured, and specimens of the bird. Seen during the autumnal migration. at Scilly.
- Black Redstart, *P. Tithys*; not uncommon in the winter months in immature plumage. Observed at Scilly.
- Stonechat, *Saxicola rubicola*; generally distributed.
- Whinchat, *S. rubetra*; rare and local; eastern moors; occasionally in the neighbourhood of Penzance.
- Wheatear, *S. ananthe*; summer visitant.
- Grasshopper Warbler, *Salicaria locustella*; summer visitant; rare.
- Sedge Warbler, *S. phragmites*; summer visitant.
- Reed Warbler, *S. arundinacea*; several captured at Scilly, with other summer migrants, in the autumn of 1849.
- Blackcap Warbler, *Currucula atricapilla*; local; summer visitant. Song sweet, wild, and full.
- Garden Warbler, *C. hortensis*, Cornish; summer visitant; eastern part of the county. Its habits, food, song, nest and eggs, and general character, approach very near the former species:—song rather more hurried, and sometimes garulous in expression, but the quality of voice quite equal, and the tones deeper, some of its notes resembling the blackbird's song.
- Whitethroat, *C. cinerea*; summer visitant: commonly distributed.
- Lesser Whitethroat, *C. garrula*; occasionally seen at Scilly.
- Wood Warbler, *Sylvia sibilatrix*; summer visitant: common in several localities in the eastern parts of the county, viz.—Trebartha Woods, where it breeds annually: only once seen in the western district. This bird possesses two varieties of song, quite different from each other: the first, and the most usual, is the rapid jarring trill, from which it derives its Latin name; the second is a low whining, plaintive call, repeated two or three times, at uncertain intervals, resembling the words "chea," "chea," "chea."
- Willow Warbler, *S. trochilus*; summer visitant; rather local.

- Chiff-chaff, *S. rufa*; summer visitant: generally distributed. Some few remain throughout most winters, and have been heard chirping, in mild, open weather, in December and January.
- Dartford Warbler, *Melizophilus provincialis*; much more common than formerly.
- Gold-crested Regulus, *R. cristatus*; generally distributed.
- Fire-crested Regulus, *R. ignicapillus*; not uncommon; Penzance, Gwennap, &c.
- Great Tit, *Parus major*; generally distributed.
- Blue Tit, *P. cæruleus*; generally distributed.
- Cole Tit, *P. ater*; not uncommon in woods.
- Marsh Tit, *P. palustris*; not uncommon, and not confined to marshes.
- Long-tailed Tit, *P. caudatus*; rather local: found in small families throughout the winter.
- Bearded Tit, *Calamophilus biarmicus*; very rare.
- Bohemian Waxwing, *Bombycilla garrula*; occasional winter visitant.
- Pied Wagtail, *Motacilla yarrellii*; generally distributed.
- Continental Pied Wagtail, *M. alba*; not uncommon in the spring months.
- Grey Wagtail, *M. boarula*; winter visitant in the south of England: generally distributed. Some few remain throughout the summer in Cornwall, and breed.
- Grey-headed Wagtail, *M. neglecta*; rare: Marazion Green.
- Ray's Wagtail, *M. flava*; seen for a few days on their first arrival, and again in the autumn, on their return.
- Tree Pipit, *Anthus arboreus*; summer visitant: very common in the eastern parts of the county, in the summer months: rare in west Cornwall. Song louder and very superior in quality to the titlark.
- Meadow Pipit, *A. pratensis*; generally distributed.
- Rock Pipit, *A. aquaticus*; generally distributed on our rocky beaches.
- Tawny Pipit, *A. campestris*; Scilly Isles.
- Richards' Pipit, *A. Richardi*; (length $7\frac{1}{2}$, not $6\frac{3}{4}$, ins.: see Yarrell), Cornish; rare.
- Sky Lark, *A. arvensis*; generally distributed.

- Crested Lark, *A. cristata*. The discovery of this species in this district took place at about the period of the publication of the 1st supplemental number to Yarrell's History of Birds, the bird not having been recognized as British at the time of the publication of his work.
- Wood Lark, *A. arborea* ; local.
- Short-toed Lark, *A. brachydactyla* ; very rare ; a specimen shot at Scilly on September 23rd, 1854.
- Snow Bunting, *Emberiza nivalis* ; not uncommon in the autumn months.
- Common Bunting, *E. miliaria* ; generally distributed.
- Black-headed Bunting, *E. schœniculus* ; not uncommon in marshes where bushes grow.
- Yellow Bunting, *E. citrinella* ; generally distributed in every hedge-row.
- Cirl Bunting, *E. cirrus* ; not uncommon.
- Ortolan Bunting, *E. hortulana* ; very rare : one specimen was killed on a wall at Trescoe Abbey, Scilly, in 1851.
- Chaffinch, *Fringilla œlebs* ; generally distributed.
- Mountain Finch, *F. montifringilla* ; winter visitant in severe weather.
- Tree Sparrow, *F. montana* ; very rare.
- House Sparrow, *F. domestica* ; generally distributed.
- Greenfinch, *F. chloris* ; generally distributed.
- Hawfinch, *Coccothraustes vulgaris* ; winter visitant : appears singly, and sometimes in small flocks, at uncertain intervals.
- Goldfinch, *Carduelis elegans* ; rather locally distributed.
- Siskin, *Fringilla spinus* ; winter visitant.
- Common Linnet, *Linaria linota* ; universally distributed.
- Lesser Redpole, *L. minor* ; very rare throughout the county.
- Mountain Linnet, *L. montana* ; rare.
- Bullfinch, *Pyrrhula vulgaris* ; locally distributed and nowhere numerous.
- Common Crossbill, *Loxia curvirostra* ; rare : seen at distant and uncertain intervals in small flocks.
- White-winged Crossbill, *L. bi-fasciata* ; rare : an adult bird killed at Larrigan, near Penzance, some years since.
- Common Starling, *Sturnus vulgaris* ; Cornish : universally distributed in the winter months, in flocks ; rare in summer.

- Rose-coloured Pastor, *Pastor roseus*; several examples have been obtained in Cornwall, and an adult bird from Scilly.
- Chough, *Corvus graculus*; much less common than formerly; sparingly observed in different localities on the coast.
- Raven, *C. corax*; generally distributed.
- Carrion Crow, *C. carone*; generally distributed.
- Hooded Crow. *C. cornix*; rare: occasional visitant. Formerly abundant on Marazion Green, whence it derived one of its synonyms of "Market-Jew Crow"
- Rook, *C. frugelegus*; generally distributed.
- Jackdaw, *C. monedula*; generally distributed.
- Magpie, *C. pica*; generally distributed.
- Jay, *C. glandarius*; common in the woodland districts of the county.
- Green Woodpecker, *P. viridis*; very common in the eastern woodlands, and more frequent than formerly in the west of Cornwall.
- Great spotted Woodpecker, *P. major*; rare: seen in the eastern woodlands.
- Lesser Spotted Woodpecker, *P. minor*; rare. The note of this bird exactly resembles the roosting call of the common blackbird.
- Wryneck, *Yunx torquilla*; rare in all parts of the county: occasionally observed in the neighbourhood of Penzance in the autumn only, near the coast, probably preparing for migration. Some specimens obtained at Scilly, with other migratorial birds, in the autumn.
- Common Creeper, *Certhia familiaris*; commonly distributed where large trees grow.
- Wren, *Troglodytes vulgaris*; Cornish; generally distributed.
- Hoopoe, *Upupa epops*; examples of this bird are generally to be obtained every spring.
- Nuthatch, *Sitta Europea*; very common in the eastern woodlands, becoming more rare westward.
- Cuckoo, *Cuculus canorus*; generally distributed in the summer months.
- Yellow-billed American Cuckoo; on the authority of the notice in Yarrell's work, a very rare British bird.
- Roller, *Coracias garrula*; two or three captured near the Land's End.

- Bee-eater, *Merops apiaster*. The only instances of the occurrence of this bird in this county was the capture of a flock of twelve near Helston, in 1828, and which came into the possession of the late George Borlase, Esq., of that place; and, on the authority of Mr. Couch, of Polperro, four specimens were seen in the parish of Madron.
- Kingfisher, *Alcedo hispida*; generally observed on the sea-coast; nowhere common, but generally observed, from its attractive metallic colours.
- Swallow, *Hirundo rustica*; summer visitant: universally distributed.
- Martin, *H. urbica*; summer visitant: universally distributed.
- Sand Martin, *H. riparia*; summer visitant: generally distributed in the neighbourhood of, and within reach of sandbanks.
- Common Swift, *Cypselus apus*; locally distributed.
- Alpine Swift, *C. Alpinus*; very rare: one example taken near the Lizard, and afterwards preserved by Mr. Jackson, of Looe. One specimen of the Alpine swift in adult plumage was captured in the parish of Mylor, in the summer of 1859.
- Nightjar, *Caprimulgus Europeus*; locally distributed.

RASORES.

- Ring Dove, *Columba palumbus*; generally distributed.
- Stock Dove, *C. oenas*; rare in the western counties: two specimens obtained from Scilly a few years since.
- Rock Dove, *C. livia*; found occasionally in the cliffs on the south coast of Cornwall, about Looe and Polperro.
- Turtle Dove, *C. turtur*; summer visitant: generally observed in more or less numbers, in the spring months, in sheltered valleys.
- Black Grouse, *Tetrao tetrix*; very rare in Cornwall: occasionally seen in the eastern moors.
- Pallas's Sand Grouse, *Syrrhaptes paradoxus*. The general distribution of a flight of this oriental species (which has hitherto only been noticed in the great sand deserts in western Asia, and in the eastern portions of Europe) over the whole of the British Isles, from John o'Groat's house to the Land's End and the Scilly Isles, and from Norfolk to Ireland, during the summer of 1863, entitles it to be ranked amongst the British wild birds. Some specimens showed eggs in the

ovarium more or less develope, and one female in particular from the naked state of the breast and belly gave strong evidence of incubation. (See "Zoologist" for 1863.)

Partridge, *Perdix cinerea*; universally distributed.

Common Quail, *C. vulgaris*; rare.

Great Bustard, *Otis tarda*; one observed and afterwards captured on Goonhilly, Lizard district: this proved to be a female. Another example of the great Bustard was obtained from the immediate neighbourhood of St. Austell, near Polgooth mine, in the month of January, 1854.

Little Bustard, *O. Tetrax*; rare: two specimens (females) of the little Bustard were brought to Penzance and sold to the poulterers in December, 1853.

Great Plover, *Edicnemus crepitans*; occasionally observed in the Land's-end district in the winter months, and one or more examples captured every year.

Golden Plover, *Charadrius pluvialis*; generally distributed in the winter months.

Dottrell, *C. morinellus*; rare: open moors and sheepwalks; an inland species.

Ringed Plover, *C. hiaticula*; Cornish; generally distributed along our sea-shores.

Kentish Plover, *C. Cantianus*; a specimen obtained from Marazion beach.

Little Ringed Plover, *C. minor*; very rare as a British bird. A young bird of the year, corresponding in every particular with the figure in Gould's "Birds of Europe," was shot near the higher pond of Tresco, Scilly, in October, 1863.

Grey Plover, *Squatarola cinerea*; occasional winter visitant, especially after severe weather.

Lapwing, *Vanellus cristatus*; locally distributed.

Turnstone, *Streptilas interpres*; observed in the spring and autumn migrations.

Sanderling, *Calidris arenaria*; not a very numerous species: specimens in winter and summer plumage frequently obtained.

Oyster-catcher, *Hæmatopus ostralegus*; not uncommon on the western coast of Cornwall and at Scilly.

- Common Heron, *Ardea cinerea*; generally distributed in suitable localities, especially in creeks and estuaries. There is a Heronry on the Lamorran river, near Truro; another near Fowey.
- Purple Heron, *A. purpurca*; two adult examples in perfect plumage obtained in the county within the last few years.
- Squacco Heron, *A. comata*; occasional visitant in the spring months.
- Little Bittern, *A. minuta*; very rare: a specimen was lately obtained from St. Hilary and Scilly.
- Common Bittern, *Botaurus stellaris*; not uncommon at uncertain periods.
- Night Heron, *Nycticorax Europæus*; occasionally met with and specimens obtained from East and West Cornwall.
- White Stork, *Ciconia alba*, Cornish; very rare: only one recorded instance, and that at the Land's-end, in May, 1848.
- Black Stork, *C. nigra*; very rare: a specimen killed either on the Tamar or Lynher, in 1831.
- White Spoonbill, *Platalea leucorodia*; occasionally, and especially of late years, observed in various parts of the county, and at Scilly.
- Glossy Ibis, *Ibis falcinellus*. On September 19th, 1854, the glossy ibis was shot at Tresco, Scilly.
- Common Curlew, *Numenius arquata*; common on the sea-coast, and in harbours, creeks, and estuaries.
- Wimbrel, or May Bird, *N. phæopus*; observed in the latter part of April, and again in the autumn, in going to and returning from their northern breeding-grounds. When disturbed their note resembles the words "luddle, luddle, luddle, luddle," quickly uttered.
- Spotted Redshank, *Totanus fuscus*; rare: occasionally met with in the autumn months.
- Common Redshank, *T. calidris*; not uncommon on salt marshes.
- Bartram's Sandpiper, *T. Bartramii*. A specimen of *T. Bartramii* was shot at or near Goonhilly, in the week of the 6th of November, 1865.
- Green Sandpiper, *T. ochropus*.
- Yellow-shanked Sandpiper, *T. flavipes*; one specimen shot on Marazion Marsh.

- Wood Sandpiper, *T. glareola*; not uncommon in the autumn, and sometimes in the spring months.
- Common Sandpiper, *T. hypoleucos*; summer visitant.
- Greenshank, *T. glottis*; not uncommonly met with in the same localities as the redshank. This bird shews the connecting link between the sandpiper and the godwits, in the form of the beak, which turns a little upwards.
- Avocet, *Recurvirostra avocetta*; very rare as a Cornish bird: one obtained from the Land's-end, apparently a bird of the year, in September, 1847.
- Black-tailed Godwit, *Limosa melanura*; occasional visitant.
- Bar-tailed Godwit, *L. rufa*; generally to be met with in the autumnal months on flat sands and estuaries. In summer the breast of this species is bright bay, in winter white; the breast of the bird of the year, until the next summer, buff.
- Ruff, *Machetes pugnax*; occasionally met with in the autumnal months only in the marshes in the Land's-end district.
- Woodcock, *Scelopax rusticola*; winter visitor: universally distributed.
- Great Snipe, *S. major*; very rare generally in the western counties.
- Common Snipe, *S. gallinago*; universally distributed in suitable localities: a brown variety, with the dorsal stripes narrower, occasionally met with.
- Jack Snipe, *S. Gallinula*; as universally distributed as the last-named species.
- Sabine's Snipe, *S. Sabini*. This variety of the common snipe, as it is supposed to be by some, and doubted by others, was killed near Carnanton, in the neighbourhood of St. Columb, in January, 1862; also at Madron recently.
- Brown Snipe, *Macrorhamphus griseus*; very rare as a British bird, five or six examples only having occurred: one reputed to have been killed in Devon. Very common on the shores of America. The first and only example of this rare species in Cornwall (a bird of the year) occurred at Scilly, on the 3rd of October, 1857.
- Curlew Tringa, *Tringa subarquata*; common in the autumnal months along our flat beaches.
- Knot, *T. canutus*; a few observed on most of our flat beaches in the autumnal and spring seasons: in summer plumage the breast is bright red, in winter, white.

Buff-breasted Tringa, *T. rufescens*; very rare—two examples only recorded of its capture in Cornwall, one between Penzance and Marazion; the other on high ground near Chûn Castle, Morvah.

Little Stint Tringa, *T. minuta*; occasionally seen, and specimens obtained from salt marshes near the sea.

Temminck's Stint Tringa, *T. Temminckii*; found occasionally in the same localities as the last-named species, but not so frequently.

American Stint, *T. pusilla*. An example killed in Marazion marsh, October 10th, 1854.—This is the first recorded British specimen, killed by Mr. W. H. Vingoe.

Schinz's Tringa, *T. Schinzi*; two specimens killed on Hayle estuary, in Oct., 1846.

Pectoral Tringa, *T. pectoralis*. I quote the words of Mr. Yarrell in reference to the capture of this interesting species in Cornwall:—

“D. W. Mitchell, Esq., of Penzance, sent me in June, 1840, a coloured drawing of the natural size, and a fully detailed description with measurements, of a sandpiper, shot by himself on the 27th of the previous month, while the bird was resting on some sea-weed within a few yards of the water on the rocky shore of Annet, one of the uninhabited islands of Scilly.—On the following day another example was seen, but became so wild after an unsuccessful shot that it took off to another island and escaped altogether.—The close accordance of the specimen obtained with the description of *Tringa pectoralis* in summer plumage in the 4th part of M. Temminck's *Manuel*, led Mr. Mitchell to a true conclusion as to the species and its novelty and interest in this country.”

Several obtained since from Scilly.

Dunlin Tringa, *T. variabilis*; generally distributed on all our flat beaches throughout the year.

Purple Tringa, *T. Maritima*; not unfrequently seen on the rocks extending into the sea, both in the spring and winter.

Collared Pratincole, *Glareola torquata*; very rare as a British bird. The Lizard.

Land Rail, *Gallinula crex*; locally distributed over the east and west of Cornwall.

Spotted Crake, *G. porzana*; occasional winter visitant.

Little Crake, *G. minuta*. This is a rare British bird, and although no recorded Cornish example exists, Mr. Drew, naturalist, late of Plymouth, had a specimen which he said he received from the neighbourhood.

- Baillon's Crake, *Crex Baillonii*; a rare British species: one specimen obtained from the basin of Penzance pier, another from Zennor, and a third from Marazion marsh in 1877.
- Moor-hen, *Gallinula chloropus*. The remarks on the water-rail apply to this species.
- Water Rail, *Rallus aquaticus*; generally met with in suitable localities.
- Common Coot, *Fulica atra*; common in marsh pools, &c.
- Grey Phalarope, *Phalaropus lobatus*; occasional visitant, and often in large numbers, in the autumnal and winter months, but at uncertain intervals.
- Red-necked Phalarope, *Lobipes hyporboreus*; occasional visitant, found inland near fresh water.

NATATORES.—(SWIMMERS.)

- Grey Lag Goose, *Anser ferus*. A specimen was shot in Marazion marsh in the early part of March, 1862.
- Bean Goose, *A. segetum*; this is our common wild goose.
- White-fronted Wild Goose, *A. albifrons*; not unfrequently obtained at the Land's-end in the winter months.
- Bernicle Goose, *A. bernicla*; occasionally obtained from the Land's End marshes.
- Brent Goose, *A. brenta*; occasional visitant, and in considerable flocks in hard winters.
- Spur-winged Goose, *A. gambensis*; the only recorded British specimen was killed near St. Germans, in June, 1821, and, in a mutilated state, was given by Mr. Henry Mewburn of that place.
- Hooper, or Wild Swan, *Cygnus ferus*; the hooper is generally observed in the western counties after a long continuance of hard frost.
- Bewick's Swan, *C. Bewickii*. This species was so long confounded with the former, as a small variety, that I have ventured to record it as Cornish.
- Mute Swan, *C. olor*; only known as domesticated.
- Common Shieldrake, *T. vulpanser*; not uncommon in severe winters.
- Shoveller, *Spathulea clypeata*; not uncommon in severe winters.
- Wild Duck, *Anas boscas*; universally distributed.

Gadwall, *Cauliodus strepera*; rare: one specimen, and the only one recorded from this neighbourhood.

Pintail Duck, *Querquedula acuta*; common in the Land's-end district in severe weather.

Garganey, *Q. circea*; a spring visitor in Cornwall: a few summers since several were obtained in the neighbourhood of Penzance in very beautiful plumage.

Teal, *Q. crecca*; the most regular of our duck visitors every winter, appearing sometimes early in the autumn.

Wigeon, *Mareca Penelope*; a regular visitor to the Land's-end district.

Eider Duck, *Somateria mollissima*; one specimen killed on the river Looe: rarely seen in southern latitudes.

Velvet Scoter, *Oidemia fusca*; sometimes seen in Mount's-bay, and one shot at Penzance quay.

Common Scoter, *O. Nigra*; rare: occasionally seen in Mount's-bay and captured. All the scoters are oceanic in their habits, and are more frequently seen at sea than inland.

Surf Scoter, *O. perspicillata*; a rare bird in England, and only occasionally seen in the north of Scotland. A specimen of this duck in adult plumage was picked up in a dying state on the beach at St. Mary's, Scilly, on the 22nd September; the autumnal moult was completed and the plumage yet black,—the white on the top and back of the head, pure white,—the colour of the anterior portion of the bill, Seville-orange-yellow,—nail, greyish-yellow.

Pochard, *F. ferina*; not uncommon in the winter months after frost.

Scaup Duck, *F. marila*; rare in the western districts, a few occurring in severe weather: the female has a broad white patch at the base of the bill.

Tufted Duck, *F. cristata*; found in the Land's-end district in all winters with more or less frost.

Long-tailed Duck, *Harelda glacialis*; very rarely found in the southern counties of England: a female killed on Marazion marsh a few years since, and at Tregothnan.

Golden Eye, *C. vulgaris*; not an uncommon species in hard winters in the Land's-end district.

- Smew, *Mergus albellus*; rare: a few instances of its occurrence on record.
- Red-breasted Merganser, *M. serrator*; generally a winter visitor.
- Goosander, *M. merganser*; sometimes observed in Mount's-bay, but only in winter plumage: the adult male has the breast of a beautiful glowing maroon buff colour.
- Great Crested Grebe, *Podiceps cristatus*; not uncommon in winter on marshes.
- Red-necked Grebe, *P. rubricollis*; quite as often occurring as the last-named species,—frequenting the same localities.
- Horned Grebe, *P. cornutus*; specimens not in adult pluma occasionally obtained from the Land's-end district.
- Eared Grebe, *P. auritus*; specimens not unfrequently obtained, but generally in immature plumage: a specimen in adult summer plumage obtained some years since from St. Just pool, Falmouth harbour, and now in the Truro museum.
- Little Grebe, *P. minor*; the most commonly distributed of all the grebes in the Land's-end district. In summer plumage the neck is dark-red with the chin black.
- Great Northern Diver, *Colymbus glacialis*; found in more or less numbers every year, generally in immature plumage, and in the autumnal months; though of late years some specimens in the adult state have been killed.
- Black-throated Diver, *C. arcticus*; more rare than the former species, sometimes seen in Mount's-bay.
- Red-throated Diver, *C. septentrionalis*; common in the autumnal and winter months in Mount's Bay, and at this season invariably found without the red throat, and in the plumage represented by Bewick as the "speckled diver."
- Common Guillemot, *Uria troile*; frequently seen singly, and in small parties, in Mount's-bay, and around our coast.
- Ringed Guillemot, *U. lacrymans*; the specific distinction of this bird from the common guillemot is doubted.
- Black Guillemot, *U. grylle*; rare on the western coasts of Cornwall: one example, in intermediate plumage, taken some years since in Mount's-bay.
- Little Auk, *Mergulus melanoleucos*; not frequently met with on our coasts.

Puffin, *Alca fratercula*; occasionally observed on the Land's-end cliffs, but the precipitous rocks on some of the islands at Scilly appear to be its favourite haunts.

Razor Bill, *A. torda*; a common species.

Common Cormorant, *Phalacrocorax carbo*; generally distributed throughout the western coast of Cornwall.

Common Shag, *P. cristatus*; more numerous as a species than the last-named, and more frequently observed in creeks and arms of the sea.

Gannet, *Sula bassana*; not unfrequently observed, and sometimes in small companies, in Mount's-bay and on the north coast.

Sandwich Tern, *S. cantiaea*; a few pairs observed in the summer months on some of the islands at Scilly.

Roseate Tern, *S. Dougallii*; formerly abundant in summer at Scilly: breeds on Annet, a Scilly rock, and some other localities near.

Common Tern, *S. hirundo*; more or less common in the summer in Mount's-bay, approaching nearer the shore in windy weather: less abundant at Scilly than the roseate or arctic terns.

Arctic Tern, *S. Arctica*; a common species in summer both on our coast and at Scilly, at which latter locality its eggs may be obtained every year.

Whiskered Tern, *S. leucoparvia*; an immature specimen obtained in the month of September, 1851, at Scilly.

Gull-billed Tern, *S. Anglica*; a few examples only have been captured in England. In the latter part of May or beginning of June, 1852, an adult specimen was shot at Scilly.

Lesser Tern, *S. minuta*; several examples of this small tern have been obtained close by the town of Penzance.

Black Tern, *S. nigra*; generally observed in the autumnal months, and nearly every year, in more or less numbers, on the sea-side and island.

Sabine's Gull, *Larus Sabini*; rare: occasionally obtained in winter in its immature plumage. This bird has been mistaken for the little gull, but in its young state it may be known by the absence of black in the wing, by the greater length and slenderness of the beak, and by the tail being deeply forked.

- Little Gull, *L. minutus*; rarely met with, but specimens in adult and immature plumage have been obtained at Penzance and the Land's-end,—the latter in the month of December, 1844.
- Black-headed Gull, *L. ridibundus*; not uncommon on the sands at Hayle and elsewhere, in winter.
- Kittiwake Gull, *L. tridactylus*; common on our coasts generally.
- Ivory Gull, *L. eburneus*; very rare: the only recorded example of this bird in Cornwall was captured off the pier at Penzance, in the month of February, 1847.
- Common Gull, *L. canus*; generally distributed in more or less numbers along our coasts.
- Bonapartian Gull, *L. Bon* (See Yarrell's 2nd "Supplement," p. 55); an immature specimen killed in Falmouth harbour, in June, 1865.
- Lesser Black-backed Gull, *L. fuscus*; generally distributed, with the herring gulls, in large numbers on our flat sands and open estuaries.
- Herring Gull, *L. argentatus*; the most common gull on our coast, and generally distributed in estuaries, creeks, open sands, and precipitous cliffs.
- Great Black-backed Gull, *L. marinus*; one or two may be seen, at all times and seasons, in different localities along our coast.
- Glaucus Gull, *L. glaucus*; occasionally observed, but by no means regularly or frequently.
- Iceland Gull, *L. islandicus*; rare. A specimen of the Iceland gull in the state of plumage almost amounting to pure-white, obtained from Scilly.
- Common Skua, *Lestris catarractes*; rarely met with in the western counties: observed at the Wolf rock in considerable numbers in 1863.
- Pomerine Skua, *S. pomarinus*; occasionally, and at uncertain intervals, occurring on our coast, and in every instance in immature plumage.
- Richardson's Skua, *L. Richardsonii*; rarely observed on our coast, and more rarely in adult plumage.
- Buffon's Skua, *L. parasiticus*; very rare: a specimen found inland in the parish of St. Buryan, in adult plumage.

Greater Shearwater, *Puffinus major*; occasionally seen, and specimens obtained from Mount's-bay.

Manx Shearwater, *P. anglorum*; common at Scilly, where it annually breeds in rabbit-holes.

Fulmar Petrel, *Procellaria glacialis*; very rarely observed in the south of England: one specimen taken alive at the Land's-end.

Wilson's Petrel, *P. Wilsonii*; one specimen only obtained from Cornwall, and this was found dead in a field near Polperro; it passed into the hands of Mr. Couch, who forwarded it to Mr. Yarrell, whose figure of this bird was taken from the Cornish specimen.

Fork-tailed Petrel, *P. Leachii*; several specimens of this small petrel have from time to time been obtained on our coasts.

Storm Petrel, *P. pelagica*; of frequent occurrence in the summer months, and observed at a distance of five or six miles at sea. Abundant at Scilly, where they breed. Egg white, with a rufous zone at the larger end.

APPENDIX.

From the year 1843 to the present time much attention has been given to the Natural History of the Isles of Scilly: valuable contributions have been given in our Geological and Natural History Reports on the geology of the islands, and on the botanical, entomological, and other natural productions of this western archipelagó, and a large amount of statistical information as to the specimens recorded has appeared in the pages of the "Zoologist" since the above period. The following list of the occurrences and captures of some of our rarer and more interesting British species of birds in these islands (most of our common way-side birds being found there) may, it is hoped, keep alive an interest in the natural history of this district, remembering that from the peculiar westerly and southerly position of the group, there always exist chances of stragglers being found there under disturbed states of the elements, or as a favourable resting-place in the great northern and southern migratorial movements of birds, as the following list will show.

The following is a list of some of the rarer and more interesting species of British birds observed and captured at Scilly.

- Pectoral Sandpiper, *Tringa pectoralis*.—Isle of Annet, Scilly May 29th, 1840.
- Ring Dottrel, *Charadrius hiaticula*.—Breeds. . . April 25th, 1843.
- Hoopoe, *Upupa epops*.—At different times since 1843, to present time.
- Scops Owl, *Strix Aldrovandi*.—The grey figure of this owl in Gould's "Birds of Great Britain" is a male bird, and drawn from this specimen. April, 1847.
- Night Heron, *Ardea nycticorax* May, 1849.
- Osprey, *Pandion haliaetus* May, 1849.
- | | |
|--|---|
| Pied Flycatcher, <i>Muscicapa luctuosa</i> . | } September, 1849, during autumnal migration,—apparently in transitu only, as they are not found in Cornwall in the spring. |
| Reed Wren, <i>Salicaria arundinacea</i> . | |
| Woodchat Shrike, <i>Lanius rufus</i> .. | |
| Garden Warble, <i>Curruca hortensis</i> . | |
| Wryneck, <i>Yunx torquilla</i> | |
- Spoonbill, *Platalea leucorodia*. June, 1850.
- Ortolan Bunting, *Emberiza hortulana* October, 1851.
- | | |
|---|--------------------|
| Little Stint, <i>Tringa minuta</i> | } September, 1851. |
| Whiskered Tern, <i>Sterna leucoporeia</i> | |
- Lesser Grey or Rose-breasted Shrike, *Lanius minor* (the first British specimen) November, 1871.
(See Gould's "Birds of Great Britain.")
- | | |
|--|------------------|
| Fire-crested Wren, <i>Regulus ignicapillus</i> | } October, 1851. |
| Richard's Pipit, <i>Anthus Richardi</i> | |
- Montague's Harrier, *Circus cineraceus*.—Three specimens; one with a thrush's egg in its mouth April, 1852.
- | | |
|---|--------------|
| Gull-billed Tern, <i>Sterna Anglica</i> | } May, 1852. |
| Iceland Gull, <i>Larus islandicus</i> | |
- Goosander, *Mergus serrator* December, 1853.

- Short-toed Lark, *Alauda brachydactyla* }
 Glossy Ibis, *Ibis falcinellus* } September, 1854.
- Schinz's Sandpiper, *Tringa Schinzi* }
 Hawfinch, *Loxia coccothraustes* } October, 1854.
 White-fronted Goose, *Anser albifrons* }
- Pied Flycatcher, (young), see *ante* September, 1857.
- Lesser Whitethroat, *Curruca garrula* }
 Landrail, *Gallinula crex* } October, 1857.
 Brownsnipe, *Macroramphus griseus* }
 Temminck's Stint, *Tringa Temminckii* }
- Long-eared Owl, *Otus vulgaris* . . }
 Short-eared Owl, *O. brachyotus* . . } Every year.
- Merlin, *Falco Æsalon* }
 Purple Sandpiper, *Tringa maritima* } December, 1859.
 Cirl Bunting, *Emberiza cirrus* }
 Bramble Finch, *Fringilla montifringilla* }
- Red Phalarope, *Phalaropus hyperbora* }
 Brent Goose, *Anas Brenta* } October, 1860.
- Golden Oriole, *Oriolus galbula* (first recorded) . . June, 1861.
- Pallas's Sand Grouse, *Syrrhaptes paradoxus* June, 1863.
- Marsh Harrier, *Circus rufus* }
 Red-breasted Flycatcher, *Muscicapa parva* . . } October, 1863.
 Little Ringed Plover, *Charadrius minor* }
- Long-tailed Duck, *Anas glacialis* November, 1864.
 Sparrow Hawk, *Accipiter nisus*.—Occasionally.
- Chiff Chaff, *Sylvia Rufa* December, 1864.
- Redstart, *Phenicura rutila*. }
 Blackstart, *P. Tithys*. } Observed generally every autumn.
- Golden Oriole, *Oriolus galbula* (in several states }
 of plumage for some weeks) } May, 1865.

Grey Plover .. }
 Little Grebe }
 Chaffinch .. }
 Linnet }
 Green Linnet .. }
 Blackbird }
 Thrush .. }
 Fieldfare }
 Redwing .. }
 Starling }
 Peewit .. }
 Golden Plover .. }
 Larks }
 Missel Thrush .. }
 Goldfinch }

Periodical migrants, varying, according to
 circumstances, in numbers and time of
 appearance.

50642

Journal

OF THE

ROYAL INSTITUTION

OF

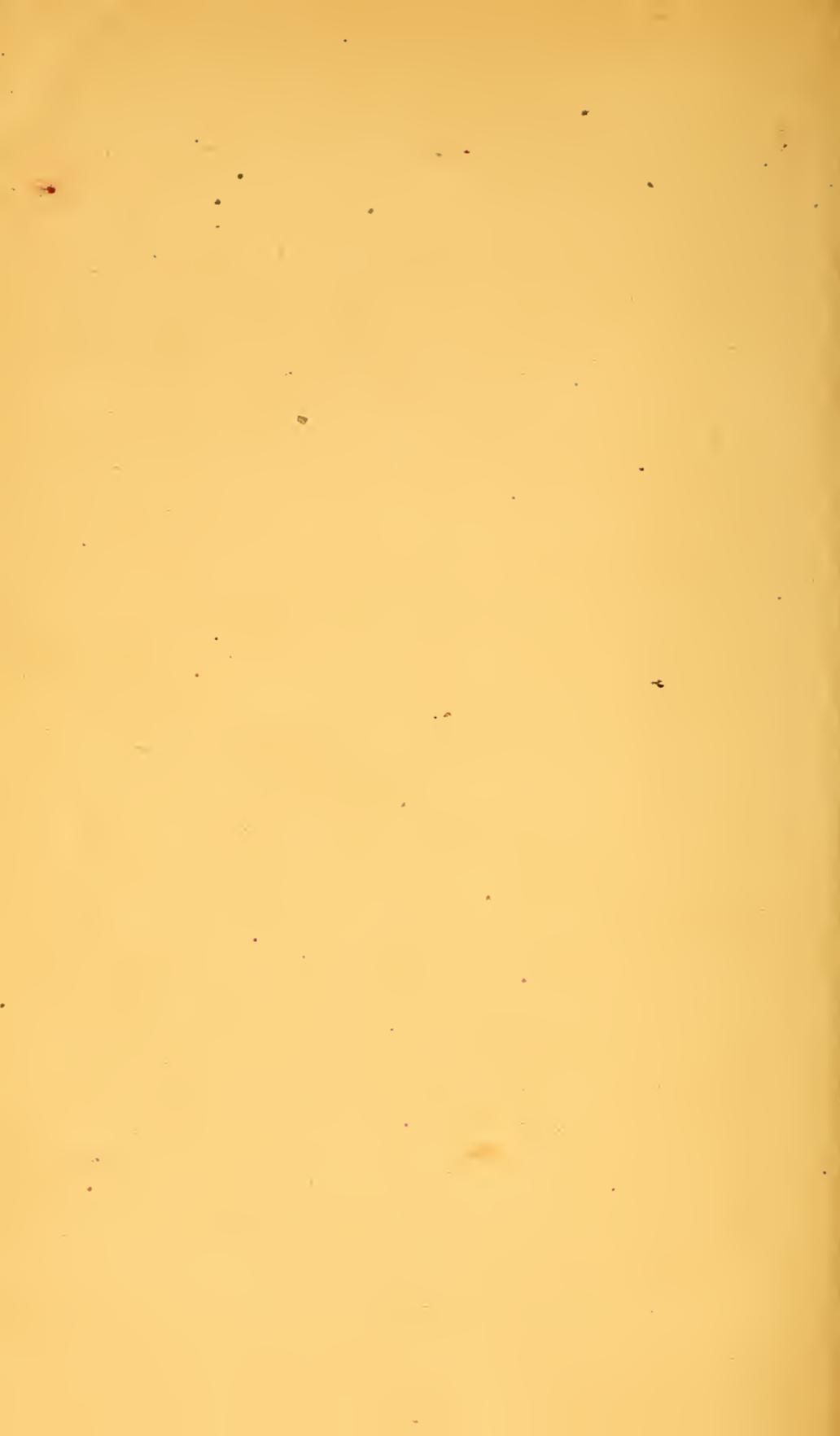
CORNWALL.

No. XIX, Part II.

JULY, 1878.

EDITED BY J. H. COLLINS, F.G.S.

TRURO:
LAKE & LAKE, PRINCES STREET.
1878.



ILLUSTRATIONS
OF
BISHOP VIVIAN'S TOMB, BODMIN,
AND OF
CARDINHAM ANTIQUITIES.

—————
(Note by Rev. W. IAGO, B.A.)
—————

The Papers to which these illustrations belong will be found at pages 342 and 358 of this Journal.

The *Plates* should be inserted (some in pairs, some singly) in the following order:—

- I.—“High Tomb of Vivian” to face page 342.
- II.—“Slab of John Vyvyan” to follow the former, at page 343.
- III.—“Vivian Inscription” to face page 344.
- IV.—“Details at Rialton and Bodmin” to follow the former, at page 345.
- V.—“Vivian’s Effigy” to face page 346.

Corrections and Additions (Letterpress).—Page 343, line 19, for Catacluse, read “*Catacluse.*”

Page 343, line 20.—Including effigy the Tomb is rather over 4 feet high ; it is 6 feet 9 inches long, and 2 feet 9 inches wide.

Page 343, line 27, for orphrey, read “*orphreys.*”

Page 344, line 1. read “*pillow and cushion, tassels broken off.*”

„ „ 21.—It is alleged that the metal is tin.

„ „ 26, for TVMILATV[E], read TVMILATV[R].

„ (foot note), to “3 lions’ heads” add “*erased.*”

Page 345, line 2, “Suffragan †”—The note for this reference is at foot of former page.

Page 345, line 7.—These sculptures are wrought so as to form grotesque human faces, forms of animals &c., combined with foliage and fruit.

Page 345, line 9 (see also foot note)—The Arms inscribed “Edgarus” by Vivian, are usually assigned to “Athelstanus.”

Page 346 (foot note), for “Cornwall Register,” read “*Bodmin Register.*”

Cardinham Plates.—I.—“Inscribed Stones and Castle Plan to face page 362.

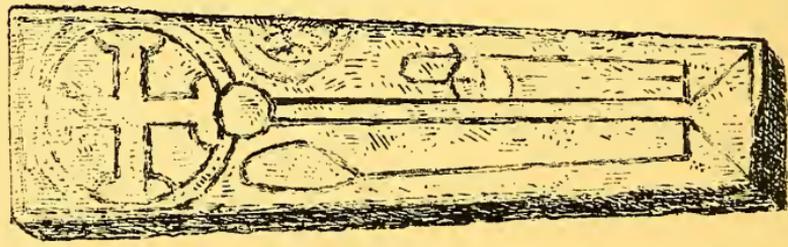
II.—“Crosses and Slab,” to face page 364.

Corrections.—Page 358 (foot note). A bracket is omitted.

Page 365, line 10, for “Ochari,” read “*Ochani.*”

Ancient Crosses
and Slab

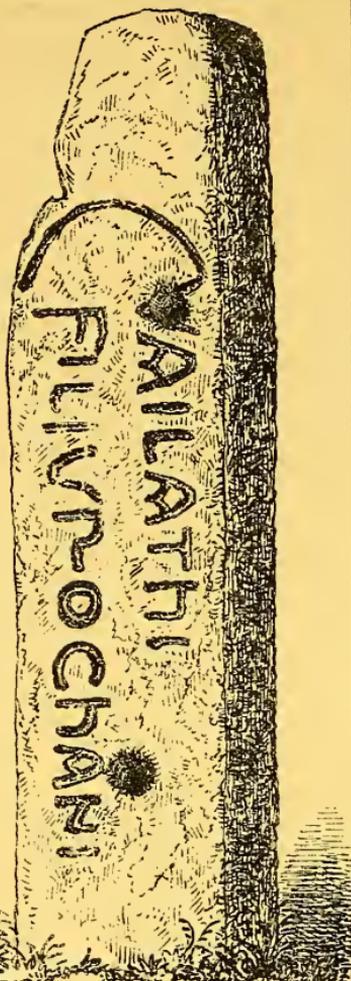
at Cardinham
1877.



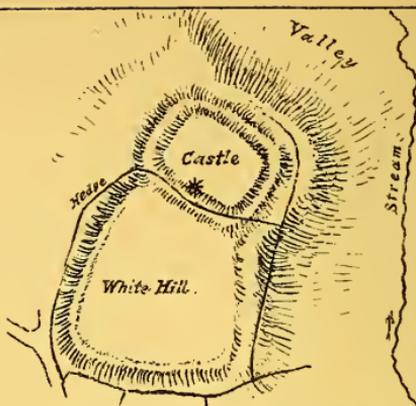
Incised Tomb (Granite) with rudely cut representations of Cross, Shield, Sword, and Key.

[W. Fago.]

[Probably "VALIATHI THII UROCHAN."]

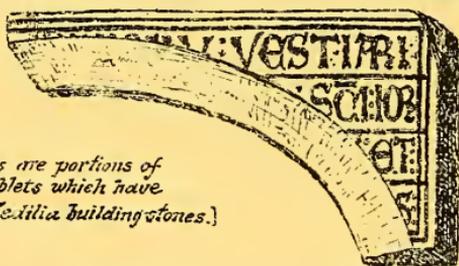
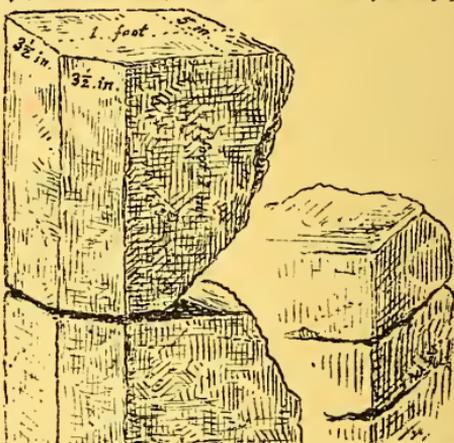


Ancient Inscribed Stone at Welltown.



PLAN OF OLD CARDINHAM CASTLE.

[* Spot at which foundations of a Wall have been excavated, containing Shells, Bones and Cinders, with fragments of Pottery, and several finely dressed squared and chamfered pieces of freestone loosely thrown in. (Some here figured).]

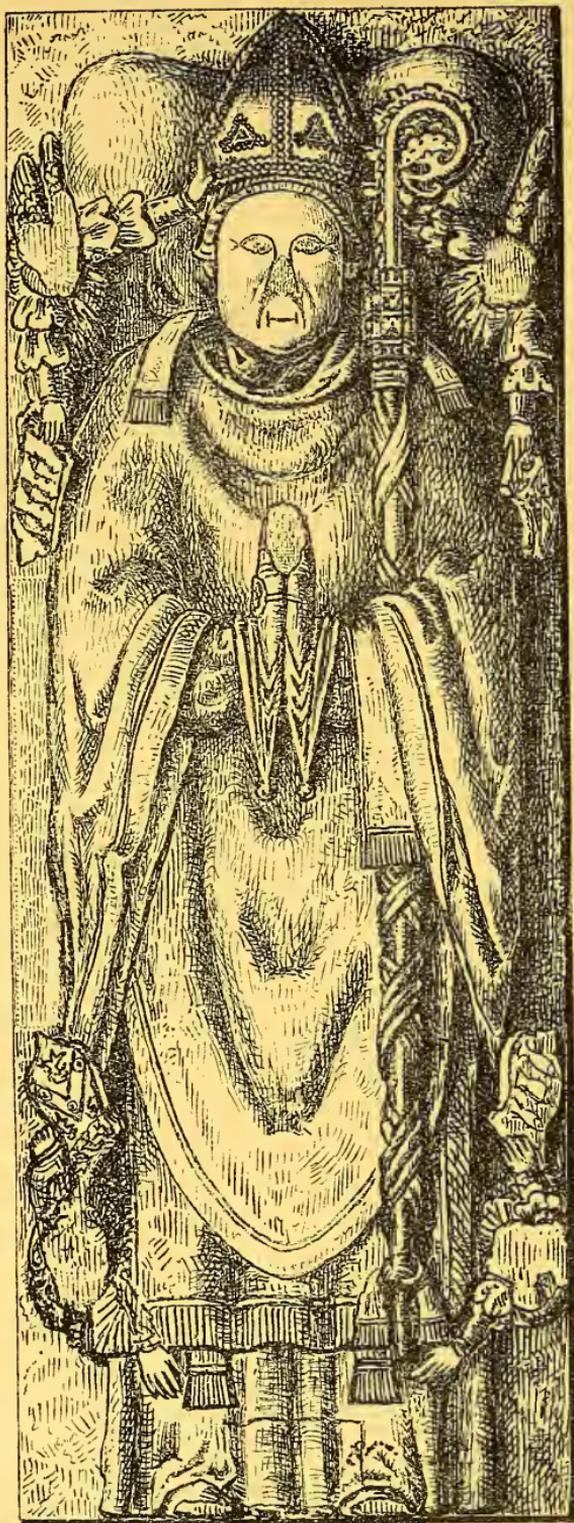


[These three Stones are portions of two Inscribed Tablets which have been cut to form Scullia building stones.]

Incised Fragments in
CARDINHAM CHURCH.







[1 Inch = 1 Foot.]

BISHOP VIVIAN. BODMIN. A.D. 1533.

[W. Lugo]

EDGARVS S PETROC

Arms of
 King Edgar and of St Petrock, son
 Sculptured Archstones, with Monogram of the
 Initials of Bishop Vivian, at Rialton, St Columba



Arms of Bishop Vivian
 [on his Tomb]

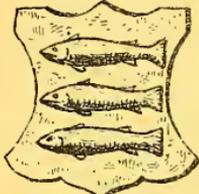
Arms and Badges of King Henry VIII.



Head Panel of Vivian's Tomb 1533



Arms of Vivian, as Prior.
 [On a stone in the
 wall of Bodmin
 Church]



Arms of Bodmin Priory.
 [on Vivian's Tomb]



Arms of
 King Edgar.
 [on the foot of
 *]

Bishop Vivian's
 Tomb,
 at Bodmin.]
 *

HIC TUMULAT VENERABILIS PATER TOMAS VIVIAN MEGARENSIS EPVS

(Last)

FRVVSQ DOMVS PRIOR

CVI OBIT ANNO DNI M OXXXII PRIMO DIE IVNI CVIS

(Last)

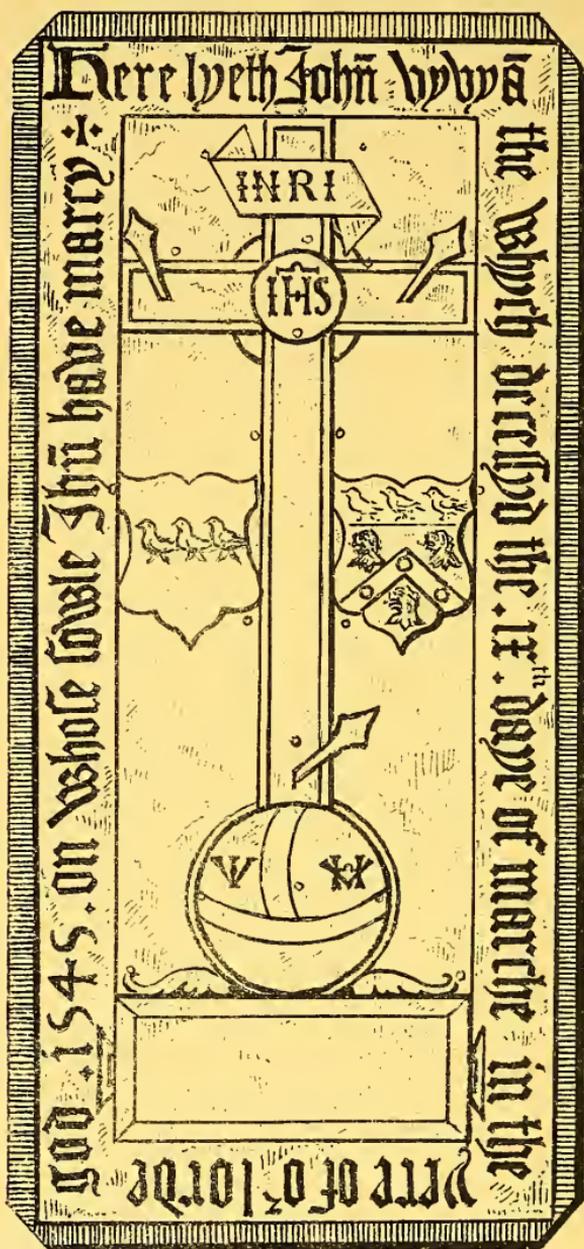
PROFICIANT DEVS AMEN

(Last)

[SCALE, 1 Inch to 1 Foot]

Inscription on the Tomb of Bishop Vivian, Prior of Badminton

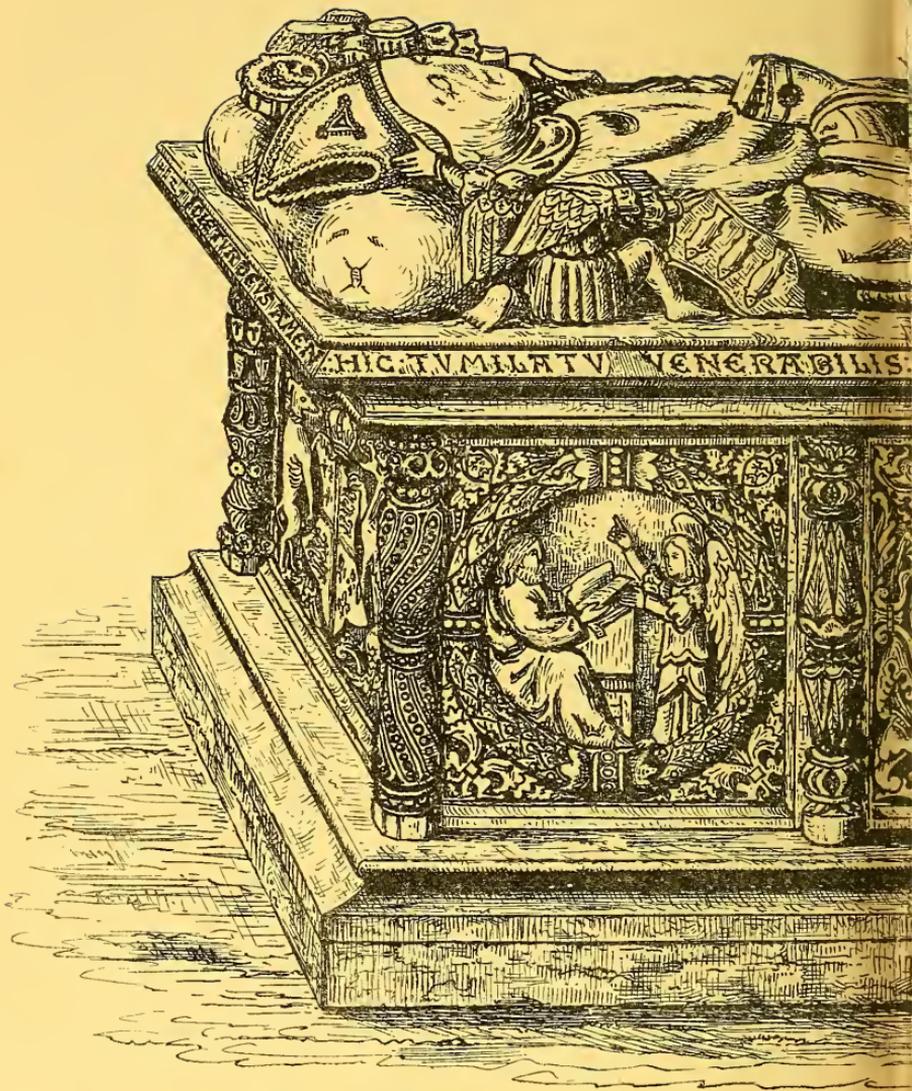
W. IAGO. B.A.



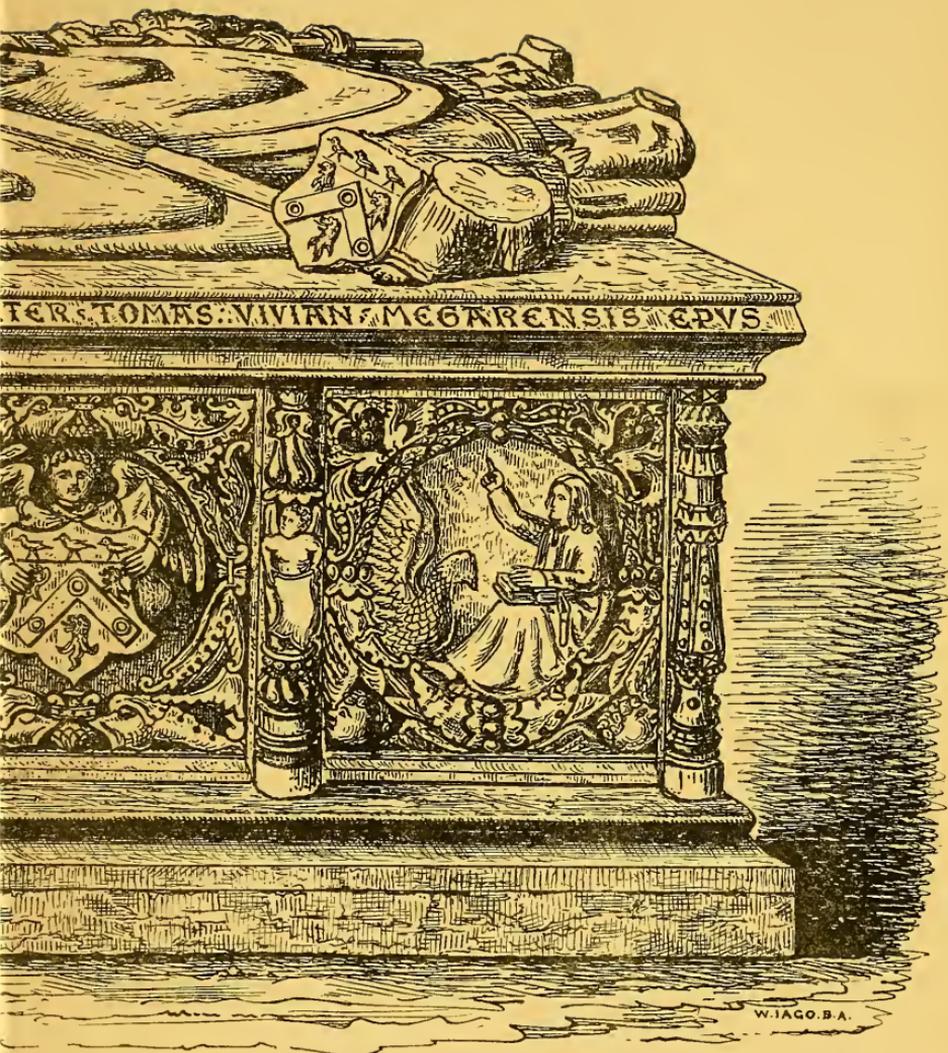
[1 Inch = 1 Foot.]

Slab of John and El. Vybyan, 1545, at Bodmin.

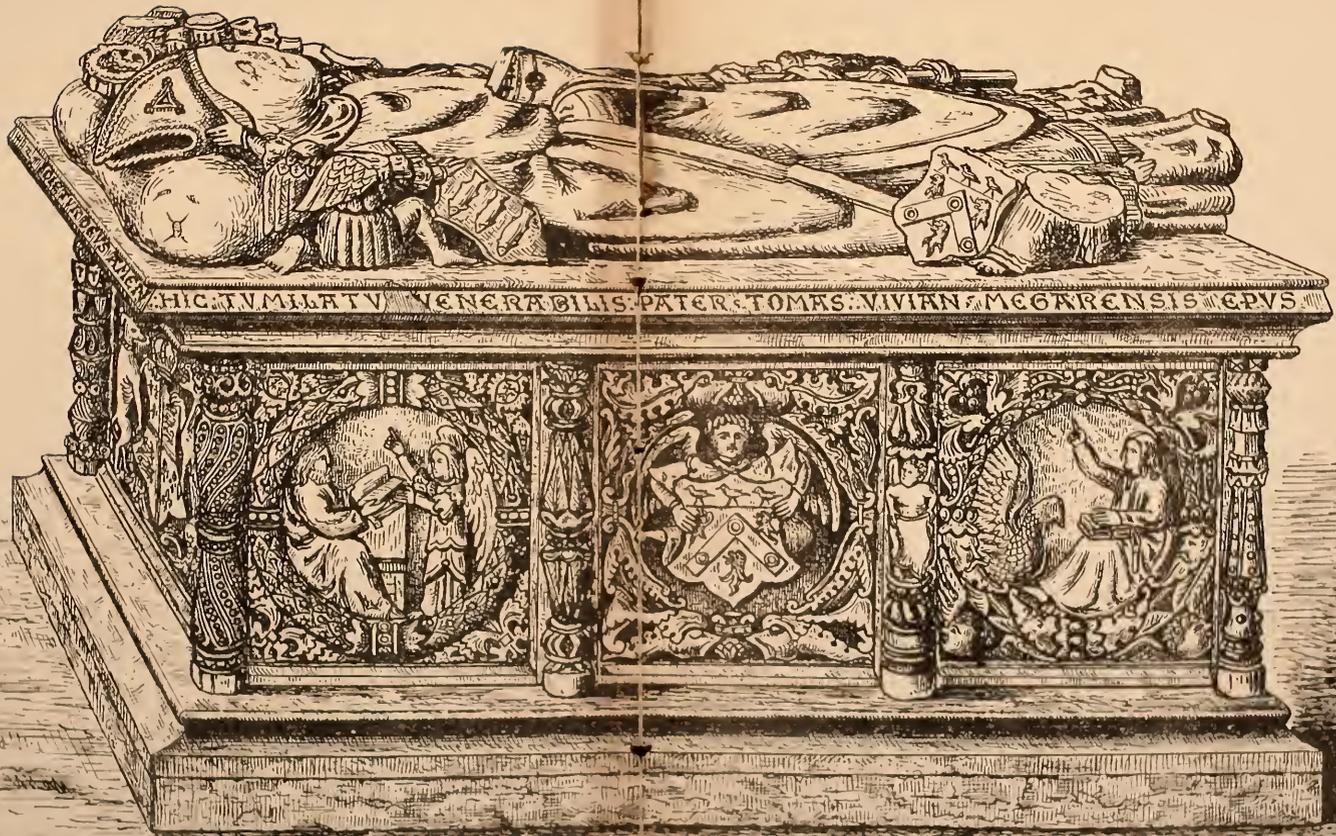
It contains several metal rivets, as shewn. W. IAGO. B.A.



• Tomb of the Suffragan-Bishop Vivian, Prior of the Monastery of
• Erected originally before the High Altar of the Conventual Church, &c.



tery of St Mary and St Petrock, Bodmin: A.D. 1533 
 destroyed, and now standing in the Parish Church of Bodmin, Cornwall. 



HIC IN MILITIA VENERABILIS PATER TOMAS VIVIAN MECORRENSIS EPVS

W. IACOBA

22. Tomb of the Suffragan Bishop Vivian, Prior of the Monastery of St Mary and St Petrock, Bodmin, A.D. 1533. It was erected originally before the High Altar of the Conventual Church, since destroyed, and now standing in the Parish Church of Bodmin, Cornwall.

VERTEBRATA—*REPTILIA* & *AMPHIBIA*.

Revised by Thos. Cornish.

I HAVE revised Mr. Couch's list of Cornish reptiles after having revised his list of Cornish fishes, and therefore I must beg leave to refer to the remarks with which I preface that list for an explanation of my process now.

REPTILIA—(REPTILES).

“Luth” or “Leathery Turtle” (*Sphargis Coriacea*). Borlase records the occurrence of this turtle in Cornish seas, and there is no reason to doubt the correctness of his observation. Certainly several have been taken on the coast of France, and some on the coast of England. It is a powerful swimmer.*

“Green Turtle” (*Chelonia viridis*.) The turtle which yields the green fat of turtle soup, A specimen, covered with barnacles and sea weed, was taken alive and in vigorous condition, in a drift net about two miles south of Mousehole Island, in Mount's Bay, on 5th October, 1874. This turtle sometimes appears in English waters, washed overboard from ships or out of a wreck, but it is probable that this particular specimen found its way across the ocean naturally (by coming with the current) not only from the state in which it was when taken, but also from the fact that within four days of its capture “pimelepteres cornubiensis,” a tropical fish, was taken alive in Mount's Bay, out of a floating packing case, which was covered with barnacles. The fish and the turtle probably floated across the Atlantic together in some sort of involuntary company.

The Sand Lizard (*Lacerta agilis*) is mentioned by Borlase, and retained by Couch as having occurred in Cornwall. They

* Couch (appendix p. 149) records the capture of a turtle off “the Wolf” Rock, but its species was not identified. It was taken in August, 1839.

are probably correct, but I myself have never seen it west of Dartmoor.

The Viviparous or Scaly Lizard (*Zootoca vivipara*) is not uncommon. These are the only two lizards known to be natives of England.

The Slow-worm (*Anguis fragilis*). The Blind Worm. Very common.

The Snake (*Tropidonotus natrix*.) The common snake. By no means uncommon, but local in its habitat. Couch says of it that "it has been found six feet in length," but this must be a mistake. There is no record of the occurrence of an English snake of more than four feet in length, and a specimen which exceeds three feet is unusual. This snake takes readily to water, in which it swims partly submerged with its head erect.

Viper (*Pelias Berus*) adder, long-cripple. The only British reptile capable of causing a poisoned wound; common in some localities. Never attains the size of the common snake at its largest. Can swim as the snake does, but does not take to water voluntarily. "Red Viper" may be considered abandoned as a distinct species. The story that the viper swallows its young to protect them from danger may be regarded as mythical.

Newt. Two species only are admitted as English by the authorities of the British museum. The crested newt (*Triton vulgaris*), and the smooth newt (*Lophinus vulgaris*.) The other dissimilar newts are treated as mere accidental varieties. The crested newt and its consort are entirely aquatic. The smooth newt is in my experience more often found on land than in water. Both species occur in Cornwall and correspond, the "triton palustris" of Couch to the "triton vulgaris" and the "Triton punctatus" of Couch to the "lophinus vulgaris." These little lizards are called by very many names "asker," "evat," "eft," and even "salamander" can be heard of them in Cornwall. The newts are easily tamed and very playful. The "crested newt" derives its name from the fact that the male develops in the breeding season a membraneous crest, which it is without during the rest of the year.

Frog (*Rana temporaria*). The common frog. In its young form after leaving its tadpole stage, it is known as "Quilkin."

Toad (*Bufo vulgaris*.) Common and perfectly harmless. Can make itself stink disagreeably, but that is all.

I do not think that the edible frog (mentioned by Mr. Couch in the "Fauna") can be maintained as belonging to Cornwall.

But I consider that the common land tortoise (*Testudo graeca*), having bred in Cornwall, is as much entitled to admission into the Fauna of Cornwall as any other import which has proved permanent (say for instance, perch, carp, gold fish, or even horses, or canaries).

VERTEBRATA.—PISCES.

Corrected and Revised by Thomas Cornish

SINCE the late Mr. Jonathan Couch wrote on the fishes of Cornwall in his "Cornish Fauna," thirty nine years have elapsed. Within that period Yarrell has published an Appendix to each of his two volumes; Couch himself has published his "British Fishes;" "The Zoologist" has been an open record of all the new observations on British Fishes, and last (and least) I have had myself the pleasure of maintaining a constant correspondence on Ichthyology with Mr. Couch during the last twelve years of his life, and whilst I was yet in leading strings as a naturalist I enjoyed the great advantage of a close personal friendship with the well-skilled son of a well-skilled father, the late Mr. R. Q. Couch, of Penzance. Of course in the lapse of so many years many new fishes have been observed in our Cornish seas, and many observations on old ones have been corrected, and therefore with the advantages of which I boast I approach the revision of Mr. Couch's list of fishes with less diffidence than I should otherwise have felt.

His work must stand. It is a perfectly accurate record of the state of ichthyological knowledge in 1838, and in revising it I propose to leave out a good deal of information which was very interesting then but has been since superseded; and I hope to add some details of more active interest at the present time.

For the sake of preserving as much similarity in the two lists as is possible I propose to follow the classification adopted by Mr. Couch, but as he is now himself a greater authority than the author (Jenyns) whom he most frequently quotes, and whose work is now but rarely to be met with, I shall substitute his own work ("Couch's British Fishes," 1st ed., 1862-1865) for that of the older writer. This course will be attended by the further advantage that in making Couch's British Fishes the book on which I work I can shorten my list by the omission of all reference to it. Whoever wishes to learn the full history of any fish

named has but to refer to the index in the fourth volume of the book, and he will there find out where to read of it.

There is one difficulty connected with the detailing of a list of British fishes observed in Cornwall to which I must call attention. Of course we score everything as of Cornwall which we actually catch on the Cornish coast, and if a specimen occurs in Plymouth harbour (as of the hippocampus) we may fairly claim it as occurring in the Cornish seas, but we frequently obtain rare specimens from the stomach of a cod (which fish some one has wittily termed the "naturalists' purveyor,") or rare fish are taken in the Bristol channel (surely a Cornish sea), off the Welsh coast, or are landed by some captain of a ship who has procured them on his voyage home (as for instance, "Remora" from the Bay of Biscay), or they are taken by our driving boats many leagues south and west of the Scilly islands. Are these specimens Cornish fish? They present themselves in our museums, and on the whole I am inclined to give them rank as Cornish fishes. We are, I think, entitled from our promontorial position to regard as our own all fish which come within the sweep of our fishermen, or of vessels landing them in fresh condition on our shores.

PERCIDÆ.—(THE PERCH KIND).

Perch. (*Perca Fluviatilis*). A freshwater fish; not an aborigine of Cornwall, but naturalised in many ponds.

Basse. (*Labrax Lupus*). Common in harbours, in sandy bays, and on a lee shore in rough weather. Weighs on an average 8 lbs.

Smooth Serranus. (*Serranus Cabrilla*). Comber. West of the Lizard it is known as the "Loe fish;" not uncommon; usually dies with its mouth wide open.

Dusky Serranus (*Serranus gigas*). Dusky perch. A mediterranean fish of very rare occurrence.

Stone Basse (*Serranus Couchii*). The term "stone basse" is applied in Cornwall to at least three distinct fish. This fish is not a basse at all, but a serranus. The only known specimen of it was observed by Mr. Couch, and it worthily bears his name. It is also known as "Couch's Polyprion."

Squirrel fish. (*Hæmulon Formosum*). Mr. Couch in his Fauna says "It is a native of the West Indies. One specimen has

been taken at Looe," but he does not record it in his "British Fishes," nor does Yarrell mention it. It is probable therefore that Mr. Couch concluded his record of it was doubtful.

Dentex. (*Dentex vulgaris*). Four-toothed sparus. Has been observed twice off Falmouth.

Mendole. (*Sparus mæna*). The Cackarel. A Mediterranean fish recorded as having once occurred at Falmouth.

The Red Mullet. (*Mullus Surmuletus*). The striped red mullet, "The woodcock of the sea." Very common. Has been taken in Mount's Bay of the weight of $39\frac{1}{2}$ oz.

Plain Red Mullet. (*Mullus Barbatulus*). Mr. Couch mentions this fish as Cornish, but I believe when he wrote there was a confusion between plain red mullet and one of the gurnards (*Mullus Imberbis*). I do not think that the occurrence of *Mullus Barbatulus* in Cornwall is anywhere recorded.

The Weever. (*Trachinus Draco*). The Sting Bull. The Poison fish. The Canker. Very good eating, but its first dorsal contains a poison bag at the base of the rays, which had better be cut out before the fish is cooked. The fish is able by means of these dorsal rays to inflict a poisoned wound, which causes swelling and much pain as far as the elbow joint. It is common in some sands, but is never found in rocky grounds.

Lesser Weever. (*Trachinus Viperæ*). Shorter and deeper than the last-named, much more rare. Found occasionally at Hayle and at Pra Sands in Breage.

TRIGLIDÆ.—(GURNARDS).

Elleck. (*Trigla Cuculus*). Red Gurnard. Red fish. Soldier.

Halleck. Common off every coast.

Tub. (*T. Hirundo*). Sapphirine Gurnard. Common.

Piper. (*T. Lyra*). Stated by Mr. Couch in the Fauna to be common, but it certainly is not so in West Cornwall.

Streaked Gurnard. (*Mullus imberbis*). The Rock Gurnard. The French Gurnard. The Parson. Formerly confounded with plain red mullet (which see). Not uncommon on shoal rocky ground.

Grey Gurnard. (*T. Gurnardus*).- The Gurnard. Very common.

- Bloch's Gurnard. (*T. Blochii*). Distinguished from Elleck by its blunt profile and dark colour. By no means uncommon.
- Lantern Gurnard. (*T. Lucerna*). The Long-finned Captain. Recorded as having occurred once at Plymouth. Very rare.
- Little Gurnard. (*T. Paciloptera*). A very small fish. Very rare. Has been taken at Falmouth and in the Bristol Channel.
- Armed Gurnard. (*Peristedron malarum*). Mailed Gurnard. Very rare.
- Pogge. (*Aspidophorus cataphractus*.) Armed Bullhead. Sea Poacher. Black sting fish. Mentioned by Couch as not uncommon. I have never seen a specimen.
- Miller's Thumb. (*Cottus Gobio*). River Bullhead. A freshwater fish. Common.
- Fatherlasher. (*Cottus Scorpius*). Sea Scorpion. Sting fish (but it does not sting. It is so called from the complete spine armament of its head.) Found inshore. Common.
- Lucky Proach. (*Cottus Bubalis*). Also called Fatherlasher. Common in deep water with rocky bottom.
- Three-spined Stickleback. (*Gasterosteus Spinulosus*). Banstickle. Pricklefish. Mr. Couch says of it "It is not uncommon, though not in abundance. It ascends our rivers in May." My experience of it is that it is a very common fish, and a permanent resident in our small brooks, where it is frequently mistaken for (and called) the minnow.
- Fifteen-spined Stickleback. (*G. Spinachia*). Sea Adder. Often confounded with the Pipe fishes. Common.

The half-armed Stickleback and the Smoothtailed Stickleback are abandoned by Couch in his "British Fishes."

Couch here introduces the Maigre (*Sciæna Aquila*), which is not a stickleback, but the typical fish of the Sciænidæ, an allied family. It is a Mediterranean fish, and has occurred in Cornwall on several occasions in sizes varying from one foot to over five feet in length. The largest specimen recorded was literally drowned off the Land's End. A large stem of seaweed had got entangled in its gills, and the fish being thus prevented from breathing, died from suffocation.

SPARIDÆ.—(SEA BREAMS).

- Black Bream. (*Cantharus Griseus*). Old wife. Stone basse. Common in some localities (off Rinsey and Trewavas Heads in Mount's Bay for instance), but usually rare. An excellent fish for the table.
- Bogue. (*Boops vulgaris*). Box. Ox-eye. Rare.
- Becker. (*Pagrus vulgaris*). Braise. Not common, and when occurring frequently confounded with common bream. An excellent table fish.
- Couch's Sea Bream. (*Pagellus Rondeletii*). Only a single specimen is recorded.
- Spanish Bream. (*P. Erythrinus*). Couch in "British Fishes," distinguishes this from Erythrinus (so called by him as its English name), but I am confident that the differences between the two fish are only those caused by size and accidental circumstances.
- Bream. (*P. centrodontus*). When half-grown, "Plosher." When young, "Chad." Common everywhere.
- Short Sea-Bream. (*P. Curtus*). Distinguished by Couch in his British Fishes but only one specimen is recorded.
- Gilthead. (*Chrysophrys Aurata*). Rare. Last recorded occurrence off Land's End, 1st March, 1870.

Couch here follows with :—

Rays Bream (*Brama Raii*), which is not a Bream at all, but one of the scalerayed (*squamnipennes*) family. Natives usually of the tropics. This fish has occurred several times, but always, thus far, in an exhausted state, wave-beaten on a beach.

On 9th October, 1874, a specimen of another scalerayed fish occurred alive in Mount's Bay. It was identified as one of the Family Pimelepterus (Cuvier), and named *P. Cornubiensis*. It also is tropical, and has no English name. It is described in Zoologist, 2nd series, No. 111, p. 4255, December, 1874.

SCOMBERIDÆ.—(THE MACKAREL TRIBE).

Mackarel. (*Scomber scombrus*). Common. Having taken the opportunity of a voyage from the Scilly Islands in the busy part of the mackarel season of 1874, to inspect over 15000,

* There were over 60,000 mackerel on board, but 45,000 were packed in "pads" before we started.

mackarel, I can say with confidence that the fish described in British Fishes as "dotted" and "scribbled" mackarel are accidental varieties.*

Spanish Mackarel. (*Scomber maculatus*). I am very doubtful also whether this is a distinct species. Its variation from the typical fish does not appear to me to be sufficient to distinguish it.

Tunny. (*Thynnus vulgaris*). Not uncommon as a spring and summer visitor, but not often taken.

Bonito. (*Scomber pelamis*). Same.

Germon. (*Orcynus alalonga*). Longfinned Tunny. Very rare.

Pelamid. (*Pelamis sarda*). Belted Bonito. I take this to be a fish known to mackarel fishermen as the albacore, and if so it is common in spring and summer.

Plain Bonito. (*Auxis vulgaris*). Rare. A specimen has been recently (1877) taken in Mount's Bay.

Shortfinned Tunny. (*Thynnus brachypterus*). Very rare.

Pilot Fish. (*Naucrates ductor*). Not an uncommon visitor. Frequently follows vessels into our harbours.

John Dorée. (*Zeus faber*). Common.

Blackfish. (*Centrolophus pompilus*; *Coryphæna pompilus*). Rare. Has been usually taken in company with a shark or some other large fish.

Cornish Centropholus. (*C. Britannicus*). A specimen was thrown on shore near Looe in February, 1859.

Ausonia Cuvieri. A single specimen was taken at Falmouth in 1866. It is supposed to have occurred twice only in British seas.

Opah. (*Lampris Luna*). This beautiful fish is but rarely seen.

Scad. (*Trachurus vulgaris*). Horse mackarel. Common.

Derbio. (*Centronotus binotatus*). A Mediterranean species, of which one example occurred in Mount's Bay, in 1857.

Boar fish. (*Zeus aper*). Very common near the Rundle-stone and Wolf Rocks. In 1875 large shoals were thrown on shore at Scilly in a gale of wind. It has also occurred singly at Scilly and Whitesand Bay in Sennen. Elsewhere it is rare.

Sword fish. (*Xiphias gladius*). Occurs commonly, but is rarely taken.

TÆNLÆDÆ.—(SCABBARD FISHES).

The Scabbard fish. (*Lepidopus Argyreus*). Rare.

Silvery Hairtail. (*Trichiurus lepturus*). Not uncommon of late years. Remarkable for its barbed teeth and enormous gape. Couch (see British Fishes, vol. II, p. 63) was apparently misled as to this latter fact by having seen only specimens which had been dead for some time, and which were consequently stiff.

Banks Oarfish. (*Regalecus Banksii*). Hawkins' Gymnetrus. Occurred at Newlyn in Mount's Bay once, at some date between 23 February, 1788 and 1796. The confusion has arisen from the existence of several copies of a sketch of it, bearing different dates, but which are evidently copies of one original. There is a trace, but not a record, of its occurrence once subsequently at Marazion. This is the "Ceil Conin," and the "King of the Herrings."

Red Bandfish. (*Cepola rubescens*). Red Snakefish. Couch (Fauna) speaks of it as "not uncommon." I have heard of its capture, on competent authority, off the coast of Cornwall, but I have never seen a specimen, and curiously enough Couch, though (British Fishes) he speaks of it as common in the south and west of England, does not record a capture of it in Cornish waters.

MUGILIDÆ.—(THE MULLET).

Grey Mullet. (*Mugil capito*). Common. The object of large fisheries in many parts of Cornwall.

Lesser Grey Mullet. (*Mugil chelo*). Thickclipped grey mullet. Rare.

Atherine. (*Atherina presbyter*). Sand Smelt. A frequent visitor in autumn in large shoals. It takes a bait readily and is excellent eating. It is said never to frequent waters in which the smelt (*Osmerus eperlanus*) is to be found.

Boiers' Atherine. (*Atherina Boieri*). Large shoals of this rare fish occurred at Polperro in 1846.

Longfinned grey mullet. (*Mugil Auratus*). Golden mullet. A specimen was captured in Mount's Bay about 1865.

Trumpet fish. (*Centrisceus scolopax*). Bellows fish. Has been recorded as having occurred three times in Cornwall.

GOBIOIDÆ.—(THE BLENNIES).

- The Gattorugine. (*Blennius Gattorugine*). The Tompot. Common.
- The Butterfly Blenny. (*Blennius ocellaris*). Not uncommon near Falmouth, but elsewhere it is rare.
- The Shanny. (*B. pholis*). The Bully or Bullcod, dear to the youth of our sea-coasts. The smooth Blenny. Common everywhere. Voluntarily spends a large portion of its time out of water in the crevices of the rocks, and can, by the aid of two false pectorals and its tail direct its motions when on shore.
- Montague's Blenny. (*B. Montagui*). Not uncommon.
- Yarrell's Blenny. (*Blenniops Ascarii*). Not uncommon in Cornwall, but rare in West Cornwall.
- Butterfish. (*Gunnellus vulgaris*). Nine eyes. Spotted gunnel. Common. Traditionally said to have derived its name of Gunnel from the ignorance in common of the naturalist who first observed it, and of a fisherman to whom he showed it. The fisherman said "it looked very much like a gunnel" (meaning the gunwale of a small boat), and the naturalist assumed that the fisherman knew the fish, and had called it by its proper name. Couch (see "Fauna") alludes to this.
- The Wolf-fish. (*Anarchichas lupus*). The Catfish. Very rare.
- The Rock Goby. (*Gobius niger*). The black goby, also called Miller's thumb. Common.
- The Paganellus. (*G. Paganellus*). A Mediterranean species. Rare in this country, but recorded as having occurred in Cornwall.
- The two-spotted Goby. (*G. bipunctatus*). Is recorded as having occurred in Cornwall, but it is not common.
- The Broadfinned Goby (*G. biocellatus*) and the Tail spotted Goby (*G. attenuatus*) are distinguished from *G. bipunctatus*, and from each other, by Couch, but it seems to me that they are thus distinguished on insufficient grounds. In very little fish like these the accidental variations are out of all proportion numerous to those of large fish. Take for instance the white goby, admitted by Yarrell as *G. albus*, and by Gunther as *Latrunculus albus*. Couch sweeps it away at once

as the "young of some better known species." Nothing but aquariums can settle these questions for us.

The Yellow Skulpin. (*Callionymus lyra*). The Gemmeous dragonet. This very handsome fish is now recognised as the adult male, whilst the dusky skulpin or sordid dragonet (*C. dracunculus*) is the adult female or immature young of the same fish. It is heavily armed with a jagged spine at the lower back angle of the operculum. Though small, its flesh is excellent. Not uncommon.

The Angler. (*Lophius piscatorius*). The fishing frog. The Devil fish. Common.

Couch abandons the small winged angler and the long angler.

LABRIDÆ.—(THE WRASSES).

(Pronounced, in the singular, Ráa). I follow Mr. Couch (see "Fauna") in giving the Wrasses with great reservation. He speaks of the confusion from which they were only "emerging" when he wrote in 1838, but I, having had unusual opportunities of examining the family, (having, for several years for a holiday month outright, caught never less than a dozen a day, of all sorts of wrasse) am at present inclined to a belief that the Labridæ are not of so many species as the books say, and that the confusion which Mr. Couch noticed in 1838 is by no means at an end.

Ballan Wrasse. (*Labrus maculatus*). The "Jöhráa" of the country people. Very common. With this one, must go, in my opinion, the greenstreaked wrasse (*L. lineatus*) as its female or immature young. Couch (Fauna) apparently at one time favoured this view, although he retains the green wrasse in his larger work.

The Comber. (*L. Comber*). This wrasse is rare if it is a distinct species, but I incline to think it an accidental variation of the young Ballan wrasse.

The Blue striped wrasse. (*L. coquus*). Male; takes with it as its female the three-spotted wrasse (*L. trimaculatus*), and together are a beautiful pair of fish, and not at all uncommon.

The Scalerayed Wrasse (*Acantholabrus Couchii*) is admitted by Yarrell and by Couch, but is so rare, and its peculiarity of being scale-rayed is so un-English, that I am unwilling to rank it as a Cornish wrasse, although it may well be a scale-

rayed visitor from the tropics of some other species, just as were Ray's bream and *Pimelepterus Cornubiensis*.

Rock cook. (*Acantholabrus exoletus*). Small mouthed wrasse. Common and well defined, but I am by no means certain that it is not *L. maculatus* or *L. coquus* in its young form.

Corkwing. (*Crenilabrus Cornubicus*). Gold finny. Very common, but as Couch says, "the Corkwing like others of its family varies in its colours.

Jago's Goldsinny. (*Crenilabrus rupestris*), Cuvier). Common, but it is frequently a matter of great difficulty to say when a specimen is corkwing and when goldsinny.

Rainbow Wrasse (*Julis vulgaris*) has occurred once only. In Mount's Bay.

Two-spotted Wrasse (see "Fauna") is probably another name for the three-spotted wrasse. See Yarrell, Vol. I, p. 286, ed. 1836, where he gives the synonym of "Doubly-spotted wrasse" to *L. trimaculatus*. Hog wrasse is abandoned by Couch in British Fishes.

I think I have said enough to show that the classification of the Labridæ is in a most unsatisfactory condition, and requires the close attention of ichthyologists.

CYPRINIDÆ.—(THE CARPS).

The Carp. (*Cyprinus carpio*). A pond fish throughout Cornwall. The Gudgeon (*Gobio fluviatilis*) said by Couch (British Fishes) to have been introduced of late into Cornwall, and to be thriving "in some ponds near Penzance," but I do not know of it.

The Tench. (*Tinca vulgaris*). A common pond fish.

Gold-fish. (*Cyprinus auratus*). A pond fish, of course not aboriginal. But it breeds in ponds.

Dace. (*Leuciscus vulgaris*). Common in the Tamar and its tributaries.

Minnow. (*Leuciscus phoxinus*). Minnis. Often confounded with the three-spined stickleback. Common.

Loach. (*Cobitis barbatula*). Occurs in Cornwall, but I think it rare. From my experience of it in other counties, I can fully agree with those who say it is "delicious food" (Couch British Fishes, vol. 4, p. 70), if only you can get enough of them to make a dish.

ESOCIDÆ.—(THE PIKES).

- The Garfish. (*Belone vulgaris*). The Gerrick. The Greenbone. Bones of a most unpleasantly bright green, but the fish is nevertheless very good eating. Smells most disagreeably when caught. Assembles in shoals in the autumn. Common.
- Greater Flying-fish. (*Exocætus exiliens*). Rare, but has been observed in Cornwall. There are two species of Flying-fish, one leaning to the Gurnards, and the other to the Mulletts. There is, I think, no doubt that the Cornish specimens belong to the Mullet alliance.
- The European Half-beak, (*Hemiramphus longirostis*) and Blunt-headed half-beak (*H. obtusus*) are of exceedingly rare occurrence. Indeed, it is not yet certain that they are distinct.
- The Skipper. (*Scomberesox saurus*). This fish is not common off the Coast of Cornwall, but is well known off the Welsh ports.

SALMONIDÆ.—(THE SALMON KIND).

- Salmon. (*Salmo salar*). Common in a few rivers and in the sea, off inlets into which fresh water falls.
- Bull trout. (*S. trutta*). Peal. Sea trout. This fish is often confounded with Salmon peal, which is the young Salmon. It is distinguishable by its blunter head, fuller tail, and redder and less flaky flesh. Couch (British Fishes) distinguishes Salmon trout from this fish, but not, I think, on sufficient grounds. Of slender Salmon (*s. gracilis*), I had an opportunity of showing a specimen to Mr Frank Buckland, and he at once pronounced it a sea trout. It seems probable that all our salmons may be ranged as salmon or sea trout in various stages of developement.
- Trout. (*S. fario*). Common everywhere. I have known this fish in ponds to attain a weight of over 3 lbs. (very large for Cornwall), and I have seen fish of over 1 lb. taken in our smallest brooklets, but the ordinary run of the fish in its wild state taking the county through, is about 2 oz.
- Samlet. (*Salmo Samulus*). Parr. Distinguishable from trout in having its red spots on, or on each side of, the lateral line, instead of scattered over the back, and in having several

dusky bars running from the back across the lateral line towards the belly. It is a small fish, very common in some of the West Dartmoor rivers. It is recorded as frequently occurring in some of the rivers of Cornwall. The only Cornish specimen I myself have ever seen, came from the ponds at Tehidy.

American Lake Trout. (*S. Fontinalis*.) This fish has been recently introduced into the county, at Tehidy, as an experiment. It is said to attain considerable size, and to afford excellent sport.

CLUPEIDÆ.—(THE HERRING TRIBE).

Pilchard (*Clupea pilchardus*) is the base of one of the principal fishing industries in Cornwall. Without being a migratory fish (properly so-called) it swarms in from the deep sea in summer and autumn, and keeping in shoals or schools by day, it scatters at night, probably to feed. Shoals have been taken in excellent condition so late in the year as 24th December. A few years since a shoal was taken in the lower reaches of Truro river in the month of February, but in what condition they were, I do not know. I have, however, received pilchards cast on shore in the month of February, and they were utterly unfit for food. It is probable that the sardine is pilchard.

Herring. (*Clupea Harengus*). Large quantities of this fish are taken off our coasts in the fall of the year, but they are nowhere in Cornwall of sufficient importance to maintain a separate fishery.

Sprat. (*C. sprattus*). Any quantity of this delicious little clupeid could be obtained on our coasts if nets of a proper mesh were used, but it happens to come with its more valuable congeners the pilchard and the herring, and it is not therefore separately sought after. When economy in our fisheries comes to be studied, it will doubtless receive the attention of which it is worthy. At present, when a shoal of sprats is captured, some are sold for food at 2d. a quart, but the larger part are sold for manure.

Whitebait (*Clupea alba*) was formerly considered as a distinct fish. It is now certain that some whitebait are young herrings, and it is probable that all whitebait are the young of clupeid

fishes, and that no distinct fish occurs. In some years white-bait swarm on our coasts.

Allice Shad. (*Alosa vulgaris*). Damon (qu : Dame of the) herring. A large and beautiful herring of most delicate flavour. It is by no means uncommon, but is frequently confounded with herring proper.

Twaite Shad. (*Alosa finta*). Not so common as the Allice Shad, but like it, of excellent flavour, and often confounded with herring.

Anchovy (*Engraulis encrasicolus*.) This fish has been taken occasionally in St Ives Bay, but my experience of it is that it is not common.

GADIDÆ.—(THE CODFISH TRIBE).

The Cod (*Gadus morrhua*.) Common off all our coasts but rarely taken in good condition for the table. The best are those which have the deepest groove or depression at the back of the head, and the largest "belly," (i.e. greatest depth and distension of the stomach under the first dorsal fin.) Those that fail in this respect, are called by the fishermen, "churchyard cod" and are sure to turn out woolly and watery. No naturalist should ever allow the stomach of a cod to be thrown away without examination. Being bottomfeeders on crustaceans they are invaluable as collectors.

Dorse (*Morrhua callarias*.) This fish is by no means uncommon, but it is generally confounded with cod, to which it is very similar. A cod of rich red brown color over the back will probably turn out to be a dorse. There are external distinctions sufficient to mark the two species but the texture of the flesh is a certain guide. The dorse is firmer and less flaky than the cod, superior to the cod of our seas, but inferior to the "head and shoulders" of London. It also is a good collector.

Haddock (*Morrhua eglifnus*.) An excellent fish for the table in midwinter, but of most uncertain habitat. It frequents a rocky ground in large numbers for years, and then it suddenly leaves it, and is found in some new locality.

Blind (*Morrhua lusca*) Bib. Whiting pout. Blens. Very common, and when of 2 lbs weight and upwards excellent

for the table all the year round. It is despised on account of its boniness.

Power Cod (*Morrhua minuta*.) A miserable little fish, very much like the blind, but longer in proportion to its depth. It is common everywhere.

Whiting (*Merlangus vulgaris*.) This well-known delicacy is abundant off our coasts from September to March. The largest and best are taken off Polperro.

Poutassou (*Couch's Whiting*.) This Mediterranean member of the cod family has occurred twice off Polperro, but has not that I am aware of been recognised elsewhere in the County.

Pollack (*Merlangus pollachius*.) The whiting pollack. Peculiarly a Cornish fish. It is said to be almost unknown East of the Start. An excellent table fish all the year round, but best in winter. A fry of little pollack, about six inches long, will beat a similar dish of Cornish trout at any time.

Coalfish (*Merlangus carbonarius*.) Rauning (qu. Ravening or ravenous) pollack. This fish is common off all our coasts, and attains a very large size, (up to half a hundred weight) off the Land's End. Its flesh is coarser than that of the whiting pollack, but in small specimens it is quite as palatable. The straight white lateral line of this fish distinguishes it at once from the whiting pollack. Couch himself (*British Fishes*) identifies his "green pollack" with this fish.

Ling (*Lota molva*.) Very common and deserving of much more gastronomic attention than it gets. Good fresh ling is an excellent fish in winter, and Scilly salt ling is a delicacy all the year round. It has been recently suggested that there are two permanent varieties of ling, but this second variety may turn out to be the "torsk."

Hake (*Merluccius vulgaris*.) Sold in London as "Cornish salmon." Very common. Twenty years ago 3s 6d a "burn" (i.e. 21 fish or a "burthen" for one person) was a very high wholesale price for hake in West Cornwall, and 6d a fish was a fair retail price. Now hake commands in West Cornwall a wholesale price of from 15s to 20s a burn, and a retail price from 1s. to 1s. 6d. each.

- Three-bearded Rockling (*Motella vulgaris*.) Whistler. Very common in rocky pools. It is sometimes taken of a large size in deep water. It is considered a delicacy.
- Four-bearded Rockling (*Motella cimbria*.) A small rare fish.
- Five-bearded Rockling (*Motella quinquecirrata*.) A small fish. Common inshore. Very like the Whistler, but never of the size to which that fish attains.
- Mackarel Midge (*Motella glauca*.) A tiny fish. Usually to be found amongst shoals of "bait" (Lance, whitebait, &c.,) which swarm inshore in summer and autumn. Rare.
- Thompson's Midge (*M Coryphæna*.) Mr. Couch records this as having occurred in Cornwall.
- Lesser Forkbeard (*Raniceps trifurcatus*.) Tadpole fish. R. Jago. By no means uncommon; with an extremely unpleasant smell when fresh. Usually taken on hook and line.
- Greater Fork-beard (*Phycis furcatus*.) Hake's dame. Couch (Fauna) speaks of it as "not uncommon in winter;" but my experience of it is that it is rare. The more the pity, its flesh being extremely delicate, and much superior to whiting. Couch (British Fishes) mentions a Blennoid Forkbeard, but after seeing several specimens of Greater Forkbeard at all seasons of the year, I do not find that it can be distinguished from the ordinary fish out of condition.

PLEURONECTIDÆ.—(FLAT FISHES).

- Holibut (*Hippoglossus vulgaris*.) Lady fluke. This largest of the British flat fish, which not rarely runs to 8 cwt, is of frequent occurrence off our coasts. It is sometimes of a few pounds weight only. It is edible, but in my own opinion, not good.
- Long Rough Dab (*Hippoglossoides limandoides*, Gunther.) Is reported as having occurred off Falmouth.
- Turbot (*Rhombus maximus*.) Common. This fish is remarkably apt to take its colour from the sands in which it is feeding.
- Brill (*Rhombus vulgaris*.) Common. Very uncertain eating. About one in three is fit for the table.
- Carter (*Rhombus megastoma*.) Mary sole. Whiff. Lantern (because one can almost see through it). Common.

- Mullers Topknot (*Rhombus hirtus*). Not well-known, but not uncommon. Its flesh is excellent. I do not think Block's Topknot (*R. punctatus*) has ever been taken in our seas, but the two fish are so much alike that they may well have been confounded. Eckstrom's Topknot (*R. Norvegicus*: Gunther) has been taken in the Bristol channel. Whether that is Cornish water is doubtful.
- Megrim (*R. Arnoglossus*) Scald fish. This is not a common fish, and it is not, I think, certain that it is more than a variety (may be the partly developed young) of the "Carter." Gunther calls it "Arnoglossus Lanterna." Mr. Couch, (British Fishes), in describing the megrim, refers to some specimens of "Arnoglossus lophotes" which probably occurred at Plymouth, but I understand his conclusion and that of Mr. Yarrell to be that these were accidental varieties of the principal fish.
- Plaice (*Platessa vulgaris*). Of uncertain occurrence, and very variable value for the table. In observations in Mount's Bay, extending over 25 years, I have remarked that when the Masked Crab (*Corystes Cassivelaunus*) is common in the early spring, Plaice in the summer, and Red Mullet in the autumn, are always abundant. The Plaice from a hard close killas sand are usually good edible fish. Those from a loose granite sand are valueless.
- Dab (*Platessa limanda*). Very common, and by no means a bad fish.
- Smear Dab (*Platessa microcephalus*) Lemon Dab. Smooth Dab. A very excellent fish. Common in some localities.
- Pole (*Platessa pola*). Has been taken in Cornwall, but I am inclined to think only rarely.
- Flounder (*Platessa flesus*). Common as a harbour fish and in tidal fresh waters.
- Sole (*Solea vulgaris*). Common. Usually captured in nets, but there is no reason why it should not be taken in any quantities on lines if only hooks small enough were used.
- Variiegated Sole (*Monochirus Variiegatus*.) Rare. It is with difficulty that this fish can be distinguished from the common sole until the texture of its flesh be tested.

Lemon Sole (*Solea pegusa*). Couch (British Fishes) mentions one specimen as having occurred at Plymouth, and I have a record of the occurrence of two (on the same day) at Porthcurnow under the Logan Rock. It is rare.

Solenette (*Monochirus linguatulus*). Little Sole. A fish rarely seen, but yet a common one. At its largest size it is so insignificant, that the trawlers who take it fling it overboard as valueless.

CYCLOPTERIDÆ.—(SUCKING FISHES).

Lumpfish (*Cyclopterus lumpus*) Lump-sucker. Not uncommon. The blue fish being the female, and the red one the male. This fish is remarkably tenacious of life. (Couch abandons the Coronated Lumpfish of the Fauna.)

Sea Snail (*Liparis Vulgaris*). Rare. Has been taken at Falmouth. Also called Butterfish.

Montague's Sucker (*Liparis Montaguï*). Common. Probably the Network Sucker (*Lepidogaster bimaculatus*: Gunther) is an accidental variety.

Cornish Sucker (*Lepidogaster cornubiensis*) "The Sucker." Common under stones and in small pools by the seashore. The double spotted Sucker (*L. bimaculatus*: Yarrell) is probably an accidental variety of the Cornish Sucker. It cannot be distinguished from it in a satisfactory manner.

It must, however, be remarked that Gunther and Yarrell apply the term "*bimaculatus*," the one to a fish allied to Montague's Sucker, the other to a fish allied to the Cornish Sucker; and with such authorities as these in view, it may well be that a species exists, intermediate between Montague's and the Cornish Sucker, yet allied to both.

The Sucking Fish (*Echeneis Remora*). Properly belonging to the family *Echeneidæ*. Has occurred attached to Codfish in the Bristol Channel, and has been landed in fresh condition taken off the body of a Shark captured in the Bay of Biscay. These are its only claims to be called a Cornish fish, but it is a pure parasite, and I have no doubt it is to be found (if sought for) on the bodies of some of the large fish occasionally caught, especially attached under the pectorals.

MURÆNIDÆ.—(THE EEL TRIBE.)

Sharp-nosed Eel (*Anguilla acutirostris*). The common eel of the county. It is not unfrequently a permanent resident in salt water, but not, so far as I have observed, at any great distance from the shore.

Broad-nosed Eel (*Anguilla latirostris*). Couch (Fauna) speaks of this as "less common than the sharp-nosed eel" (of course in Cornwall). The only specimens I have seen of it have been from the fresh water pond at Tresco in the Scilly Islands. The largest of these weighed 6lbs. 8ozs. when I weighed it, but it wasted 6 ozs. on its way to London, where a cast of it was taken by Mr. Buckland.

The Snig Eel (*Anguilla mediorostris*). Is mentioned by Mr. Couch as having occurred in Cornwall, but I cannot see in what way the Snig differs from what a small sharp-nosed Eel would be.*

Conger (*Conger vulgaris*). Common everywhere. Varies in its colour with the ground it inhabits. It differs from the fresh water eels in having its upper jaw longer than its lower. There are two varieties, but whether more than accidental, I cannot say. One thick at the "shoulder," and of which a specimen of five feet long would weigh close on 60lbs.; the other thin at the shoulder, of which a specimen of 5 feet long would not exceed 30lbs.

Morris (*Leptocephalus Morrisii*). Mr. Couch records this fish in Fauna with the note of "not uncommon," but he does not, in express terms, in "British Fishes," say it has been taken off Cornwall; and I have never seen nor heard of a specimen, I think it must be accepted as rare. Probably, as happened some years since of the rare Arch-fronted Swimming Crab (*portunus arctuatus*), one summer produced them in unusual abundance.

Muroena (*Muroena Helena*). Very rare. Only one specimen recorded as Cornish or even British. It was taken in 1834.

* Yarrell distinguishes it from *A. acutirostris* principally by its habits of feeding and a slight variance in the *proportionate* size of the bones of the skull. These differences may well belong to the old and young of the same species.

ANGUILLIDÆ.—(THE LAUNCE FAMILY.)

The Launce (*Ammodytes tobianus*). The ordinary "bait" of our fishermen.

The Sand Launce (*Ammodytes lancea*). Very common. Larger than the Launce; buries itself in wet sands, whence it is fetched out by hooks made for the purpose, it being much too toothsome to be left in its retirement. On comparing Yarrell with Couch and Gosse, it will be found that there is still confusion over this family.

SYNGNATHIDÆ.—(PIPE FISHES.)

Great Pipe Fish (*Syngnathus acus*). Common.

Broad-nosed Pipe-fish (*S. Typhlé*). About as common as *S. Acus*.

Ocean Pipe-fish (*S. æquoreus*). The æquoreal Pipe-fish. In some years a common fish.

Snake Pipe-fish (*S. Ophidion*). Most abundant occasionally.

Worm Pipe-fish (*S. lumbriciformis*). A constant visitor, but it is rarely caught.

Sea-horse (*S. Hippocampus* Linnæus). This fish has, I believe, been taken in Plymouth Sound. The closely allied species *S. biaculeatus* has been taken in the Baltic and in the Chinese seas, and it will be hard, indeed, if we do not some day stop a specimen on a visit to its relations.

Blunt-tailed Pipe-fish (*S. brevicaudatus*). In October, 1872, a *Syngnathus* was captured in Mount's Bay, which differed from all the known species in a most remarkable manner. It was described in the *Zoologist* of October, 1872, second series, No. 85, p. 3274, and received the above name.

GYMNODONTIDÆ.—(THE SUNFISH FAMILY.)

Four-horned Trunk-fish (*Ostracion quadricornis*. Linnæus.) One specimen taken off Mevagissey.

File Fish (*Balistes caprisceus*). Taken off Port Loe in 1865.

Pennant's Globe Fish (*Tetrodon Pennantii*). Rare. Of this singular fish it should be noted that its "globe" or spinous bladder is inflated by the action of involuntary muscles. I cannot of course say that it may not also be inflated voluntarily.

Sunfish (*Orthogoriscus mola*). Common during every summer.
 Oblong Sun-fish (*Orthogoriscus oblongus*). Rare.

STURIONIDÆ.—(THE STURGEONS.)

Sturgeon (*Acipenser sturio*). Rare.

SQUALIDÆ.—(THE SHARK TRIBE.)

The Nurse (*Scyllium stellaris*). The Nursehound. The Rough-hound. A bottom feeding shark of considerable size, reaching usually to $\frac{3}{4}$ of a cwt. Not uncommon.

The Morgay (*Squalus catulus*: Linnæus). The small spotted dog fish. The commonest of our small sharks. A pest to fishermen, but makes good soup, and does not eat badly when salted.

The Black-mouthed Dogfish (*Scyllium melanostomum*). The eyed dog-fish. Only one specimen on record as Cornish or even British. Caught in 1834.

Six-gilled Shark (*Hexanchus griseus*). Rare.

White Shark (*Squalus Carcharias*: Linnæus.) I place this in the list in deference to the authority of Mr. Couch, but I can find no record of the appearance of this shark in Cornish waters.

Blue Shark (*Carcharias glaucus*). A very common pest of our fishermen.

Thrasher (*Carcharias*, or *Squalus vulpes*). Sea Fox. Fox Shark. By no means uncommon. A few are taken every year by the mackerel and pilchard drivers.

Porbeagle (*Squalus Cornubicus*). The Beaumaris Shark. Not uncommon.

Topper (*Galeus vulgaris*.) This fish is beyond question known in our seas, but I do not consider it a common fish. In my opinion the Smooth Hound is often mistaken for it.

The Smooth Hound (*Mustelus lævis*). The Ray-mouthed Dog (it has teeth like a Ray) is common.

The Dogfish (*Squalus acanthias*). The picked dog. A savage brute who knows well how to use his spurs even after capture.

The Spinous Shark (*Squalus spinosus*). Rare. It is at present doubtful whether there are not two permanent varieties of

this fish, one a ground shark, and the other a "round" or swimming fish.

The Basking Shark (*Squalus maximus*). Our largest British fish. Not uncommon in summer.

Pennant's Basking Shark (*Selachus maximus*: Prof: P. Panesi). A Mediteranean fish. Very rare. It has been wrongly described as the Rashleigh Shark and the Broadheaded Gazer. It feeds as the whale does on medusæ or some other exceedingly small marine productions, which it strains through a comb-like arrangement in its gills. Its teeth are rudimentary.

The Hammer-headed Shark (*Squalus zygena*: Cuvier). Very rare.

The Monkfish (*Squatina angelus*). The Angel fish. Common. Viviparous.

The Centrine (*Squalus centrinus*: Bloch). The first British specimen of this fish was taken off the Wolf Rock in the spring of this year (1877).

Mr. Couch has, so far as I can see, abandoned the Lewis Shark (*Squalus Lewis*) in his "British Fishes."

RAIIDÆ.—(THE RAY TRIBE.)

The Skate (*Raia batis*). Common. I do not think the Flapper Skate can be distinguished from it.

The Long-nosed Skate (*Raia mucronata*). Not uncommon in deep water.

Burton Skate (*Raia oxyrhynchus*). Not uncommon in deep water.

The Thornback (*Raia clavata*). Common. I do not think the Starry Ray can be distinguished from it.

The Homelyn (*Raia maculata*). This and the Thornback are our chief edible rays. The Homelyn beyond question includes the Cuckoo Ray of Couch. I have seen them of all gradations from plain Homelyn to most brilliant Cuckoo.

Small-eyed Ray (*Raia microcellata*). The Painted Ray. The Owl. Held in high esteem as an article of food by those who know it. It is a very local fish, but where it is found it is abundant. For instance, off Pra-sand in Mount's Bay, quite three-fourths of the rays caught are "Owls."

- The Sandy Ray (*Raia circularis*). I record this Ray in deference to the authority of Mr. Couch, but I much doubt whether it is not an accidental variety of the Homelyn.
- The Torpedo (*Raia torpedo*). The Cramp Ray. The Electric Ray. Is not uncommon, and yet is rarely observed, because most fishermen cut it away as soon as they see it.
- The Sting Ray (*Irygon pastinaca*). The Fire-flaire. Is of rare occurrence.
- The Eagle Ray (*Myliobatis aquila*) is recorded as having occurred once off the coasts of Cornwall.

PETROMYZIDÆ.—(THE LAMPREYS.)

- The Sea Lamprey (*Petromyzon marinus*.) Common.
- The Lampern (*P. fluviatilis*). A river fish. Is said by Mr. Couch to be "Common," and no doubt it is so in the eastern part of the county. With it, should, apparently, go the Silver Lamprey and Planer's Lamprey; but I am now making my conclusions from written descriptions and not from observation, and cannot therefore speak with confidence.
- The Mud Lamprey (*Ammocetes branchialis*). The Pride. Blind Lamprey. Common.
- The Mixine (*Gastrobranchus cæcus*). The Borer. The Hag Fish. Rare.
- Lancelet (*Amphioxus lanceolatus*). A tiny fish, and very rare. All small fish of the deep sea are rare. They escape observation.

I have now closed my list, having followed, as I have before said I should, as closely as possible the classification adopted by Mr. Couch. The advantages to be gained by my doing this seemed to me to outweigh the advantages of a more modern method. I have cited, wherever I could, the scientific names given by Yarrell as rendered by Couch. Where this has been impossible, I have added the name of the naturalist whose nomenclature I have adopted. A list of this sort can never be perfect, and if I have fairly followed in the footsteps of my predecessor (who did the work; I have but revised it) I shall be quite content.

It seems to me that a practical value of local ichthyology lies in its teaching us of our supply of fish as an article of food, and I can say with confidence that very few people, indeed, know the

excessive waste which goes on in this department. We depend for our main supply on four families*—the mackarel tribe, the herring tribe, the flat fish, and the cods; but it is only the well known members of these families that are eaten. If a rare specimen occurs, it is thrown away, but yet it is certain† that every member of each of these families is not only edible, but good eating. Indeed, with the exception of the larger sharks, the sunfishes, and the globe-fish, there is not, in my opinion, based on an extensive experience, a single British fish which is unfit for food under some form of cookery or other. Whilst of the sharks and rays I can say that their cartilaginous bones under the process of stewing, dissolve into a strong jelly. I suppose this may be so of the globe-fish and sun-fishes, but I do not know it. But it is not only in the fish which we throw away that we make our waste, but in the method of dressing the fish which we cook. We boil turbot and sole, and the water in which they are boiled is (and correctly) thrown away; but if instead of boiling them we dressed them by the process of steaming, we should save from them a quantity of very rich jelly. And then again, how very rarely do we make any use of fish liver! the good housewife who will boil down the bones and scraps of any meat to make stock for soup, will throw away fish bones and scraps with complacency, never recollecting for a moment that fish soups are as good as any other soups, and not aware perhaps that the stock of most of the queen of soups—turtle soup—(a soup by the way wholly of marine origin) when used for public dinners or in large hotels is made from conger. The subject is worthy of consideration. We throw away a third part of our fish, and waste a third part of those which we consume.

THO. CORNISH.

Penzance.

* It will be observed that I confine myself to the supply of salt-water fish, I say nothing of Salmon and other fresh water fish; but I apprehend that they are by no means so important a branch of fish supply as the smallest of the families which I have named. The "Gurnards" or the "Conger" are, perhaps, quite equal to the salmon as a source of general fish supply.

† I except Tadpole Fish. I have never tried it, but, its strong smell notwithstanding, I see no reason against its being wholesome food.

CRUSTACEA.

Revised and added to by C. Spence Bate, F.R.S.

IN complying with the request of the Council to revise the late Mr. Jonathan Couch's list of Crustacea in his Cornish Fauna, I have endeavoured to retain as much as possible of Mr. Couch's words, and to collect from books and other sources the information that he communicated to various authors on this branch of natural history.

I have, moreover, included any new forms that have, since the publication of his Fauna, been published as having been found in Cornwall; and have added from the History of the British sessile-eyed crustacea, a list of all the animals of that sub-kingdom that have been found on the coast of Cornwall.

The original portion of Mr. Couch's Fauna will be distinguished by inverted commas.

It will be seen that the Cornish Crustacea exhibits a very large proportion of the known British forms; and considering the few places as well as naturalists that have been engaged in the observation of these animals, I think there can be little doubt but that many other forms may yet be added to the local and probably to the British Fauna.

C. SPENCE BATE.

Plymouth, Dec. 28th, 1877.

CRUSTACEA.

"The class of articulata, or "*Arthropoda*" that are known as Crustaceans, in which are included the families of Crabs, Lobsters, Shrimps, Sea Screws and others recognized as Entomostacous or Insect Crustaceans, may be popularly described as "animals without an internal vertebral skeleton, but having the body divided into distinct rings moveable on each other by joints; the integument forms a crust or external skeleton; antennæ or

feelers, and eyes separately on footstalks or sessile. The mouth formed by the adaptation of several pairs of appendages varying in separate orders to assist in manducation. The legs with several joints, some of the higher groups being varied into prehensile appendages. Vent at the extremity of the animal."

"The stalk-eyes Crustaceans possess a carapace or shelly crust above the thorax or *Pereion*, within which the principal organs of life are protected, the branchiæ or gills for breathing are not branched; five posterior pairs of appendages belonging to the thorax or *Pereion* only formed for walking.

"They are arranged by Dr. Milne Edwards in his *Histoire des Crustacés*, 1830, into three great sections, of which the separate characters are"

"BRACHYURA or short-tailed Crabs, having the pleon or abdomen, vulgarly called the tail, slightly developed, having none of its appendages adapted for swimming and destitute of fan-like caudal plates," or uropoda.

"ANOMOURA, abdomen or pleon well developed, with a portion bent under the thorax or pereion, with terminal caudal plates" or uropoda.

"MACROURA, abdomen or pleon well developed and extended, having paddles (pleopoda) beneath and terminal fan shaped uropoda or caudal plates."

The Order of the Brachyura is again divided into the following families, *Oxyrhynchidæ*, *Macropodidæ*, *Maiadæ*, *Parthenopidæ*, *Canceridæ*, *Portunidæ*, *Pinnotheridæ*, *Grapsidæ*, *Leucosiadæ*, &c.

MACROPODIDÆ. (SEA SPIDERS.)

GENUS STENORHYNCHUS.—*Lam.*

"Second pair of legs much longer than others; the stalk of the external antennæ inserted before the level of the eyes, of which the footstalk is very short."

STENORHYNCHUS TENUIROSTRIS—*Leach*—*Smaller Sea Spider.*

„ LONGIROSTRIS—*Couch's Cornish Fauna*

"Common at the depth from two to twenty fathoms, often taken in crab-pots."

" STENORHYNCHUS PHALANGIUM—*Pennant*—*Long-legged Spider Crab.* "Common at the mouth of rivers—*Leach*; off the south coast of Cornwall. *Bell*, C.S.B.

GENUS ACHÆUS.—*Leach.*

“Snout not much lengthened, and on each side leaving uncovered the insertion of the stalk of the external antennæ. The terminal joint of the two posterior pairs of legs is large, compressed and falciform.”

ACHÆUS CRANCHII.—*Leach.*—*Cranch's Spider Crab.*—Not common.

Deep water among weed, and from its small size probably frequently overlooked.”

GENUS INACHUS.—*Fabr.*

“Differing from the two former genera in having retractile eyes capable of extensive motion, second pairs of legs thrice as long as the first-frontal portion of the carapace; terminal portions of the four hinder pairs similar and slender.”

INACHUS DORSETENSIS.—*Leach.*

„ SCORPIO—*Couch's Cornish Fauna*—“*Scorpion Spider Crab.*—Commonly taken in crab pots within a few miles of the shore at all depths.”

“INACHUS DORHYNCHUS—*Leach.*—*Feeble Inachus.*—Common, not unfrequently found on board crab boats.”

“Except in the rostrum it has much of the aspect of *Stenorhynchus longirotris*, but is less common.”

INACHUS LEPTOCHIRUS.—*Leach.*

„ LEPTORHYNCHUS—erroniously given by *Edwards* and *Couch*—*Small Snouted Inachus.*—Taken off the coast of Cornwall by *Cranch.*

MAIADÆ. (MAIANS.)

GENUS PISA.—*Leach.*

“Rostrum much developed, stout, formed of two lengthened horns, somewhat conical; stalk of the external antennæ nearly on the level of the rostrum.”

“PISA TETRAODON—*Milne Edwards, Crust., Vol. 1, p. 305*—*Four-horned Spider Crab.*—Much larger than the other spider crabs and far more formidable in appearance. Not common.”

PISA GIBBSI.—*Leach.*—*Gibbs' Spider Crab.* Not uncommon in from about twenty fathoms of depth, and taken in crab-pots.”

GENUS HYAS.—*Leach.*

“Distinguished from *Pisa* by the absence of the strong spine which in that genus forms the anterior portion of the circle of the orbit; and by the second member of articulation of the outer antennæ being flattened and widened on the outer side.

HYAS ARANEUS—*Linnaeus*;—*Spider Hyas*.—*Milne Edwards, Hist. des Crust., Vol. 1, p. 312*; *Leach, Malac. p. 121*; *Pennant, p. 19, fig. 16*.—Off the S. coast of Cornwall. C.S.B.

HYAS COARCUATUS.—*Leach, Mal. pl. 21*; *Milne Edwards, Hist. des Crust., Vol. 1, p. 312*.—Off the S. coast. C.S.B.

Although Mr Couch wrote in the previous edition of his Cornish Fauna that he was not acquainted with either of these species and therefore supposed them not to be common, it is recorded as having been taken off the Cornish Coast upon his authority in Bell's crustacea. And he also mentioned that specimens taken off the coast of Cornwall are in the museum of the Athenæum at Plymouth.

GENUS MAIA.—*Lam.*

“The stalk of the external antennæ inserted into the internal angle of the orbit, and uncovered; nippers of the hand slender and pointed.”

MAIA SQUINADO—*Herbs, Corwich or Skerry*.—*Milne Edwards, Hist. des Crust., Vol. 1, p. 327*.

Mr. Couch in the previous edition of the Cornish Fauna mistook the Mediterranean species, *M. Verrucosa*, for this, but it differs in having tubercles instead of spines on the dorsal surface. Mr. Couch says that this species “in its season is the most abundant species of the family, and by far the largest, sometimes weighing as much as five pounds, and the carapace measuring from nine to ten inches in length; so that it is commonly used as food, though only by poor people and fisher-boys, who find in it a delicate meal. Its not tempting form and the small size of the legs conspire to exclude it from the tables of the rich.”

The information in Bell's account of this animal in his British stalk-eyed crustacea is mostly from the pen of Mr. Couch, and I therefore do not hesitate to transfer it in full. He says “This is the most abundant of all the crabs found on our coast, but it does not make its appearance as early in the season as the

common crab, the lobster, or indeed any other; it is rarely found earlier than May, but from that time till the end of the fishing in August or September, these crabs make their appearance in vast numbers, to the great vexation of the fishermen; for it is found that from the time these begin to enter the pots, the more valuable kinds considerably decrease in number; and this is supposed to arise from their restless activity. No sooner are they in the crabpot than they are continually in motion, scrambling from one part to another, and in this way frighten the crab and lobsters and prevent them from entering.

“In the spring and early part of the summer they lie concealed beneath the sand in deep water. About May they leave their places of concealment, but never come into shallow water, as does the common crab. The latter is often found in crevices of rock or beneath stones left by the receding tide, but this is never the case with the *Corwich*. They shed their spawn about August or September at some short distance from the shore, most probably in the sand. In this too they differ from the common crab, for even when the spawn is quite mature for casting, they enter the pots as readily as at any other time, whilst on the other hand it is a very rare occurrence to catch the common crab with spawn, unless it be with a dredge net. It would seem that either they grow fast, or that the young differ considerably in their habits from the larger ones; for whilst it is very common to find specimens measuring nine or ten inches in length of the carapace, it is very rare indeed to get one less than three inches, and a fisherman tells me that after many years fishing he caught one about the size of half-a-crown, which was the smallest he ever saw.

“The ova when quite ready for shedding are about the size of a very small mustard seed, and of a reddish brown colour, besprinkled with dark spots.

After keeping them suspended in sea water for twenty-four hours, some of the ova dropped from their attachments, and soon after the young escaped, and this is evidently by their own exertion, as distinct motions were easily observable under the microscope while they were yet enclosed. When they first escape, they are as it were rolled on themselves, the caudal extremity being bent on the body; but this is soon changed for

the position of a straight line. I could detect no spine on the anterior part of the carapace, which was quite smooth, but marked with dots. The eyes are sessile and large, the claws, particularly towards the extremity, covered with minute hairs."

The figures of the young or zœa form are given in Mr. Bell's work from Mr. Couch's drawings, who says that an ordinary sized Corwich bears at one time upwards of seventy-six thousand eggs.

PARTHENOPIDÆ. (PARTHENOPIANS.)

GENUS.—*Eurynome.*

"Eyes retractile; joint of the hand more or less triangular and armed. First joint of the outer antennæ fused with the frontal plate, and giving insertion to the next articulation on the fore part of the level of inner canthus of the eye."

EURYNOME ASPERA.—*Rough Eurynome.*—*Milne Edwards, Hist. des Crust., fig. 1, p. 357; Leach, Malac., p. 17; Pennant, p. 9, fig. 20; Bell, Hist. Brit. Stalk-eyed Crust., p. 46*—There is a specimen in the museum of the Athenæum at Plymouth.

"The length of the legs in this family of Crabs necessarily leads to slowness of motion; but they are well fitted to a residence among rocks and stones covered with seaweed, among which they stride with little difficulty. In the winter, they become almost, if not altogether torpid, concealing themselves at this season either in deep crevices of rocks or embedded in the soil; for the Corwich crab has been observed when caught at the time of its first activity in April to have the inequalities of its carapace covered with the mud of the bottom. It is perhaps at this period of repose that the crops of seaweed and corallines (*Sertularia* &c.) fix themselves, as they are often seen beautifully adorning them; shells of different species, but especially oysters and mussels, are also found adhering, and on the smaller kinds, as of the Genera *Inachus* and *Pisa*, and sponge will grow so luxuriantly as to conceal the whole carapace with tufts from the legs to the extremities.

"In the spring the spider crabs appear in water of the depth of a few fathoms; but as the weather grows warmer they approach the shore and in summer climb the rocks, so as sometimes to be left by the receding tide. At the season of the greatest activity, the corwich crab becomes so abundant that as no one thinks of

purchasing them they are regarded as a great annoyance by the fishermen; for it is found that when they occupy a crab-pot no lobster will enter it. I have been informed of nearly a cart load having been taken at one haul of a ground seine, and singularly enough the whole were found to be females. It is indeed a matter of general observation that the females exceed the males in the proportion of perhaps 10 to 1; and during the summer they are all well laden with spawn, which having been carried beneath the flap as in other crabs, for several months, for the sake of full exposure to the water and light, are dropped in some concealed places, where they elude observation, for I have not succeeded in finding one of a very small size." This may be accounted for by the fact that when in the zœa form the young animal swims on the surface of the sea in a form unlike the parent.

CANCERIDÆ.—(CANCERIANS.)

GENUS, XANTHO.—*Leach.*

„ Zantho.—*Couch.*

Carapace large, horizontal, a narrow fissure dividing it into two portions, the separating line furrowed; cavities of the antennæ transverse, separated by a slender partition, antennæ short.

XANTHO FLORIDUS—Furrowed Crab.—*Leach, Malac. pl.* 11; *Milne Edwards, Hist. des Crust., fig.* 1, *p.* 294; *Bell, Brit. Stalk-eyed Crust., p.* 51.

Bell says that "it is found in considerable numbers on the Coast of Cornwall and Devonshire, and also in Dorsetshire. It has been observed on several parts of the Coast of Ireland. Of its peculiar habits nothing is known."

XANTHO RIVULOSA—*Leach, Trans. Sin. Soc. xi, p.* 320; *Bell, Brit. Stalk-eyed Crust., p.* 54; *Milne Edwards, Hist. des Crust., t.* 1, *p.* 394.

"Equally common with the last and in similar situations, under stones about low water mark."

This species is known in the Mediterranean sea, and it has been taken at Antrim, in Ireland. Mr. Couch informed Mr. Bell that it is rather more common than *X. florida*, in Cornwall.

XANTHO TUBERCOLATA.—*R. Q. Couch, Bell's Brit. Stalk-eyed Crust., appendix p. 359.*

This species, which was first described by Mr. Bell in his book, on the British Crustacea, was added to our Fauna by the late Mr. R. Q. Couch, of Penzance, son of the author of the first edition of this report.

Mr. Couch says that it appears to prefer deeper water than the other two species, as he found it repeatedly in crevices of *Eschara foliacea* in the deep water off the Runnell Stone, in Mount's Bay. In the summer it approaches the shore and is found under stones. It spawns in June. Mr. Bell adds "the name *tuberculata* has been given to the species by its discoverer, from whom and from his father, Mr. Jonathan Couch of Polperro, I have had so many claims upon my acknowledgments for their intelligent and ready assistance in the progress of the present work."

GENUS, CANCER.—*Lin., Leach, Bell.*

,, Platycarcinus.—*Edwards, Couch.*

Carapace approaching to a transverse oval without furrows.

CANCER PAGURUS.—Edible Crab.—*Linn., Leach, and Bell Brit. Stalk-Eyed Crust., p. 59.*

Platycarcinus pagurus.—*Edwards, Hist. des Crust., t. 1, p. 413; Couch, Cornish Fauna, p. 68, 1838.*

This is the species so highly esteemed for the table, and for which a regular fishery is carried on. The male, called the Stool crab, is much the larger, not uncommonly weighing a dozen pounds, whilst the female, termed the Bon crab, is rarely half that size. Although this crab is somewhat affected by cold weather, so that it is most abundantly caught in summer, its activity is not diminished by it, and some may be obtained at all seasons. The fishery, therefore, is more influenced by the danger to which the pots set to take them are exposed in stormy weather, than by the absolute scarcity of the crabs. The haunts are along the edges of the rocks, in situations varying from low water mark to about 20 fathoms, and the selection is perhaps as much influenced by the facility of hiding or burrowing, as by the supply of food. The Bon crab begins to breed when about three inches across the carapace; and the spawn after remaining long attached to the parent, is buried beneath some shelter at all seasons of the year; but when engaged in this duty the female feeds

but little and commonly hides herself, few of them are taken in the pots. Fishermen mention such instances as somewhat remarkable, though most other crustaceans are familiarly taken with the "pea" attached.

The eggs are commonly shed while the parent is hid in the sand; and the young, of very small size, may be found beneath stones at low water mark; but there are some differences in this, as in some other of the habits of the different sexes; for among the multitudes of young found as described I have never been able to discover a female.

The trap made use of in taking crabs and lobsters is made of wicker work, in the form of the ordinary dome-shaped mouse trap, with the difference that the only entrance is at the top, and that the bottom is immovably joined to the structure. It is about two feet and a half high, and the bait is fastened within, between the neck of the entrance and the sides, by wooden skewers, so as to be seen at the greatest distance.

The skate and other fishes not generally sold in the market are used for bait, and it is found that the freshest only will attract the crab, whilst for lobster it is best when hung for several days to become tainted.

The pot is weighed down by a couple of stones fastened within, and the place is marked by a line with single corks along its course and a buoy at the end. The pots are *hauled* or examined every morning, at which time they are rebaited, and the crabs and lobsters conveyed to the store pots, which are much larger than the others, and are suspended near the surface by a small barrel fastened above, the more effectually to secure them from the voracity of ravenous fishes that prowl below. In this manner the fish are preserved until the arrival of the Well-Boat or Lobster Smack which comes periodically to convey them to the market.

When first taken it is usual to drive a wooden peg into the joints of the prehensile claws to prevent their injuring each other, and no food is afforded as they will endure long abstinence without suffering although they can live but a very short time without a renewal of water. In the small collection of a few dozens kept together in the store pots, this source of injury is indeed of small importance; but in the well of the lobster smack

it is essential, and I have been informed that when a vessel has been detained in harbour, it has been found necessary to go to the open sea and back to renew the water in the hold that the cargo may be kept alive.

The master of the lobster smack has a method of dealing with the fisherman that must not a little redound to his own advantage. If the lobster exceeds the length of eleven inches from snout to tail it is considered a full size fish or tale, of which the price was (in 1833) 10s. per dozen; but all that fall short of that length are regarded as only amounting to half the price.

A crab of the largest size can pass for no more than half the value of a full lobster, but if less than eight inches across the shell or carapace, they are half of a full or tale crab, and none are admitted that measure less than four inches.

Crab fishing is followed chiefly by the poorer fisherman, or by those whose activity has given way to the infirmities of age. It was formerly more profitable than now, and seems to be gradually decreasing. The lobster smacks that pass along the Cornish coast collecting the produce of the fishing of the two or three preceeding weeks, are mostly from Southampton, but the destination of the cargo seems to be the port of London.

In the report for 1843, of the Royal Polytechnic Society, Mr. Couch published a paper on the process of exuviation in crabs and lobsters, and again in the report of the same society for 1854, he published "a particular description of some circumstances hitherto little known, connected with the process of exuviation in the common edible crab;" in the latter communication he demonstrated the manner in which the larger claws split previously to the old shell being cast.

In the report of the recent commission (1877) on crabs and lobsters, the evidence went to prove that there was no decrease in the quantity of animals taken but that there is a larger demand, and a greater number of fishermen. The price of crabs is now (1877) 15s. per doz. for males, and 3s. per doz. for females.

CANCER INSOCRENATUS.—*Couch, Cornish Fauna*, 1838, p. 69-70.

"Carapace large, oval, somewhat elevated in the middle; points of the nippers not spoon-shaped. Legs short, compressed, those which are prehensile furnished above with a crest formed of a

row of spines or tubercles; terminal portion of the walking legs short and pointed.

No British example of this species has hitherto been known; but a specimen has come to my hands that belongs to this section, though I have not been able to refer it to any known species.

It was found in a crab pot in June, 1837, and though of small size, appearing to the fisherman to be of rare occurrence, it was reserved for my inspection. It was scarcely the fourth of an inch across the carapace, the form and colour resembling those of the common edible crab, but the antennæ were covered with small wavy protuberances. On the margin between the ocular cavities were five segments (lobes) the central most projecting; on the lateral margin were nine crenations, each, as those between the eyes, distinctly but finely notched. Antennæ, small, fine, simple, and with the palpi resembling those of the common crab. Hand claws and walking legs short, the two outer segments (joints) with a serrated crest, and the finger also notched at its root, walking legs with short bristles.

It may be that it is not uncommon, as its small size may easily cause it to be overlooked."

Most probably this is the young of some known species. I am not aware that it has been seen by any one but Mr. Couch. Bell does not notice it. It appears to me to resemble *Pilumnoides* of Edwards and Lucas.

GENUS, PILUMNUS.

Second portion of the outer antennæ placed in the inner canthus of the orbit, and extending beyond the front. Carapace rounded over the summit and without lines.

PILUMNUS HIRTELLUS.—Furry pilumnus.—*Leach, Malac. Brit., t. 12; Milne Edwards Hist. des Crust., t. 1, p. 417; Pennant, pl. 6, fig. 11.*

"Common under stones at low water."

This appears to be a widely extended species, having been found, according to Bell, in Mediterranean, Red Sea, East Indies, and other parts of the coast of Asia, Australia, and both Eastern and Western coasts of South America.

GENUS, PIRIMELA.

“Carapace rounded in front, and about as wide as long, strongly embossed, and toothed at the sides, the third articulation of the inner foot-jaws giving insertion to the next on its internal edge.”

Mr. Bell defines the genus as being most easily recognised from all other *Canceridæ*, in the circumstance that the external foot-jaws are advanced over the epistome to the autennary cavities.

PIRIMELA DENTICULATA.—*Leach. Malac. Brit. pl. 3; Milne Edwards, Hist. des Crustacea, t 1, p. 424.*

“This is the only known species of the Genus, and is not common.”

It has been taken all round our southern coast and in one or two places in Ireland. It is a species that is not littoral, since it is generally taken in the trawl refuse.

PORTUNIDÆ.—(SWIMMING CRABS.)

GENUS, CARCINUS.

Terminal articulations of the hindmost legs lancet shaped flat and broad, carapace broader than long, front advanced.

CARCINUS MÆNAS—Common Harbour Crab.—*Leach, Malac. pl. 5; Pennant, pl. 2, fig. 5; Milne Edwards, Hist. des Crust., vol. 1, p. 434.*

One of the commonest crabs of our shores, where it hides under stones on the beach but never goes far from land. It is a hardy species, easily kept in confinement for the sake of observation, and has even survived the being kept in fresh water. It lives in fresh water streams where the sea enters.

The development of this crab has been observed through all its stages from the zœa to the adult form, and it seems to be one of progressive morphology.—(Vide Phil. Trans.)

GENUS, PORTUMNUS.—*Leach, Bell.*

“Platyonychus.—*Edwards, Hist. des Crust., V. 1, p. 434; Couch.*

“Hinder legs with a wide and oval joint; corresponding part of the other legs straight and unfit for swimming.”

This definition of Couch's is scarcely sufficient to determine the Genus from that of *Portunus*. *Portumnus* is easily detected by

the form of its carapace, which is Lyre-shaped, and is as long as it is broad.

Mr. Bell considers it to be a distinct Genus from *Platyonychus*, but I doubt if he has made out more than a specific separation, even if he has good evidence of that.

PORTUMNUS LATIPES.—Wide Foot.—*Pennant*.

Platyonychus latipes—*Edwards, Hist. des Crust., t 1, p. 436; Couch's Cornish Fauna, p. 71.*

Portumnus variegatus—*Leach, Bell, Hist. Stalk-Eyed Crust., p. 85.*

It is found at low water mark on sandy beaches, in many places, where it burrows. Though not common it is tolerably abundant where taken.

GENUS, POLYBIUS.—*Leach*.

Carapace nearly circular, much depressed, anterior margin dentated, posterior pair of legs having the terminal joint flattened for swimming.

POLYBIUS HENSLOWII.—Nipper or Henslow's Swimming Crab.—*Leach, Malac. Brit., t. 1, 9; Milne Edwards, Hist. des Crust., t. 1, p. 439.*

“This, more than any of the others, is a swimming crab; for whilst the other British species of this family are only able to shoot themselves along from one low prominence to another, the nipper crab, as our fishermen term it, mounts to the surface over the deepest water, in pursuit of its prey, among which are numbered the most active fishes, as the Mackerel and Rauning Pollock, the skin of which it pierces with its sharp pincers, keeping its hold until the terrified victim becomes exhausted. We are witnesses to this curious method of obtaining food in the summer only, at which season the fishermen's nets intercept them and their prey together; and it is probable that, in colder weather, they keep at the bottom in deep water, from which, however, I have never seen them brought in the stomachs of fishes, so far as my observation extends. It is only or chiefly the male that pursues this actively predaceous existence; but that for a time they also remain quietly at the bottom, appears from the fact that while, for the most part, the smooth and flattened carapace is clean, I have occasionally seen it covered with small corallines. (*Sertularia*).”

The foregoing passage has been quoted at length in Bell's *Stalk-Eyed Crustacea*, p 118.

GENUS, PORTUNUS.—*Leach*.

Terminal articulation of the posterior legs formed flat for swimming. "Moveable stem of the outer antennæ composed of two articulations, and inserted on the same line with the eyes and inner antennæ; their basilar articulations fixed in front and entirely separating the orbit and cavity of the antennæ."

PORTUNUS PULBER.—Velvet Crab.—*Leach's Malac.*, p. 16; *Milne Edwards, Hist. des Crust.*, t 1, p. 431; *Bell's Brit. Stalk-Eyed Crust.*, p. 90.

Cancer velutinus.—*Pennant*, pl. 4, fig. 8.

"This is the largest British species of the family, sometimes measuring four or five inches across the carapace. It is also the most active and fierce, running with great agility on the appearance of danger, but stopping and assuming the attitude of defence when closely pressed. The largest keep in water at the depth of a few fathoms, and the smallest about low water mark, among stones, beneath which they shelter themselves."

Writing to Mr. Bell Mr. Couch says:—"It seizes an enemy suddenly and holds him with tenacity."

Mr. Bell says "that he has occasionally seen it brought to the London market with *Carcinus Menas*, and it is taken in large quantities on the French coast as an article of food."

A friend residing in the Channel Islands informed me that it is preferred in that locality as a greater luxury than the common edible crab.

PORTUNUS DEPURATOR.—Cleanser Swimming Crab.—*Linn.*, *Pennant*, *Leach Malac.*, pl. 9; *Bell Brit. Stalk-Eyed Crust.*, p. 90.

Portunus plicatus.—*Milne Edwards, Hist. des Crust.*, t 1, p. 442; *Couch's Cornish Fauna*, p. 71.

"Common, with much of the habits of the last species. There is some difficulty in assigning the proper synonyms, to this and the two following species, which are described as inhabiting our coasts, and it is probable that we have one or more to which none of the descriptions apply. They are all termed harbour or Mary crabs, and all exceedingly ravenous, fastening eagerly on any animal substance that comes within their reach."

It ranges from ours and the Irish coast to the Mediterranean sea, where it was first observed by Risso at Nice.

PORTUNUS LONGIPES.—Risso.—*Milne Edwards' Hist. des. Crust.*, t 1, p. 445.

Portunus dalyelii.—*Spence Bate, Ann. Nat. Hist.*, 1851, p. 320, t xi, fig. 9.

This species was taken first off the coast of Cornwall, by Prof. Ed. Forbes and Mr. McAndrews, and afterwards at Falmouth by Mr. Cocks, and at Penzance by Mr. R. Q. Couch.

Professor Bell says that it is doubtless the same species as that described as *P. dalyelii*, l. c. by Spence Bate in the *Ann. Nat. His.* for 1851, which he took off the coast of South Wales. But certainly the Welsh species is more pronounced in its character than the figure given by Prof. Bell.

PORTUNUS MARMOREUS.—Marbled Crab.—*Leach, Malac.*, pl. t viii; *Milne Edwards, Hist des Crust.*, t 1, p. 442.

Cancer Depurator.—*Pennant, pl. 2, fig. 6.*

This species receives its name from the beautifully coloured and variegated carapace, which is more conspicuous in the males than in the females.

PORTUNUS HOLSALUS.—Livid Swimming Crab.—*Fabr. Milne Edwards, Hist. des. Crust.*, t. i, p. 442; *Bell's Brit. Stalk-Eyed Crust.*, p. 109; *Couch's Cornish Fanna*, p. 72.

Portunus lividus.—*Leach, Brit. Malac.*, pl ix, fig. 3-4.

Bell says l. c., p 110. "The occurrence of this crab is extremely rare on our coasts. Dr. Leach had only seen one prior to the publication of his work, but there is now a fine series in the collection of the British Museum."

PORTUNUS CORRUGATUS.—Wrinkled Swimming Crab.—*Leach, Malac. Brit.*, t. viii; *Pennant, pl. 5, fig. 9*; *Bell, Stalk-Eyed Crust.*, p. 94.

Scarce. Bell says that it must be considered as one of the rarer species of the Genus. Leach mentions specimens as having been taken by Mr. C. Prideaux, in Plymouth Sound, and Mr. Bell has had a fine female specimen from the same locality.

It has been found as far north as Skye, and it is recorded from Carrickfergus, Dublin Bay, and Cork Harbour, in Ireland, and Berwick Bay on the Eastern Coast of England. *Milne*

Edwards says that it is very common in the Mediterranean. Risso does not mention it, unless, as is not improbable, that his species of *P. Leachii* be identical with it.

PORTUNUS PUSILLUS.—Dwarf Crab.—*Leach, Malac. Brit. Crust., t. ix; Milne Edwards, Hist. des. Crust., t 1, p. 444; Bell, Brit. Stalk-Eyed Crust., p. 112.*

P. Maculatus.—*Risso, Hist. Nat. En Merid., V, p. 5.*

Common. Bell says that this species inhabits deep water and is common on the Coasts of Devonshire and Cornwall. It is found from the Isle of Man to the Mediterranean sea, from which it has been recorded by Risso and Roux.

Its ordinary size is about four lines in length. But Mr. McAndrew took a male off the Isle of Man fully an inch in breadth and eight tenths of an inch in length.

PINNOTHERIDÆ.—(PARASITIC CRABS.)

GENUS, PINNOTHERES.—*Fabr, Leach, Edwards.*

Antennæ small, short, eyes impoverished, small, on short peduncles; carapace round, globular; chelæ, sub-equal, legs short. These crabs inhabit the shells of bivalve Mollusca.

PINNOTHERES PISUM—Pea Crab.—*Pennant, pl. 1, fig. 1; Leach, Malac. Brit., t. 14; Milne Edwards, Hist. des Crust., t. 2, p. 30; Bell, Brit. Stalk Eyed Crust., p. 121.*

“This species seems rare with us and only found in the Mussel shell, the natural inhabitant of which it either finds diseased or renders so. I have never found it in the *Pinna* as reported by authors, though many have been examined for that purpose.”

Mr. Ball informed Mr. Bell that he had, on two occasions, taken a great number of *Pinnotheres*, which were all males, from *Cardium edulis* (the common cockle), nine out of every ten contained a crab. On opening oysters at Tenby, in Wales, he has likewise procured this crab, and says that at every age it generally selects such shell as with out-stretched legs it would fill from side to side.

The young or zœa of this crab has been described and figured by Mr. Vaughan Thompson in the *Entomological Magazine*, vol. iii, p. 88, which has been copied into *Bell's British Stalk-Eyed Crustacea*, as a vignette to page 125.

PINNOTHERES VETERUM—Pinna Pea Crab.—*Bell*. Ancient Pea Crab.—*Couch*, *Bosc*, *Leach Malac. t. 15*; *Milne Edwards, Hist. des Crust., t. ii, p 32, pl 19*; *Bell, Brit. Stalk-Eyed Crust., p 72*.

“This is more rare than the last named, but there is a specimen in the Museum of the Athenæum, at Plymouth, as also of *P. Varius* of Leach, and either marked by that gentleman or Mr. Prideaux, but which is supposed by Dr. M. Edwards to be identical with *P. Pisum*, a species that is subject to variation at different stages of growth.”

According to Bell it has been found in *Pinna ingens* both on our Coast and in the Mediterranean: it has also been taken in *Modiola* and in the common oyster.

Bell considers that *P. Montagui* of Leach is a variety only of this species.

GONOPLACIDÆ.—(ANGULAR CRABS.)

GENUS, GONOPLAX.—*Leach*.

“Foot-stalk of the eyes long, received into a cavity occupying the chief part of the anterior border of the carapace. Carapace angular and extended laterally.”

GONOPLAX ANGULATA—Square Crab.—*Milne Edwards Hist. des Crust., t. ii, p. 61*; *Pennant pl. 5, fig. 10*; *Bell's Brit. Stalk-eyed Crust., p 130*.

G. bispinora.—*Brit. Malac., t. xviii*.

“Common, in moderately deep water, and often in the stomach of fishes.”

It is rare in Ireland where it has been taken mostly on the south coast. It has not been recorded from Scotland.

It is a Mediterranean species, and has been recorded from the southern and north-western coasts of France.

Mr Couch next describes—a very doubtful species under the name of *Gelasimus Bellii*, which Mr. Bell thinks may be the young of Roux's *Gonoplax rhomboides*, which most carcinologists consider as a variety of *Gonoplax angulata*. I copy Mr. Couch's description in full, so that observers may be able to verify his observations.

GENUS, GELASIMUS.

“Foot-stalk of the eye long and slender, the transparent cornea small. Carapace resembling that of *Gonoplax*, but more advanced in front, and less extended laterally.

This family (by Genus) is by Dr. M. Edwards placed among the *Ocypodidæ*, but is here coupled with *Gonoplax* from the great similarity of form and habit of the following species.

In the history of Crustaceans by Dr. M. Edwards, no notice is given of any species of this Genus as found in the European seas; and therefore I feel some hesitation in assigning to it a species frequently found in the stomach of fishes taken in depths varying from five to more than twenty fathoms, but of which no figure is found in the works of Pennant or Leach.

The form of the Carapace is represented by Dr. M. Edwards, pl. 18, fig. 10, and consequently much resembling that of *Gonoplax*; but that of the present species differs from the figure by that gentleman in possessing a second and well-marked hook on the lateral margin a little behind the anterior angle, and at the place where in the *Gonoplax bispinosa* there is a protuberance much less marked, but giving origin to the trivial name. Both claws are of equal size and less than the transverse breadth of the carapace. The eye-stalks are concealed in the manner of *Gonoplax*; but as the carapace is more advanced at the separation of the ocular cavities, when withdrawn, their extremities point a little backward.

I find but little difference in the form of the male and female, and none in the proportion of the claws, though such is the case for the most part in Crustaceans. I have provisionally designated it *G. Bellii* (Couch MS and fig.) in honour of the professor of Zoology in Kings' College, whose labours have been eminent in this department of science.”

GRAPSIDÆ.

GENUS, PLANES.—*Leach*.

„ *Nautilograpsus*.—*Edwards*.

„ *Pachysoma*.—*De Haan*.

Carapace quadrate, straight in front, rounded posteriorly. Orbits placed at the latero-anterior angles, space between the eyes half the width of the carapace. First pair of legs chelate robust.

not longer than the carapace; remaining pairs compressed, a little longer and more slender than the first.

Bell says that he has given this name to the genus because it was applied by Leach in MSS. in the British Museum, and adopted by Bowdich in his "Excursion in Madeira and Porto Santo."

PLANES LINNEANA,—*Leach MSS.*—Floating Crab.

This is a stray inhabitant of our shores, and drifted hither after Atlantic gales. Its proper habitat is the Sargossa or Gulf-weed of Mid-Atlantic. Sloane says that it was these crabs that Columbus, finding alive on the Sargossa floating in the sea, concluded himself not far from some land, in the first voyage he made, on the discovery of the West Indies.

In our report to the British Association on the marine Fauna and flora of S. Devon and Cornwall, Mr. Couch says, "In the spring of the present year, 1867, an example of the Hawk's-bill Turtle was taken in the channel, at not a great distance from the French coast, and therefore not to be classed as British; but when brought alive and active into Polperro there were found, adhering closely under the shelter of its tail, two full grown examples of this crab; the situation evidently chosen for support and shelter; for from the structure of their hind legs, it does not appear probable that they can maintain themselves at the surface without the aid of some extraneous support."

Mr. Couch says "a species of the Genus Grapsus is in the Athenæum at Plymouth,, under the name of *G. Pelagicus*, by Mr. Prideaux, and known to Dr. Leach, but not in any published work. It is understood that the collection in the Museum of that Institution is confined to specimens taken on the borders of Devon and Cornwall."

LEUCOSIADÆ.

GENUS, EBALIA.—*Leach, Edwards, Bell.*

Carapace rhomboidal, angles rounded, antennæ small, eyes having short foot-stalks.

This is the only British genus in this family.

EBALIA BRYERII—Bryer's Ebalia.—*Leach, Malac Brit.*, p. 125; *Milne Edwards, Hist. des Crust.*, t. 2, p. 128.

“Rare. Mr. Couch says that this is the only species that he has met with, and Dr. M. Edwards thinks that the others named are only varieties. The other two are in the Athenæum at Plymouth.”

It has been taken at Scarborough, and is rare in Ireland.

EBALIA CRANCHII—Cranch’s *Ebalia*.—*Leach, Malac., p. 25; Milne Edwards Hist. des Crust., vol. ii, p. 129.*

Bell says, “The male of this species so nearly resembles that of *E. bryerii* that without careful examination they may readily be mistaken for each other. The principal distinctive characters are to be found in the form and proportions of the antennæ, and the size of the granulations on the surface.”

This is the most rare of the British species of *Ebalia*. It was discovered by the indefatigable and unfortunate Mr. Cranch in Plymouth Sound, where, according to Leach, it was afterwards observed in considerable numbers.

EBALIA PENNANTII—Pennant’s *Ebalia*.—*Leach, Malac. Brit., pl. 25; Milne Edwards, Hist. des Crust., vol. 2, p. 129; Pennant, pl. 9, fig. 19.*

This species ranges from Shetland to the coast of Cornwall.

GENUS, ATELECYCLUS.—*Leach.*

“Carapace large, circular, arched anteriorly, more contracted behind. Cavities of the eyes longitudinal, front denticulated.”

ATELECYCLUS HETERODON—Circular Crab.—*Leach, Malac. Brit., t ii; Milne Edwards, Hist. des Crust., t 2, p. 143.*

“Common in the stomachs of fishes, chiefly Cod fishes and common Rays, from the depth of 20 to 50 fathoms. They must abound at these depths, as I have found more than thirty in a single fish, and almost every Ray opened for several days in succession was found to contain them.”

It has been recorded from the north of Scotland, and on the Irish coast.

GENUS, CORYSTES.

Carapace longer than broad, and in shape approaching an ellipse. Outer antennæ very long, and inserted in a cavity of the orbitary foramen.

CORYSTES CASSIVELAUNUS—Long Crab—*Couch.*—Masked Crab—*Bell. Leach, Malac. Brit., p. 1.*

Corystes Dentatus.—*Milne Edwards, Hist. des Crust., vol. 2, p. 148*; *Couch, Cornish Fauna, p. 74*.

Cancer Cassivilanus—*Pennant, pl. 7. C. Personatus, of some writers.*

It is common on sandy shores at low water, "where it burrows in the sand, leaving the extremities of the antennæ alone projecting above the surface. These organs are of some use beyond their common office of feelers, perhaps as in some others, they assist in the process of excavation; and when soiled by labour, I have seen the Crab effect their cleaning by alternately bending the joints of these stalks, which stand conveniently angular for this purpose. Each of the long antennæ is thus drawn along the brush that fringes the internal face of the other, until both are cleared of every particle that adhered to them."

The animal received its synonym of Masked Crab from the representation of a human face impressed upon its carapace.

ANOMURA.—(SOFT-TAILED CRABS.)

The genera of this group are distinguished from the *Brachyura* by the length of the pleon or tail, many of which from occupying shells of molluscs and other situations have no hard or crustaceous covering, hence their name. But the whole group or sub-order are recognized by having the fifth and sometimes the fourth pair of legs feeble and small.

PAGURIDÆ.

GENUS, PAGURUS.

"The abdomen (pleon) large and membranous, turned sideways; the pairs of the abdominal feelers irregular."

PAGURUS BERNHARDUS.—*Linn.*; *Milne Edwards, Hist. des Crust. t. ij, p. 215*; *Bell, Brit. Stalk-eyed Crust., p. 171*.

P. *Streblonyx*—*Leach, Malac. Brit. p. 26*; *Pennant, pl. 17*.

"Common and abundant, the smaller in pools left by the tide, the larger in a considerable depth of water; where they become so large as to occupy Whelk shells (*Buccinum*) of the largest size. As Crabs of this genus are weak and defenceless in the hinder parts of the body, they exercise the well known habit of residing

in the empty shells of various species of the turbinated mollusca, moving about in this way from an early stage of their existence as if the structure were a portion of their own bodies.

They cannot, indeed, be easily induced to quit their habitation, but shrink into it on the least appearance of danger, so that the usual way in which they fall victims to an enemy is when the shell and its inhabitants are swallowed together. Few crustaceans are more frequently found in the stomachs of fishes, and as they quit the shell when about to die, they soon become the food of their devourer, the empty shell being speedily rejected from the mouth. These crustaceans also quit their assumed tabernacle from increase of size, which as in others, is at the time of exuviation; and on one occasion, when I was observing the combat of a pair in captivity, the smaller, which seemed to have felt itself fettered by its unwieldy covering, quitted the encumbrance, and manœvered round the enemy with great alacrity in its naked condition. They often seize the fishermen's bait, and are drawn up from deep water by the line; and in feeding I have seen them hold their prey with the smaller (or left) hand, whilst the other was engaged in nipping off pieces and conveying them to the mouth. They breed when of small size, the pea being thrown round on the back, from which position it is certain that they must quit the shell in order to deposit it."

This last statement is corrected by the fact that Crustacea never deposit their spawn, but the young are hatched from the egg and are thrown out of the shell by the current of water that passes out of the shell during the process of respiration. I have seen them ejected through the branchial passage under the wing of the carapace.

Mr. W. A. Lloyd, who was formerly curator of the Hamburg aquarium, informed me that in the spring of the year in the aquarium he had seen the male of this crab take hold of the shell in which a female was contained, and carry her about for weeks together, grasping the thin edge of the shell, and when the female was fed the male did not take away the food as he would if a male one fed in his vicinity.

In the *Zoologist* for July 1871, pp. 26-85, Mr. Gurney states that he found in one of the capsules of a group of eggs of *Buccinum*, that had been discharged, a little whelk shell not larger than No. 5 shot, occupied by a young Hermit crab about an

eighth of an inch in length, and in another capsule a second hermit crab of similar size, but not ensconced in a shell.

This crab is very generally distributed on European coasts.

PAGURUS PRIDEAUXII (Prideaux's Hermit Crab).—*Leach, Malac., Brit. t. xxvi, pp. 5, 6; Milne Edwards, Hist. des Crust., t. ii p. 255; Bell, Hist. Brit. Stalk-Eyed Crust., p. 175.*

“More scarce than the last.

“I have examined a specimen with a line of hairs encompassing the thorax (pereion), with a few rather long fibres also pointing forwards from the first segment of the abdomen (pleon); but further observation is necessary to decide whether it be a distinct species.”

This species was first taken by Prideaux, in Plymouth Sound. Since then it has been found on many parts of the coast.

It is frequently found associated with a sea anemone on its shell, (*Adamsia maculata*.) It is not unfrequently associated also with a nereid annelid and an amphipodous crustacean. I have seen the annelid come out of the shell when the crab was feeding and steal his food from him.

PAGURUS CUANENSIS.—*Thompson; Bell, Stalk-Eyed Crust., p. 178.*

Dredged off the coast in Whitsand Bay, near Plymouth. C.S.B.

Report of Dredging Committee British Association, 1868. First

found in Ireland by Thompson. *Report Brit. Assoc., 1843, p. 267.*

PAGURUS ULIDIANUS.—*Thompson, Rep. Brit. Assoc., 1843 p. 257;*

Bell, Stalk-Eyed Crust., p. 180.

Off Plymouth. C.S.B. *Rep. Brit. Assoc.*

I have little doubt but that the suggestion of Professor Bell is correct, and that *P. ulidianus* is the young of some other species, probably *P. Bernhardus*.

PAGURUS HYNDMANII.—*Thompson, Rep. Brit. Assoc., 1843, p. 267;*

Bell, Stalk-Eyed Crust., p. 180.

P. fasciatus.—*Bell, p. 374.*

Plymouth, dredge, near the White Buoy, by Mr. Boswarva.

Pagurus fasciatus is evidently this species also.

PAGURUS LEVIS.—*Thompson, Rep. Brit. Assoc., 1843, p. 267;*

Bell, Stalk-Eyed Crust., p. 184.

Taken in a trawl near the Eddystone. C.S.B.

PAGURUS DILLWYNII.—*Spence Bate, Ann. Nat. Hist., 1851, p. 320,*

pl. X, fig. II. Bell, Stalk-Eyed Crust., p. 377.

Dredged off Plymouth. C.S.B.

This species was first found in South Wales, several years ago, and no naturalist appears to have met with it since. In the summer of 1865 I again met with it in tolerable abundance. I took it with a dredge off the entrance to Plymouth Sound, and seeing it with a number of shrimps in the basket of a fish woman, at Teignmouth, I purchased the entire stock, and hastening to the beach, there, with the incoming tide I took many specimens, which I kept alive. This, the prettiest of all the pretty genus, has the habit of burrowing in the sand, and it is probably to this circumstance that it has not been met with more frequently.

An interesting point in the development of this animal I have been enabled to make out and publish in the Report on the Marine Fauna and Flora of South Devon and Cornwall, presented to the British Association for 1865. Early in June we were enabled to capture many specimens of the young animal in various degrees of progressive growth, a circumstance that has enabled us to declare that the genus *Glaucothoe* described by Mr. Milne Edwards in the *Annales Sci. Nat.*, for March, 1830, *Prophylax* of Latrielle, is none other than an immature stage of *Pagurus*; at this period the little creature swims freely in the ocean, and so continues until obliged by an increase of growth to take refuge in a shell, when he settles down and becomes a Hermit crab.

PORCELLANADÆ.

GENUS, PORCELLANA.—*Lamarch.*

“Carapace nearly circular; hands broad and twisted; the hinder pair of legs slight and weak, bent on the other, and ending with a finger. The abdomen (pleon) bent under as in *Brachyurus*, but ending in a fan-shaped tail.”

PORCELLANA PLATYCHELES (Hairy Crab).—*Milne Edwards, Hist. des Crust., t. ii, p. 255; Pennant, p. 6, fig. 12; Bell, Stalk-Eyed Crust., p. 190.*

“Abundant under stones at low water mark. It is incapable of moving in any direction except backwards, not lifting its claws, but drawing them after it; the antennæ lying on the sides of the carapace in the direction of its march. Unlike our other crabs, it does not wait for an attack to throw off its legs; but siezing an enemy with its nippers, it leaves them to do all the injury of which they are capable, whilst itself has retreated to a place of safety.”

Its geographical range is from the Orkneys, where it reaches; its largest size, to the Mediterranean. On our coast it ranges from the shore to about three fathoms of water, and is very common.

PORCELLANA LONGICORNIS.—*Pennant, pl. 1, fig. 2.*

Pisidia longicornis.—*Leach, Dict. des. sc. nat., xviii, p. 54 (not Malac. Brit.); Milne Edwards, Hist des Crust., Vol. 2, p. 257; Bell, Stalk-Eyed Crust, p. 193.*

Porcellana Leachii.—*Gray, Zool. Miscel., p 15; Couch, Cornish Fauna, p. 76.*

Common on zoophytic and rocky ground, from one to forty fathoms of water. It seldom frequents the shore above half-tide.

I think that there can be little doubt but that Mr. Bell is correct in his opinion that *Porcellana acanthecheles* of Couch's previous Cornish Fauna is but a young specimen of this species.

GALATHIADÆ.

GENUS, GALATHEA.—*Fabr.*

“Carapace covered with transverse sections edged with short hair; snout (rostrum) advanced and spirey; half of the abdomen (pleon) permanently bent under.”

Carapace depressed; anterior pair of legs chelate, equal, flat, long; posterior pair feeble, unfit for walking; abdomen (pleon) broad, flat; posterior pair of pleopoda (tail) broad, flat; telson wide.

GALATHEA STRIGOSA (Plated Lobster); *Linn.*

G. spinigera.—*Leach, Malac., pl. 28; Pennant, pl. 14, p. 26 Milne Edwards, Hist. des Crust., t. 2, p. 323; Bell, Stalk-Eyed Crust., p. 200.*

“Common, and in its younger state not easily distinguished from *G. squamosa*. It is incapable of any motion but backward, and rarely rises above the bottom, when by a laborious motion of its tail it continues to retreat from its enemies; and its usual progress is creeping, and by its legs only.”

Mr. Couch's observations must have been on the sea-shore when the animal is out of the water. In the sea, *Galathea* as well as *Porcellana*, having the power of swimming very rapidly, and this they do mostly with the power of the whole tail (or pleon.)

GALATHEA SQUAMOSA (Scaly Galathea, *Bell.*)—*Leach, Malac, pl.* 28; *Milne Edwards, Hist. des Crust., t. ii, p. 975, Bell, Stalk-Eyed Crust, p. 197.*

Common under stones at low water.

This species is not so frequent as *G. strigosa*, and frequents deeper water, ranging, according to our experience, to 12 fathoms.

GALATHEA NEXA.—*Embleton, proc., Berwickshire Club; Bell, Stalk-Eyed Crust., p. 204.*

We have taken this specimen off the Cornish coast in forty fathoms of water. It has been taken at Zetland and in Ireland.

GALATHEA DISPERSA—*Spence Bate; Proc. Linnean Society.*

This is a smaller species than the two preceding, and is among our commonest form beyond low water.

GALATHEA ANDREWSII—*Kinahan, Dublin Nat. Hist. Soc.*

This species was first found off the coast of Cornwall, but described by Prof. Kinahan from a female taken in Dublin Bay. It has since been described by Mr. Spence Bate, from a male taken off the Cornish coast. The male differing from the female in having a much longer pair of chelate limbs.

This species is tolerably frequent on the zoophytic ground from 10 to 50 fathoms, and the female is apparently much more abundant than the male.

It is perhaps the smallest species of our local forms.

GALATHEA BAMFFICA.—*Pennant, Brit. Zool., iv, t. iii.*

Munida rugosa.—*Leach, Dict. des sc: Nat., xviii, p. 52.*

Galathea bamfia.—*Leach, Edin. Encyc., vii, p. 398.*

Munida rondellii.—*Bell, Stalk-Eyed Crust., p. 208.*

I have taken this species, which is rare on the stony ground, in from 20 to 30 fathoms off the Dudman.

Mr. Couch says that it is common in the stomachs of codfish. Bell in writing on the species says that it is far from common, and was found by Mr. Prideaux in Plymouth Sound, and he also received it from Falmouth, where it was taken by the late Dr. Cocks: and it is somewhat remarkable that it has not found a place in Mr. Couch's list of Cornish Crustacea. It is recorded from Zetland and Ireland, and it is worthy of note that while

extending as far as the Shetlands from whence I have received it, the specimens that have been dredged in the colder regions are very small, and the inhabitants of very deep water.

GALATHEA DIGIDISTANS.—*Spence Bate, Report on the South Devon and Cornwall Marine Fauna Flora; Brit. Assoc. Report, 1867, p. 277 and 279.*

In that report the author says, "among the Galathea that we have taken on our coast, and which embrace all that have been previously known as British, is one that we think must be accepted as not having been previously described. The largest specimen measuring from the extremity of the tail to that of the extended hands is little more than two inches, of which the animal itself, measuring from the extremity of the rostrum to that of the tail, is little more than one inch. This species differs from either of the others in having the large pair of chelate pereopoda (hands) flat and broad, the fingers much curved, very distant, and meeting only at their apex when closed, furnished on the inside with a considerable brush of hairs, and armed near the base of the moveable finger with a prominent tubercle or tooth, but which appears to be of little importance, since it is not able to impinge against the opposite finger.

We have sometimes thought that this specimen may only be an extreme form of the male of *Galathea squamifera*; but the armature of the surface of the hands, which is generally a safe guide to specific characters, has a distinct variation. In *G. squamifera* the arms are covered generally with a series of curved scale-like tuberculations, the anterior margin of which is divided into a series of bead-like elevations, while in the most typical parts such as on the surface of the *meros* and *carpus* the central prominence is elevated to a point, and the whole of the tubercular ridge is crowned by a row of short hairs, so minute that they are not perceptible except by the assistance of a lens. These tuberculations are closely packed and regular.

In this species the tuberculations are less prominent and defined, the margins of which can only be perceived to be at all baccated by careful arrangement of light, while the cilia, being far less numerous, are yet more conspicuous under the lens."

Two specimens only have been taken on stony bottom, in 30 fathoms of water.

MACRURA—(LONG-TAILED DIVISION).

SCYLLARIDÆ.

GENUS, SCYLLARUS—*Fabr.*

Second pair of antennæ having a broad disc-like plate instead of an extended rod-like flageller.

SCYLLARUS ARCTUS.—*Linn.* ; *Milne Edwards, Hist. des Crust., t. ij, p. 282.*

Several specimens of this very interesting animal have been taken of late, one of which was at Polperro, and Mr. Couch had the honour of announcing its first addition to the British fauna. Since then it has been taken by Mr. Cornish at Penzance, and at Plymouth near the entrance of the Sound. Two of these were pregnant with spawn. Two also were taken in the stomach of a cod fish. Those that I have seen were about four inches long. The zœa of Scyllarus, according to Anton Dhorn are Phyllosoma.

PALINURIDÆ.

GENUS, PALINURUS.—*Fabr.*

“The body almost cylindrical, in front a deep impression, having on each side a prominent spine with others scattered about. The legs compressed, all monodactyle.”

PALINURUS VULGARIS—(Crawfish, or Red Crab)—*Couch* ; *Leach* ; *Fabr* ; *Milne Edwards, Hist. des Crust., t. ii, p. 292* ; *Leach, Malac., pl. 30.*

Cancer Homarus.—*Pennant, pl. 11, fig. 22* ; *Bell, Stalk-Eyed Crust., p. 213.*

“A large and valuable species, inhabiting along the borders of rocks, where it is often taken in crab-pots, which, however, its long and unyielding antennæ frequently hinder it from entering. Keeping in companies, it also gets entangled in the trammel net, and in some abundance on the fishermen’s lines. It meets a ready sale in the market, though not so highly esteemed for the table as the lobster.”

It appears to be more general on our western coasts than elsewhere. They are rare in the north, both in England and Ireland.

The young or zœa of this species was first made known by Mr. R. Q. Couch, son of the author of the Cornish Fauna, at the meeting of the British Association at Dublin, 1857.

Its peculiar form, and the failure up to the present time, of tracing the animal through all its stages of development, makes it an object of interest; and I think it worthy of consideration, particularly by those who, as a crucial test in the theory of evolution, demand the exposition of a series of successional forms of life. They should remember that of this animal so common on our coast and in our markets, that there is no one yet who has been able to determine the several forms through which this animal passes in its growth from the zœa to the adult stage. Its first form is that known as *Phyllosoma*, its next stage is, I believe, that known as the genus *Amphion*, but this is only conjecture, as it has not been traced or clearly determined beyond the form the young quits the ovum. How, therefore, if a common form like this Crawfish cannot be traced from one end of its life to another, can we expect that the record of many forms of lost animals can be made perfect?

The young quit the ovum mostly at the same time, and Mr. A. Lloyd tells me that in the aquarium they suspend in the water for a day or so like a monster cone-like cloud, after which they disperse and die.

THALASINIDÆ.

GENUS, CALLIANASSA.—*Leach*.

“The integuments, except of the claw, less, soft; caudal plates large and foliaceous; first pair of legs didactyle, unequal; second pair small, didactyle;” third pair not didactyle. Carapace with rostrum.

CALLIANASSA SUBTERRANEA.—Burrowing Shrimp.—*Leach, Malac.*

Brit. t. xxxii; Milne Edwards, Hist. des Crust., vol. ii, p. 3 and 9.

Montague first took this species, probably, in Kingsbridge river; I took it many years since in company with the late Professor Kinahan, in Plymouth Sound. Mr. Couch makes no remark about it, or says where it was taken, but most probably off Polperro, but as it is a burrower it probably escapes observation.

GENUS, AXIUS.—*Leach*.

“Integuments moderately firm; caudal plates large and foliaceous. First pair of legs chelate, unequal; second pair chelate, subequal; the following pairs not didactyle. Carapace with a small triangular rostrum.”

AXIUS STIRYNCHUS.—*Leach, Malac. Brit. t. 33; Milne Edwards, Hist. des Crust., t. ii, p. 311; Bell, Stalk-Eyed Crust., p. 228.*

“The male of what I (Mr Couch) judge to be the same species, differs from the female in the snout (rostrum), which in my specimen of the latter was finely notched, and without the well marked longitudinal ridge of the former. The outer antennæ of the male are furnished with a ridge of fine hair on their inward line decreasing towards the point, which the female is without; and the former also has well-marked brushes near the lateral edges of the abdominal rings. This specimen, like those of the Genus *Callianassa*, has the habit of burrowing in the sand, from which it rarely emerges; and then it seeks shelter in a crevice covered with weeds, for it is sluggish in its motions, and if distant from a soft bottom in which to sink, incapable of escaping an enemy. A female that I obtained loaded with spawn, was dug out of sand in the middle of summer.

In the *Zoologist* for 1856, page 5282, Mr. Couch figured and described a specimen that appears to differ from this only in the more equal size of the two great chelæ, and this might have been due to a loss of one of the limbs and its gradual reconstruction.

GENUS, *GEBIA*.—*Leach.*

“Carapace terminating in a rostrum large enough to conceal the eyes, the sides forming a ridge passing back and encircling the region of the stomach. Outer antennæ without a scale. Abdomen (Pleon) long, more enlarged behind; caudal plates large. The claw legs straightened, the moveable finger large, but not met by a corresponding portion in opposition. The following legs one fingered, those of the second pair having the next to the last articulation large and ciliated.”

GEBIA STELLATA.—*Montagu; Leach, Malac., t. 31; Milne Edwards, Hist. des Crust., t. ii, p. 313; Bell, Stalk-Eyed Crust., p. 223.*

The habits of this animal is similar to that of *Callianassa*, in whose company it has been taken. Dr. Leach says that it has been taken in Plymouth Sound under the mud, in which it makes long winding horizontal passages, often a hundred feet or more in length.

GEBIA DELTURA.—*Leach, Malac., t. 31; Milne Edwards, Hist. des Crust., t. ii, p. 214; Bell, Stalk-Eyed Crust., p. 228.*

“I (Mr. Couch) find what appears to me to be this species in abundance in the Ray fishes (*Raia maculata* and *R. Clavata*), caught in from 30 to 50 fathoms of water.”

ASTACIDÆ.

GENUS, HOMARUS.—*Edwards.*

“Rostrum, and with a few spines on each side; scale of the outer antennæ very small, and like a tooth.” First pair of limbs chelate, hands large, ovate compressed; second and third pair small, chelate; fourth and fifth simple.

HOMARUS MARINUS.—*Fabr.*

Astacus marinus.—*Pennant; Fabr.*

Homarus vulgaris—*Milne Edwards, Hist. des Crust., t. ii, p. 334; Couch, Cornish Fauna, p. 78.*

“Lobsters are very common among the borders of not very elevated rocks, from close to the shore to the depth of about 20 fathoms. It is certain that they are less abundant at present than about the beginning of the present century; for whilst now, with a hundred pots, a dozen a day is regarded as tolerable success, persons now living have caught about a hundred in the same space, and in one instance a hundred and forty seven. One fisherman has taken 640 in a week, where now another has secured only 300 in a season. The reason assigned for this falling off is that the fishery for congers is not followed as formerly, and it is certain that this fish feeds eagerly on them. Perhaps, however, too little is ascribed to the increased demand in the market, and the consequent extension of the fishery, for the number of edible crabs has also diminished within the few years that an advanced price has been obtained for them. On the coast of Scotland, where it does not appear that fishes likely to destroy them are less abundant than with us, lobsters are in great multitudes, for Sir William Jardine informs us that at Montrose from 60,000 to 70,000 are annually sent to London, at the rate of 2½d. for each lobster.”

“Lobsters do not wander much from their accustomed haunts, and hence the discovery of a new station is a fortunate circumstance for the fisherman; and each situation is found to impress its own shade of colour on the shell. The same means are employed in fishing for lobsters as for crabs; but whilst the crab prefers bait

perfectly fresh, the lobster is attracted by that which is hung up to become tainted, or has been preserved by salting. Some other particulars of this fishery are given when speaking of the common crab."

Upon the authority of Mr. J. E. Saunders, the respectable fish salesman of Thames-street, Mr. Bell says, that often during the season the supply at Billingsgate is not less than 20,000 to 25,000 lobsters in one day. Most of these come from Norway, from whence the supply is not less than 600,000. It is computed, moreover, that not less than 150,000 reach London from Scotland and the neighbouring islands.

During the Commission which has recently been held in Devon and Cornwall, it is quite clear that the apparent scarcity is due to the increased number of fishermen, and the division of the produce of the fishery among so many.

Still, however, from increasing population, the demand is gradually becoming greater than the supply. It would therefore be desirable as much as possible to discourage the destruction of lobsters while bearing spawn. The loss of one lobster in berry is the destruction of some 60,000 to 100,000 young animals of the same kind.

In Bell's *Crustacea* I observe that he is indebted to Mr. Couch for the following paragraph—speaking of the opinion that the antennæ are thrown off at will or from injury,—I have not found this to be the fact; but subjecting the parts to blows or fracture, both in short and long-tailed crustacea, I have found the creature suffering acutely from the injury, most so when just emerged from the water; but in no case have they rejected the whole organ in consequence of the violence. If, however, it be violently handled, a separation takes place at the terminal joint of the peduncles in preference to any other place; and from this wound no stream of blood flows, but a fine membrane quickly forms on the surface, by which all effusion is prevented."

When the antennæ is reproduced it is curved in a spiral form within a saccular case, and becomes extended when the animal throws off its external covering in the next natural period of moulting.

On the same animal Mr. Bell gives the following statement on the authority of Mr. Peach:—

“I have heard the fishermen of Gorran Haven say that they have seen in the summer, *frequently*, the old lobsters with their young ones around them; some of the young have been noticed as six inches long. One man noticed the old lobster with her head peeping out from under a rock, the young ones playing around her; she appeared to rattle her claws on the approach of the fisherman, and herself and young took shelter under the rock; this rattling, no doubt, was to give the alarm. I have heard this from several, some very old men, who all speak to this without concert, and as a matter of course; and they are men I can readily believe.”

GENUS, CRANGON.—*Fabr.*

“Carapace somewhat depressed, with only the rudiment of a rostrum; antennæ inserted on about the same transverse line, on the outer side a large scale. The claw legs expanded, the moveable finger opposed to a slight rudiment of a process.” (Subchelate).

CRANGON VULGARIS—Sand Shrimp.—*Fabricius*; *Milne Edwards*, *Hist. des Crust.*, t. ii, p. 341; *Leach*, *Malac.*, pl. xxxvii; *Bell*, *Stalk-Eyed*, 256; *Astacus crangon*, pl. 15, fig. 30.

“Common in harbours on a sandy bottom, in which it buries itself, an operation performed by the aid of the hinder legs, but it heaps the loose sand on itself by the action of the antennæ.”

CRANGON SPINOSUS.—*Leach*; *Bell*, p. 261.

Crangon cataphractus.—*Edwards*, *Hist. des Crust.*, t. ii, p. 243; *Couch*, *Cornish Fauna*, p. 79.

Pontophilus spinosus.—*Leach*, *Malac.*, pl. xxxvii A.

One specimen only was obtained by Mr. Couch, and that came from the stomach of a fish taken at a depth of from 12 to 15 fathoms. We have taken it frequently among the Zoophites from six to sixteen fathoms of water.

CRANGON BOREAS—Arctic Shrimp.—*Phipps*.

Crangon fasciatus.—*Risso*, *Crust. de Nice*, t. iii, fo. p. 83; *Edwards*, *Hist. des Crust.*, t. ii, p. 324; *Bell*, *Stalk-Eyed Crust.*, p. 259.

Crangon sculptus.—*Bell*, *Stalk-Eyed Crust.*, p. 263.

There can be little doubt but that *C. fasciatus* and *C. sculptus* are identical with *C. boreas* of Phipps. I have compared the animals with the description and figures of the respective authors, and

feel sure that the variations between the several forms are dependant upon habitat. Those of the Arctic and more northern forms having the spines more strongly developed.

Found occasionally on stony ground in about 20 fathoms of water.

CRANGON TRISPINOSUS.—Three-spined shrimp.—*Bell, Stalk-eyed Crust., p. 265.*

Pontophilus trispinosus.—*Hailstone, Mag. Nat. Hist. viii. p. 261, fig. 25.*

I have taken four specimens of this species in Bigbury bay, on the north coast of Devon. Strictly this is not Cornish, but I can hardly imagine that an animal can be found as near, and yet not existing on the coast of Cornwall, the conditions being so similar.

GENUS, NIKA.—*Risso.*

First pair of antennæ two branched; first pair of legs dissimilar, one chelate, the other simple; second pair long multi articulate, minutely chelate.

NIKA EDULIS.—*Risso, Crust. de Nice, p. 85; Bell, Stalk-Eyed Crust., p. 275; Edwards, Hist. des. Crust., t. ii, p. 364.*

We have taken it occasionally on stony ground in about 30 fathoms of water.

NIKA COUCHII.—*Bell, Stalk-Eyed Crust., p. 278.*

We have taken this in the same locality as the other.

With all due deference to the ability and a cute observation of the author of the work cited, I must insist that this is nothing more than a variety of *N. Edulis*. It was first found by Mr. Couch and sent to Professor Bell, who never saw but this one specimen.

GENUS, AUTONOMEA.

“Eyes on short footstalks, projecting from beneath the border of the carapace. The snout scarcely passing beyond the eyes. The inner antennæ double, one filament much longer than the other. Outer antennæ slender, and much longer than the body, first pair of hands only with fingers.”

AUTOMOMEA OLIVII.—*Milne Edwards, Hist. des Crust., t. ii, p. 361.*

“This species has been hitherto unknown as British, but I have examined several specimens taken from the stomachs of fishes, from the depth of 15 or 20 fathoms. Some of these were of

larger size than described from the Mediterranean. One, not the largest measuring three inches from snout to tail, with antennæ of the length of five inches."

This species has not been noticed in *Bell's Crustacea*.

ALPHEADÆ.

GENUS, ALPHEUS.—*Edwards*.

Carapace covering the eyes. Second pair of antennæ having two branches. First pair of legs being large, chelate. Second pair long, slender, multarticulate, minutely chelate. Three posterior pairs simple.

From the manner in which the anterior margin of the carapace covers the eye, it is evident that all the members of this genus dwell under the surface of the sea bottom.

ALPHEUS RUBER.—*Edwards, Hist. des Crust., t. vi, p. 231; Bell, Stalk-eyed Crust, p. 271.*

The late Dr. Cocks, of Falmouth, took the first specimen of this species on our coast, as recorded by *Bell*. It has since been taken off the Dodman in thirty fathoms of water. Also in Plymouth sound. Its more general habitat is on stony ground in about thirty fathoms of water.

Its colour, salmon, and red at the joints.

ALPHEUS EDWARDSII.—We have taken several specimens of this species off the Dodman on stony ground, in about 30 fathoms of water.

I am inclined to believe that the habitat was shallower than recorded.

GENUS, TYPTON.—*Costa*.

„ Pontonella.—*Heller*.

Eyes exposed beyond the carapace. First pair of legs equal slender, long, chelate. Second pair large, unequal, chelate.

TYPTON SPONGIOSUM.—*Spence Bate. Report of Devon and Cornish Fauna, Brit. Assoc., 1867, p. 283.*

Several specimens of this species were found inhabiting a sponge in about four fathoms of water, on stony ground off Plymouth sound.

The Rd. Merle Norman, Annals, Nat. Hist., considers this species to be identical with *Costa's* species from the Mediterranean.

GENUS, HIPPOLYTE.—*Leach.*

“Carapace inflated on the top, rostrum large, compressed, toothed. First pair of antennæ with two branches. First pair of legs chelate, equal, short; second pair long, unequal, multarticulate minutely chelate.

HIPPOLYTE CRANCHIL.—*Leach, Malac, t. xxxviii, fig. 13,—21; M. Edwards, Hist. des Crust., t. ii, p. 367; Bell, Stalk-eyed Crust., p. 288.*

“Common in crab boats, and consequently living where the fishing is carried on for lobsters.”

This species appears to exist all round the island, and is common on stony ground, in from 6 to 10 fathoms of water.

GENUS, CARADINA.—*Edwards.*

Like Hippolyte, but having the first pair of legs chelate, and more robust. The *propodos* or hand articulating with the *carpus* or wrist by the inferior angle only.

CARADINA VARIANS.—*Spence Bate, Brit. Assoc., Sept. 1865, p. 53.*

Hippolyte varians.—*Leach, Malac., p. 38; Edwards, Hist. des Crust., t. ii., p. 371; Bell, Stalk-eyed Crust., p. 286.*

This was long classed among the Hippolytes, but it undoubtedly belongs to this genus. Not uncommon in Plymouth sound. *Dr. Leach* says that it is abundant in pools amongst the rocks on the south-western coast of Devon and Cornwall, and it is curious that it is not mentioned in *Mr. Couch's Cornish Fauna* for 1857, as it is one of the most common species on the shore.

CARADINA TENUIROSTRA.—*Spence Bate, Rep. Brit. Assoc., 1867, p. 278; Ann. Nat. Hist. (Carcinological Gleanings) 1865,*

Several specimens taken in Plymouth sound in from 4 to 6 fathoms of water.

GENUS, PANDALUS.

First pair of antennæ two branched. First pair of legs simple; second pair, slender, unequal in length, multarticulate, minutely chelate.

PANDALUS ANNULICOENUS.—*Leach, Malac. Brit. t. xi; Edwards, Hist., des Crust., t. ii, p. 384; Bell, Stalk-eyed Crust., p. 297.*

“Common in crab boats. There appears to be two other species on our coasts which I have been accustomed to call Æsop’s Shrimps, from their habit of bending up the back into a hump, but further observation is necessary to decide whether they are known to naturalists.”

One of these is the following.

PANDALUS THOMPSONI.—*Bell, Stalk-eyed Crust, p. 290.*

Pandalus Jeffreysii.—*Spence Bate, Ann. Nat. Hist., and Brit. Assoc. Rep., 1867, p. 278.*

Occasionally on rocky ground in about 6 fathoms of water.

GENUS, PALÆMON.—*Fabr.*

“Carapace elongated into a serrated rostrum of considerable length.” First pair of antennæ on three branches. First pair of legs small, slender, chelate; second pair larger and chelate.

PALÆMON SERRATUS.—Common Prawn.—*Pennant; Leach, Malac, pl. 48; Milne Edwards, Hist. des Crust., t. ii, p. 389; Bell, Stalk-eyed Crust., p. 302.*

“A common species, found of largest size on the rockiest coasts, where it seeks the shelter of large stones and places overhung with weeds. It prefers the stillest waters, advancing and retiring with the tide; in summer preferring water that has a distinct feeling of warmth, and in winter going into what is, at that season, less cold than at the margin, but never far from land.”

“It is sought after as a delicacy, the usual method of taking it is with a bag net suspended from a circular ring of iron at the end of a pole. Another method is by small pots, resembling those employed for the Crab and Lobster. The Prawn is a tempting bait for most sea fish.”

It inhabit all our coasts from about forty fathoms.

PALÆMON SQUILLA.—*Linn., Fabr.; Leach, Malac, pl. 43; Milne Edwards, Hist. des Crust., t. ii, p. 300; Bell, Stalk-eyed Crust, p. 305.*

“Scarce, and generally confounded with the last named species.” According to *Leach* it is tolerably abundant on the coast of Devon.

GROUP STOMAPODA.

*MYSIDÆ.*GENUS, *MYSIS*.—*Lats.*

Legs terminating in a multarticulate extremity supporting a second multarticulate branch attached to the "coxa," or first joint. Female carrying the ova beneath the body in a pouch.

MYSIS CHAMELEON.—(Opossum Shrimp).—*V. Thompson, Zool. Research, p. 27; Milne Edwards, Hist. des Crust., t. ii, p. 457.*

M. Spinulous.—*Couch's Cornish Fauna, p. 80.*

"Common in summer, when it draws near the shallows from deep water. It also enters rivers in multitudes, forming a long line of migrations, at which season it is much devoured by the trout. Its English name is taken from its habit of carrying the eggs in a receptacle under the body, until they are hatched, as in the analogous genus of quadrupeds, the opossum tribe.

There are other species as well as the nearly allied genus *Cynthia* on our coast, but they are here omitted for want of a recent opportunity for comparison.

MYSIS GRIFFITHSLÆ.—*Bell, Stalk-eyed Crust, p. 342.*

We have taken this supposed species, but I feel assured that it is only the younger stage of a macrurous form, probably *Palemon* or *Crangon*, the young of either genus of which it closely approximates.

GENUS, *THYSANAPODA*.

Branchia external and pendulous, branched, legs having the secondary branch short.

THYSANAPODA COUCHII.—*Bell, Stalk-eyed Crust, p. 346.*

This species was described by Professor Bell from specimens sent to him by "Mr. Couch, who obtained them from the Cornish coast from the stomach of a mackerel, which appeared to have been making a feast of this rare and interesting little crustacea." The author adds "The following account has been kindly furnished me by that gentleman, and shows that it can scarcely be considered as an ordinary inhabitant of our coasts. "The mackerel from which the curious shrimps *Thysanopoda* were taken, were caught almost at mid-channel, or almost ten leagues from us, perhaps seven or eight south of the Lizard; and I have not seen any since, although I am much in the habit of search-

ing the stomach of mackerel and other fishes. There were myriads in the stomachs of the mackerel at the time when I obtained those I sent you." As a mark of esteem Professor Bell "dedicated the species to that indefatigable and acute observer to whom we are indebted for so many valuable contributions to natural science."

We have since procured specimens near the coast, but only one or two.

SQUILLADÆ.

GENUS, SQUILLA.

Carapace reduced in size, covering only half the Pereion (body), second pair of gnathopoda (outer maxilliped or footjaws, of authors), large sub-chelate. First three pair of legs (pereiopoda) small, sub-chelate. Posterior three pairs only five joints, third joint carrying a second branch. Pleon large.

SQUILLA MANTES.—Rondel.—*Bell, Stalk-eyed Crust, p. 351.*

This species was taken first by Mr. Couch on the coast of Cornwall, and Professor Bell is indebted to him for a knowledge of it. It was found "about two leagues off, where the bottom is rocky with spots of sand."

SQUILLA DESMARESTII.—*Risso; Edwards; Bell, Stalk-eyed Crust, p. 354.*

Mr. Couch in his Cornish Fauna of 1868 records this species as rare, a few specimens having come into his possession, and he says that it seems to be the species alluded to by Pennant and Turton, under the name of *S. mantes*.

GROUP CUMACEA.

DIASTYLIDÆ.

GENUS, DIASTYLIS.—*Say, Trans. Phil. Soc., Philad., Vol. 1.*

Carapace having the lateral angles developed anteriorly and uniting in front of the eye and antennæ, and produced to look like a split rostrum. Eyes confluent as a single organ. Tail ending with a pair of double stylets. Telson (extreme point of the tail) produced to a long sharp process.

DIASTYLIS RATHKII.—*Spence Bate, Ann. Nat. Hist, June, 1856.*

Cuma Rathkii.—*Kroyer, Voyages en Scand.*

Alauna Rostrata.—*Goodsir, Edin. New Phil.*, 1843.

This animal is probably to be met with in muddy bottoms all around our coast, and along the northern shores of Europe.

It was first taken in Cornwall, at St. Ives, by the late Mr. Barlee. From Falmouth I received it from Mr. Webster. I have taken it among trawl refuse off Plymouth.

GENUS, CUMA.—*Montagu*.

Carapace with the lateral angles produced in front of the confluent eye, but not produced into a rostrum like projection. Tail end with two double branched stylets. Telson absent.

CUMA SCORPIOIDES.—*Montagu, Linn. Trans. Vol. ix.*

Cuma Audouinii.—*Edwards, Ann. Nat. ; Goodsir ; Edin. New Phil.*; 1843.

This animal has not yet been recorded as having been found on the coast of Cornwall, but as it was first found on the south coast of Devon, also in Scotland, I cannot but believe that it must exist on this coast.

This was taken by Montagu and is the first animal of the whole group that was found.

GENUS, EUDORA.—*Spence Bate*.

Differs from *Cuma* in having the antennæ obsolete.

EUDORA TRUNCATULA.—*Spence Bate, Ann. Nat. Hist., June, 1856.*
Plymouth sound.

DIVISION II.

THE SESSILE-EYED CRUSTACEA.

AMPHIPODA.

This name was given by Latreille to this order, on account of the animals comprised in it having two kinds of appendages, one for perambulation, the other for swimming.

ORCHESTIDÆ.

GENUS, TALITRUS.—*Latr.*

First pair of antennæ rudimentary, second long. First pair of legs strong and simple in both sexes, second pair small and feeble.

TALITRUS LOCUSTA—Sand Hopper.—*Linnaeus.*

Abundant on sandy shores above high-water mark, mostly under weed and offal. Dwelling in holes burrowed in the hot sand. In the summer they are abundant, in the winter they burrow into the sand.

GENUS, ORCHESTIA.—*Leach.*

Like Talitrus, but having the anterior two pairs of legs subchelate. The second large and powerful in the male, but slender and feeble in the female.

ORCHESTIA LITTOREA.—Shore Hopper.—*Montagu, Lin. Trans. lx. p. 9614, f. 4.*

Stony and pebbly beaches, above high-water mark. Tolerably frequent on the shores of Plymouth Sound.

ORCHESTIA MEDITERRANEA.—*Costa, Rind dell'accad. Sci. nap, p. 171, 1853.*

This species has not yet been recorded from Cornwall, but it reaches from the Mediterranean and the shores of the Crimea, and the northern coast of Ireland, and also from Wales. I feel

assured that it only wants to be looked for on rocky coasts above high-water to be found.

ORCHESTIA DESHAYSI.—*Audouin, Explic. Savigny, Crust. Egypt, p. lxi., fig. 8.*

Rare. Few specimens have been taken in England, of these most have been found on the rocky parts of Plymouth Sound.

GENUS, ALLORCHESTES.—*Dana.*

Like *Orchestia*, but the first pair antennæ are longer than the peduncle of the second.

ALLORCHESTES NILLSONII.—*Rathke, Beit. zur Fauna, Norw, xx, p. 264.*

This animal may generally be found nearer the sea than *Orchestia* and lives between high-water mark of ordinary tides and that of spring tides, in damp places, under weeds and stones.

ALLORCHESTES IMBRICATUS.—*Spence Bate.—Bate and Westwood, Sessile-eyed Crust., vol. i, p. 43.*

GENUS, NICEA.—*Nicolet.*

Both pairs of antennæ short, subequal. First two pairs of legs subchelate. Telson, or extremity of the tail, deeply cleft.

NICEA LUBBOCKIANA.—*Spence Bate.—Bate and Westwood, Sessile-eyed Crust., vol. i, p. 74.*

I have received specimens of this species from Falmouth and Penzance.

GAMMARIDÆ. (STEGOCEPHALIDES.)

GENUS, MONTAGUA —*Spence Bate.*

Antennæ subequal, first pair without a secondary appendage. First two pairs of feet subchelate.

MONTAGUA MONOCULOIDES.—*Montagu, Trans., Lin., vol. xi, pl. 11, fig. 3.*

I have received this from Falmouth, Penzance, and Plymouth.

MONTAGUA MARINA.—*Spence Bate.—Bate and Westwood, Sessile-eyed Crust., vol. 1, p. 58.*

I have found this species in the refuse of the trawlers, off the Eddystone. Mr. Edward, of Banff, has sent it to me from the

Moray Frith, and Mr. Gwyn Jeffreys has found it on the coast of Piedmont.

MONTAGUA POLLEXIANA.—*Spence Bate*.—*Bate and Westwood, Sessile-eyed Crust., vol. i, p. 64.*

I have had this species dredged off the north coast of Cornwall, near St. Ive. I have also had it sent to me from the Shetland.

GENUS, DANAIA.—*Spence Bate.*

Bate and Westwood, Sessile-eyed Crust., vol. i, p. 67.

Like *Montagua*, but first pair of legs less simple. Telson single.

DANAIA DUBIA.—*Spence Bate*.—*Bate and Westwood, vol. i, p. 68.*

Taken in trawl refuse off the Eddystone. Rare.

LYSIANASSIDES.

GENUS, LYSIANASSA.—*Milne Edwards.*

First pair of antennæ short, thick at the base, appendiculate. First pair of legs simple, second subchelate, long, and slender. Telson single.

LYSIANASSA COSTÆ.—*Milne Edwards, Ann. des Sc. Nat., t. xx, p. 365.*

Dredged off Plymouth.

LYSIANASSA AUDOUINIANA.—*Spence Bate*.—*Bate and Westwood, p. 79.*

I have taken this species the with dredge in Plymouth Sound.

LYSIANASSA ATLANTICA.—*Milne Edwards, Ann. des Sc. Nat., t. xx.*
Dredged in Plymouth Sound.

GENUS, ANONYX.—*Kroyer.*

Like *Lysianassa*, but with the first pair of legs subchelate. Telson single, cleft.

ANONYX EDWARDSII.—*Kroyer, Voyage en Scand., pl. xvi, f. 2.*

This species has been taken in Plymouth Sound and Falmouth Harbour.

ANONYX HOLBOLLI.—*Kroyer, Voy. en Scand., pl. xv, fig. i.*

This evidently is an arctic and deep-sea species. We have received it from the Haaf fishing ground, off the Shetland. Mr.

Loughrin has found it at Polperro, and I have dredged it in Plymouth Sound.

ANONYX MINUTUS.—*Kroyer, Voy. en Scand. pl. xviii, fig. 2.*

Found in Plymouth Sound and Falmouth Harbour.

GENUS, CALLISOMA.—*Costa.*

Like Anonyx and Lysianassa, but having the first pair of legs slender, and not tipped with a nail. Telson double.

CALLISOMA CRENATA.—*Spence Bate—Bate and Westwood, vol. i. p. 120.*

I have only seen two or three specimens of this species. I found it first off the Eddystone, and Mr. Edwards has sent to me from Banff. Mr. Jeffreys has taken it in abundance on the Haaf fishing ground, off the Shetland.

AMPELISCIDES.

GENUS, AMPELISCA.—*Kroyer.*

Eyes imperfect. Cephalon, or head, produced. Antennæ long and slender. First two pairs of legs slender, imperfectly subchelate. Telson squamiferous, cleft.

AMPELISCA GAIMRADI.—*Kroyer, Voy. en Scand. Crust., pl. xviii, fig. 1.*

Frequently taken in Plymouth Sound.

AMPELISCA BELLIANA.—*Spence Bate—Bate and Westwood, vol. i., p. 135.*

A northern species, but I have dredged it in Plymouth Sound.

PHOXDES.

GENUS, PHOXUS.—*Kroyer.*

Cephalon considerably advanced in front, like a hood, eyes none, or inconspicuous. First antennæ with a secondary appendage. First two pairs of legs subchelate. Telson double.

PHOXUS SIMPLEX.—*Spence Bate—Bate and Westwood, p. 140.*

Dredged in Plymouth Sound.

PHOXUS HOLBOLLI.—*Kroyer, Tidik., vol. iv., p. 150.*

I have taken it with the dredge in Plymouth Sound, and Mr. Edward has sent it to me from Banff. I am induced to believe that this and the previous species are but sexually distinct.

GENUS, GRAYA.—*Spence Bate.*

Approaches *Phoxus*, but with the eyes large and conspicuous.
 GRAYA IMBRICATA.—*Spence Bate.*—*Bate and Westwood, vol. i, p.*
 152.

Taken in Falmouth Harbour.

GENUS, WESTWOODILLA.—*Spence Bate.*

Head (Cephalon) produced in front, eyes confluent, antennæ subequal. First pair of legs subchelate, second not so.

WESTWOODILLA CÆCULA.—*Spence Bate.*—*Bate and Westwood, vol.*
i., p. 155.

Taken in the trawl off the Eddystone. Mr. Edward has sent it to me from the Moray Frith.

WESTWOODILLA HYALINA.—*Spence Bate, Cat. Amps. Brit Mus., p.*
 103, *pl. vii, fig. 5.*—*Bate and Westwood's Sessile Eyed Crust,*
p. 158.

This species was procured from trawl refuse which had been taken near the Eddystone Lighthouse.

These two species may be only male and female. In general form they are not very dissimilar, but there is a considerable variation in the microscopical structure of the dermal tissues.

The former species *W. cæcula* is undoubtedly a female, having been taken with ova. The latter we have not determined.

GENUS, ACANTHONOTUS.—*Owen.*

App. to Ross., Sed. voyage N.W. Passage, p. xc.

Cephalon anteriorly produced slightly, antennæ simple, subequal. Hands feeble, subchelate. Telson single, cleft to the apex.

ACANTHONOTUS OWENII.—*Spence Bate.*—*Bate and Westwood, p.*
 232.

This species is pretty generally distributed from the Shetland to the coast of Cornwall, it has been dredged at Falmouth, and found in trawl refuse brought in from the Channel off the Cornish coast. But all the specimens were taken from the back and gill chamfers of the Corwich crab (*Maia squinado*). They appear to live among the thick fur on the back of this spider crab, as if it was their natural habitat, their prehensile legs being peculiarly adapted for holding themselves on that animal.

GENUS, IPHIMEDIA.—*Rathke.**Beit. zur Fauna, Norw.*

Cephalon produced anteriorly. Eyes two, antennæ simple. Hands feeble, imperfectly subchelate. Telson squamose emarginate.

IPHIMEDIA OBESA.—*Rathke.*—*L.c. nov act. Scop., vol. xx, p. 89, pl. iii, fig. 1; Bate and Westwood, l.c., vol. i, p. 219.*

Dredged near Drake's Island, in Plymouth Sound.

GENUS, SILGEBORGIA.—*Spence Bate.**Cat. Brit. Mus., p. 118.*

Cephalon but slightly produced. First pair of antennæ short, having a second appendage, hands large. Telson cleft.

SILGEBORGIA PALLIDA.—*Spence Bate, Bate and Westwood, p. 203.*

Plymouth Sound. I have no doubt but that it is the same species as *Gammarus brevicornis* of Bruzelius (Mem. on amphipoda of Skandinavia.)

GENUS, ISÆA.—*Milne Edwards.**Hist. des Crust, t. iii, p. 26.*

First pair of antennæ with secondary branch, hands subchelate, all the legs smaller but subchelate. Telson cylindrical, single.

ISÆA MONTAGUI.—*Milne Edwards, l.c. p. 26, pl. xix, fig. 11.—Bate and Westwood, vol. i, p. 215.*

I have frequently taken this species.

GENUS, UROTHÖE.—*Dana.**U. S. Expl. Exp., p. 920.*

Body scarcely compressed. Eyes apart. First pair of antennæ with secondary appendage. First two pair of feet subchelate. Telson double.

UROTHÖE ELEGANS.—*Spence Bate.—Bate and Westwood, vol. i, p. 200.*

This species is named from its having beautifully variegated colours when alive. It was taken from some trawl refuse from the neighbourhood of the Eddystone.

It bears a generally close resemblance to *U. irrostratus*, which Mr. Dana took in the Zooloo seas. Nor is this the only instance

in which I have observed a close affinity of our own crustacea with those of the antipodal seas.

SULCATOR ARENARIUS.—Sandfurry maker.—*Spence Bate, Bate and Westwood, vol. 1, p. 189.*

I first found this species on the coast of South Wales, on sandy shores between the tide marks, but I found afterwards that undescribed specimens had been in the collection of the British Museum, which had been taken by Dr. Leach in the neighbourhood of Falmouth.

The late Mr. Albany Hancock has paid considerable attention to the furrows made by this creature, and described them in a paper "On the vermiform fossils in the mountain limestone districts of the North of England," published in the "Transactions of the Tyneside Nat. Field Club."

GENUS, SULCATOR.—*Spence Bate.*

An. Nat. Hist., vol. xii, p. 504, and vol. xix, p. 140.—Bate and Westwood, p. 187.

Cephalon anteriorly produced. First two pairs of legs feeble, imperfectly subchelate. Most of the points of the legs developed like scales.

DARWINIA.—*Spence Bate, Cat. Amps. Brit. Mus., p. 108.—Bate and Westwood, p. 182.*

Cephalon produced anteriorly. First two pairs of legs smaller than the succeeding, and subchelate. The portion of the animal that supports the swimming legs (pleon) lies generally closely compressed beneath the sterrunt of the anterior portion.

DARWINIA COMPRESSA.—*Spence Bate, Cat. Brit. Mus., p. 108, pl. —Bate and Westwood, l.c., vol. i, p. 184.*

This species was first taken on the shores of Banff by the well-known naturalist, Mr. Edward, and afterwards on the shores of Cornwall, where it was found off Polperro by Mr. Loughrin. These last were as white as writing paper, and in this respect differed from those received from the Moray Frith, which were of a brown hue. After having been kept for a short time the Cornish specimens assumed the colour of those from the Moray Firth. Hence we may assume that white is their colour while alive. Mr. Loughrin says that his specimens were procured either from

the throat of a codfish, or from the skin of a common dogfish (*Squalus acanthus*.) The swimmerets of these specimens were thickly covered with a species of *Vorticella*, a circumstance that is suggestive that they lived rather in the retired and quiet position of the throat of the codfish, which their black colour also supports, rather than on the external surface of a fast-swimming dogfish.

GENUS, MONOCULODES STIMPSON.

Marine invert. Grand Manan, p. 54.

Cephalon produced and depressed anteriorly. Eyes coalesced into one. First antennæ without a secondary appendage. First two pairs of feet subchelate, wrist antero-distally produced to the extremity of the inferior margin of the hand. Telson entire.

MONOCULODES STIMPSONI.—*Spence Bate, Cat. Brit. Mus., p. 105, pl. xvi, f. 3*—*Bate and Westwood, p. 168.*

Our first specimen was taken in the Channel off the coast of Cornwall, but it only consisting of a mutilated portion, the original description in the catalogue of the British Museum was taken. We have since seen a specimen taken by the Rev. Mr. Norman off the coast of Northumberland.

GAMARIDES.

GENUS, DEXAMINE.—*Leach.*

Edin. Encyclopedia, vii, p. 433.

First pair of antennæ having the third joint of the peduncle reduced to resemble the first articulus of the flagellum. Without a secondary appendage. Mandibles having no appendage, Hands feeble, subchelate. Telson single, divided.

DEXAMINE SPINOSA.—*Montagu, Lin. Trans., vol. xi, t. ii, fig. 1.*
Bate and Westwood, vol. i, p. 237.

All round our coasts where naturalists have searched.

It is a prettily coloured species, brilliant red with dark crimson spots. Those that are found nearer the shore are less bright but darker hue, and obtain a stain of blue that lessens their brilliancy.

GENUS, ATYLUS.—*Leach.**Zool. Misc., ii, pl. lxix.*

Like *Dexamine*, but having the mandibles furnished with a palpiform appendage.

ATYLUS SWAMMERDAMI.—*Milne Edwards, Hist. des Crust., t. iii. Bate and Westwood's Sessile Eyed Crust, vol. i, p. 246.*

We have taken it in Plymouth Sound, and Mr. Loughrin has sent it to us from Polperro.

ATYLUS BISPISSOSUS.—*Spence Bate, Cat. Amph. Brit. Mus., p. 104, pl. xxvii, fig. i.—Bate and Westwood, p. 250.*

We have dredged this species on the sandy bottom in Whitsand Bay, not far from the Rame Head, and have had it sent to us from Falmouth, as well as from Scotland and the coast of Northumberland.

GENUS, PHERUSA.—*Leach.**Edin. Ency., vii, p. 432.*

Like *Atylus*, but Telson not divided.

PHERUSA BICUSPIS.—*Kroyer, Grön Amph., p. 45, pl. i, fig. 1. Bate and Westwood, p. 253.*

We have had specimens taken at Falmouth, and Mr. Edward has sent it to us from Banff.

PHERUSA FUCICOLA.—*Leach, Edin. Ency. vii.—Bate and Westwood, p. 255.*

This is the type of the genus, and was taken first by Montagu from rocky shores in Devonshire. We have had specimens from Falmouth; from Polperro, where they were found by Mr. Loughrin; and from Banff, where they were procured by Mr. Edward, the Scottish naturalist.

GENUS, LEUCOTHÖE.—*Leach.*

Antennæ simple, subequal. Hands unequal. Second larger than the first, formed by the carpus or wrist being produced to reach beyond the next joint, and meeting the extremity of the finger.

LEUCOTHÖE ARTICULOSA.—*Montagu, Lin. Trans., vii, p. 70, pl. vi, fig. 6.—Bate and Westwood, p. 271.*

We have dredged it in Cawsand Bay, and Mr. Loughrin has sent it to us from Polperro.

GENUS, AORA.—*Kroyer*.

Zidst. zur 2, 1, p. 335.

First hand larger than the second, and formed by third joint having the infero-anterior angle produced to meet the extremity of the finger.

AORA GRACILIS.—*Spence Bate, Cat. Amph. Brit. Mus., p. 160, pl. xxix, fig. 7.*—*Bate and Westwood, l.c., p. 281.*

We took our first specimen on the coast of Glamorgan; we have since obtained it from St. Ives and off the Eddystone.

It is remarkable that the only other species of this genus known is that described by Kroyer and Nicolet, and closely resembling this in form, it is from the coast of Chili.

GENUS, MICRODEUTOPUS.—*Costa*.

First pair of antennæ larger than the second. First hand larger than the second.

MICRODEUTOPUS WEBSTERII.—*Spence Bate, Cat. Amph. Brit. Mus., p. 162, pl. xxx, fig. 2.*—*Bate and Westwood, p. 291.*

Mr. Webster dredged this species in Falmouth harbour.

MICRODEUTOPUS VERSICULATUS.—*Spence Bate, Cat. Amph. Brit. Mus., p. 165, pl. xx, fig. 5.*—*Bate and Westwood, p. 295.*

We have dredged this species in Plymouth Sound.

GENUS, GAMMARELLA.—*Spence Bate*.

Cat. Amph. Brit. Mus, p. 179.

First pair of antennæ with second appendage. First hand small, second large. Last appendage of the tail single, brown. Telson, single, cleft.

GAMMARELLA BREVICAUDATA.—*Milne Edwards, Hist. des Crust., t. iii, p. 53.*—*Bate and Westwood, p. 331.*

The first specimen of this species was taken by Milne Edwards at Morbihan, on the coast of France. Our specimen was taken by Mr. Loughrin, at Polperro.

GENUS, MELITA.—*Leach*.

Edin. Ency., iii, p. 403.

First antennæ longer than second, appendiculate. Second hand longer than the first.

MELITA PALMATA.—*Montagu, Lin. Trans., vii, p. 69, pt. 6, fig. 4.*
Bate and Westwood, p. 337.

It has been taken by Dr. Leach at Plymouth. Mr. Loughrin has found it at Polperro. It is a species that is by no means plentiful even where it has been found.

MELITA OBTUSATA.—*Montagu, Lin. Trans., vol. xi, p. 5, fig. 7.*
—Bate and Westwood, p. 341.

The original type of this species is in the British Museum, it having been taken by Col. Montagu, at Salcomb, on the south coast of Devon, from which the figure given in the *Sessile Eyed Crustacea* was taken, while the description was written from a recent specimen taken in Plymouth Sound.

MELITA PROXIMA.—*Spence Bate, Cat. Mus. Amph., p. 184, pt. xxxiii,*
fig. 4.—Bate and Westwood, p. 344.

This species has been taken in Plymouth Sound, and Mr. Edwards, of Banff, has sent it to us from that locality.

MELITA GLADIOSA.—*Spence Bate, Cat. B. M., p. 185, pt. 33, f. 6.—*
Bate and Westwood, p. 346.

Taken in Plymouth Sound. It resembles *Gammanes podayer* of Mr. Milne Edwards, which undoubtedly belongs to this genus.

GENUS, MÆRA.—*Leach.*

First pair of antennæ longer than the second, having a second appendage. Second hand larger than the first. Telson double.

MÆRA GROSSIMANA —*Montagu, Lin. Trans., xi, p. 359.*

When alive the animal is very transparent, its colour being faint yellow, tinted with rose.

The type was taken by Col. Montagu, in rocky pools on the south coast of Devon, but it has since been taken in Plymouth Sound, Penzance, and Polperro, as well as on the coasts of Scotland and France.

It bears a close resemblance to *Mæra tenella*, which Dana found in the Feejee Islands.

GENUS, EURYSTHEUS.—*Spence Bate.*

Antennæ subequally long. First pair with a second branch. Hands subchelate, second larger than the first; last pair of caudal appendages biramose, branches equal. Telson cylindrical.

EURYSTHEUS ERYTHROPHTHATMUS.—*Lilgeborgy, in ofvers af Kongl. Vet. Akad. Zorhandl, 1855, p. 124.*

Not uncommon in Plymouth Sound, and it has been sent to us, among other places, from Banff, by Mr. Edward.

GENUS, AMATHILLA.—*Bate and Westwood, p. 459.*

Head produced to a sharp point. Antennæ rather short. First pair with a second branch. Hands small, subequal. Back carinated. Telson entire, slightly emarginate at apex.

AMATHILLA SABINI.—*Leach, Rosse's First Voyage, oct. ed., ii, p. 178.*

This is an arctic species. First taken in Baffin's Bay by Genl. Sabine, during Rosse's first expedition. It has since been found on all the northern places where naturalists have dredged, both on the European and American coasts. Those from the Arctic seas and the coast of Scotland are large, being about an inch in length, but the size appears to diminish in regular proportions as it progresses southward. In Shetland and the Moray Frith it is scarcely as large as the Arctic specimens. At the Menai Straits it is scarcely half as large, and on the south coast of Cornwall it appears to have reached its minimum size, as it has not been recorded further south. It will be found in rocky pools near low water mark occasionally everywhere.

GENUS, GAMMARUS.—*Fabricius.*

Three posterior rings of the body furnished with bundles of short spines. Eyes long, narrow, or curved. Antennæ slender, with a short second branch. Hands not large, subequal. Telson double.

GAMMARUS MARINUS.—*Leach, Lin. Trans, xi, p.—Bate and Westwood, p. 370.*

The colour of the animal is olive-green. They are very gregarious, and live amongst the seaweed on our shores, and frequent estuaries a considerable distance from the mouth of every river.

GAMMARUS CAMPYLOPS.—*Leach, Edin. Ency.—Bate and Westwood, p. 375.*

This species is named from the crooked shape of the eyes. It appears to be an intermediate form between *G. marinus*, and *locusta*. It is not very common, but it has been taken among other places in Plymouth Sound.

GAMMARUS LOCUSTA.—*Linnaeus, Fauna Suec., 2nd ed., p. 497.*—*Bate and Westwood, p. 378.*

This species appears to be pretty generally distributed all round Europe, and may be found in pools near low water. It inhabits the sea a little further from the shore than *G. marinus*. The parent in this species has been observed by Dr. Salter to watch over and care for its newly hatched young. These swim round and follow the parent, and when frightened will rush to her and hide themselves in the incubating pouch, in which they nestled until the danger was passed.

GAMMARUS PULEX.—*Linnaeus, Syst. Nat., 1055.*—*Bate and Westwood, p. 388.*

Common in all our ponds and fresh water rivers, but according to our own experience less frequent and smaller than in other parts of England.

GENUS, MEGAMERA.—*Spence Bate.*

MEGAMERA SEMISERATA.—*Spence Bate.*—*Bate and Westwood, p. 401.*

This species as yet has only been recorded from Plymouth Sound.

MEGAMERA LONGIMANA.—(Long handed screw.)—*Leach, MSS.*—*Bate and Westwood, p. 403.*

This has been found in many places in Great Britain and Ireland, but does not appear to be common anywhere. In Cornwall we only know it from Penzance, and there it was taken under St. Michael's Mount.

MEGAMERA OTHONIS.—*Milne Edwards, Ann. des Sc. Nat., t. xx, p. 373, pl. x, fig. 11.*—*Bate and Westwood, p. 405.*

We have dredged this species in Plymouth Sound, and Mr. Loughrin has sent it to us from Polperro, but it has not been taken any where else in the British Isles.

MEGAMERA BREVICAUDATA.—*Spence Bate, Cat. Amph. B. M.*—*Bate and Westwood, p. 409.*

Dredged in Plymouth Sound.

DOMICOLA.

COROPHIIDÆ.—(PODOCERIDES.)

GENUS, AMPHITOE.—*Leach.*

Antennæ subequally long, first without a second branch. Hand subequal. Last appendage of the tail having two branches, one with short spines or hooks, the other without. Telson single.

AMPHITOE RUBRICATA.—*Montagu, Lin. Trans., ix, p. 99.—Bate and Westwood, p. 418.*

The adult is colored a brilliant crimson with large blotches of white. When young the animal is a yellowish green with minute red spots and a few white blotches.

The animals of this subdivision live in homes of their own construction. This species makes one by collecting stray material round some chosen nook, which it binds together with an exquisitely delicate web. We have not been able to discover how this web is secreted, whether by the mouth or some special organ.

It is tolerably common in a few fathoms of water or on shores, but the first we ever saw were dredged in Plymouth Sound; of more brilliant a colour than any paint we could prepare to represent it.

AMPHITOE VITTORINA.—*Spence Bate, Cat. Amph. B. M.—Bate and Westwood, p. 422.*

Common on stony beaches associated with *Gammarus*, being larger, it may readily be detected as a "Triton amongst the minnows."

GENUS, SUNAMPHITOE.—*Spence Bate.*

Cat. Amph. B. M.—Bate and Westwood, p. 429.

Like *Amphitoe*, except that the Telson or extremity of tail ends in a hook.

SUNAMPHITOE HAMULUS.—*Spence Bate, Cat. Amph. B. M.—Bate and Westwood, p. 430.*

A specimen of this species has been sent to us from Penzance.

SUNAMPHITOE CONFORMATA.—*Spence Bate, Cat. Amph. B. M.—Bate and Westwood, p. 432.*

One specimen has been taken by us in Plymouth Sound, another was sent to us from the Shetlands.

GENUS, PODOCERUS.—*Leach*.

Linn. Trans, xi, p. 360.

First antennæ with minute second appendage; second antennæ not multarticulate, laminating in short strong spines or hooks. Hands unequal, second pair largest. Telson single, scalelike.

PODOCERUS PULCHELLUS.—*Leach, Edin. Ency.*, vii, p. 433.—*Bate and Westwood, l.c.*, p. 436.

We have taken it in Plymouth Sound, and Mr. Edward has sent it to us from Banff. It closely resembles *P. validus*, Dana, of South America.

PODOCERUS VARIEGATUS.—*Leach, Edin. Ency.*, vii, p. 433.—*Bate and Westwood*, p. 439.

This species is very common amongst the weed attached to buoys and floating objects, amongst which, and the sertularia, they build and occupy nests.

We have had specimens from Mr. Edward, of Banff, and Mr. Loughrin, of Polperro.

PODOCERUS CAPILLATUS.—*Rathke, Nov. Acta. Acad. Scop.*, xx, pl. iv, fig. 8.—*Bate and Westwood*, p. 442.

This species also builds very pretty nests among the branches of various kinds of zoophytes. In one of these we found a mother with the young of different ages, demonstrating tolerably clearly in this comparatively low group of animals the instinct of maternal love.

PODOCERUS FALCATUS.—*Montagu, Lin. Trans.*, ix, p. 100, pl. v, fig. 2.—*Bate and Westwood*, p. 445.

Dredged in Plymouth Sound, and along the southern coast of Cornwall.

GENUS, CERAPUS.—*Say*.

Jour. Acad. Phil., i, p. 49.

Body not laterally compressed. Antennæ subequal, first pair with a second branch. Second pair with flagellum multarticulate. First pair of hands subchelate, second larger than the first, and

complexly* chelate; posterior of tail appendages unbranched. Telson rudimentary.

The animals of this genus construct tubes in which they dwell.
 CERAPUS ABDITUS.—*Templeton, Trans. Ent. Soc.*, 1, p. 188, *pl.*
xx, fig. 3.—*Bate and Westwood, l.c.*, p. 456.

Templeton took the specimens, from which he described the species between the southern and northern hemispheres. Dana has described a crustacean from the coast of Brazil under the name of *Pyctilus brasiliensis*, which nearly resembles this British species, which offers among other facts, evidence of the approximation of forms between British and South American crustacea.

It has been taken in Plymouth Sound. According to Mr. Templeton, it lives in a long narrow membranous tube.

CERAPUS, *Fem.*—GENUS, DERCOTHÖE.—*Dana, U.S. Expl. Exp.*,
p. 968.—*Bate and Westwood, p. 459.*

These are females of the last genus, but differ so considerably in form, that they were described as a separate genus by Dana, and the name is retained in Bate and Westwood's "Sessile-Eyed Crustacea" as a temporary convenience for the females until the males have been determined. But we have little doubt but that *Dercothöe punctatus* is the female of *Cerapus abditus*.

The second hand is smaller, and the carpus only projects as a scale below the hand.

GENUS, NÆNIA.—*Spence Bate.*

Cat. Amph. B. M., p. 271.—*Bate and Westwood, p. 471.*

Antennæ subequal; no second branch. Hands subchelate, posterior pair of caudal appendages two branched. Telson cylindrical.

NÆNIA TUBERCULOSA.—*Spence Bate, Cat. Amph. B. M.*, p. 271,
pl. xlvi, fig. 2.—*Bate and Westwood, p. 472.*

We have taken this species not unfrequently in the dredge off Plymouth, and we have received it from Banff, from Mr. Edward.

A closely allied species of this genus is known to inhabit a whelk shell, together with a soldier crab and annelid, in the peaceful character of a "Happy family."

* Complexly chelate means, when the claw is formed by more than two joints.

COROPHIIDÆ.

GENUS, CYRTOPHIUM.—*Dana*.*U. S. Expl. Exp.*, p. 839.

Head subquadrate. Body broad, narrowing posteriorly. Eyes prominent. Antennæ subpediform. Hands subchelate. Second much larger than first. Last pair of tail appendages rudimentary. Telson squamiferous.

We consider that Dana's genus of *Platophium* is identical with this.

This species has been taken with the dredge off Falmouth, and obtained on the shore of St. Michael's Mount.

GENUS, COROPHIUM.—*Latrielle*.*Gen. Crust.*, i, p. 58—*Bate and Westwood*, p. 492.

Body not compressed. Eyes small. First antennæ multarticate. Second subpediform. First hand subchelate, second simple.

COROPHIUM LONGICORNE.—*Latr.*, *Gen. Crust. et Ent.*, 1, p. 89.—*Bate and Westwood*, p. 493.

This species may probably be found all round the British coast. Quatrefages, in his "Rambles of a Naturalist," says that "they come from the open sea in April, in myriads, to wage war with the annelids, which they entirely destroy before the end of May. They then attack the mollusca and fish, all through the summer, and disappear in a single night about the end of October."

Mr. Walker, of Chester, tried several experiments with this animal, by keeping it in small vessels with some nereid annelids, but they appeared to dwell together in peace.

COROPHIUM BONELLI.—*Milne Edwards*, *Hist. des Crust.*, t. iii, p. 67.—*Bate and Westwood*, p. 497.

This species has also been taken in Plymouth Sound.

CHELURIDÆ.

GENUS, CHELURA.—*Philippi*.*In Wiegman's Archit.*, 1839.—*Bate and Westwood*, p. 502.

Body not compressed. First antennæ short, second long, robust, flagellum multarticate and spatuliform. Hands chelate. Telson single.

HELURA TEREBRANS.—*Philippi, vol. v, p. 120, pl. iii, fig. 5.*—*Bate and Westwood, p. 503.*

This is one of our most destructive wood-eating crustacea. It is commonly associated with *Limnoria legurium*, but fortunately for our piles and pier woodwork, it is not prolific as the smaller *Limnoria*. It has been found to destroy a piece of sound timber thirteen inches square in less than ten years. It eats into the timber in a level with the mud to the usual height of neap tides, avoiding, however, the knots in the wood. In this manner the wood is riddled in every direction, and is then easily destroyed by the force of the waves.

HYPERINA.

HYPERIDÆ.

GENUS, LESTRIGONUS.—*Milne Edwards.*

Hist. des Crust., t. iii, p. 81.—*Bate and Westwood's Brit. Sessile-Eyed Crustacea, vol. i, p. 3.*

Head orbicular, deeper than broad. Anterior division of the body (pereion) broader than the posterior (pleon). Eyes large. Telson single, triangular.

These are supposed to be the males of the following

GENUS, HYPERIA.—*Latrielle.*

Bate and Westwood, vol. 2, p. 11.

HYPERIA GALBA.—*Montagu, Lin. Trans., xi, p. 4, pl. 2, fig. 2.*
Taken in the sea floating in medusæ, off the coast.

CAPELLLIDÆ.

GENUS, PROTO.—*Leach.*

Lin. Trans., xi, p. 362.—*Bate and Westwood, p. 36.*

Head and first somite of the body united. Posterior portion of the body rudimentary.

PROTO PEDATA.—*Abildgaard, in Müller, Zool. Dan., pl. iii, p. 33 pl. cl, fig. 1, 2.*—*Bate and Westwood, p. 38.*

Occasionally found in dredging all round the coast. The late Mr. R. Q. Couch took it at Mousehole, Cornwall.

GENUS, PROTELLA.—*Dana*.*U.S. Expl. Exp.*, p. 812.

Like Proto, but having rudimentary appendages to the two somites succeeding the hands.

PROTELLA PHASMA.—*Montagu, Trans. Lin. Soc.*, vol. ii, p. 66, pl vi, fig. 3.—*Bate and Westwood*, p. 45.

This species was first found by Col. Montagu, and we have obtained it in the neighbourhood of Plymouth; and Mr. R. Q. Couch has found it among confervæ, at Lariggan rocks, Mount's Bay, Cornwall.

GENUS, CAPRELLA.—*Linnaeus*.

Like Protella, but without any appendage to the two central segments of the body.

CAPRELLA LINEARIS (Skeleton Shrimp).—*Linnaeus' Syst. Nat.*, ii, p. 1056.—*Bate and Westwood*, p. 52.

All round our shores, amongst stones and weed. This animal appears to watch and protect its young, they creeping about the parent and looking like small branches of weed attached to her body.

CAPRELLA LOBATA.—*Müller, Zool. Dan., Prod.*, 197.—*Bate and Westwood*, p. 57.

We have taken this species in Plymouth Sound, and Mr. Edward has sent it to us from the Moray Frith.

CAPRELLA ACUTIFRONS.—*Latrielle's N. Dict. de. Hist. Nat.*, 2nd ed., vol. vi, p. 433.—*Bate and Westwood*, p. 60

Taken in Plymouth Sound; and Mr. R. Q. Couch informed me that it is not uncommon among corallines in Mount's Bay.

This species appears to have a near representation in different parts of the globe. *Caprella geometrica*, of the United States; and *Caprella robusta*, from Rio Janeiro, as well as *Caprella nodosa*, from the Mauritius, would no doubt be considered the same species as this were they not found in such very distant parts of the globe.

CAPRELLA HYSTRYX.—*Kroyer, Nat. Hist. Tid.*, iv, 603, pl. viii, fig. 20, 26.—*Bate and Westwood*, p. 63.

This species has been found on the shores of the North of England, and also in Plymouth Sound.

CAPRELLA ACANTHIFERA (Skull-headed Skeleton Shrimp).—*Leach, Edin. Ency., vii, p. 404.*—*Bate and Westwood, p. 65.*

It has been taken at Plymouth, on Drake's Island, at low water; as well as dredged in the Sound. Mr. Edward has sent it to us from Banff.

CAPRELLA TUBERCULATA.—*Guerin, Scon. Ran. Crust., pl. xxviii, fig. 1.*—*Bate and Westwood, p. 68.*

Mr. Couch found a considerable number in the crevices of a crab-pot buoy, thrown on the coast at Polperro during a heavy gale; and Mr. R. Q. Couch obtained a female in Gwavas Lake, off St. Michael's Mount.

CAPRELLA ÆGUILIBRA.—*Say, Journ. Acad. Phil., 1, p. 391.*—*Bate and Westwood, p. 71.*

Taken in Plymouth Sound on buoys hid among weeds.

Specimens apparently identical with this species have been sent to us from the North of England, from Rio Janeiro, from Hong Kong, and North America.

ISOPODA ABERANTIA.

TANAIDÆ.

GENUS, TANAIS.—*Audouin and Milne Edwards.*

Head and first segment united. Body elongated. Antennæ short. First hand large, didactyle; second pair slender.

TANAIS VITTATUS.—*Rathke, Nor. Act., 20, pl. i.*—*Bate and Westwood, p. 125.*

Found at Polperro by Mr. Loughrin.

TANAIS DULONGII.—*Audouin, Expl. pl. Egypt., t. xi, fig. 1.*—*Bate and Westwood, p. 129.*

This species was first taken on the coast of Egypt. We found it in tolerable numbers in the worm-eaten timber during the erection of the battery inside the breakwater, Plymouth; and at Polperro, where it was found by Mr. Loughrin.

GENUS, APSEUDES.—*Leach.*

Edin. Ency., vol. vii, p. 404.

Body elongated. Head having first segment united. First antennæ longer than the second. Second antennæ with a foli-

aceous appendage. Last pair of caudal appendages two-branched.

APSEUDES TALPA.—*Montagu, Lin. Trans., ix, p. 98, t. 6, f. 6.*—*Bate and Westwood's Sessile-Eyed Crustacea, vol. ii, p. 149.*

The first specimen of this very interesting animal was found by Col. Montagu on a large scallop shell (*Pecten maximus*), at Salcombe, on the south coast of Devon. It has been found in the Channel Isles, and in Plymouth Sound.

ANTHURIDÆ.

GENUS, ANTHURA.—*Leach.*

Bate and Westwood, p. 157.

Body slender, elongated. Head and segments quite distinct. First pair of legs robust and imperfectly subchelate, all the rest filiform. Tail appendages arranged to be dorsally concave.

ANTHURA GRACILIS.—*Montagu, p. 104.*—*Bate and Westwood, p. 162.*

First taken by Col. Montagu, many years ago, at his usual hunting ground, Salcombe harbour. It has since been taken at Falmouth, and off the south coast.

ANCEIDÆ.

GENUS, ANCEUS.—*Risso.*

Crust. des Nice, p. 51.—*Bate and Westwood, p. 170.*

Male. Head square. Mandibles developed anteriorly like antennæ, body having two segments wanting, the anterior division (pereion) much broader than the posterior (pleon). Only five pairs of walking legs, no hands.

ANCEUS MAXILLARIS.—*Montagu, Lin. Trans., vii, p. 65, t. 6, f. 2.*—*Bate and Westwood, p. 187.*

In crevices of rocks between tides all round the coast. It has been taken in such places at extreme low water, at Gyllyngvase, near Falmouth, as well as at Polperro, and Plymouth. It has also been taken in trawl refuse.

GENUS, PRANISA. (Female of *Anceus*.)

Head pointed. Antennæ, as well as the appendages of the mouth, small. Three last segments of the anterior portion of the body united into one. Posterior portion much narrower than the anterior. Five legs, slender.

ANCEUS (PRANISA) CERULIATA.—*Desmarest, Consid. sm. Crust., p. 284.*

This is the female, probably, of *Anceus maxillaris*.

These two animals for a long time were considered as representing two distinct genera, and by some as separate families, their habits and appearance are so unlike each other. It now appears from the researches of M. Hepe, of Brest, who has the honor of first determining their relative connection with each other to be male and female. In early life the two resemble each other very closely, and they then live as parasites on the external surface of fish; as they grow older the male assumes the form of *Anceus*, and the female continues unaltered in the form of *Pranisa*. After quitting their parasitic mode of life they appear, as far as we can judge, particularly the male, to live without eating, for it has no mouth, and the mandibles are placed in the front of the head like antennæ. The female appears to exist as a huge ovisac, and when the young are matured the mother appears to be empty, and almost devoid of the traces of internal organs. The life of both male and female now appear, as far as usefulness is concerned, to be over, for although I have kept them alive for months in this condition they never appear to change, or seek or obtain food, but lie motionless and feeble.

ISOPODA NORMALIA.

BOPYRIDÆ.

GENUS, BOPYRUS.—*Latrielle*.

Male. Small, narrow; antennæ rudimentary.

Female six times as large as the male. Pearshaped, unsymmetrical. Body much flattened.

BOPYRUS SQUILLARIUS.—*Latrielle, Hist. Nat. Crust., vii, p. 55, t. 59, f. 2.*—*Bate and Westwood, p. 218.*

Frequently found under the shell of prawns and shrimps. From Polperro and off the coast.

GENUS, PHRYXUS.—*Rathke*.

Male. Very minute and elongated, head transversely minute, with two dark minute eyes.

Female. Large inert nearly globular mass, with the segments scarcely indicated by depressions, with wide and oviparous plates.

PHRYXUS LOGIBRACHITUS.—*Bate and Westwood, p. 246.*

Specimens of this species have been taken at Polperro, upon an old *Galathea squamifera*, by Mr. Loughrin.

ÆGIDÆ.

GENUS, *ÆGA*.—*Leach.*

Oval in shape, antennæ short, three anterior pairs of legs robust, with hands. Four posterior pairs slender, pediform.

ÆGABICARINATA.—*Leach, Dict. Se. Nat., xii, p. 349.*—*Bate and Westwood, p. 278.*

Taken in trawl refuse off Plymouth.

GENUS, *ROCINELLA*.—*Leach.*

Eyes very large, nearly uniting at the centre; second antennæ nearly one-third the length of body, rest like *Æga*.

ROCINELLA DANMONIENSIS.—*Leach, Dict. Sci. Nat., xii, p. 349.*—*Bate and Westwood, p. 391.*

This for half a century was known only by one specimen in the British Museum, named by Dr. Leach. Taken in Plymouth Sound. It has since been found at Polperro.

GENUS, *CORIOLANA*.—*Leach.*

Like *Rocinella*, but having the eyes at the margin of the head.

CORIOLANA SPINIPES.—*Bate and Westwood, p. 299.*

Taken at Falmouth by Dr. Leach and Mr. Cranch, and we have dredged it in Plymouth Sound.

M. Hepe, of Brest, has described several species of this genus that he had taken burrowing in sand on the coast of Brittany.

GENUS, *CONILERA*—*Leach.*

Body subcylindrical, narrow, equal in width from head to tail.

CONILERA CYLINDRACEA.—*Montagu, p. 71, t. 6, f. 8.*—*Bate and Westwood, p. 304.*

This species was first obtained by Col. Montagu. It has since been taken in Plymouth Sound, near the Knap buoy; from trawlers off the coast; and from Polperro.

GENUS, *EURYDICE*.—*Leach.*

Ovate. First antennæ short, second long; legs small.

EURYDICE PULCHRA.—*Leach, Lin. Trans., xi, p. 370.*—*Bate and Westwood, p. 310.*

Taken in pools on the coast.

Mr. Walker, of Brookfield, near Chester, says that "It is a most savage little beast. If you are a moment still in the water while bathing, dozens will fasten upon you and nip most unpleasantly. I have had to jump into the water again after coming out from bathing and splash violently to get rid of the hosts that had stuck to me while clinging to the side of the boat preparatory to getting in. They continue to bite after you are out of the water. I once put a wretched *Hyperia*, which I had taken from a *Rhizostoma*, into a small bottle with two *Eurydices*, the blood-thirsty little brutes attacked him like tigers, and soon sucked his shell clean."

LIBERATICA.

APELLIDÆ.

GENUS, JÆRA.—*Leach.*

First antennæ short, second more than half the length of the animal. Legs uniform, slender. Posterior portion of the body (pleon) united into one segment, short and round.

JÆRA ALBIFRONS.—*Montagu; Bate and Westwood, p. 317.*

It has been found especially abundant in crevices of rocks at half-tide near Falmouth, and in Plymouth harbour.

JÆRA NORDMANNI.—*Rathke, Fauna der Kryn., pl. 6, f. 1, 5.*—*Bate and Westwood, p. 322.*

Rathke obtained his specimen at Cape Parthenon, in the Crimea, under stones. Our specimens were found at Plymouth and South Wales.

GENUS, JANIRA.—*Leach.*

Like *Jæra*, but having the second antennæ and the posterior tail appendages very long.

JANIRA MACULOSA.—*Leach, Edin. Ency., vii, p. 434.*—*Bate and Westwood, p. 338.*

Not unfrequent on the coast. They have been taken at Falmouth, Polperro, and Plymouth.

GENUS, ASELLUS.—*Geoffroy*.

Body long, oval, like Janira. First antennæ short, second long. First pair of legs with hands, all the rest pediform, slender.

ASELLUS AQUATICUS.—*Linnaeus, Syst. Nat., ii, 1061.*—*Bate and Westwood, p. 343.*

Common in freshwater ponds and ditches throughout the kingdom.

GENUS, LIMNORIA.—*Leach*.

Like Asellus, but with shorter segments to the body. Posterior portion divided into six segments.

LIMNORIA LIGNORUM. (The Gribble).—*Rathke, Skript. af Natur. Selsk., vol. 101, t. 3, f. 14 (1799).*—*Bate and Westwood, p. 351.*

All round our coast, in submarine timber, which it eats with avidity. The bores are one fifteenth of an inch in diameter. Admiral Sir W. Drummond, when Superintendent of H.M. Dockyard, Devonport, afforded me every facility to examine the submerged timber in the arsenal and Sound. Assisted by the extensive knowledge and experience of Mr. Moore, the master shipwright of the yard, I was by comparison of dates, according to the length of time that the timber was submerged, able to arrive at a general conclusion that these animals destroyed the sunken wood at the average rate of one quarter to half an inch in depth a year. The earlier years were scarcely as much, but that with time the rate increased, so that a five inch solid balk of timber would be eaten up in about ten years. They seemed to attack all timbers equally, but the knots resisted their depredation, and the most successful of artificial means was the rust that penetrated the wood from the presence of nails and bolts of iron.

ARCTURIDÆ.

GENUS, ARCTURUS.—*Latrielle*.

Body long. First antennæ short; second antennæ long. Four anterior legs filiform. Three posterior pediform.

ARCTURUS LONGICORNIS.—*Sowerby, Brit. Miscel., t. 19.*—*Bate and Westwood, p. 365.*

Occasionally taken all round our coast. A colony of young animals was taken, attaching themselves to the spines of *Echinus sphaerus*, off Plymouth. The young of these animals for some time cling to the parent, hanging mostly about the antennæ.

IDOTEIDÆ.

GENUS, IDOTEA.—*Fabricius*.

Body long and narrow, legs subequal; posterior portion of the body united into one segment, having no tail appendages posteriorly projecting.

IDOTEA TRICUSPIDATA.—*Desmarest, Cons. Crust., p. 289.*—*Bate and Westwood, p. 381.*

All along the coast. Among the largest specimens that we have seen—one inch and a quarter long—were some taken off the Dudman.

IDOTEA PELAGICA.—*Leach, Lin. Trans., xi, p. 365.*—*Bate and Westwood, p. 384.*

All round our coast, amongst weed. In Cornwall it has been taken near the Eddystone.

IDOTEA EMARGINATA.—*Fabricius, Ent. Syst. ii, p. 508.*—*Bate and Westwood, p. 387.*

Common among weeds all round the coasts of Europe. On the coast of Cornwall it was found among trawl refuse, and in the stomach of fish.

IDOTEA LINEARIS.—*Pennant, Brit. Zool. (1777), iv, 118, f. 2.*—*Bate and Westwood, p. 388.*

This species is not uncommon on many parts of the British coast. We have dredged it near Plymouth, where it is not uncommon. I received it from Falmouth. It generally assumes the colour of the weed on which it feeds.

IDOTEA PARALLELLA.—*Costa, d' Regno d' Napoli Crust, pl. xi, fig. 2.*—*Bate and Westwood, p. 391.*

This rather rare species has been taken at Falmouth and at Polperro. It bears a close resemblance to *Cleantis linearis*, of Dana, which was taken from the stomach of a fish in Rio Negro, North Patagonia.

IDOTEA ACUMINATA.—*Leach, Edin. Ency., vii, 438.*—*Bate and Westwood, 394.*

Mr. W. P. Cocks took some specimens in the trawl refuse, at Gyllyngvase, Falmouth, and some specimens are in the Hopeian Collection at Oxford, and labelled "South-west Coast of England." It has also been taken in Scotland.

IDOTEA APPENDICULATA.—*Risso, Hist. Nat. de l'Ent. Nereid, vol. v, p. 107, 14, f. 29.*

Not very common, it has been taken at Polperro.

SPHÆROMIDÆ.

GENUS, SPHÆROMA.—*Latrielle.*

Animal capable of rolling itself into a ball. Head small. Eyes dorsally placed at the posterior angles. Antennæ short. Body wider than head. Posterior portion of the body (pleon) united into one segment.

SPHÆROMA SERRATUM.—*Fabricius, Mant. Inst., 1, p. 242.*—*Bate and Westwood, p. 405.*

This species is common under stones and among pebbles on all our coasts, from Kent to Cornwall, and in the Mediterranean. We have also dredged fine specimens in Plymouth Sound, and observed quantities in brackish streams in South Wales.

SPHÆROMA RUGICANDATA.—*Leach, Edin. Ency., vii, pp. 405-433.*—*Bate and Westwood, p. 408.*

From the Hebrides to the coast of France has this animal been obtained. In Cornwall we have found it at the mouth of the river Tamar.

This is a very active species, swimming, as all of the genus do, with its back downwards.

SPHÆROMA PRIDEAUXIANAM.—*Leach, Dict. Sci. Nat., xii, p. 345.*—*Bate and Westwood, p. 455.*

"Dr. Leach obtained this unique specimen from Mr. C. Prideaux, who took it on the west coast of Devonshire" (probably Plymouth Sound).

GENUS, DYNAMENE.—*Leach.*

Resembles a male Sphæroma, but is distinguished from it by a notch in the tail.

DYNAMENE RUBRA.—*Leach, Dict. Sci. Nat., xii, p. 344.*—*Bate and Westwood, p. 419.*

Occurs all round our coast.

DYNAMENE MONTAGUI.—*Leach, Dict. Sci. Nat., xii, p. 344.*—*Bate and Westwood, p. 423.*

We have taken it among *fuci* between tide marks in Cornwall. It is tolerably common associated with other allied forms all round our coast, on rocky beaches.

GENUS, CYMODOCEA.—*Leach.*

Like *Dynamene*, but with a tooth in the centre of the emargination in the middle of the tail.

CYMODOCEA EMARGINATA.—*Leach, Dict. Sci. Nat., xii, p. 343.*—*Bate and Westwood, p. 428.*

Dr. Leach took his specimen at Plymouth, under Mount Batten. Mr. John Cranch found specimens less strongly granulose, at Falmouth.

GENUS, NÆSA.—*Leach.*

Like *Cymodocea*, but with the sixth segment of the body dorsally produced into a strong bidentate process.

NÆSA BIDENTATA.—*Adams, Trans. Lin. Soc., vol. v, p. 812, f. 3, 4.*
Bate and Westwood, p. 431.

Common probably all round the south western coast of England, including the rocky shores of Cornwall, where it has been found.

GENUS, CAMPECOPEA.—*Leach.*

Six segments, and with a single long dorsal tooth in the male.

CAMPECOPEA HIRSUTA.—*Montagu, Trans. Lin., vii, p. 71, t. 5, f. 8.*
Bate and Westwood, p. 434.

This species was found by Montagu on the coast of Devonshire. We have taken it in some profusion at Torquay and Polperro, amongst the small dry *fuci* that exist on the surface of the rocks within reach of the spray of the sea, but where the sun appears to drain off all moisture.

CAMPECOPEA CRANCHII.—*Leach, Dict. Sci. Nat., xii, p. 341.*—*Bate and Westwood, p. 436.*

Found with the preceding, and is probably the female. Taken at Falmouth, as well as plentifully mingled with the former species in the localities named.

ÆRO-SPIRANTIA.

ONISCIDÆ.

GENUS, LIGIA.—*Fabricius*.

First antennæ rudimentary, second long. Tail appendage directed posteriorly, having two branches.

LIGIA OCEANICA.—*Lin. Syst. Nat., ii, p. 1061.*—*Bate and Westwood, p. 444.*

This species is common on all our coasts, running with agility, and when frightened simulating death. It does not live in water but on the sea-shore, within reach of the spray. It feeds on decaying animal and vegetable substances.

GENUS, PHILOSCIA.—*Latrielle*.

Ovate, sub-depressed. First antennæ rudimentary; second, eight-pointed; tail appendage with two unequal branches.

PHILOSCIA MUSCORUM.—*Scopelli, Entom. Carniol., p. 1145.*—*Bate and Westwood, p. 480.*

This species is widely distributed and very common, preferring dry situations under leaves, stones, and moss, near the sea-shore.

PHILOSCIA COUCHII.—*Kinahan, Nat. Hist. Rev., vol. v, 1858, p. 193, pl. 23, fig. 4.*—*Bate and Westwood, p. 452.*

This species runs with agility, but does not roll itself into a ball. It was discovered at Talland Cove, near Polperro. Prof. Kinahan, Trinity College, Dublin, and the writer, were returning from paying a visit to Mr. Couch, when the former found it at the margin of a high tide, mingled with *Ligia oceanica*, *Porcellio scaber*, and *Orchestia littorea*.

GENUS, PHILOUGRIA.—*Kinahan*.

Like *Philoscia*, but with second antennæ having nine or ten joints.

PHILOUGRI ARIPARIA.—*Koch, Deutsch Crust., 22, 17.*—*Bate and Westwood, p. 456.*

At Plymouth. At Polperro it is not uncommon in the garden of the inn. At Looe it is abundant among sticks by the river side. It is found in very moist places amongst all kinds of decaying matter. It runs with agility, and buries itself deep in

the ground, and generally congregates in numbers. It feigns death, but does not roll itself up in the least.

PHILOUGRIA ROSEA.—*Koch, Deutsch Crust.*, 22, 16.—*Bate and Westwood*, p. 460.

It is tolerably abundant in gardens in Plymouth. This is the only habitat yet known in England. We have little doubt but that it only has to be looked for in Cornwall to be found. It is of a pretty rosy colour, and may be found in garden pots and crevices of the yards.

GENUS, ONISCUS.—*Linnaeus*.

Head with large lateral lobes. Second antennæ eight-jointed; second joint detailed at the base. Tail appendage imbranched short.

ONISCUS ASELLUS.—*Lin. Syst. Nat.*, *ii*, p. 1061.—*Bate and Westwood*, p. 468.

Common throughout England, Scotland, and Ireland, under decaying vegetable and animal matter. Common near the sea.

GENUS, PORCELLIO.—*Latrielle*.

Second antennæ seven jointed. Tail appendage with outer branch trigonate, exposed; inner, small and concealed.

PORCELLIO SCABER.—*Latrielle, Hist. Nat. Crust. et Ins.*, *vii*, p. 45.
—*Bate and Westwood*, p. 475.

This species runs with agility, and partially rolls itself into a ball when alarmed. It has been observed feeding on living caterpillars; frequenting moist places where decaying vegetation is found, also among sea-weed with *Ligia*. It is partial to growing vegetables, and enjoys ripe fruit. Common throughout England and Ireland.

I have little doubt but that most, if not all the British species might be found in Cornwall if they were looked for.

GENUS, ARMADILLO.—*Latrielle*.

Very convex. Capable of rolling itself into a ball. Second antennæ seven-jointed. Tail appendages not reaching beyond the margin of the body.

ARMADILLO VULGARIS.—*Latrielle, Hist. Nat. Crust. et Ins.*, *vii*, p. 48.—*Bate and Westwood*, p. 492.

This species is widely dispersed and very common in Devonshire and Cornwall.

In former times it was highly reputed for its supposed medicinal virtues, and was inserted as a medical agent in the older books of *Materia Medica*. Though discarded from the *Pharmacopœia*, it is still taken medicinally in some parts of Somersetshire.

ENTOMOSTRACOUS CRUSTACEA.

OSTRACODA.

The following species were dredged off the Cornish coast, and were examined and named by Mr. G. S. Brady, F.L.S.

Pontocypris	mytiloides	..	<i>Norman.</i>
„	trigonella	.. ..	<i>G. O. Sars.</i>
„	angusta	.. ..	<i>Brady.</i>
Bairdia	inflata	.. ..	<i>Norman.</i>
„	acanthigera	.. ..	<i>Brady.</i>
Cythere	pellucida	.. ..	<i>Baird.</i>
„	tenera	.. ..	<i>Brady.</i>
„	badia	.. ..	<i>Brady.</i>
„	convexa	.. ..	<i>Baird.</i>
„	finmarchica	.. ..	<i>Sars.</i>
„	villtosa	.. ..	<i>Sars.</i>
„	emaciata	.. ..	<i>Brady.</i>
„	semipunctata	.. ..	<i>Brady.</i>
„	cuneiformis	.. ..	<i>Brady.</i>
„	antiquata	.. ..	<i>Baird.</i>
„	jonesii	.. ..	<i>Baird.</i>
„	acerosa	.. ..	<i>Brady.</i>
Eucythere	parva	.. ..	<i>Brady.</i>
Loxoconcha	impressa	.. ..	<i>Baird.</i>
„	guttata	.. ..	<i>Norman.</i>
„	tamapindus	.. ..	<i>Jones.</i>
Xestoleberis	aurantia	.. ..	<i>Baird.</i>
Cytherura	angulata	.. ..	<i>Brady.</i>
„	cuneata	.. ..	<i>Brady.</i>

Cytherura	striata	.. ..	Sars.
„	similes	.. ..	Sars.
„	acuticostata	.. ..	Sars.
Cytheropteron	punctatum	.. ..	Brady.
„	nodosum	.. ..	Brady.
„	multiforum	.. ..	Norman.
„	suberinatum	.. ..	Sars.
Bathocythere	constricta	.. ..	Sars.
„	turgida	.. ..	Sars.
Pseudocythere	caudata	.. ..	Sars.
Sclerochilus	contortus	.. ..	Norman.
Paradoxostoma	ensiforme	.. ..	Brady.
„	abbreviatum	.. ..	Sars.
Polycope	compressa	.. ..	Brady.



ADDENDA.



MAMMALIA.

Martes foina—The Marten Weasel, or Marten Cat.—This has been recently shot near Delabole.

AVES.

Crex Minuta—The Little Crake.—This has lately been shot in the Parish of St. Dominick.

APPENDIX.



CATALOGUE

OF THE

NON-METALLIC MINERALS

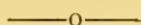
IN THE MUSEUM

OF THE

ROYAL INSTITUTION OF CORNWALL.

1878.

INTRODUCTION.



THIS catalogue of the “non-metallic minerals” in the collection of the Royal Institution of Cornwall forms the first of a series which it is intended to publish from time to time.

The old primary classification of the mineral series into two “divisions,” non-metallic and metallic, has been retained—not because it is thought to be the most philosophical arrangement possible—little can be said of it in this respect—but because it has many practical advantages in a mining locality.

The non-metallic division is again subdivided into the following “classes.”

1. CARBON AND BORON.
2. SULPHUR AND SELENIUM.
3. HALOIDS AND SALTS.
4. EARTHS.
5. SILICATES AND ALUMINATES.

These being the classes adopted for the collection at the Royal School of Mines in London.

The several classes are again subdivided into groups, each group being characterised by the presence of some common and distinctive ingredient in considerable proportions; or, in the case of the Silicates, by some mineral possessing marked physical characters.

This 1st division of the mineral collection occupies the whole of the first five cases and one half of the sixth, the numbering being from left to right throughout. The following specimens are particularly worthy of notice:—

Case I.—The various forms of native *Bitumen*, from Mines near Redruth, and from Castleton in Derbyshire (Nos. 18-22); the *Hatchettite* formerly found in cavities of ironstone at Merthyr

Tydvil (No. 24). The large prism of *Barytes* from Alston Moor (No. 61); the dark coloured crystals from the United Mines, Gwennap (81, 82, 83); the beautiful yellowish tables from Huel Wrey (63); and the large reddish mass from Devonshire (No. 84), are all worthy of notice; so are the brilliant crystals of *Celestine* from Clifton Downs, near Bristol, and the series of *Calcite* crystals which occupies the remainder of the case.

Case II contains some fine examples of *Stalactitic Calcite*, a large slab of the so-called "Ruin Marble," from Cotham, near Bristol, which fairly simulates a landscape; and a series of specimens of *Dolomite* and *Gypsum*.

Case III is occupied on one side chiefly with the collection of *Fluor* specimens, among which Nos. 281, 282, and 299 are particularly conspicuous for their size and beauty. The other side of this case is occupied with a portion of the Quartz collection, among which will be noticed the fine *Rock Crystal* from Tintagel (No. 371); the rich purple *Amethyst* crystals (No. 410); the beautiful pink crystal group (No. 419); the large detached *Cairngorm* crystal (No. 422); and the curious series of "Geodes" (Nos. 431, 439.)

Case IV contains some small but very beautiful *Jaspers* and *Agates*. Here, too, will be noticed some fine Cornish specimens of *Chalcedony*. The western side contains specimens of *Opal* and *Semiopal* from St. Just; Cornish and other *Topazes*; the collection of tourmalines, &c. Among these latter, the fine black *Tourmalines* from Dartmoor (Nos. 635, 636, 637); and the *Achroite* from near St. Austell (No. 647), are especially interesting.

Case V.—This contains the series of *Felspars*, *Micas*, *Hornblendes*, *Augites*, and *Garnets*. The *Adularia* from Tintagel cliffs (No. 674); the fine *Leucites* from Vesuvius; the very beautiful specimen of *Amianthus* (No. 813); the *Mountain Leather* (No. 809); the *Mountain Cork* (No. 811); and the new mineral *Duporthite* (No. 1246), are all worthy of notice; so also are the numerous Cornish specimens of *Garnet* in the same case.

Case VI.—The first half of this case contains an interesting collection of *Zeolites*, and a series of specimens of *Serpentine*, *Steatite*, and various forms of clay, among which will be found

specimens of the natural China Clay rock of Cornwall (Carclazyte), and of the washed Clay. The non-metallic portion of the mineral collection is terminated by various specimens of *Spinel* and other aluminates.

To render this division only approximately complete, the following minerals are still required :—

CLASS I.

BORACITE.	HARTITE.	SCHEERERITE.
COPALITE.	HOWLITE.	SCLERETINITE.
CRYPTOMORPHITE.	IDRIALITE.	SZABELYITE.
DYSODILE.	KÖNLITE.	TORBANITE.
FICHELITE.	MELLITE.	ULEXITE.
GEOCERITE.	NATIVE BORAX.	URFETHITE.
GUAYAQUILITE.		

CLASS II.

NATIVE TELLURIUM. ; SELEN-SULPHUR.

CLASS III.

ALUMINITE.	GLAUBERITE.	PARISITE.
ALUMIAN.	GUANOVIITE.	PEGANITE.
ALUNITE.	HÄIDINGERITE.	PENCATITE.
ALUNOGEN.	HERDERITE.	*PHARMACOLITE.
AMBLYGONITE.	HOERNISITE.	PICKERINGITE.
AMPHITALITE.	HOVITE.	PICROMERITE.
ANKERITE.	HUMBOLDTITE.	PLUMBO-GUMMITE.
APHTHALITE.	HYDRODOLomite.	*POLYHALITE.
ARKSUTITE.	HYDROMAGNESITE.	PREDAZZITE.
AUGELITE.	JAROSITE.	STERCORITE.
BECHILITE.	KIESERITE.	*STRUVITE.
BERLINITE.	KISCHMITITE.	SODA NITRE.
BLOEDITE.	LANTHANITE.	SPHAERITE.
BOUSSINGALTITE.	LAZULITE.	SVANBERGITE.
BRUSHITE.	LECONTITE.	TAVISTOCKITE.
CALLAINITE.	LÖWITE.	TAYLORITE.
*CARNALLITE.	LÖWIGITE.	TESCHEMACHERITE.
CHALCOMORPHITE.	MASCAGNITE.	*THENARDITE.
CHIOLITE.	MENDOZITE.	THERMONATRITE.
CHODNEFFITE.	MESITITE.	THOMSENOLITE.
CHURCHITE.	METABRUSHITE.	TROLLEITE.
CIRROLITE.	*MIRABILITE.	*TRONA.
CRYPTOLITE.	MISENITE.	TSCHERMAKITE.
DAWSONITE.	MONAZITE.	TSCHERMIGITE.
EVANSITE.	*NATRON.	TURQUOISE.
EPSOMITE.	NITRE.	TURNERITE.
FELSOBANYTE.	NITRO-CALCITE.	WAGNERITE.
FISCHERITE.	NITRO-MAGNESITE.	WHEWELLITE.
FLUELLITE.	PACHNOLITE.	XENOTIME.
FLUOCERITE.	PARALUMINITE.	YTROCERITE.
GAYLUSSITE.		

CLASS IV.

ASMANITE.	COTTERITE.	SAPPHIRE QUARTZ.
AVANTURINE QUARTZ.	JENSCHITE.	TRIDYMITE.

CLASS V.

ACMITE.
 ALLANITE.
 AMAZON STONE.
 ANDESITE.
 ANORTHITE.
 ANTHOSIDERITE.
 APHRODITE.
 BEAUXITE.
 BOLE.
 BREWSTERITE.
 CELADONITE.
 CERITE.
 CHABAZITE.
 CHLOROPAL.
 CHONICRITE.
 CHRYSOLITE.
 COLLYRITE.
 DAMOURITE.
 DATHOLITE.
 DIASPORE.
 DIFYRE.
 EDINGTONITE.
 EKEBERGITE.
 EKMANNITE.
 EMERALD.
 EPISTILBITE.
 EUCLASE.
 EUDNOPHITE.
 EUDIALYTE.
 FAHLUNITE.

FAUJASITE.
 FIBROLITE.
 GADOLINITE.
 GAHNITE.
 GEHLENITE.
 GIBBSITE.
 GISMONDITE.
 GLAUCONITE.
 HALLOYSITE.
 HELVITE.
 HERCYNITE.
 HERSHELITE.
 HYDROPHITE.
 HYDROTALCITE.
 HYPOSTILBITE.
 IOLITE.
 KAMMERERITE.
 KEROLITE.
 LEUCHTENBERGITE.
 LEUCOPHANITE.
 LEVYNITE.
 MARGARITE.
 MARGARODITE.
 MASKELYNITE.
 MEIONITE.
 MELILITE.
 MELINOPHANE.
 MONTMORILLONITE.
 MOSANDRITE.

NEOLITE.
 NEOTOCITE.
 NOSITE (Nosean).
 OKENITE.
 PALAGONITE.
 PHENAKITE.
 PHILLIPSITE.
 PHOLERITE.
 PIHLITE.
 PILINITE.
 PROCHLORITE.
 PYROSCLERITE.
 PYROSMALITE.
 RUBY.
 RIPIDOLITE.
 SARCOLITE.
 SAMOITE.
 SAPPHIRE.
 SAPPHIRITE.
 SCHORLOMITE.
 SCHRÖTTERITE.
 SOLECITE.
 SEPIOLITE.
 SMECTITE.
 THOMSONITE.
 VILLARSITE.
 WERNERITE.
 WOHLERITE.
 ZOISITE.

May, 1878.

J. H. COLLINS.

CATALOGUE
OF THE
MINERALS
IN THE MUSEUM
OF THE
ROYAL INSTITUTION OF CORNWALL.

DIVISION I.—NON-METALLIC.

Class I.—CARBON and BORON.

Catalogue Number.	<i>CARBON GROUP.</i>
1	DIAMOND—Rough fragments. <i>Loc.</i> , Cape of Good Hope. <i>Obs.</i> —Presented by Mr. J. H. Collins.
2	GRAPHITE—(<i>Plumbago, Black Lead.</i>) large mass of iron-grey color. <i>Loc.</i> , Invernesshire.
3	Do. Small specimen, with Pyrites and Hematite. <i>Loc.</i> , Borrowdale.
4	Do. Large foliated specimen.
5	COAL.—a. <i>Anthracite.</i> Black iridescent specimen, with slaty cleavage. <i>Loc.</i> , Susquehana, Pennsylvania.
6	Small specimen, with sub-metallic lustre. <i>Loc.</i> , Rhode Island.
7	Black laminated specimen. <i>Loc.</i> , Unknown.
8	Black laminated specimen. <i>Loc.</i> , Unknown.

Catalogue Number.	<i>CARBON GROUP—Continued.</i>
9	COAL.—a. <i>Anthracite.—continued.</i> Black, brilliant metallic lustre. <i>Loc.</i> , Bideford.
10	Dull black specimen. <i>Loc.</i> , Talcahuana, Chili. <i>Obs.</i> , Presented by Mr. J. M. Williams.
11	Small iridescent specimen. <i>Loc.</i> , Pennsylvania. <i>Obs.</i> , Presented by Mr. Allen.
12	Do. b. <i>Cannel Coal.</i> <i>Loc.</i> , Durham.
13	Do. c. <i>Caking Coal.</i> <i>Loc.</i> , North of England
14	Do. d. <i>Lignite (Brown Coal.)</i> Flat fibrous specimen. <i>Loc.</i> , Giants' Causeway, Antrim.
15	Brownish specimen, with clayey matter. <i>Loc.</i> , Unknown.
16	Brownish specimen shewing woody structure. <i>Loc.</i> , Bovey Tracey, Devon.
17	Do. e. <i>Jet.</i> Velvet black inside, woody outside. <i>Loc.</i> , Unknown.
18	BITUMEN.—a. <i>Asphaltum (Mineral Pitch).</i> Pitchy lustre, with Chalcopryrite. <i>Loc.</i> , Cornwall.
19	Pitchy lustre, with Chalcopryrite. <i>Loc.</i> , Cornwall.
20	Do. b. <i>Elaterite (Elastic Bitumen).</i> Dark brown, pitchy lustre. <i>Loc.</i> , Castleton, Derbyshire.
21	Dark brown, slightly resinous. <i>Loc.</i> , Castleton, Derbyshire.
22	Brownish, black, coating Quartz. <i>Loc.</i> , Poldice, Cornwall.

CARBON GROUP—Continued.

- 23 AMBER.—Reddish yellow, transparent.
Loc., Unknown.
- 24 HATCHETTITE (*Hatchettine*).
In cavities of Ironstone, with crystals of
Chalybite.
Loc., Dowlais, Merthyr Tydvil.

BORON GROUP.

- 25 SASSOLITE.—(*Boracic Acid*).
Small specimen, with Sulphur.
Loc., Unknown.

Class II.—SULPHUR and SELENIUM.
SULPHUR GROUP.

- 26 SULPHUR.—Translucent, bright yellow.
Loc., Cattolica, Sicily.
- 27 Do. Crystallized and stalactitic.
Loc., Sicily.
- 28 Do. Dark yellow crystals on Calcite.
Loc., Sicily.
Obs., Presented by Mrs. E. Carne.
- 29 Do. Rhombic crystals with calcareous matter.
Loc., Sicily.
- 30 Do. Dark yellow crystals.
Loc., Sicily.
- 31 Do. Fine crystallized specimen.
Loc., Sicily.
- 32 Do. Bright yellow crystalline mass.
Loc., Sicily.
- 33 Do. Pale yellow, stalactitic.
Loc., Sicily, from a fissure.
- 34 Do. Pale yellow.
Loc., Crater at Vulcano.

SULPHUR GROUP—Continued.

- 35 SULPHUR—*continued*—Pale-yellow and vesicular.
Loc., Fissure at Vulcano.
- 36 Do. Pale-yellow and stalactitic.
Loc., Unknown.
- 37 Do. Large translucent crystals.
Loc., Sicily.
- 38 Do. Rough mass.
Loc., Saba, West Indies.
Obs., Presented by Mr. J. H. Collins.

SELENIUM GROUP.

- 39 SELENIUM.—Small specimen, artificially prepared.
Loc., Unknown,
Obs., Presented by Mr. J. H. Collins.

Class III.—HALOIDS and SALTS.*AMMONIA GROUP.*

- 40 SAL-AMMONIAC.—Yellow and red, crystallized specimen.
Loc., Unknown.

SODA GROUP.

- 41 HALITE.—(*Rock Salt*).
White and transparent.
Loc., Stassfurth, Prussia.
Obs., Presented by Mr. R. Pearce.
- 42 Do. White and transparent.
Loc., Stassfurth, Prussia.
Obs., Presented by Mr. R. Pearce.

POTASH GROUP.

- 43 SYLVITE.—White and transparent.
Loc., Stassfurth, Prussia.
Obs., Presented by Mr. R. Pearce.

BARYTA GROUP.

Catalogue Number.	
44	WITHERITE—Greyish translucent crystals, with Galena. <i>Loc.</i> , Cumberland.
45	Do. White crystals. <i>Loc.</i> , Cumberland.
46	Do. Small specimen, with Galena. <i>Loc.</i> , Cumberland.
47	Do. Greyish-white, pearly lustre. <i>Loc.</i> , Cumberland.
48	Do. Large greyish crystals, with Galena. <i>Loc.</i> , Teesdale.
49	Do. Portion of a large crystal, with Galena. <i>Loc.</i> , Cumberland.
50	Do. Greyish white crystals, translucent. <i>Loc.</i> , Cumberland.
51	Do. White radiated mass. <i>Loc.</i> , Cumberland.
52	Do. Massive, with Galena. <i>Loc.</i> , Fallowfell.
53	Do. Massive radiated, translucent. <i>Loc.</i> , Cumberland.
54	ALSTONITE.—White and translucent, with Witherite and Calcite. <i>Loc.</i> , Cumberland.
55	Do. White and translucent. <i>Loc.</i> , Cumberland.
56	Do. White, with Calcite and Galena. <i>Loc.</i> , Cumberland.
57	BARYTO-CALCITE.—Brownish-white, crystallized. <i>Loc.</i> , Alston Moor.
58	Do. Small pearly-white crystals. <i>Loc.</i> , Alston Moor.
59	Do. White transparent crystals. <i>Loc.</i> , Alston Moor.
60	Do. Large translucent crystals, with brown coating. <i>Loc.</i> , Alston Moor.

BARYTA GROUP—Continued.

- | | |
|----|---|
| 61 | BARYTES.—Very large rhombic prism.
<i>Loc.</i> , Alston Moor. |
| 62 | Do. Doubly terminated prisms, coated.
<i>Loc.</i> , Teign Valley Mine, Devon. |
| 63 | Do. Large yellowish-white tables.
<i>Loc.</i> , Huel Wrey. |
| 66 | Do. Greyish-white tabular crystals.
<i>Loc.</i> , Alston Moor. |
| 67 | Do. Large tabular crystals. |
| 68 | Do. Large white crystals, with Pyrites. |
| 69 | Do. Radiated specimen, from one of the septaria of the London clay.
<i>Loc.</i> , Southend, Essex. |
| 70 | Do. Yellow transparent crystals, on Quartz.
<i>Loc.</i> , Kapnitz. |
| 71 | Do. Yellowish modified prisms. |
| 72 | Do. White crystals, with Pyrites and Fluor. |
| 73 | Do. White crystals, with Pyrites and Fluor. |
| 74 | Do. Grey crystals, with Quartz.
<i>Loc.</i> , Hungary. |
| 75 | Do. Pearly white crystals, with Galena.
<i>Loc.</i> , Alston Moor. |
| 76 | Do. Fine transparent cleavable mass.
<i>Loc.</i> , Dufton. |
| 78 | Do. Reddish mass, foliated.
<i>Loc.</i> , Culfeightrim, Antrim.
<i>Obs.</i> , Presented by Capt. James. |
| 79 | Do. Grey and white mass.
<i>Loc.</i> , Derbyshire. |
| 80 | Do. Grey, polished.
<i>Loc.</i> , Derbyshire. |
| 81 | Do. Dark colored crystals, with Quartz.
<i>Loc.</i> , United Mines, Gwennap. |
| 82 | Do. Dark colored crystals, with Quartz.
<i>Loc.</i> , United Mines, Gwennap. |

BARYTA GROUP—Continued.

- 83 BARYTES.—*continued.*—Small crystals, with Chlorite and Chalcopyrite.
Loc., United Mines, Gwennap.
- 84 Do. Large reddish mass, on Calcite.
Loc., Devonshire.
Obs., Presented by Mr. H. C. Hodge.

STRONTIA GROUP.

- 85 STRONTIANITE.—Small radiated specimen.
Loc., Marsdon Park, Durham.
- 86 Do. Greyish radiated specimen, with Calcite.
Loc., Nagpore, India.
- 87 Do. Yellowish white mass.
Loc., Sangor, India.
- 88 CELESTITE.—(*Celestine*).
White transparent crystals, with Sulphur.
Loc., Girgenti, Gibbisa, Sicily.
- 89 Do. Small crystals, with Sulphur.
Loc., Girgenti, Regalminto, Sicily.
- 90 Do. Small crystals on an opaque mass.
Loc., Girgenti, Fangirotter, Sicily.
- 91 Do. Flesh coloured crystals on an opaque mass.
- 92 Do. Colorless crystals in cavity.
Loc., Clifton.
- 94 Do. Colorless crystals in cavity.
Loc., Clifton.
- 95 Do. Transparent crystals, with Sulphur.
Loc., Sicily.
- 96 Do. Large specimen, with Sulphur.
Loc., Sicily.
- 97 Do. Large specimen, with Sulphur.
Loc., Sicily.

Catalogue
Number*STRONTIA GROUP—Continued.*

- 98 CELESTITE.—(*Celestine*).—*continued.*
Large specimen, with Sulphur.
Loc., Sicily.
- 99 Do. Large translucent crystals.
Loc., Sicily.
- 100 Do. Dark greyish-white crystals.
- 101 Do. Large colorless crystals, in pink mass.
Loc., Bristol.
- 102 Do. Lamellar mass, in clay.
- 104 Do. Large transparent crystals.
Loc., Bristol.

—◆—

LIME GROUP.

- 105 CALCITE.—Large obtuse rhombohedrons.
- 106 Do. Large rhombohedron on Chalybite.
- 107 Do. Rhomb of Iceland spar, or doubly refracting spar.
Loc., Iceland.
- 108 Do. Obtuse rhombohedrons, coated with oxide of iron.
Loc., Devonshire.
- 109 Do. Obtuse rhombohedrons, with Quartz and Chalybite.
- 110 Do. Obtuse rhombohedrons, with curved faces.
- 111 Do. Hexagonal prisms, with pearl spar and Galena.
- 112 Do. Large rhombohedrons, with specks of Chalcoppyrite, on black limestone.
Loc., Padstow.
- 114 Do. Large rhombohedrons, with specks of Chalcoppyrite, on black limestone.
Loc., Padstow.

*LIME GROUP—Continued.*CALCITE—*Continued.*

- | | | |
|-----|-----|---|
| 115 | | Group of obtuse rhombohedrons, modified.
<i>Loc.</i> , Alston Moor. |
| 116 | Do. | Very acute rhombohedrons, on Quartz.
<i>Loc.</i> , Liskeard. |
| 117 | Do. | Dark rhombohedrons on Barytes.
<i>Loc.</i> , Cumberland. |
| 118 | Do. | Small brown obtuse rhombohedrons.
<i>Loc.</i> , Cumberland. |
| 119 | Do. | Obtuse rhombohedrons, laterally modified. |
| 120 | Do. | Obtuse rhombohedrons, laterally modified. |
| 121 | Do. | Acute rhombohedrons. |
| 122 | Do. | Obtuse rhombohedrons, on Barytes.
<i>Loc.</i> , Cumberland. |
| 123 | Do. | Large brown specimen, acute rhombohedrons. |
| 124 | Do. | Large brown scalenohedrons.
<i>Loc.</i> , Devonshire. |
| 125 | Do. | Large brown specimen, acute rhombohedrons. |
| 126 | Do. | White transparent crystals.
<i>Loc.</i> , Telling Colliery. |
| 127 | Do. | Acute rhombohedrons, on stalactitic limestone. |
| 128 | Do. | Acute rhombohedrons of a flesh color on
stalactitic limestone.
<i>Loc.</i> , Oreston. |
| 129 | Do. | Hexagonal prisms, with bournonite, on Quartz.
<i>Loc.</i> , Liskeard. |
| 130 | Do. | Hexagonal prisms, covering a large crystal of
Fluor. |
| 131 | Do. | Transparent hexagonal prisms, with Chalcopyrite. |
| 132 | Do. | Greyish-white hexagonal prisms, modified.
<i>Loc.</i> , Norway. |
| 133 | Do. | Modified hexagonal prisms on Quartz.
<i>Loc.</i> , Cumberland. |
| 134 | Do. | Large hexagonal plates, translucent. |

Catalogue Number.	<i>LIME GROUP—Continued.</i>	
135	CALCITE— <i>continued</i> —Group of six-sided tabular crystals. <i>Loc.</i> , Devonshire.	
137	Do. Tabular crystals, modified with planes of the rhombohedron. <i>Loc.</i> , Alston Moor?	
138	Do. Group of six-sided tabular crystals on Quartz and galena.	
139	Do. Group of small modified prisms, on Quartz with Galena.	
140	Do. Translucent hexagonal prisms, on limestone.	
141	Do. Hexagonal prisms, modified, with Galena. <i>Loc.</i> , Alston Moor.	
142	Do. Transparent acicular crystals, beautifully modified. <i>Loc.</i> , Huel Wrey. <i>Obs.</i> , Presented by Mr. W. M. Tweedy.	
143	Do. Reddish hexagonal prisms, with tabular crystals, on Quartz. <i>Loc.</i> , Botallack.	
144	Do. Compound hexagonal prisms, with Galena. <i>Loc.</i> , Cumberland.	
145	Do. Hexagonal prisms, with planes of the scalenohedron.	
146	Do. Transparent crystals, beautifully modified.	
147	Do. Large deeply furrowed scalenohedron. <i>Loc.</i> , Devonshire.	
148	Do. Opaque scalenohedrons, with Quartz. <i>Loc.</i> , Bristol.	
149	Do. Group of pale-yellow scalenohedrons on Fluor-with Blende. <i>Loc.</i> , Staffordshire. <i>Obs.</i> , Presented by Mrs. Chilcott.	
150	Do. Large scalenohedron enclosing Pyrites. <i>Loc.</i> , Staffordshire.	

LIME GROUP—Continued.

Catalogue Number	
151	CALCITE— <i>continued</i> —Brown crystals, much modified, on Stilbite. <i>Loc.</i> , Norway.
152	Do. Small brown crystals, on Syenite. <i>Loc.</i> , Norway.
153	Do. Pearly, scalenohedrons. <i>Loc.</i> , Liskeard.
154	Do. Scalenohedrons on Coal. <i>Loc.</i> , Bristol.
155	Do. Scalenohedrons, on Coal, with Pyrites. <i>Loc.</i> , Bristol.
156	Do. Perfect scalenohedrons, with white coating.
157	Do. Scalenohedrons, with acute angles modified. <i>Loc.</i> , Cumberland.
158	Do. Scalenohedrons, in a cavity, in limestone. <i>Loc.</i> , Devonshire.
159	Do. Large yellowish cleavable mass.
160	Do. Opaque cleavable mass. <i>Loc.</i> , Baitool, India.
161	Do. Milk white cleavable mass.
162	Do. Pearly acute rhombohedrons, on Quartz, with Pyrites. <i>Loc.</i> , Liskeard.
163	Do. Green cleavable mass.
164	Do. (<i>Schiefer Spar</i>).—Beautifully white and very brittle. <i>Loc.</i> , Botallack. <i>Obs.</i> , Presented by Rev. Saltren Rogers.
165	Do. Pearly lustre. <i>Loc.</i> , Germany.
166	Do. White pearly mass.
168	Do. (<i>Stalactite</i>).—Large specimen, with long stalactites.
169	Do. Large reddish-brown mass; white within. <i>Loc.</i> , Somersetshire.

LIME GROUP—Continued.

- CALCITE (*Stalactite*)—continued.
- 170 Yellowish-white, translucent, on slate.
• *Loc.*, Bermuda.
- 171 Do. Long pendulous mass formed of concentric lamellar concretions.
Loc., Ulysses Cave.
- 172 Do. Long pendulous mass formed of concentric lamellar concretions.
Loc., Ulysses Cave.
- 62 Do. Section shewing structure.
Loc., Ulysses Cave.
- 173 Do. White, semi-transparent.
- 174 Do. Brown polished specimen.
- 113 Do. (*Oriental Alabaster*)—Large brown mass.
- 175 Do. (*Tufa*).—Compact (travertine).
Loc., New York.
- 176 Do. White, very light, enclosing moss.
- 177 Do. Very light, tubular.
- 64 Do. (*Kunkur*)—Nodular mass.
Loc., Lower India.
Obs., Presented by Mr. J. H. Collins.
- 178 Do. (*Marble*).—Polished grey marble.
Loc., Sebastopol.
- 179 Do. Polished specimen, mosaic work of Taj Mahal.
Loc., Agra, India.
- 180 Do. White, granular.
Loc., Tuscany.
- 181 Do. White, granular, polished.
Loc., Tuscany.
- 182 Do. Small slab of polished "Ruin" marble.
Loc., Cotham.
- 183 Do. Large slab of polished "Ruin" marble.
Loc., Cotham.
- 184 Do. Specimen of "Ruin" marble.
Loc., Cotham.
Obs., Presented by Mr. W. M. Tweedy.

LIME GROUP—Continued.

Catalogue Number.	
	CALCITE (<i>Marble</i>)—continued.
185	Yellowish-brown, compact. <i>Loc.</i> , Cotham.
186	Do. Polished specimen, a boat drawn on it. <i>Loc.</i> , Aginore, India.
187	Do. Yellow specimen, suitable for rough chalk drawing. <i>Loc.</i> , Aginore, India.
188	Do. Yellowish brown, polished. <i>Loc.</i> , Aginore, India.
189	Do. Very compact, white, with red veins. <i>Loc.</i> , India.
190	Do. Flesh-red, enclosing Sahlite, polished. <i>Loc.</i> , Tiree.
191	Do. Flesh-red, enclosing Sahlite, rough specimen. <i>Loc.</i> , Tiree. <i>Obs.</i> , Presented by Mr. J. H. Collins.
192	Do. (<i>Pisolite</i>)—Pale-yellowish specimen.
193	ARAGONITE.—Large crystalline specimen.
194	Do. (Typical) large six-sided macle. <i>Loc.</i> , Aragon.
195	Do. Group of acicular crystals. <i>Loc.</i> , Cleator Moor, Cumberland.
196	Do. White crystalline mass. <i>Obs.</i> , Presented by Mr. W. H. Paddon.
197	Do. White crystals. <i>Loc.</i> , Pisa.
198	Do. Botryoidal, drusy on surface, on Quartz. <i>Loc.</i> , Botallack.
199	Do. Greenish fibrous diverging crystals. <i>Loc.</i> , Sicily. <i>Obs.</i> , Presented by Mr. W. M. Tweedy.
200	Do. Light brown, globular. <i>Loc.</i> , Levant.
201	Do. Red, globular, with quartz. <i>Loc.</i> , Levant Mine.

LIME GROUP—*Continued.*

- ARAGONITE—*continued.*
- 202 Reddish, globular, encrusting slate.
Loc., Levant Mine, St. Just.
- 203 Do. Massive, white, botryoidal, fibrous.
Loc., Somersetshire.
- 204 Do. White, mammillated, on killas.
Loc., Tintagel.
- 205 Do. Massive, white, silky lustre, drusy surface.
Loc., Tintagel.
- 206 Do. Yellowish white, branching, stalactitic.
Loc., South Devon.
- 207 Do. White, branching, stalactitic.
Loc., North Devon.
- 208 Do. Reddish, globular, on slate.
Loc., Levant Mine, St. Just.
- 210 Do. Yellowish-white, stalactitic.
Loc., Port Isaac.
- 211 Do. Yellowish-white, globular, on Quartz.
Loc., Botallack.
- 213 Do. Mammillated and very compact.
- 214 Do. Dirty white, stalactitic.
- 215 Do. White, stalactitic.
Loc., Port Isaac.
- 216 Do. White, stalactitic.
Loc., Port Isaac.
- 217 Do. (*Satin Spar*)—Polished, with a vein of Pyrites.
Loc., Alston Moor.
- 218 Do. Polished, with a vein of Pyrites.
Loc., Alston Moor.
- 219 Do. Polished mass.
- 220 DOLOMITE (*Pearl Spar*).—Large specimen, with Blende, Calcite, and Pyrites.
Loc., Perranzabuloe.
Obs., Presented by Mr. T. Blenkinsop.

LIME GROUP—Continued.

- | Catalogue Number. | |
|-------------------|---|
| 221 | DOLOMITE (<i>Pearl Spar</i>).— <i>continued</i> .
White, pearly lustre, on Quartz.
<i>Loc.</i> , Trevascus. |
| 222 | Do. Small rhombohedrons, on Quartz. |
| 223 | Do. Brownish mass of confused rhombohedrons, with Pyrites. |
| 224 | Do. Large confused mass coating Quartz crystals. |
| 226 | Do. Rosette-like mass of confused crystals. |
| 228 | Do. Pearly rhombohedrons, curved. |
| 230 | Do. Rhombohedrons coating Quartz and Calcite. |
| 231 | Do. Brilliant pearly crystals on dark limestone. |
| 232 | Do. Yellowish confused crystals on Quartz.
<i>Loc.</i> , Alston Moor. |
| 233 | Do. Globular mass coating Pyrites. |
| 234 | Do. Pearly-white rhombohedrons, on Quartz.
<i>Loc.</i> , Devonshire. |
| 235 | Do. (<i>Gurhofian</i>).—Compact white mass.
<i>Loc.</i> , Wurbschitz. |
| 236 | Do. (<i>Bitter Spar</i>).—Pale-brown cellular mass.
<i>Loc.</i> , Beeralston. |
| 238 | Do. Pinkish crystals on Quartz.
<i>Loc.</i> , Botallack. |
| 239 | Do. (<i>Massive</i>).—Brown columnar mass.
<i>Loc.</i> , Wearmouth. |
| 240 | Do. Brownish mass of freestone, with fossils.
<i>Loc.</i> , Hartlepool. |
| 351 | MAGNESITE.—White mass. |
| 352 | BREUNERITE.—Large crystal in Talcose Slate.
<i>Loc.</i> , Greiner, Tyrol. |
| 241 | APATITE.—Hexagonal prisms, in Chlorite.
<i>Loc.</i> , St. Agnes. |
| 242 | Do. Bluish crystals in a greenish Talcose rock.
<i>Loc.</i> , Tremearne, Breage. |
| 243 | Do. Amorphous, green, with Gilbertite.
<i>Loc.</i> , Stenna Gwynn. |

LIME GROUP—Continued.

- APATITE—*continued.*
- 244 Fragment of a large opaque grey crystal.
Loc., Cumberland.
- 245 Do. Six-sided tables.
Loc., Poldice.
- 246 Do. Greenish grey hexagonal prisms.
- 247 Do. Greenish grey hexagonal prisms, with Gilbertite.
- 275 Do. White hexagonal prism, doubly terminated.
Loc., Snarum, Norway.
- 276 Do. Large bluish green prisms.
Loc., Red Lake, Canada.
- 277 Do. Bluish prisms.
Loc., Bohemia.
- 577 Do. Part of large crystal.
Loc., Norway.
- 248 Do. (*Moroxite*).—Bluish green, with Calcite and Blende.
Loc., Norway.
- 249 Do. Small hexagonal prism, with Calcite.
Loc., Norway.
- 250 Do. (*Francolite*).—Very fine specimen, on Quartz, with Chalcopyrite.
Loc., Fowey Consols.
- 252 ANHYDRITE.—Pink specimen, in imperfect rectangular prisms.
Loc., Hall, Tyrol.
- 253 GYPSUM (*Selenite*).—Mass of large yellow crystals.
- 254 Do. Large yellow macled crystal.
- 255 Do. Mass of indistinct tabular crystals.
Loc., Girgenti, Sicily.
- 256 Do. Large arrow-headed macle.
Loc., France.
- 257 Do. Acicular crystals on coal.
- 258 Do. Acicular crystals on lava.
Loc., Vesuvius Eruption, 1832.
- 259 Do. Transparent mass, with Calcite.

LIME GROUP—Continued.

Catalogue Number.	
260	GYPSUM (<i>Selenite</i>).—continued. Large nearly colorless specimen.
261	Do. Pearly acicular crystals. <i>Loc.</i> , Huel Hamblyn, Bridestow. <i>Obs.</i> , Presented by Mr. R. Pearce.
262	Do. Acicular crystals on lava. <i>Loc.</i> , Vesuvius.
263	Do. Crystallized mass, pearly lustre. <i>Loc.</i> , Niagara.
264	Do. (<i>Fibrous Gypsum, Satin Spar</i>).—Long delicate fibres, pearly lustre, translucent. <i>Loc.</i> , Derbyshire.
265	Do. White, curved, fibrous. <i>Loc.</i> , Carrickfergus.
266	Do. White, curved fibres. <i>Loc.</i> , Watchett.
267	Do. White, straight fibres, pearly lustre. <i>Loc.</i> , Chili. <i>Obs.</i> , Presented by Mr. W. Tweedy.
268	Do. Brown, straight fibres, translucent on edges.
269	Do. White fibrous mass. <i>Loc.</i> , Penarth, Cardiff. <i>Obs.</i> , Presented by the Rev. S. Rogers.
270	Do. (<i>Massive—Alabaster</i>).—White, with lias clay. <i>Loc.</i> , Watchett.
271	Do. White and compact. <i>Loc.</i> , Watchett.
272	Do. Pink mass.
273	Do. White and red concretion.
274	Do. Massive white, compact. <i>Loc.</i> , Kimaon, Himalayas.
275	Do. Massive, white, compact. <i>Loc.</i> , Kimaon, Himalayas.
281	FLUOR.—Large mass of purple crystals. <i>Loc.</i> , Derbyshire.
282	Do. Very large purple cubes, with Göthite. <i>Loc.</i> , Derbyshire.

LIME GROUP—Continued.

- | | |
|-----|---|
| 283 | FLUOR— <i>continued.</i> —Purple cubes, on Quartz.
<i>Loc.</i> , Huel Gorland. |
| 285 | Do. Purple cubes.
<i>Loc.</i> , Cumberland.
<i>Obs.</i> , Presented by Mr. Chilcott. |
| 286 | Do. Large pale purplish crystals, with Galena,
sprinkled with Quartz crystals.
<i>Loc.</i> , Alston Moor. |
| 287 | Do. Purplish elongated cubes.
<i>Loc.</i> , Alston Moor. |
| 288 | Do. Small purple cubes, on slate, highly modified. |
| 289 | Do. Purple cubes, rough, highly modified.
<i>Loc.</i> , St. Agnes. |
| 290 | Do. Violet cubes, with drusy surfaces. |
| 291 | Do. Dark violet crystals, with drusy surface. |
| 292 | Do. Dark-purple opaque four-faced cube, with planes
of rhombic dodecahedron.
<i>Loc.</i> , St. Agnes. |
| 293 | Do. Purple cubes, with Blende.
<i>Loc.</i> , Cumberland. |
| 294 | Do. Pale purple modified cubes, on slate, with Quartz,
Pyrites, and Chlorite.
<i>Loc.</i> , St. Agnes. |
| 295 | Do. Purple cubes, on Slate, with Pyrites, &c.
<i>Loc.</i> , St. Agnes. |
| 296 | Do. Pale pink cubes, with Galena and Pearl Spar.
<i>Loc.</i> , Alston Moor. |
| 297 | Do. Transparent nearly colorless cubes, with Pearl Spar.
<i>Loc.</i> , Alston Moor. |
| 298 | Do. Colorless cubes, with Chalcopyrite and Pearl Spar. |
| 299 | Do. Very large green cubes, with drusy Pyrites.
<i>Loc.</i> , Huel Trelawny. |
| 300 | Do. Dull green cubes, with Chalcopyrite on Chalcedony |

LIME GROUP—*Continued.*

Catalogue Number.	
	FLUOR— <i>continued.</i>
301	Pale green cubes, on crystallized Quartz. <i>Loc.</i> , Cornwall.
302	Do. Bright green cube.
303	Do. Green iridescent complex cubes, on massive green Fluor.
304	Do. Small pale bluish-green modified cubes, on Quartz. <i>Loc.</i> , Huel Gorland.
305	Do. Deep blue cubes.
306	Do. Bluish-green modified cubes.
307	Do. Fine green cubes, on sandstone. <i>Loc.</i> , Alston Moor.
308	Do. Pale purple modified cubes.
309	Do. Pale-yellowish green modified cubes, with Pyrites.
310	Do. Greenish modified cubes, with Chalcopyrite.
311	Do. A large greenish cube sprinkled with Pyrites and Quartz.
312	Do. Large translucent pale-green cubes, partially coated with Chalybite and Pyrites. <i>Loc.</i> , Huel Gorland.
313	Do. Fine yellow cubes, on Tennantite. <i>Loc.</i> , Huel Gorland.
314	Do. Transparent light-green cubes, with Pyrites. <i>Loc.</i> , Huel Unity.
315	Do. Very pale yellow cubes.
316	Do. Pale yellow modified cubes.
317	Do. Very large grey opaque cubes, drusy with Pyrites.
318	Do. Large nearly colorless cubes, modified. <i>Loc.</i> , Huel Unity.
319	Do. Pale greyish cubes, with Galena. <i>Loc.</i> , Alston Moor.
320	Do. Small pinkish cubes. <i>Loc.</i> , Huel Gorland.
321	Do. White modified cubes. <i>Loc.</i> , Huel Unity.
322	Do. Very brilliant colorless crystals.

LIME GROUP—Continued.

- FLUOR—*continued.*
- 323 White semi-transparent modified crystals, with Mispickel.
- 324 Do. Very small pink crystals, on a Quartz crystal.
- 325 Do. Pale purple modified cubes, coated with Pyrites.
- 326 Do. Yellowish modified crystals, with Chalcopyrite.
Loc., Cornwall.
- 327 Do. Nearly colorless highly modified crystals.
Loc., Huel Unity.
- 328 Do. Polished specimen containing Pyrites.
Loc., Cumberland.
Obs., Presented by Mrs. Chilcott.
- 329 Do. Large polished slab.
Loc., Cumberland.
Obs., Presented by Mrs. Chilcott.
- 331 Do. Polished fragment of "Blue John."
Loc., Derbyshire.
Obs., Presented by Mrs. Chilcott.
- 332 Do. Polished specimen of octahedral Fluor.
Loc., Derbyshire.
- 333 Do. Polished specimen of octahedral Fluor.
Loc., Derbyshire.
- 334 Do. Green mass.
Loc., Gwennap.
- 335 Do. Green mass.
Loc., Gwennap.
- 336 Do. (*Compact.*)—White, sub-translucent, strongly pyro-phosphoric.
Loc., East Pool Mine.
Obs., Presented by Mr. J. H. Collins.

ALUMINA GROUP.

- 355 WAVELLITE.—Light grey radiations.
Loc., Bohemia (?)

ALUMINA GROUP—Continued.

- WAVELLITE—*continued.*
- 356 Hemispherical concretions.
Loc., Barnstaple.
- 357 Do. Greenish mammilations.
Loc., Ireland (?)
- 358 Do. Small dark-colored radiations.
Loc., Bohemia (?)
- 359 Do. Greyish-green and radiated, on dark slate.
Loc., Barnstaple.
- 361 Do. Light-grey radiations.
Loc., Barnstaple.
- 362 Do. Bright-green radiations.
- 363 Do. Very thin ash-grey radiations.
- 364 Do. Light-grey concretions.
Loc., Stenna Gwynn.
Obs., Presented by Mr. J. H. Collins.
- 365 Do. In radiated stalactitic groups.
Loc., West Chester, Pennsylvania.
Obs., Presented by Mr. Talling.
- 353 CRYOLITE.—Massive.
Loc., Greenland.
- 354 Do. Massive, with Chalybite, Galena, and Quartz.
Loc., Greenland.
Obs., Presented by Mr. R. Pearce.
- 366 ALUM.—Compact mass.

Class IV.—EARTHS.*SILICA GROUP.*

- 371 QUARTZ. (*a. Rock Crystal.*)—Fine transparent crystal.
Loc., Delabole.
- 372 Do. Flat double-pointed crystal, shewing iridescence.
Loc., Brazil.

SILICA GROUP—Continued.

- QUARTZ (*a. Rock Crystal.*)—continued.
- | | | |
|-----|-----|---|
| 373 | Do. | Group of transparent crystals.
<i>Loc.</i> , Cornwall. |
| 374 | Do. | Beautiful flattened crystal. |
| 375 | Do. | Group of small crystals, some doubly-pointed.
<i>Loc.</i> , North America. |
| 376 | Do. | Large fractured crystal. |
| 377 | Do. | Flattened macled crystal. |
| 378 | Do. | Large specimen, with crystals of Chalcopryrite. |
| 379 | Do. | Group of small crystals, sprinkled with Pyrites. |
| 380 | Do. | Long crystals on Chlorite. |
| 381 | Do. | Large group of crystals on Fluor. |
| 382 | Do. | Large group, with Pyrites.
<i>Loc.</i> , Cornwall. |
| 383 | Do. | Group of prisms, with transparent summits. |
| 384 | Do. | Group of pyramids, with brilliant drusy surfaces. |
| 385 | Do. | Small transparent crystals, with Garnet.
<i>Loc.</i> , Norway. |
| 386 | Do. | Transparent prism, with Chalcopryrite.
<i>Loc.</i> , Cornwall. |
| 387 | Do. | Highly modified transparent crystals.
<i>Loc.</i> , Little Falls, Niagara.
<i>Obs.</i> , Presented by Mr. Allen. |
| 388 | Do. | Transparent prisms, with Pyrites. |
| 389 | Do. | Double-pointed crystal, with Chalcopryrite. |
| 390 | Do. | Double-pointed crystal, with Chalcopryrite. |
| 391 | Do. | Double-pointed crystal, with Chalcopryrite. |
| 392 | Do. | Group of drusy pyramids, with attached crystals.
<i>Loc.</i> , St. Day Consols.
<i>Obs.</i> , Presented by Mr. Rickard. |
| 393 | Do. | Group of pyramids, with drusy surfaces. |
| 394 | Do. | Group of crystals peculiarly "capped."
<i>Loc.</i> , Cornwall. |
| 395 | Do. | Group of semi-opaque prisms. |

SILICA GROUP—Continued.

Catalogue Number.	
	QUARTZ (<i>a. Rock Crystal.</i>)— <i>continued.</i>
396	Group of pyramids deposited upon others.
397	Do. Large group of prisms, with drusy surfaces.
398	Do. Large group of prisms, with drusy surfaces. <i>Loc.</i> , Cornwall.
400	Do. (<i>b. enclosing other minerals.</i>)—Enclosing oxide of iron.
401	Do. Prisms enclosing Rutile and Adularia. <i>Loc.</i> , Tintagel.
402	Do. Flattened prism enclosing Tourmaline. <i>Loc.</i> , St. Gothard.
403	Do. Transparent crystal enclosing Rutile. <i>Loc.</i> , Brazil.
404	Do. Pyramids enclosing scales of Oxide of Iron.
405	Do. Flattened prism enclosing Rutile, &c.
406	Do. Transparent crystal enclosing air and water. <i>Loc.</i> , Dartmoor.
407	Do. Pyramids partially enclosing oxide of Iron. <i>Loc.</i> , St. Just.
408	Do. Enclosing red oxide of Iron. <i>Loc.</i> , Cornwall.
409	Do. Flattened prism enclosing Rutile.
410	Do. (<i>c. Amethyst.</i>)—Large deep purple crystals.
411	Do. Group of large crystals.
412	Do. Group of semi-transparent crystals. <i>Loc.</i> , Cornwall.
413	Do. Group of short pyramids. <i>Loc.</i> , Cornwall.
414	Do. Group of short pyramids. <i>Loc.</i> , Cornwall.
415	Do. (<i>d. Milk Quartz.</i>)—Massive. <i>Loc.</i> , Cornwall.
416	Do. (<i>e. Rose Quartz.</i>)—Very pale specimen. <i>Loc.</i> , Bavaria.

SILICA GROUP—Continued.

- QUARTZ (*e. Rose Quartz*).—continued.
- 417 Very pale "massive" specimen.
Loc., Baffin's Bay.
- 418 Do. Fine colored "massive" specimen.
Loc., Bavaria.
- 419 Do. Large group of pyramids, with Chalcopyrite.
- 420 Do. (*f. Yellow Quartz or False Topaz.*)—Group of pale colored prisms.
- 421 Do. Group of pyramids, tinged on surface only.
- 422 Do. (*g. Brown Quartz or Cairngorm.*)—Large detached crystal.
Loc., Cairngorm Mountain, Scotland.
- 423 Do. Fragment of a transparent crystal.
- 424 Do. A small group of well-formed crystals.
Loc., Hotwells, Bristol.
- 425 Do. Group of small pyramids and prisms.
- 426 Portion of a large crystal.
Loc., Brazil.
- 427 Do. Large group of short pyramids.
- 428 Do. (*h. Black Quartz.*)—Group of dark-coated crystals.
Loc., Pentire Glaze.
- 429 Do. (*i. Ferruginous Quartz or Eisenkiesel.*)—Massive, bright red.
Loc., Beeralston, Devon.
- 430 Do. Massive, with patches of green Quartz.
- 431 Do. (*j. Geodes.*)—Lined with small rose-colored crystals, with Calcite.
Loc., Somerset.
Obs., Presented by Dr. Barham.
- 432 Do. The other portion of 431.
- 433 Do. Small crystals enclosing Göthite.
Loc., Somerset.
Obs., Presented by Dr. Barham.
- 434 Do. The other portion of 433.

SILICA GROUP.

Catalogue Number.	
	QUARTZ (<i>j. Geodes.</i>)— <i>continued.</i>
435	Lined with small crystals.
436	Do. The other portion of 435.
437	Do. Large crystals with Calcite.
438	Do. The other portion of 437.
439	Do. Very minute drusy crystals.
440	Do. Concretion from 40-fathom level of a mine. <i>Loc.</i> , Cornwall.
441	Do. Part broken from 440. <i>Loc.</i> , Cornwall.
442	Do. (<i>k. Fibrous Quartz or Crosscourse Spar.</i>)—In coarse radiations. <i>Loc.</i> , Cornwall.
443	Do. With concentric layers of Carbonate of Lime.
444	Do. (<i>l. Babel Quartz.</i>)—Six-sided tables on Fluor. <i>Loc.</i> , Beeralston, Devon.
445	Do. (<i>m. Compact Quartz.</i>)—Brownish water-worn mass.
483	JASPER.—Reddish-brown mass, part of a nodule. <i>Loc.</i> , Faroe Isles.
484	Do. Brownish mass. <i>Loc.</i> , Cornwall.
485	Do. Brick-red, spotted with Quartz. <i>Loc.</i> , Scotland.
486	Do. Dark-brown, intermixed with Quartz. <i>Loc.</i> , Tuscany.
487	Do. Dull brick-red, with Quartz and Calcite. <i>Loc.</i> , Sicily.
488	Do. Brown and dark-green, massive. <i>Loc.</i> , Bengal.
489	Do. Massive, red, with Quartz. <i>Loc.</i> , Ting Tang.
490	Do. Pebble of dark-red color.
491	Do. Polished slab of red color. <i>Obs.</i> , From the Burncoose collection, 1850.

SILICA GROUP—Continued.

- 492 JASPER—*continued.*
Blackish brown.
Loc., Dolcoath.
Obs., Presented by Mr. R. Pearce.
- 493 Do. Brownish yellow.
Loc., St. Just.
- 494 Do. Reddish-brown, with Quartz.
Loc., Ting Tang.
- 495 Do. Brown.
Loc., Ting Tang.
- 496 Do. (*b. Ferruginous Opal.*)—Red mass.
Loc., Huel Gorland.
- 497 Do. Red mass.
Loc., Huel Gorland.
- 498 Do. Yellowish-brown, with Mispickel.
Loc., Huel Gorland.
- 499 Dark and light-brown, with Pyrites.
Loc., Huel Gorland.
- 500 Do. Brown, with Fluor, Quartz, and Pyrites.
Loc., Huel Gorland.
- 501 Do. Pale brown.
Loc., Ting Tang.
- 502 Do. Chocolate brown.
Loc., Huel Gorland.
- 503 Do. Brick red.
Loc., South Huel Basset.
- 504 Do. Bright-red.
Loc., Ting Tang.
- 505 Do. Dark brown.
Obs., From the Burncoose collection, 1850.
- 506 Do. (*c. Riband Jasper.*)—Brown and red.
Loc., Norway.
- 1182 Do. (*d. Heliotrope, Bloodstone.*)—Dark-green, polished.
- 507 Do. (*e. Agate.*)—Polished brown specimen.
Obs., Presented by Mr. J. H. Collins.

SILICA GROUP—Continued.

Catalogue Number.	
508	JASPER (<i>e. Agate</i>)— <i>continued.</i> —Mass of rough striped Agate. <i>Loc.</i> , Shropshire.
509	Do. Beautiful polished specimen with red spots.
510	Do. "Fortification" Agate, polished on end.
511	Do. Small polished specimen.
512	Do. White and massive, enclosing crystalline Quartz.
513	Do. White and massive, enclosing crystalline Quartz.
514	Do. White and massive, enclosing crystalline Quartz.
515	Do. Part of a concretion, pale lavender colored.
516	Do. "Fortification" Agate, polished. <i>Loc.</i> , Scotland. <i>Obs.</i> , Presented by Mr. S. Michell.
517	Do. Thirteen specimens, mostly bluish. <i>Loc.</i> , Scotland. <i>Obs.</i> , Presented by Mr. S. Michell.
518	Do. Ten specimens, mostly reddish. <i>Loc.</i> , Scotland. <i>Obs.</i> , Presented by Mr. S. Michell.
519	Do. Part of a pebble with a white band. <i>Loc.</i> , Scotland. <i>Obs.</i> , Presented by Mr. S. Michell.
520	Do. Large specimens, with blue spots, &c. <i>Loc.</i> , Scotland. <i>Obs.</i> , Presented by Mr. S. Michell.
521	Do. Polished Moss agate. <i>Obs.</i> , Presented by Mr. W. H. Paddon.
522	Do. (<i>f. Carnelian.</i>)—Brownish pebble. <i>Loc.</i> , Colombia River.
523	Do. Large brown pebble.
524	Do. Light colored pebble. <i>Loc.</i> , Colombia River.
525	Do. (<i>g. Plasma.</i>)—Dull green. <i>Loc.</i> , Baden.
526	Do. Green. <i>Loc.</i> , India.

SILICA GROUP—Continued.

- JASPER—(*h. Chrysoprase*).—continued.
- 527 Massive, light-green.
 Loc., Silesia.
- 528 Do. Light-green, cut and polished.
 Loc., Silesia.
- 529 Do. (*i. Catseye*).—Fibrous, greenish.
 Loc., Bavaria.
- 1215 Do. (*j. Jade*).—Pale-green, polished.
- 1216 Do. (*k. Basanite or Lydian Stone*).—Black mass.
 Loc., Kimaon, Himalayas.
- 1217 Do. Black mass.
 Loc., Kimaon, Himalayas.
- 1218 Do. (*l. Saussurite*).—Greyish green mass.
 Loc., Thibet (?)
- 550 CHALCEDONY.—Very large brown specimen.
- 551 Do. Greyish, stalactitic, part of a nodule.
 Loc., Faroe Isles.
- 552 Do. Beautiful white specimen.
- 553 Do. Mammillate, and branching, stalactites hollow.
 Loc., Trevascus.
- 554 Do. White and stalactitic.
 Loc., Trevascus.
- 555 Mammillary, yellowish-white.
 Loc., Trevascus.
- 556 Do. Very delicate stalactites.
 Loc., North Pool.
 Obs., Presented by Mr. W. M. Tweedy.
- 557 Do. Part of a pebble.
 Loc., Hastings.
- 558 Do. Pale-brown stalactites.
 Loc., Trevascus.
- 559 Do. Large dark colored specimen, with oxide of Iron.
- 560 Do. Brown stalactitic mass.
 Loc., Trevascus.
- 561 Do. Light brown mass.
 Loc., Trevascus.

SILICA GROUP—Continued.

Catalogue Number.	
	CHALCEDONY— <i>Continued.</i>
562	Dark brown. <i>Loc.</i> , Ponsanooth.
563	Do. Lighter brown, with tin oxide. <i>Loc.</i> , Ponsanooth.
564	Do. Dark colored specimen.
565	Do. Lavender blue, with Dolomite, &c.
566	Do. Pale lavender, coating white mass.
567	Do. Bluish-white, enclosing Chlorite.
568	Do. Small mammillations on massive Quartz.
569	Do. Pale-blue mass, coated with Quartz. <i>Loc.</i> , Greenland.
570	Do. Pale-blue, coated with crystallized Quartz.
571	Do. Coating Quartz crystals.
572	Do. Delicate stalactites on Quartz.
573	Do. Very delicate mammillations, on Quartz. <i>Loc.</i> , Pednandrea.
574	Do. Mammillary, on Quartz.
576	Do. Delicate brown stalactites.
530	Do. (<i>b. Flint.</i>)—Nodular flint, from the Upper Chalk <i>Loc.</i> , Kent.
531	Do. Banded flint.
532	Do. Reddish-white and translucent. <i>Loc.</i> , Black Down, Somerset.
533	Do. Greyish-black and opaque. <i>Loc.</i> , New Jersey.
534	Do. Light-colored, full of sponge spicules. <i>Loc.</i> , Black Down.
535	Do. Greyish, banded.
536	Do. (<i>c. Chert.</i>)—Dark, opaque, from Mountain Limestone. <i>Loc.</i> , Matlock.
537	Do. Dark, opaque, from Mountain Limestone. <i>Loc.</i> , Matlock.

SILICA GROUP—Continued.

- CHALCEDONY—(*c. Chert.*)—continued
- 538 Said to be altered Limestone, from contact with Trap.
- 539 Do. (*d. Hornstone.*)—Brown and massive.
Loc., India.
- 540 Do. Flesh-red.
Loc., Dorchester, Mass., U.S.
- 541 Greyish, translucent, with Chlorite.
Loc., Cornwall.
- 542 Do. Light-greyish brown.
Loc., India.
- 543 Do. Compact, with Amethyst.
Loc., Ting Tang.
- 544 Do. White and brown, in layers.
Loc., India.
- 545 Do. Reddish, massive and compact.
Loc., India.
- 546 Do. Bluish-grey, in thin bands, like some greenstones.
Loc., Polurath, Cornwall.
- 593 OPAL (*a. Precious Opal.*)—Bluish-green, in Porphyry.
Loc., Haselau, Upper Hungary.
- 594 Do. Bluish-white, with common white Opal.
Loc., Haselau, Upper Hungary.
- 589 Do. (*b. Fire Opal.*)—Small yellowish fragments.
Loc., Huel Gorland.
- 590 Do. Greyish, in quartzose matrix.
Loc., St. Just.
- 595 Do. (*c. Hyalite.*)—
Loc., Walsch, Bohemia.
- 580 Do. (*d. Common Opal.*)—Pale yellowish-brown.
Loc., St. Just.
- 581 Do. Pale yellowish-brown.
Loc., St. Just.
- 582 Do. White and translucent.
Loc., St. Just.

SILICA GROUP—Continued.

- OPAL (*d. Common Opal.*)—continued.
- 583 White and translucent.
- 584 Do. White, on granite.
Loc., Huel Sovereign, St. Austell.
Obs., Presented by Mr. R. Parsons.
- 585 Do. White, on granite.
Loc., Huel Sovereign, St. Austell.
Obs., Presented by Mr. R. Parsons.
- 586 Do. Brown and massive.
Loc., Herlau, Upper Hungary.
- 587 Do. White and green, in basalt.
Loc., Giants' Causeway.
Obs., Presented by Capt. James.
- 599 Do. (*e. Semi-Opal.*)—Yellow, striped with black.
Loc., Libethen, Lower Hungary.
- 600 Do. Yellowish-brown, waxy.
Loc., Hungary.
- 602 Do. (*f. Cacholong.*)—Cream-colored.
Loc., Botallack.
- 603 Do. Pale colored, with Steatite.
- 606 Do. (*g. Silicious Sinter.*)—Large white mass.
Loc., Iceland.
- 607 Do. Large brown mass.
Loc., Iceland.
- 609 Do. (*h. Flexible Sandstone.*)—Brownish mass.

ALUMINA GROUP.

- CORUNDUM.—(*a. Ruby.*)
- Do. (*b. Sapphire.*)
- 596 Do. (*c. Adamantine Spar.*)—Massive and opaque.
Loc., Baitool, India.
- 597 Do. Massive and opaque.
- 598 Do. (*d. Emery Stone.*)—Dark greyish mass.
Loc., Madras.
- 601 Do. Small brown grains.

TOPAZ GROUP.

MAGNESIA GROUP.

PERICLASE.

- 610 BRUCITE.—Thin layer on Serpentine.
Loc., Hoboken, New Jersey.
- 611 Do. White and foliated.
Loc., Texas, Pennsylvania.

 Class V.—SILICATES, ALUMINATES, &c.

SILICATE SECTION.

TOPAZ GROUP.

- 612 TOPAZ.—Small colorless crystals, on granite.
Loc., St. Michael's Mount.
- 613 Do. Large colorless crystals, on granite.
Loc., St. Michael's Mount.
- 614 Do. Fine yellow crystals.
Loc., Saxony.
- 615 Do. Fine yellow crystal, on Quartz.
Loc., Schneckensteine, near Auerbach.
- 616 Do. Pale yellow crystals.
Loc., Saxony.
- 617 Do. Brownish-yellow crystals.
Loc., Brazil.
- 1185 Do. Four rolled fragments.
Loc., Beechworth, Victoria.
Obs., Presented by Mr. Wm. Nicholas.
- 618 Do. Pale yellow crystals.
Loc., Saxony.
- 619 Do. (*b. Pyrophyssalite.*)—Massive.
- 620 Do. (*c. Pycnite.*)—Deeply striated prisms, with Mica.
Loc., Altenburg.

TOPAZ GROUP—Continued.

- 621 STAUROLITE.—Brown prisms on Quartz.
Loc., Ireland.
- 622 Do. Brown prisms, in mica-schist.
Loc., Ireland.
- 623 Do. Brown prisms, in mica-schist.
Loc., Ireland.
- 624 Do. Fine prisms, in mica-schist.
Loc., St. Gothard.
- 625 ANDALUSITE.—Large square prism, in granite.
Loc., Ireland.
- 626 Do. (*Chiastolite.*)—Long prisms, in dark clay-slate.
Loc., Skiddaw.
- 627 Do. (*Do.*)—White prisms, in dark clay-slate.
Loc., Skiddaw.
- 628 KYANITE.—Blue crystals in mica slate, with Garnets.
Loc., India.
- 629 Do. Blue lamellar mass.
Loc., Greiner, Tyrol.
- 630 Do. White fibrous mass.
Loc., Pfitschthal, Tyrol.
- 631 Do. Blue crystalline mass.
Loc., Zillerthal, Tyrol.
- 632 Do. (*Rhatizite*)—Grayish blue radiated mass.
Loc., Tyrol.

◆

TOURMALINE GROUP.

- 633 TOURMALINE.—(*Schorl.*)—Long black prisms with white quartz.
Loc., Dartmoor.
- 634 Do. (*Do.*)—Long black prisms in white Quartz.
Loc., Dartmoor.
- 635 Do. (*Do.*)—Very fine black crystals with Quartz.
Loc., Bovey Tracey.

TOURMALINE GROUP—Continued.

- TOURMALINE.—(*Schorl.*)—continued.
- 636 Beautiful black crystal.
Loc., Bovey Tracey.
- 637 Do. (*Do.*)—Large black crystal.
Loc., Bovey Tracey.
Obs., presented by Mrs. Chilcott.
- 638 Do. (*Do.*)—Radiated mass in Quartz.
Loc., Caldbeck Fells.
- 639 Do. (*Do.*)—Large embedded crystals in Quartz.
Loc., Bovey Tracey.
- 640 Do. (*Do.*)—Embedded crystals in Quartz.
Loc., Bovey Tracey.
- 641 Do. (*Do.*)—Part of a very large crystal.
- 642 Do. (*Do.*)—Black prisms in Quartz.
- 643 Do. (*Do.*)—Part of a large crystal.
- 1244 Do. (*Do.*)—Black crystals with Quartz.
Loc., Wallaroo mines, Australia.
Obs., presented by Mr. S. Higgs.
- 644 Do. Green prism with Quartz.
Loc., Goshen, Massachusetts.
- 645 Do. Green prism with Quartz.
Loc., Goshen, Mass.
- 646 Do. Black and yellow prisms in Granite,
Loc., Elba.
- 647 Do. (*Achroite*).—Nearly colourless, hair-like prisms
in a cavity, after Orthoclase.
Loc., Rock Hill, St. Austell.
Obs., presented by Mr. J. H. Collins.

 BERYL GROUP.

- 648 BERYL.—Large greenish-yellow prism.
- 649 Do. Light green prisms, very brilliant.
- 650 Do. Group of pale green hexagonal prisms.
Loc., Siberia.

BERYL GROUP—Continued.

- BERYL.—*continued.*
- 651 Opaque, white.
Loc., Dauphiny.
- 652 Do. Semi-transparent greyish-green.
Loc., North America.
- 653 Do. Portion of a fine bluish-green crystal.
Loc., Iceland.
- 654 Do. Opaque white crystal in Orthoclase.
- 655 Do. Pale green crystal in granite.
- 656 Do. Opaque white crystals in granite.
- 657 Do. Pale green crystal with Tourmaline in granite.
- 658 Do. Pale green crystal with Tourmaline in granite.
- 659 Do. Bright green crystal in granite.
- 660 Do. Large pale green crystals in Quartz.
Loc., Rabenstein, Bavaria.
- 661 ZIRCON.—Large brown crystal.
Loc., Siberia.
- 662 Do. Large brown crystal.
Loc., Siberia.
- 663 Do. Small reddish-brown crystals in Quartz.
Loc., Trenton, New Jersey, U.S.
- 664 Do. Olive-green and brown pebbles.
Loc., Ceylon.
- 665 CHONDRODITE.—Small yellow grains in Calcite.
Loc., Sparta, New Jersey.
- 666 Do. Small yellow grains in Calcite.
Loc., Sparta, New Jersey.

—◆—

OLIVINE GROUP.

- 667 OLIVINE.—(*Chrysolite.*)—Light yellowish-green, in basalt.
Loc., Isle of France.
- 668 Do. Bronze-colored grains in basalt.
Loc., Isle of France.

OLIVINE GROUP—*Continued.*

- OLIVINE.—*continued.*
- 669 Detached crystals and grains.
Loc., Vesuvius, eruption of 1794.
Obs., presented by Mr. G. C. Fox.
- 670 Do. Detached crystals and grains.
Loc., Vesuvius.
Obs., presented by Mr. E. C. Carne.
- 671 Do. Light yellowish-green, in basalt.
Loc., Isle of France.
- 672 Do. Dark compact masses, in lava.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 673 MONTICELLITE.—Small crystals with Calcite.
Loc., Vesuvius.

 FELSPAR GROUP.

- 674 ORTHOCLASE.—(*Adularia.*)—Beautiful transparent macles,
on slate.
Loc., Tintagel.
- 675 Do. (*Do.*)—Fine large crystal
- 676 Do. (*Do.*)—Colorless cleavable fragments.
Loc., Ceylon.
- 677 Do. (*Do.*)—Small macles on slate.
Loc., Tintagel.
- 680 Do. (*Sanidine or glassy Felspar.*)—Crystalline grains
with Hornblende.
Loc., Vesuvius.
- 678 Do. (*Murchisonite.*)—Pinkish and opalescent, on
triassic breccia.
Loc., Dawlish.
Obs., presented by Mr. J. H. Collins.
- 683 Do. (*Common Felspar.*)—Small greyish crystals, with
Hornblende.
Loc., Norway.

FELSPAR GROUP—Continued.

Catalogue Number.	
	ORTHOCLASE.—(<i>Common Felspar</i>)—continued.
684	Grey prismatic crystals, with Hornblende. <i>Loc.</i> , Norway.
685	Do. Small white crystals on Quartz.
686	Do. Large prism in granite.
687	Do. Macled crystal. <i>Loc.</i> , St. Just.
688	Do. Large crystal embedded in granite. <i>Loc.</i> , Lamorna.
689	Do. Large macle. <i>Obs.</i> , presented by Mrs. Chilcott.
681	Do. Large crystalline mass. <i>Loc.</i> , Tremearne, Breage. <i>Obs.</i> , presented by Mr. W. Tyack.
682	Do. Pale cream-colored cleavable mass. <i>Loc.</i> , Glass mine, Roche. <i>Obs.</i> , presented by Mr. J. H. Collins.
679	Do. Pale pink cleavable mass. <i>Loc.</i> , Wilmington, Delaware.
690	Do. Reddish brown, confusedly crystalline mass. <i>Loc.</i> , Bovey.
691	ALBITE.—White, massive, with brownish Quartz. <i>Loc.</i> , Sweden.
1783	Do. Large crystals, with Quartz. <i>Loc.</i> , S. Piero in Campo, Elba.
692	Do. Massive, white. <i>Loc.</i> , Sweden.
693	Do. Massive, pink.
694	Do. Massive, white. <i>Loc.</i> , Deegwar, India.
1786	Do. White crystals, with Strigovite and Fluor. <i>Loc.</i> , Fuchsberg, Striegau.
695	Do. (<i>Periclinae</i>).—White crystals with Chlorite.
696	LABRADORITE.—Part of a pebble, polished. <i>Loc.</i> , Labrador.

Catalogue Number.	<i>FELSPAR GROUP—Continued.</i>	
	<i>LABRADORITE.—continued.</i>	
697	Massive.	<i>Loc.</i> , Labrador.
698	Do. Imperfect water-worn crystals.	<i>Loc.</i> , Labrador.
1781	Do. White, massive.	<i>Loc.</i> , Norway.
1782	<i>OLIGOCLASE.—White, massive.</i> <i>Loc.</i> , Delaware.	
699	<i>OBSIDIAN.—Dark-brown, banded.</i> <i>Loc.</i> , Lipari.	
700	Do. Black.	<i>Loc.</i> , Pantellaria.
701	Do. Black, enclosing white crystals.	<i>Loc.</i> , Vesuvius.
702	Do. Black, very glassy.	
703	Do. Black lustrous "core," from which flakes have been struck.	<i>Loc.</i> , Mexico (?)
704	<i>PUMICE.—Greyish-white.</i> <i>Loc.</i> , Lipari.	
705	<i>PITCHSTONE.—Dark-brown.</i> <i>Loc.</i> , Cornwall.	
706	Do. Light-brown.	<i>Loc.</i> , Cornwall.
707	Do. Greyish-brown.	<i>Loc.</i> , Cornwall.
708	<i>SPODUMENE.—Greenish-white, in granite, with Garnets.</i> <i>Loc.</i> , Ireland.	
709	Do. Greenish-white, in granite, with Garnets.	<i>Loc.</i> , Ireland.
711	<i>PETALITE.—Rose colored and compact.</i> <i>Loc.</i> , Utoe, Sweden. <i>Obs.</i> , presented by Mr. W. H. Paddon.	

NEPHELINE GROUP.

- 712 NEPHELINE.—Indistinct crystals with black Mica.
- 713 Do. With black Garnet (*Melanite*).
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 714 With Sodalite and Felspar.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 715 Do. With Hornblende, Idocrase and Augite.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 718 Do. Small prism in Augitic lava.
Loc., Löbauer Berg, Bohemia.
- 719 SODALITE.—In rhombic dodecahedrons.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 720 Do. Light green and massive.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 721 LEUCITE.—Loose macled crystals.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 722 Do. Fragments, eruption of 1794.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 723 Do. Large crystals in lava.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 724 Do. Large macles.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 725 Do. Fine pink and grey crystals, eruption of 1847.
Loc., Vesuvius.

Catalogue Number.	<i>NEPHELINE GROUP—Continued.</i>	
	LEUCITE.— <i>continued.</i>	
726	Fragments.	<i>Loc.</i> , Vesuvius.
727	Do. Large crystals in lava.	<i>Loc.</i> , Vesuvius.
728	LAPIS LAZULI.—Polished fragment.	
		<i>Loc.</i> , Gt. Thibet.
		<i>Obs.</i> , presented by W. H. Vice.
729	Do. Polished fragment.	<i>Loc.</i> , Gt. Thibet.
		<i>Obs.</i> , presented by W. H. Vice.
730	Do. Light blue, in Quartz.	
731	Do. Embedded crystal, in sandstone.	
732	HAUYNE.—In lava.	
		<i>Loc.</i> , Laacher See.
733	Do. In lava, with Augite.	<i>Loc.</i> , Monte Somma.
734	Do. In lava.	<i>Loc.</i> , Vesuvius.
735	SCAPOLITE.—Light green six-sided prisms.	
		<i>Loc.</i> , Norway.
736	SARCOLITE.—Reddish crystals in lava.	
		<i>Loc.</i> , Vesuvius.
		<i>Obs.</i> , presented by Mr. G. C. Fox.
737	Do. Reddish crystals in lava.	<i>Loc.</i> , Vesuvius.
		<i>Obs.</i> , presented by Mr. G. C. Fox.
738	MEIONITE.—With Wollastonite and Calcite.	
		<i>Loc.</i> , Vesuvius.
		<i>Obs.</i> , presented by Mr. G. C. Fox.
739	Do. White transparent crystals.	<i>Loc.</i> , Vesuvius.
		<i>Obs.</i> , presented by Mr. G. C. Fox.
740	Do. Bluish-white crystals.	<i>Loc.</i> , Vesuvius.
		<i>Obs.</i> , presented by Mr. G. C. Fox.

*NEPHELINE GROUP—Continued.**MEIONITE.—continued.*

- 741 Small crystals in a cavity.
Loc., Vesuvius.
Obs., presented by G. C. Fox.
- 742 Do. Light greyish crystals.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 743 Do. Small white crystals on Calcite.
Loc., Vesuvius.

PREHNITE GROUP.

- 744 PREHNITE.—Globular radiated mass, with Calcite.
Loc., Strontian.
- 745 Do. Greenish-white, with Tremolite.
Loc., Scotland.
- 746 Do. Greenish-white, with Tremolite.
Loc., Scotland.
- 747 Do. Small pale-green specimen.
Loc., Scotland.
- 748 Do. Massive greenish-yellow specimen.
Loc., Strontian.
- 749 Do. Confused crystals.
Loc., Botallack, St. Just.

MICA GROUP.

- 750 MUSCOVITE.—Large pearly crystals in reddish Felspar.
- 751 Do. Large greyish-brown plate.
Loc., Hazanabagh, Kaneghur, India.
- 752 Do. Dark brown and massive.
Loc., St. Dennis, Cornwall.
- 753 Do. Greyish plates.
Loc., West Chester, New York, U.S.A.

MICA GROUP—*Continued.*

- MUSCOVITE.—*continued.*
- 754 Silvery plates.
 Loc., Ireland.
- 755 Do. Greenish-brown plates.
 Loc., Vesuvius.
- 756 Do. Pale greyish-green, with Calcite and Topaz.
 Loc., Vesuvius.
 Obs., presented by Mr. G. C. Fox.
- 757 Do. Greyish and brownish-green, with Christianite.
 Loc., Vesuvius.
 Obs., presented by Mr. G. C. Fox.
- 758 Do. Pale greyish-green plates.
 Loc., Vesuvius.
 Obs., presented by Mr. G. C. Fox.
- 759 Do. Large reddish-brown plate.
- 760 Do. Large crystal in Quartz.
 Loc., Rio Janeiro.
- 761 Do. Brownish scales.
 Loc., Caraccas.
- 762 Do. Dark green plates, with Spinel.
 Loc., Vesuvius.
 Obs., presented by Mr. G. C. Fox.
- 763 Do. Dark colored plates.
- 764 Do. Green crystals with Idocrase.
 Loc., Vesuvius.
 Obs., presented by Mr. G. C. Fox.
- 765 Do. Green crystals with Idocrase.
 Loc., Vesuvius.
 Obs., presented by Mr. G. C. Fox.
- 1247 Do. Large green scales, with Topaz and Idocrase.
 Loc., Vesuvius.
 Obs., presented by Mr. G. C. Fox.
- 1248 Do. Light brown crystals.
 Loc., Buckfeld.
- 1249 Do. Dark crystals, with Garnet and Calcite.
 Loc., Norway.

Catalogue Number.	
	<i>MICA GROUP.—Continued.</i>
	<i>MUSCOVITE.—continued.</i>
1250	Dark green crystals. <i>Loc.</i> , Vesuvius. <i>Obs.</i> , presented by Mr. G. C. Fox.
1251	Do. Large six-sided crystal. <i>Loc.</i> , The Phosphorite deposits, Canada. <i>Obs.</i> , presented by Mr. J. H. Collins.
766	<i>BIOTITE.</i> —Large black Mass. <i>Loc.</i> , Vesuvius. <i>Obs.</i> , presented by Mr. G. C. Fox.
767	Do. Dark crystals in white felspar. <i>Loc.</i> , Rio de Janeiro.
768	<i>RUBELLANE.</i> —Reddish-yellow confused mass.
769	Do. Red crystals in lava.
770	Do. Brilliant red crystals.
771	<i>LEPIDOLITE.</i> —Pearly scales in granite.
772	Do. Peach-colored scaly mass. <i>Loc.</i> , Moravia.
773	Do. Small crystals in elvan. <i>Loc.</i> , Kynance Cove.
774	Do. Large crystal in Quartz. <i>Loc.</i> , Rio de Janeiro.
775	Do. Pearly white crystals in granite. <i>Loc.</i> , Ireland.
776	<i>GILBERTITE.</i> —Pale yellowish-green scales. <i>Loc.</i> , Stenna Gwynn.
1245	<i>PYROPHYLLITE.</i> —Large mass of white crystals. <i>Loc.</i> , Brookwood Mine, Devon.
777	Do. Red radiated mass. <i>Loc.</i> , Mount Titanium, U.S.A.
778	<i>RIPIDOLITE.</i> —Large green plate.
779	Do. Fine embedded plates. <i>Loc.</i> , Cumberland, Rhode Island, U.S.A.
780	<i>PENNINE.</i> —Bright green crystal. <i>Loc.</i> , Findelengletschen.

HORNBLLENDE GROUP.

- 781 HORNBLLENDE.—Large black crystals with Magnetite.
Loc., Norway.
- 782 Do. Four dark green crystals.
Loc., Makow, Bohemia.
- 783 Do. Black crystals on pink Calcite.
Loc., Arendal, Norway.
- 784 Do. Small black crystals, on massive Hornblende.
Loc., Vesuvius.
- 785 Do. Black lamellar mass.
Loc., Norway.
- 786 Do. Brilliant black crystals on garnet rock.
Loc., Norway.
- 787 Do. Small dark green crystals on massive Hornblende.
Loc., Norway.
- 788 Do. Black crystals on grey lava.
Loc., Muckenhübil.
- 789 Do. Compact crystalline mass with white Apatite.
Loc., Huel Cock Cairn.
- 790 Do. (*Pargasite, noble Hornblende.*)—Large green crystals, deeply striated.
Loc., Norway.
- 791 Do. (*Do.*)—Large green deeply striated crystals.
Loc., Norway.
- 792 Do. (*Actinolite.*)—Dark-green, with oxide of iron.
- 793 Do. (*Do.*)—Greyish-green and divergent.
- 794 Do. (*Do.*)—Dark-green, divergent.
Loc., Huel Cock Cairn.
- 795 Do. (*Do.*)—Greenish-grey, divergent.
Loc., The Grebe Rock, Marazion.
- 796 Do. (*Do.*)—Light-green mass.
- 797 Do. (*Do.*)—Light-green with white talc.
- 798 Do. (*Do.*)—Light-green, divergent.

 HORNBLLENDE GROUP—*Continued.*

Catalogue Number	
	HORNBLLENDE.— <i>continued.</i>
799	Brown mass. <i>Loc.</i> , Great Retallack Mine. <i>Obs.</i> , presented by Mr. J. H. Collins.
800	Do. (<i>Tremolite.</i>)—Large white radiated mass. <i>Obs.</i> , from the Burncoose collection, 1850.
801	Do. (<i>Do.</i>)—White, radiating.
802	Do. (<i>Do.</i>)—White, radiating, with Quartz. <i>Loc.</i> , N. Roskear mine.
803	Do. (<i>Anthophyllite.</i>)—Greyish-brown foliated mass. <i>Loc.</i> , Bodenmais, Bavaria.
804	Do. (<i>Asbestos.</i>)—Large greenish-white mass. <i>Loc.</i> , Clicker Tor.
805	Do. (<i>Do.</i>)—Greyish-white, on serpentine. <i>Loc.</i> , Newhaven, U.S.A.
806	Do. (<i>Do.</i>)—Greenish mass. <i>Loc.</i> , Clicker Tor.
807	Do. (<i>Do.</i>)—White silky fibrous mass. <i>Loc.</i> , Antrim. <i>Obs.</i> , presented by Capt. James.
808	Do. (<i>Do.</i>)—White and silky, on serpentine. <i>Loc.</i> , Newhaven.
810	Do. (<i>Do.</i>)—Greenish mass. <i>Loc.</i> , Clicker Tor.
812	Do. (<i>Amianthus.</i>)—Fine silky fibres.
813	Do. (<i>Do.</i>)—Long white silky fibres. <i>Loc.</i> , Savoy. <i>Obs.</i> , presented by the Misses Potts.
809	Do. (<i>Mountain Leather.</i>)—Large flexible specimen.
811	Do. (<i>Mountain Cork.</i>)—Brownish granular mass.
1246	DUPORTHITE.—Two veins in serpentine. <i>Loc.</i> , Duporth. <i>Obs.</i> , presented by Mr. J. H. Collins.
814	AUGITE.—(<i>Pyroxene.</i>)—Black crystals with Calcite. <i>Loc.</i> , United States.

HORNBLLENDE GROUP—Continued.

- AUGITE.—(*Pyroxene.*)—continued.
- 815 Do. Black crystals with Calcite.
Loc., United States.
- 816 Do. Beautiful light-green crystal
- 817 Do. Small black crystals in Calcite.
Loc., Norway.
- 818 Do. Small black crystals; some macled.
Loc., Etna.
- 819 Do. Two dark blackish-green crystals.
Loc., Bohemia.
- 820 Do. Detached black crystals, somewhat rounded.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 821 Do. Confused crystals with Mica and Olivine.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 822 Do. Small green crystals.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 823 Do. Green crystals with Idocrase.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 824 Do. Green and black crystals with Biotite.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 825 Do. (*Coccolite.*)—Confused green crystals.
Loc., Norway.
- 826 Do. (*Do.*)—Confused green crystals.
Loc., Norway.
- 827 Do. (*Do.*)—Brownish-green crystals.
Loc., Vesuvius.
- 828 Do. (*Fassaite.*)—Dull-green, in Calcite.
Loc., Tyrol.
- 829 Do. (*Sahlite.*)—Green, massive, and lamellar.
Loc., Norway.
- 830 Do. (*Diopside.*)—Flattened greyish-green prisms.
Loc., Rothenkopf, Tyrol.

 HORNBLLENDE GROUP—*Continued.*

- | | |
|----------------------|---|
| Catalogue
Number. | |
| | AUGITE.—(<i>Diopside.</i>)— <i>continued.</i> |
| 831 | Part of a large crystal. |
| 832 | Do. (<i>Omphacite.</i>)—Green, with Garnets.
<i>Loc.</i> , Carinthia. |
| 1785 | HYPERSTHENE.—Dark cleavable mass.
<i>Loc.</i> , Labrador. |
| 1787 | Do. Dark crystals, with grey Felspar.
<i>Loc.</i> , Veltlin. |
| 1788 | Do. (<i>Paulite.</i>)—Large brownish plates.
<i>Loc.</i> , Voltolina, Upper Italy. |
| 1789 | Do. (<i>Do.</i>)—Dark mass, with white Felspar.
<i>Loc.</i> , Höllenmühle, Burg. |
| 833 | WOLLASTONITE.—White mass, pearly lustre.
<i>Loc.</i> , Cziklow, Banat. |
| 834 | HUMBOLDTILITE.—Grey crystals in lava.
<i>Loc.</i> , Monte Somma. |
| 835 | BRONZITE.—Dark-brown, metallic lustre.
<i>Loc.</i> , St. Keverne. |
| 836 | Do. Dark-brown, metallic lustre.
<i>Loc.</i> , St. Keverne. |

 GARNET GROUP.

- | | |
|-----|---|
| 837 | GARNET.—Large brown dodecahedral crystals.
<i>Loc.</i> , Lostwithiel. |
| 838 | Do. Small dodecahedrons.
<i>Loc.</i> , Lostwithiel. |
| 839 | Do. Brown dodecahedrons in decomposing Horn-
blende.
<i>Loc.</i> , Smallacombe, Devon.
<i>Obs.</i> , presented by Mr. J. H. Collins. |
| 840 | Do. Large deltohedrons in Mica.
<i>Loc.</i> , Huel Trannack. |
| 841 | Do. Brown mass with Quartz, Mispickel, & Chlorite. |

GARNET GROUP—*Continued.*

GARNET.— <i>continued.</i>	
842	Massive, nearly black. <i>Loc.</i> , Lanlivery.
843	Do. Dark-brown and granular. <i>Loc.</i> , Norway.
844	Do. Small brilliant crystals with Hornblende. <i>Loc.</i> , Norway.
845	Do. Dark-brown, with Nepheline. <i>Loc.</i> , Vesuvius. <i>Obs.</i> , Mr. G. C. Fox.
846	Do. Dark crystals, peculiarly modified.
847	Do. Large dark-brown crystals in Calcite. <i>Loc.</i> , Arendal, Norway.
848	Do. Dark deltohedron in granite.
849	Do. Large rhombic-dodecahedron. <i>Loc.</i> , Lostwithiel.
850	Do. Large brown rhombic-dodecahedron. <i>Loc.</i> , Oetzthal, Tyrol.
851	Do. Fractured crystal. <i>Loc.</i> , Lostwithiel.
852	Do. Small dark crystals. <i>Loc.</i> , Huel Devonshire, St. Agnes. <i>Obs.</i> , presented by Mr. J. H. Collins.
853	Do. Small dark-colored deltohedrons. <i>Loc.</i> , Botallack.
854	Do. Dark reddish-brown crystals, in mica-slate.
855	Do. Large mass, "cut" into form. <i>Loc.</i> , Sweden.
856	Do. Dard red deltohedrons.
857	Do. Large crystals in Calcite. <i>Loc.</i> , Norway.
858	Do. Small brown crystals. <i>Loc.</i> , Perran Sands, near old Cross, Perranzabuloe. <i>Obs.</i> , presented by Dr. C. Le Neve Foster.

GARNET GROUP—Continued.

GARNET.—*continued.*

- 859 Red and somewhat lamellar mass.
Loc., Norway.
- 860 Do. Large light-colored crystals.
Loc., Great Retallack, Perranzabuloe.
Obs., presented by Mr. J. H. Collins.
- 861 Do. Light reddish-brown.
Loc., Botallack.
- 862 Do. Red masses, in granite.
Loc., Haddam, Connecticut.
- 863 Do. Beautiful red crystals.
Loc., Piedmont.
- 864 Do. Brilliant crystals, in mica-schist.
Loc., Tyrol.
- 865 Do. Small translucent grains, in Mica.
Loc., Baffin's Bay.
- 866 Do. Massive and crystallized, with Hornblende.
Loc., Norway.
- 867 Do. Large red mass, in a hornblendic matrix.
Loc., Norway.
- 868 Do. Dark-green crystals in greyish-brown Felspar.
Loc., Sweden.
- 869 Do. Reddish-brown and green, granular.
Loc., Norway.
- 870 Do. Small dodecahedrons in mica-schist.
Loc., Tyrol.
- 871 Do. Massive and lamellar, with Quartz.
Loc., Hazarubagh, India.
- 872 Do. Large brown crystals in Calcite.
- 873 Do. Dark greenish rhombic-dodecahedron.
- 874 Do. (*Pyrope*).—Dark-red, in mica-schist.
- 875 Do. (*Do.*)—Small rounded grains.
Loc., Muronitz, Bohemia.
- 876 Do. (*Aplome*).—Large dodecahedron.
Loc., Zillerthal, Tyrol.

GARNET GROUP—Continued.

- GARNET.—*continued.*
- 877 (Essonite).—Dark-red.
Loc., Ceylon.
- 878 Do. (Colophonite).—Dark-brown, iridescent.
Loc., United States.
- 879 Do. (Do.).—Yellowish-brown, in Calcite.
Loc., Norway.
- 880 Do. (Do.).—Yellowish-brown, in Calcite.
Loc., United States.
- 881 Do. (Do.).—Bright orange-red crystals, with Calcite.
Loc., Norway.
- 882 Do. (Do.).—Reddish-black, in Calcite.
Loc., Norway.
- 883 Do. (Do.).—Dark-brown, in Calcite.
Loc., Norway.
- 884 Do. (Melanite).—Nearly black.
Loc., Vesuvius.
Obs., From the Burncoose Collection.
- 885 Do. (Do.).—Nearly black.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 1797 Do. (Grossularia).—Small light-green crystals.
Loc., Dobschau.
- 1798 Do. (Do.).—Dark-green crystals.
Loc., Geyer.
- 886 IDOCRASE.—Large crystals, with green Augite and Topaz.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 887 Do. Fine crystals, with Garnet.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 888 Do. Fine brown crystal, in green Mica.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 1300 Do. Small light brown crystals in Mica, with Nepheline
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.

GARNET GROUP—*Continued.*

Catalogue Number.	
	IDOGRASE.— <i>continued.</i>
889	Fine crystals, with Nepheline and Hornblende. <i>Loc.</i> , Vesuvius. <i>Obs.</i> , presented by Mr. G. C. Fox.
890	Do. Large broken crystal. <i>Loc.</i> , Monte Somma.
891	Do. With Nepheline. <i>Loc.</i> , Vesuvius.
892	Do. Green and compact. <i>Loc.</i> , Pfittch, Tyrol.
893	Do. (<i>Egeran.</i>)—Brown crystals. <i>Loc.</i> , Eger, Norway.
894	EPIDOTE.—Large prisms.
895	Do. Fine green prisms. <i>Loc.</i> , Norway.
896	Do. Very fine dark-green prism in Calcite. <i>Loc.</i> , Norway.
897	Do. Fine crystals in Calcite. <i>Loc.</i> , Norway.
898	Do. Large square prisms. <i>Loc.</i> , Culfeightrim, Antrim.
899	Do. Massive, with red felspar. <i>Loc.</i> , Culfeightrim, Antrim.
900	Do. Brilliant prisms of olive-green color. <i>Loc.</i> , Dauphiny.
901	Do. Bright-green acicular crystals on hornblende slate. <i>Loc.</i> , Huel Cock. <i>Obs.</i> , presented by Mr. J. H. Collins.
902	Do. Small brilliant crystals.
903	Do. Beautiful dark-green prisms. <i>Loc.</i> , Monte Acuto, Italy.
904	Do. Small greyish-green crystals. <i>Loc.</i> , Perranzabuloe, near Old Cross. <i>Obs.</i> , presented by Dr. C. Le Neve Foster.
905	Do. Small light colored crystals.

GARNET GROUP—*Continued.*

- EPIDOTE.—*continued.*
- 906 Part of a large crystal.
Loc., Hazarebagh, India.
- 907 Do. (*Mangan-epidote*).—Dark-red and massive.
- 908 AXINITE.—Very large crystals.
Loc., Trewellard, St. Just.
- 909 Do. Dark crystals in Chlorite.
Loc., Lukmanier Pass, Switzerland.
- 910 Do. Large crystals, with Prehnite.
Loc., Oisans, Dauphiny.
- 911 Do. Dark translucent crystals.
Loc., Trewellard, St. Just.
- 912 Do. Large brown crystals.
- 913 Do. Large brown crystals.
Loc., Trewellard, St. Just.
- 914 Do. Flat tables, with Mispickel and Dolomite.
- 915 Do. Small brown crystals.
Loc., Perran Sands, near Old Cross.
Obs., presented by Dr. C. Le Neve Foster.



ZEOLITE GROUP.

- 916 ANALCIME.—White and translucent, with Hornblende.
- 917 Do. Transparent crystals, in amygdaloid.
- 918 Do. White and translucent.
- 919 Do. White and translucent.
Loc., Ramoase, Antrim.
Obs., presented by Captain James.

Catalogue Number.	<i>ZEOLITE GROUP—Continued.</i>
	NATROLITE.— <i>continued.</i>
920	Acicular crystals in trachyte. <i>Loc.</i> , Aussig, Bohemia.
921	Do. Acicular crystals in trachyte. <i>Loc.</i> , Aussig, Bohemia.
922	Do. Fine yellow radiated masses,
923	MESOTYPE.—Part of a nodule. <i>Loc.</i> , Giants' Causeway.
924	Do. Fibrous, with Analcime in basalt. <i>Loc.</i> , Island of Eigg.
925	Do. Fibrous mass. <i>Loc.</i> , Giants' Causeway.
926	Do. Very thin fibres, with Calcite. <i>Loc.</i> , Scotland.
927	Do. Very thin fibres, with Calcite, nearly compact. <i>Loc.</i> , Greenland.
928	Do. Very thin fibres, with Calcite. <i>Loc.</i> , Greenland.
929	MESOLITE.—White and fibrous. <i>Loc.</i> , S.W. of Rathlin Island.
930	Do. White and fibrous. <i>Loc.</i> , Antrim. <i>Obs.</i> , presented by Capt. James.
931	Do. White and fibrous. <i>Loc.</i> , Antrim. <i>Obs.</i> , presented by Capt. James.
932	FAROELITE.—In white radiated globules, and greenish crystals. <i>Loc.</i> , Faroe.
933	THOMSONITE.—Radiated and divergent, with pearly lustre. <i>Loc.</i> , Dumbarton.
934	STILBITE.—Small white crystals. <i>Loc.</i> , Hartz.

ZEOLITE GROUP.—*Continued.*

- STILBITE—*continued.*
- 935 Greyish white, with Calcite.
 Loc., Scotland.
- 936 Do. Small pearly crystals.
 Loc., Faroe.
- 937 Do. Brownish, divergent structure.
 Loc., Norway.
- 938 Do. White crystals in a cavity.
- 939 Do. Small brown crystals, with Epidote, &c.
 Loc., Norway.
- 940 Do. A brown globular mass enclosing Magnetite.
 Loc., Norway.
- 941 Do. Large brown globular masses with Calcite.
 Loc., Norway.
- 943 Do. White crystals on dark slate.
- 944 Do. Large yellowish crystals with Calcite
- 945 Do. Small white crystals in a cavity.
- 946 Do. Small white crystals in green matrix.
 Loc., Norway.
- 947 Do. Light brown crystalline mass.
 Loc., Rotasghur, India.
- 948 Do. Small crystals in a cavity of garnet rock.
 Loc., Norway.
- 949 Do. Reddish-colored and fibrous.
 Loc., Strontian, Scotland.
- 950 Do. Small crystals in a cavity on trap rock.
 Loc., Ballintoy, Antrim.
 Obs., presented by Capt. James.
- 951 Do. Small crystals in a cavity on trap rock.
 Loc., Ballintoy, Antrim.
 Obs., presented by Capt. James.
- 952 HEULANDITE.—Bright-red crystals, on basalt.
 Loc., Paisley, Scotland.

ZEOLITE GROUP—*Continued.*

- HEULANDITE.—*continued.*
- 953 Clear white crystals.
Loc., Ballintoy, Antrim.
Obs., presented by Capt. James.
- 954 Do. Large white and translucent crystals.
Obs., presented by Mrs. Chilcott.
- 955 LAUMONITE.—Reddish-white and of pearly lustre.
Loc., America.
- 956 GISMONDITE.—White concretions in trap rock.
- 1304 PECTOLITE.—Beautiful white radiated mass.
Loc., Scotland.
- 975 GEHLENITE.—Small greenish crystals.
Loc., Tyrol.
- 957 APOPHYLLITE.—Small white pearly crystals.
Loc., Ovaranitz, Banat.
- 958 Do. Very fine crystals.
Loc., Hartz Mountains.
- 959 Do. White and pearly crystals.
Loc., Ballintoy, Antrim.
Obs., presented by Capt. James.
- 960 Do. (*Albin*)—White crystals in lava, with Natrolite.
Loc., Aussig, Bohemia.
- 961 Do. (*Do.*)—White crystals, in lava.
Loc., Aussig, Bohemia.
- 962 Do. (*Do.*)—White crystals, in lava.
Loc., Aussig, Bohemia.
- 963 Do. (*Do.*)—White crystals, in lava.
Loc., Aussig, Bohemia.
- 973 HARMATOME.—Four-sided macled prisms.
Loc., Andreasberg, Hartz.
- 974 Do. Brilliant macles.
Loc., Hartz.
- 976 DATHOLITE.—Bluish-white, in confused crystals.
Loc., Norway.
- 977 Do. Fine crystals, with Botryolite.
Loc., Norway.

ZEOLITE GROUP—Continued.

- 1648 KARPOLITE.—Yellowish and fibrous.
 1649 Do. Greenish-grey.
Loc., Wippra.
 966 CHABASITE.—White and transparent, in basalt.
Loc., Banat.
 967 Do. Confused crystals of a flesh color.
 968 Do. White crystals.
 969 Do. Large white and transparent, in basalt.
Loc., Banat.
 964 Do. (*Phacolite*)—Small colorless crystal.
Loc., Lobositz, Bohemia
 965 Do. Large colorless crystals.
Loc., Richmond.
 970 GMELINITE.—Crystals, in cavity of amygdaloid.
Loc., Giants' Causeway.
 971 Do. Crystals, in cavity of amygdaloid.
Loc., Scotch Isles.
 972 Do. Crystallized in cavities.
Loc., Island Magee, Antrim.
Obs., presented by Capt. James.

 SERPENTINE GROUP.

- 978 SERPENTINE.—(*Common Serpentine.*)—Yellowish-green,
 fibrous.
Loc., Newhaven, U.S.A.
 979 Do. (*Do.*)—Pale-green, with Calcite.
Loc., Connemara.
 980 Do. (*Do.*)—Very pale-green, lamellar.
Loc., Newhaven, U.S.A.
 981 Do. (*Do.*)—Dark-green, with Chromite.
Loc., Baltimore, U.S.
 982 Do. (*Do.*)—Dark-green, with dark spots.
Loc., Newhaven, U.S.A.

SERPENTINE GROUP.

Catalogue Number.	
983	SERPENTINE.—(<i>Common Serpentine.</i>)—Light-green. Hoboken, New Jersey.
984	Do. (<i>Do.</i>)—Green, with bright red spots. <i>Loc.</i> , Lizard.
985	Do. (<i>Do.</i>)—Green, passing into Soapstone. <i>Loc.</i> , Lizard.
986	Do. (<i>Do.</i>)—Dark-green. <i>Loc.</i> , St. Veep. <i>Obs.</i> , presented by Mr. C. W. Peach.
987	Do. (<i>Do.</i>)—Dark-green, with red spots, polished. <i>Loc.</i> , Lizard.
988	Do. (<i>Do.</i>)—Very dark green. <i>Loc.</i> , Sicily (?)
989	SCHILLER SPAR.—(<i>Bastite.</i>)—Greenish-yellow crystals in Serpentine. <i>Loc.</i> , Lizard.
990	STEATITE.—Green, with conchoidal fracture.
991	Do. Massive, yellowish-white. <i>Loc.</i> , Bavaria.
992	Do. Polished slab, pink, mottled. <i>Loc.</i> , India.
993	Do. Large greyish specimen. <i>Loc.</i> , From a vein in Serpentine, near the Black Head, Lizard. <i>Obs.</i> , presented by Mr. J. H. Collins.
1868	Do. Greyish-green, with black stellate markings. <i>Loc.</i> , Lizard.
994	SOAPSTONE.—White and red, mottled. <i>Loc.</i> , Gue Greaze, Kynance.
995	Do. Apparently passing into Asbestos. <i>Loc.</i> , Lizard. <i>Obs.</i> , from the Burncoose collection, 1850.
996	Do. White and lamellar. <i>Loc.</i> , India.
997	Do. Grey and compact. <i>Loc.</i> , Lizard.

SERPENTINE GROUP—Continued.

- 998 KEROLITE.—Brownish-yellow.
Loc., Silesia.
- 999 POTSTONE.—Massive, Greenish-grey.
Loc., Goosha Keitah, India.
- 1000 Do. Fibrous, greenish.
- 1001 TALC.—Pale-green and translucent.
Loc., Tyrol.
- 1002 CHLORITE.—Green, earthy, with Quartz.
- 1003 Do. Green, earthy, with Quartz.
- 1004 Do. Light-green, pearly.
Loc., Huel Prospidnick, Sithney.
Obs., presented by Mr. J. H. Collins.
- 1005 Do. Fine grained, scaly.
Loc., Switzerland.

ALUMINA GROUP.

- 1007 ALLOPHANE.—Bright blue on slate.
Loc., Huel Hamblyn, Bridestow.
Obs., presented by Mr. Rd. Pearce.
- 1008 Do. Bright blue.
Loc., Huel Hamblyn.
Obs., Presented by Mr. Rd. Pearce.
- 1009 Do. Pale-blue, botryoidal on Quartz.
Loc., Huel Hamblyn.
Obs., presented by Mr. Rd. Pearce.
- 1010 Do. Yellowish-white, on slate.
Loc., Huel Hamblyn.
Obs., presented by Mr. Rd. Pearce.
- 1011 Do. Greyish-white, botryoidal.
Loc., Garras Mine.
Obs., presented by Mr. Rd. Pearce.
- 1012 Do. Yellowish, massive.
Loc., Charlton, Kent.
Obs., presented by Mr. J. H. Collins.

ALUMINA GROUP—Continued.

Catalogue Number.	
1863	KAOLIN. (<i>Carclazyte</i>).—Decomposed granite, containing kaolin. <i>Loc.</i> , Treviscoe, St. Stephens. <i>Obs.</i> , presented by Mr. J. H. Collins.
1864	Do. (<i>China Clay</i>).—Washed specimen, as sold. <i>Loc.</i> , Huel Burn, St. Stephens. <i>Obs.</i> , presented by Mr. J. H. Collins.
1065	Do. (<i>Lithomarge</i>).—Banded, pink and white. <i>Loc.</i> , Dolcoath. <i>Obs.</i> , presented by Mr. J. H. Collins.
1066	GRAMENITE.—Grass-green, massive. <i>Loc.</i> , Smallacombe, Devon. <i>Obs.</i> , presented by Mr. J. H. Collins.
1219	ERINITE.—Dark-greenish spherules. <i>Loc.</i> , Ballintoy, Antrim. <i>Obs.</i> , presented by Capt. James.
710	KILLINITE.—Greenish particles, in granite. <i>Loc.</i> , Killiney, Dublin.
1012	PINITE.—Detached crystals. <i>Loc.</i> , Crowan.
1013	Do. Black crystals in Elvan. <i>Loc.</i> , Crowan?

ALUMINATE SECTION.

SPINEL GROUP.

1016	SPINEL.—Black crystals in green Augite. <i>Loc.</i> , Vesuvius. <i>Obs.</i> , presented by Mr. G. C. Fox.
1018	Do. Black crystals in green Augite. <i>Loc.</i> , Vesuvius. <i>Obs.</i> , presented by Mr. G. C. Fox.

Catalogue
Number.SPINEL GROUP—*Continued.*

- SPINEL.—*continued.*
- 1020 Black crystals in green Augite.
Loc., Vesuvius.
Obs., presented by Mr. G. C. Fox.
- 1021 Do. (*Pleonaste.*)—Dark-green crystals in lava.
- 1022 Do. (*Do.*)—Dark crystals in lava.
- 1023 GAHNITE. (*Automalite.*)—Black crystals in greyish-green Felspar.
- 1024 CHRYSOBERYL.—Yellowish-green, in mica-schist.
Loc., Marschendorf, Moravia.

ROYAL INSTITUTION OF CORNWALL.

FOUNDED 1818.

Patron
THE QUEEN.

Vice-Patron:
H.R.H. THE PRINCE OF WALES, DUKE OF CORNWALL, &c., &c.

Trustees
LORD ROBARTES.
SIR C. B. GRAVES SAWLE, BART.
MR. F. G. ENYS.
LIEUT.-COL. TREMAYNE.

COUNCIL FOR THE YEAR 1877-78.

President:
MR. W. C. BORLASE.

Vice-Presidents:

MR. GEORGE FREETH.
C. BARHAM, M.D. (CANTAB.)
J. JAGO, M.D. (OXON.), F.R.S.

SIR F. M. WILLIAMS, BART., M.P.
MR JONATHAN RASHLEIGH.

Treasurer:
MR. WILLIAM TWEEDY.

Hon. Secretaries:
MR. N. WHITLEY, F.M.S.
MR. J. H. COLLINS, F.G.S.

Other Members:

MR. R. H. CARTER.
MR. C. LE NEVE FOSTER, D SC.
REV. W. IAGO, B.A. (CANTAB.),
LOC. SEC. S.A.
MR. H. SPRY LEVERTON, M.R.C.S.
REV. A. P. MOOR, M.A.

MAJOR PARKYN.
MR. A. PAULL, M.R.C.S.
MR. W. J. RAWLINGS
MR. H. O. REMFRY.
MR. TYERMAN.

Librarian and Curator of Museum: MR. W. NEWCOMBE, TRURO.

THE FOLLOWING WORKS ARE
PUBLISHED BY THE SOCIETY.

THOSE MARKED (*) MAY BE OBTAINED FROM THE CURATOR.

THE CORNISH FAUNA: A Compendium of the Natural History of the County.

PART I.—Containing the Vertebrate Animals and Crustaceans by JONATHAN COUCH, J. BOOKING ROWE, THOMAS CORNISH, E. H. RODD, and C. SPENCE BATE. Price 3s.

*PART II. — Containing the Testaceous Mollusks. By JONATHAN COUCH, F.L.S., &c. Price 3s.

*PART III.—Containing the Zoophytes and Calcareous Corallines. By RICHARD Q. COUCH, M.R.C.S., &c. Price 3s.

THE SERIES OF REPORTS of the Proceedings of the Society, with numerous Illustrations.

LIST OF ANTIQUITIES in the West of Cornwall, with References and Illustrations. By J. T. BLIGHT, F.S.A. Price 1s.

MAP OF THE ANTIQUITIES in the Central District of Cornwall Price 1s.

***M**AP OF THE ANTIQUITIES in the Land's End District of Cornwall: Price 1s.

***C**ARN BREA (with Map). By Sir GARDNER WILKINSON, D.C.L. F.R.S., &c. Price 1s.

***A**DDITIONS TO BORLASE'S NATURAL HISTORY OF CORNWALL. From MS. Annotations by the Author. Price 2s. 6d.

***J**OURNAL OF THE ROYAL INSTITUTION OF CORNWALL. Nos. V to XIX are on Sale, price 4s. each.

***C**ATALOGUE OF THE NON-METALLIC MINERALS IN THE MUSEUM. Price 6d.

CATALOGUE OF THE METALLIC MINERALS (in the press).

COMplete INDEX TO THE REPORTS AND JOURNALS OF THE INSTITUTION (in preparation.)

NOTICE TO MEMBERS.

All Subscriptions become due in advance on the 1st August. Members whose Subscriptions are not paid before the 31st December, will not be supplied with the "Journal" after that date.

Members wishing to withdraw, must pay their Subscriptions for the current year, and signify their intention *in writing*, before the 31st August of the year next ensuing, or they will be liable for the Subscription of that year also.





SMITHSONIAN INSTITUTION LIBRARIES



3 9088 01299 2269