







Yorkshire Philosophical Society.

ANNUAL REPORT

FOR

MDCCLXXVI.



A N N U A L R E P O R T

OF THE COUNCIL

OF THE

Y O R K S H I R E

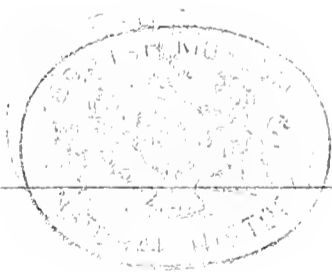
PHILOSOPHICAL SOCIETY

FOR

M D C C C L X X V I .

PRESENTED TO THE ANNUAL MEETING,

FEBRUARY 6TH, 1877.



Y O R K :

J. SOTHERAN, BOOKSELLER, CONEY-STREET.

—
1877.

PATRONESSES

OF THE

Yorkshire Philosophical Society.

HER MAJESTY THE QUEEN.

H. R. H. THE PRINCESS OF WALES.

PATRONS.

H. R. H. THE PRINCE OF WALES.

H. R. H. THE DUKE OF CONNAUGHT.

THE ARCHBISHOP OF YORK.

OFFICERS OF THE SOCIETY, 1877.

PRESIDENT :

HIS GRACE THE ARCHBISHOP OF YORK, F. R. S.

VICE-PRESIDENTS :

THE RIGHT HON. LORD LONDESBOROUGH.

THE HON. AND VERY REV. THE DEAN OF YORK, D. D.

WILLIAM HENRY RUDSTON READ, M. A., F. L. S.

EGERTON VERNON HARCOURT, M. A., F. G. S.

THE VEN. ARCHDEACON HEY, M. A.

THE REV. CANON RAINE, M. A.

THE REV. JOHN KENRICK, M. A., F. S. A.

WILLIAM REED, F. G. S.

JOHN FRANCIS WALKER, M. A., F. L. S., F. G. S., F. C. S.,
MEMBER OF THE COMMITTEE OF THE BRITISH ASSOCIATION, &c.

WILLIAM WALKER, F. G. S.

TREASURER :

WILLIAM GRAY, F. R. A. S., F. G. S.

COUNCIL :

Elected 1875. .JOSHUA OLDFIELD.

JOHN MARCH.

EDWARD ALLEN, F. G. S.

FREDERICK L. MAWDESLEY.

Elected 1876. .WILLIAM MATTERSON, M. D.

THE REV. GEORGE ROWE, M. A.

TEMPEST ANDERSON, M. D., B. SC.,

FELLOW OF UNIVERSITY COLLEGE, LONDON.

JOSEPH WILKINSON, F. R. G. S.

Elected 1877. .JOHN P. WOOD.

RICHARD PEARSON.

J. H. GIBSON, M. D.

EDWARD W. SMITHSON.

HON. SECRETARY :

T. S. NOBLE, F. R. A. S., F. G. S.

CURATORS :

GEOLOGY	W. REED, F. G. S.
COMPARATIVE ANATOMY . .	T. ANDERSON, M. D.
BRITISH ORNITHOLOGY . .	W. H. RUDSTON READ, M. A., F. L. S.
INSECTS AND CRUSTACEA . .	VEN. ARCHDEACON HEY, M. A.
ETHNOGRAPHICAL COLLECTION	S. W. NORTH, F. G. S.
ANTIQUARIAN DEPARTMENT .	{ REV. JOHN KENRICK, M. A. REV. W. GREENWELL, M. A. REV. J. RAINE, M. A.
LIBRARY	REV. G. ROWE, M. A.
BOTANY	WILLIAM MATTERSON, M. D.
CONCHOLOGY	S. W. NORTH, F. G. S.
OBSERVATORY & METEOROLOGY	{ W. GRAY, F. R. A. S., F. G. S. VEN. ARCHDEACON HEY, M. A. T. S. NOBLE, F. R. A. S., F. G. S.
<i>under the care of a Committee</i>	
<i>consisting of</i>	

REPORT OF THE COUNCIL
OF THE
YORKSHIRE PHILOSOPHICAL SOCIETY,

FEBRUARY 6TH, 1877.

In presenting the Report to the Yorkshire Philosophical Society for the year 1876, the Council propose to follow the usual plan of first dealing with the finances of the Society during the past year, and then of directing attention to the various scientific departments of the Museum.

The Council congratulate the Society that the Income for the past year has been above the average. A larger number of members than usual have been elected, and the income arising therefrom, together with the receipts at the gate (which are above the average), makes the total income of the Society from all sources £1526 11s. 9d., the greatest amount on record.

The total expenditure has been £1413 16s. 11d., leaving a balance to the credit of the Society of £112 14s. 10d. on the receipts and expenditure for the year. This, added to the sum to the credit of the Society at the close of the last year's account, namely, £317 7s. 6d., leaves a balance in the Treasurer's hands to the credit of the Society of £430 2s. 4d. on the ordinary income account.

The Council have to report that the balance to the credit of the Society would have been much larger but for various items of special expenditure, which are not likely to occur again for some years to come, and of which the chief are the following: A sum of £40 4s. has been expended in the repair of and in re-asphalting the Walks in the grounds of the Museum. A

further sum of £27 7s. 6d. has been spent upon new Geological cases required by the Curator of that Department for the Yorkshire Room; and a sum of £107 4s. 9d. has been laid out in improvements to the Hospitium. The amount of £64 5s. 6d. has been expended by the Council in the purchase of Roman and other Antiquities.

The total expenditure on the New Lodge and the Approaches has amounted to £1353 19s. 3d., whilst the various donations which have been received, amount to £693 17s., leaving a balance of £660 2s. 3d. to be provided for. The large sum received in donations is an evidence of the great interest that the public have taken in this improvement, which has been the means of securing a handsome approach to the grounds of the Society. The Council do not propose to close the Building Account for the present, but to forward a copy of it to each Member, with the names of the donors and their subscriptions, in the hope that farther donations may be received, sufficient to clear off the greater part, if not the whole, of the balance, so that no portion of it may be charged upon the income of the Society.

It will be in the recollection of the Members, that at the last Annual Meeting, reference was made to a negotiation then pending between the Committee of the Yorkshire Fine Art and Industrial Exhibition and the Society for obtaining possession in fee of the land and premises belonging to the Society (part of the Manor Shore Estate), and leasehold for years of the Crown. During the past year, the Council have agreed, at the request of the Fine Art Committee, to become the Grantees of the fee simple of this property for the sum of £4000, paid to the Crown Receivers by the Committee, with the object of obtaining from the Society, as Grantees, a lease for a long term of years of the greater portion of the land, for the purpose of erecting thereon a building suitable for the exhibition of works of Art and Industry. It is part of the scheme, that the Bird-in-Hand Inn, situate in Bootham, the property of the York Corporation, shall be pulled down to make an approach to the Fine Art Museum when completed, and although the Trustees of the Society, in obtaining posses-

sion of the leasehold property, did so with the object of preserving it as an open space, and eventually, when their income permitted, of annexing it to the grounds of the Society, they felt bound, under the circumstances, to co-operate with the Committee in obtaining the fee simple of the land, and, so far as their power extends, to aid in the promotion of a scheme which has for its object the instruction of the people and the improvement of the city. In July last, the purchase money, £4000, and the cost of the grant, £10 10s., were paid to the Representatives of the Crown, and the Council hope soon to be able to announce that the Crown Grant has been received, and no time will then be lost in completing the arrangement.

The Curator of Geology reports that the cases required for the better display of the Yorkshire Fossils have been completed. The re-arrangement of the specimens has been carried out to the end of the Inferior Oolite series (our Honorary Member, Mr. Huddleston, having kindly assisted). The gallery contains the following, viz., Peat deposits, drift from the sea coast, Fossils from the gravel pits around York, chiefly collected by the late Mr. James Cook; Chalk, Red Chalk, Speeton Clay, including Neocomian, Portlandian and Kimmeridgian strata; then the Coralline Oolite, of which the Society possesses a magnificent series; the Lower Calcareous Grit, Oxford Clay, Kelloway Rock, and Cornbrash.

In the lower room, the Inferior Oolite series, which is kept in separate sub-divisions, consists of the Upper Plant Bed, Scarbro' Limestone, the unique and valuable collection of Brandsby Slate, part of the Cook collection, then the Middle Plant Bed, the Millepore series, the Whitwell Limestone, the Lower Plant Bed, the Red Inferior Oolite of Glaizedale, and the Peak Dogger Beds. In re-arranging the collection, space has been left for additions. It is hoped that during the present year the lower room will be completed. The Lias series are already named and divided into zones by the Rev. J. F. Blake, whose valuable work on the Yorkshire Lias appeared during the past year. The collection of Carboniferous Limestone Fossils is unfortunately very deficient.

The Society has received, through the kindness of Thomas Lightfoot, Esq., of Masham, cores obtained by boring through the Carboniferous series for an Artesian Well at Masham; this is described in a paper which will be appended to the report. In the General collection there is nothing special to report, except the gift of some Lias Fossils from Leicestershire, from John James Gutch, Esq., and a large and fine specimen of *Ammonites Engelhardti* from the Middle Lias of South Petherton, from J. F. Walker, Esq. When the arrangement of the Yorkshire Fossils is complete, attention will be directed to the improvement of the general Geological collection, as several strata are very imperfectly represented, especially the Rhætic, Devonian Mollusca, and nearly all the beds of the Lower Silurian and Cambrian Formations. These deficiencies are pointed out in hope that some of our Members will try to obtain them for the Society, and assist in keeping the Geological collections of the County Museum in a position worthy of a Society rendered illustrious by the labours of Harcourt and Phillips.

The Curator of Insects and Crustacea reports that the collections are in good condition, and that great care has been taken to protect them all, and especially the magnificent Allis collection of Lepidoptera, from the depredations of mites and other insects which haunt cabinets. Mr. Hind, of this city, has presented pairs of two rare and interesting moths, *Eupithecia pimpinellata* and *E. albipunctata*, both from the neighbourhood of York, which have been placed in the Allis collection.

The progress of the Antiquarian Department in 1876, although not so great as in several recent years, has been of a satisfactory character. The excavations at the new Railway Station are drawing to a close, and have yielded during the past twelve months, comparatively little. A few objects, however, from that source, have come to the Museum, which add to the completeness of the collection of Roman antiquities. Among these, the Curators may mention a leaden coffin, one or two sculptured stones, and some personal orna-

ments of considerable beauty. To the Dean and Chapter of York, the Society is indebted for some carved stones from the South Transept of the Minster, among which are some interesting specimens of Purbeck and Petworth marble, which were brought into the North in the middle of the thirteenth century. Two other gifts to the Society during the year deserve a special mention. The first is that of a number of Roman vessels of bronze, which were discovered in the neighbourhood of Knaresbrough about 1860. Some of these were presented to the Museum by Mr. Gott in 1864; through the great kindness of the same gentleman, the Society now possesses, with one exception, the whole of this "find" that exists, and Mr. Gott's two donations, when joined together, form a unique and very remarkable collection of Roman work in bronze and iron.

Of a somewhat later date, although by no means inferior in interest, are two large coffins, formed out of oak trees of considerable size, which were discovered during the summer of the present year in a very early burial ground at Selby. They will be added to the collection in the British and Saxon Room, where they will bear testimony to the generous kindness of Messrs. Morrell, Atkinson and Woods.

The Council have secured for the Museum, by purchase, a valuable collection of objects from the lacustrine dwellings in Switzerland, which will be exhibited when sufficient space is found for that purpose.

In addition to the acquisition of these and many other objects of interest, the Curators have made considerable progress in the re-arrangement of some of the collections. This will be especially observable in the lower room of the Hospitium, in which the sculptured stones have been classified and shewn to greater advantage, and a series of Roman tombs has been set up, which cannot fail to attract the attention of the visitor. The Curators in this work thankfully acknowledge the assistance that has been rendered to them by Dr. Gibson.

In the Coin Department much good work has been made in cataloguing and arranging the acquisitions of recent years.

The Curators are glad to mention that some valuable additions have been made to the collection of English Pottery which the

Society possesses. It is their earnest wish and design to make this collection still more important, by including in it specimens of the more recent English wares, especially those which have had their origin in the North of England. The Curators venture to appeal to the Members of the Society generally to enable them to carry out what they desire to see gradually effected. There is no reason why the York Museum should not be made what the Liverpool Museum is now, through the generosity of Mr. Mayer, a repository of a continuous series of the productions of the ceramic art, from the earliest period to the present day.

In conclusion, the Curators beg to direct the attention of the Council to the fact that only a very small portion of the Monkman collection of British antiquities is at present exhibited. The fittings of the British and Anglo-Saxon Room are wholly inadequate for that purpose.

The Curator of Comparative Anatomy draws attention to the extent and great value of the Society's collection. The best known part of the collection is the splendid series of skeletons of birds, formerly belonging to the late Mr. Allis, and to the collecting and preservation of which he devoted the greater part of his life. It includes a vast number of complete specimens, each of which, with one exception, is formed from a single bird. The collection is almost, if not quite, unique, and the late Professor Grant, of University College, spoke highly of its value. It is, of course, chiefly important from the number and variety of the specimens affording materials for comparison; but, apart from this, many individual specimens are of great value, both scientifically and intrinsically. The skeleton of the *Dinornis robustus*, presented by Dr. Gibson, is the largest and most perfect specimen known, and is now one of the most valuable treasures of the collection.

The Mammalian collection contains many choice specimens, but having been formed rather from casual donations than from any systematic collection, it is somewhat deficient in some of the ordinary forms, which no one probably has thought fit to supply, because they were within every one's reach.

The Curator has added a list of a few of the most apparent gaps in the series, in the hope that some of our friends, as opportunities arise, may secure and present them.

Monotremata; *Echidna*.

Marsupialia; *Wombat*, (*Phascolomys*) *Petaurus*.

Solidungula; *Skeleton of a celebrated Race Horse*, *Skull of an Ass*.

Ruminantia; *Skull of Sheep and Goat*.

Rodentia; *Hare*, (*Lepus timidus*.)

Cheiroptera; *Any kind of Bat*.

Quadrumana; *Semnopithecus*, *Colobus*.

The principal donation during the year has been a remarkably fine series of *Dinornis* bones from New Zealand, for which the warmest thanks are due to Dr. Gibson. They are of several species, the principal being the *Dinornis elephantopus*.

A number of bones, discovered in the railway excavations, with other Roman remains, doubtless of the same age, are now in process of arrangement, and will shortly be placed in the cases. These will be interesting as affording data for comparison with existing types, and may possibly prove to have important bearings on the variations of animals under domestication.

The Curator of Botany reports that W. H. Rudston Read, Esq., has presented to the Society during the past year, twelve different species of Plants, and that Mrs. Henry Watson, of York, has given to the Society a Tree Fern from New Zealand.

The Curator of Ornithology has only to notice the gift of four eggs of the common Snipe (*Scolopax Gallinago*).

Mr. Wakefield in his remarks states that the excessive Rainfall during the past year has not been confined to England or Europe, but has extended over the greater part of the globe. It appears, from statistics, that damp moist weather has a prejudicial effect on the health when not accompanied by a very heavy rainfall, but whenever a heavy rainfall prevails,

there is an improvement in the general health, and this perhaps somewhat accounts for the low death rate which had been found in the Registrar General's reports during the past year.

The mean height of the mercurial column for the year, corrected to 32° F. and mean sea level, was 29·8628 inches, being ·0628 inch. below a mean of the last 40 years. Five times in March, once in April, and six times in December, the barometer fell below 29 inches. The highest point reached was 30·680 inches on January 15th, the lowest point touched being 28·439 on December 4th, giving a range of 2·241 inches. The mean temperature has been 1·10 degrees above the average. The following table exhibits the months of excess and defect respectively.

Excess.		Defect.	
January	·79	March	·77
February	2·23	May	2·74
April	·86	June	·39
July	4·46		<hr/>
August	1·74		3·90
September	·01		
October	3·64		
November	·38		
December	2·99		
	<hr/>		
	17·10		
	3·90		
	<hr/>		
	12)13·20		
	<hr/>		
Excess for the whole year	1·10		

The amount of rainfall has been 31·70 inches, or an excess of 7·66 inches of the mean of 40 years. The nearest approach to this amount during the past 40 years being 36·02 inches in 1848, 30·37 inches in 1860, and 39·85 inches in 1872. The number of rainy days in 1872 was 216, against 194 in 1876. The deficiency being for January ·78, May 1·05, July ·92, and August ·68, and the excess for February ·71, March 1·46, April ·55, June ·17, September 2·41, October ·36, November 1·31, and December 4·12.

The total fall of rain during the month of December was 5.95 inches, and there has been no instance since 1815, when the fall in that month has been so large.

METEOROLOGICAL REGISTER, YORK, 1876.

BAROMETER.				RAIN.		THERMOMETER.				
Month.	Highest.	Lowest.	Mean.	Inches.	Days.	Average Maximum.	Average Minimum.	Mean Temp.	Highest.	Lowest.
Jan.	30.680	29.663	30.2527	.94	11	42.16	32.03	37.09	50	22
Feb.	30.090	29.087	29.7225	2.18	22	45.78	34.28	40.03	57	24
Mar.	30.106	28.525	29.4771	3.05	22	46.03	33.03	39.53	57	24
April	30.448	28.966	29.8445	2.05	16	54.80	38.33	46.56	68	25
May	30.523	29.646	30.1643	.66	11	58.51	40.45	49.48	69	29
June	30.235	29.616	29.9744	2.51	9	67.40	48.04	57.72	80	38
July	30.446	29.646	30.0290	1.53	10	72.68	53.45	63.06	88	42
Aug.	30.345	29.000	29.9069	2.05	12	71.19	50.90	61.04	89	40
Sept.	30.315	29.382	29.7432	4.62	23	61.70	47.53	54.61	71	41
Oct.	30.329	29.195	29.9184	2.78	15	58.13	45.35	51.74	67	32
Nov.	30.329	29.354	29.8762	3.38	20	47.73	36.23	41.98	58	24
Dec.	30.210	28.439	29.4452	5.95	23	45.84	37.55	41.69	57	29
	30.680	28.439	29.8628	31.70	194	55.99	41.43	48.71	89	22

RAIN FALL, 1876.

Museum.					Malton.	Langton.
Month.	Total Depth.	Greatest Fall in 24 Hours.		Number of Days on which '01 or more fell.		
	Inches.	Depth.	Date.		Inches.	Inches.
Jan.	·94	·34	13	11	·97	·76
Feb.	2·18	·33	15	22	2·33	2·38
Mar.	3·05	·58	30	22	2·82	3·17
April	2·05	·59	11	16	1·70	2·50
May	·66	·30	23	11	·66	·86
June	2·51	·90	22	9	2·44	2·58
July	1·53	·73	27	10	1·84	2·18
Aug.	2·05	·55	3	12	2·37	2·05
Sept.	4·62	·77	23	23	3·49	3·70
Oct.	2·78	1·09	9	15	2·19	2·26
Nov.	3·38	·75	13	20	3·18	3·58
Dec.	5·95	·66	3	23	5·75	6·04
	31·70			194	29·74	32·06

COMPARATIVE PREVALENCE OF WINDS.

N.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.	S.S.E.
36	10	20	6	25	12	8	8
S.	S.S.W.	S.W.	W.S.W.	W.	W.N.W.	N.W.	N.N.W.
74	11	31	27	41	17	22	18

The following observations made at Langton, Malton, have been kindly supplied by the Rev. A. Shadwell, M. A.

WINDS.

Direction.	Number of Days.
S. to W.	147
W. to N.	75
N. to E.	66
E. to S.	60
Calm	18

Days on which the Wind force was estimated at 6 and over 6 on the sea scale, or from 'strong' to 'whole gale,' maximum being 12.

January 23.	September 5.	December 1.
March 11.	October 11.	„ 2.
April 14.	November 12.	„ 11.
June 15.	„ 13.	„ 12.
Aug. 3.	„ 25.	„ 19.
		„ 27.
		„ 30.

No gales at either vernal or autumnal equinox, but rather an unusual period of calm at both.

January was the driest month, and had the greatest number of calm days, and also the highest mean barometric pressure, amounting to 30·21 inches.

The river Derwent attained its summer level first on July 25th; was in a state of flood nearly throughout December, on 21st showing 11 feet, and on 30th 10 feet 7 inches above level.

Thirty-two new Members, four Lady Subscribers, and three Associates have been added to the Society during the past year, whilst eighteen Members, five Lady Subscribers, and six Associates have been removed from the Society's list by death and resignation.

Among the Foreign Honorary Members of the Society, the name of a distinguished French Naturalist will no longer appear in the Society's list. M. A. T. Brongniart, Member of the Academy, F. R. S., and Member of the principal learned Societies of Europe, died on the 18th of February last, at the age of 75. This illustrious French Botanist has for half a century justly occupied a prominent place as a man of science. He was the son of Alexandre Brongniart, the famous naturalist, who died in 1847. At the age of nineteen he wrote his first and only Zoological paper, on a new genus of Crustacea. He afterwards devoted himself wholly to Botany, especially to the study of fossil plants. In 1828 he commenced his great work, "Histoire des Végétaux Fossiles ou Recherches Botaniques et Géologiques." (4to., p.p. 488, illustrated by 166 plates). The work

was arrested by M. Brongniart's ill health when it had reached to 12 parts, and was not resumed for nine years. Only three additional parts were then issued, and the work remains incomplete, to the great regret of all students of Fossil Botany. M. Brongniart wrote the article on Fossil Plants in the "Dictionnaire d'Histoire Naturelle," (1849). He also contributed numerous separate papers on recent and Fossil Botany to the *Annales*, etc.

The following Lectures have been delivered in the Theatre of the Museum during the past year.

SUBJECT.	NAME OF LECTURER.
Recent Excavations in Rome ..	REV. A. SHADWELL.
Antartic discovery	CAPTAIN DAVIS, R. N.
Some recollections of a recent visit to Belgrade, &c.	} REV. F. LAWRENCE.

The Council recommend for election the following gentlemen as Honorary Members of the Society: William Whitaker, B.A., London, F.G.S., Geological Survey; C. Fox Strangways, F.G.S., Geological Survey; Prof. John Morris, F.G.S., University College, London; J. W. Judd, F.G.S., Prof. of Geology, Royal School of Mines; A. H. Green, M.A., F.G.S., Prof. of Geology, Yorkshire College of Science; P. M. Duncan, M.B., F.R.S., President of Geological Society, Prof. of Geology in King's College, London.

Four Members of Council retire during the present year by rotation, viz.: William Whytehead, Esq., Rev. M. R. Breshler, J. P. Wood, Esq., and Richard Pearson, Esq. The two latter gentlemen, in accordance with a special rule of the Society, having been elected only for one year, are proposed by the Council for re-election, along with Dr. Gibson and Edward Smithson, Esq., as ordinary Members of Council.

THE
TREASURER OF THE YORKSHIRE PHILOSOPHICAL SOCIETY
IN ACCOUNT FOR THE YEAR 1876.

Cr.	INCOME.					
	£.	s.	d.	£.	s.	d.
<i>Annual Subscriptions, &c.:</i>						
Members	675	1	0			
Lady Subscribers	75	3	0			
Associates	18	0	0			
Arrears	6	5	0			
				774	9	0
<i>Admission Fees of New Members:</i>						
Paid in Full	27	0	0			
Paid by Instalments	44	0	0			
				71	0	0
Compositions in lieu of Subscriptions				72	0	0
Keys of the Gates				42	5	0
Temporary Subscriber				1	0	0
<i>Rents:</i>						
New Manor Shore Property	100	9	1			
St. Mary's Lodge	54	10	10			
Cottages in Marygate ..	16	1	4			
Boat Yard	5	0	0			
				176	1	3
Gate Money	288	17	6			
Swimming Bath	40	0	0			
Sale of Guide to Antiquities, &c.	14	19	0			
Use of Tent	21	0	0			
Sale of Duplicate Antiquarian Specimens	25	0	0			
				£1526	11	9
<i>Permanent Debt:</i>						
Yorkshire Insurance Company	1900	0	0			
Due to Two Members, £50 each	100	0	0			
				2000	0	0
Balance in Treasurer's hands, 31st Dec., 1875 ..	317	7	6			
Surplus of Income, 1876 ..	112	14	10			
				430	2	4

		EXPENDITURE.		Dr.		
	£.	s.	d.	£.	s.	d.
Crown Rents	90	2	4			
Corporation Rents	19	15	10			
Rates and Taxes	15	6	5			
Water Rents	6	13	0			
Insurance	6	6	6			
				138	4	1
<i>Salaries and Wages:</i>						
C. Wakefield	140	0	0			
H. Baines (Pension)	101	18	5			
J. Davison (Do.)	26	10	0			
J. Fielden	70	4	0			
Lodge Keeper	46	16	0			
Attendant, Museum	46	4	0			
Do., Hospitium ..	13	14	6			
Gardeners	139	13	0			
				584	19	11
Interest to Insurance Company	75	2	9			
Interest to Bankers	16	6	2			
<i>General Expenses and Repairs:</i>						
Museum	52	9	8			
Estate	21	2	2			
				73	11	10
<i>Gardens, Greenhouses, &c.:</i>						
General Expenses and Repairs	73	1	4			
Seeds, &c.	4	14	3			
Coals and Coke	9	3	5			
Asphalting Walks	40	4	0			
New Boiler in Greenhouse	27	10	0			
				154	13	0
Purchase & Preparation of Specimens	4	4	6			
<i>Library: Books and Binding</i>	21	18	7			
Swimming Bath	21	16	2			
<i>Miscellaneous Expenses:</i>						
Printing of Report and Communications	17	15	0			
Printing, Stationery, &c.	11	16	3			
Binding Catalogue of Antiquities	8	5	10			
Coals and Gas	48	6	5			
Expenses of Lectures ..	14	19	10			
Do Observatory ..	13	6	6			
Do Bands	8	14	10			
Do Hospitium ..	75	0	8			
Do Repairing and Painting Steps of do.	32	4	1			
Do Roman Antiquities	43	0	0			
Do Antiquities from Swiss Lake Dwellings	21	5	6			
Do New Geological Cases (Yorkshire Room) ..	27	7	6			
Postages and Petty Expenses	0	17	6			
				322	19	11
				1413	16	11
Excess of Income for the Year 1876				112	14	10
				£1526	11	9
<i>Permanent Debt:</i>						
Yorkshire Insurance Company	1900	0	0			
Due to Two Members, £50 each	100	0	0			
				2000	0	0
Deficiency on the Entrance Lodge Improvement Account, not yet closed	660	2	3			
Less Balance of General Account ..	430	2	4			
Due to the Treasurer	£229	19	11			

MEMBERS ELECTED IN 1876.

- Baker, George, *The Pavement*.
 Burtchby, John, *The Pavement*.
 Bushell, Henry, *Tanner Row*.
 Chapman, Alfred, 37, *Petergate*.
 Comber, Rev. H. G. W., *Museum Street*.
 Darling, William, *Coney Street*.
 Dillon, Mrs., *Coney Street*.
 Ellison, Ralph Carr, *Dunstan Hill, Gateshead*.
 Forester, The Hon. and Rev. Canon, *Gedling, Notts*.
 Giddy, Charles, *Coney Street*.
 Gray, Edwin, *The Minster Yard*.
 Greenwood, William Francis, *Stonegate*.
 Groves, John, Jun., *Parliament Street*.
 Haynes, Edmund L., 29, *St. Mary's*.
 Herring, Francis, *Petergate*.
 Hoggard, Henry, *Chestnut Grove, Heworth*.
 Horsley, Thomas, *Coney Street*.
 Hotham, Capt. John, *Scaftworth, Bawtry*.
 Howey, Edwards Werge, *Clifton*.
 Last, Edwin William, 12, *Bootham Terrace*.
 Masterman, Thomas, *Petergate*.
 Millington, Matthew, 25, *Colliergate*.
 Rotherford, John, 18, *Bootham Terrace*.
 Saville, John, *Monk Bar*.
 Teasdale, John, 36, *St. Mary's*.
 Thomas, William Gordon, *Settrington House*.
 Thompson, Sir Henry Meysey Meysey, Bart., *Kirby Hall*.
 Tiplady, Mrs., 15, *Gillygate*.
 Whytehead, Thomas Bowman, *South Parade*.
 Wilson, Henry Andrew, *Marygate*.
 Wolstenholme, Charles Dean, *Gillygate*.
 Wood, Henry, 2, *Portland Street*.

LADY SUBSCRIBERS ADMITTED IN 1876.

Croft, Miss, 7, *Park Street.* *
 Keyworth, Mrs., *Park Street.*
 Mercer, Miss, *The Minster Yard.*
 Tesseyman, Mrs., 19, *Tanner Row.*

 ASSOCIATES.

Allanson, Edward Peter, 50, *Gillygate.*
 Camidge, John, *St. Saviourgate.*
 Trundle, Rev. George, 4, *St. Mary's.*

 RESOLUTIONS

PASSED AT THE ANNUAL MEETING, FEBRUARY 6TH, 1877.

—o—

1. That the Report of the Council now read be adopted and printed for circulation amongst the Members, Lady Subscribers, and Associates of the Society.

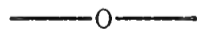
2. That the thanks of the Society be given to the Members of Council retiring from office, also to the Treasurer, Secretary, and Curators for their valuable services; and that authority be given to the Council to give admission to the Public to the Museum on Whit-Monday and Tuesday, under the same regulations as last year.

3. That the thanks of the Meeting be given to the Chairman,

DONATIONS TO THE MUSEUM.

GEOLOGY AND MINERALOGY.

- Gutch, Mr. J. J. Specimens of Soap Stone and Serpentine, from the Lizard, Cornwall.
Specimens of Granite, from Rocks north of Inverness.
- Healy, Rev. E. Cabinet and Specimens of Tin, Lead and Copper Ores, from Cornwall.
Specimens of Quartz and Iron and Copper Ores, from India.
- Lightfoot, Mr. Thos., *Masham* } Cores from the borings for an Artesian Well at Masham.
- Raine, Rev. Canon Two Corals, from Nunnington.
- Rowe, Mr. G. H. Two Specimens of Rock Salt.
- Walker, Mr. J. F. Specimens of Brachiopoda.
Am. Goliathus, from Appleton Church Quarry.
Am. Engelhardti, from South Petherton.
Fossil, from Crambeck.
- Wolstenholme, Mr. C. D. *Hippopodium ponderosum*, from the Drift, York.

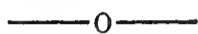


ZOOLOGY.

- Crompton, Miss Henrietta }
M. } *Fungia Ehrenbergii*, from the Red Sea.
- Hind, Mr. R. Two Specimens of *Eupithecia pim-
pinellata*.
Do. do. do. *albipunctata*.
- Relph, Mr. M. Four Snipes' Eggs.
- Walker, Mr. J. F. *Triquetra rufosissimus*, from Peru.

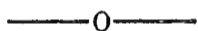
BOTANY.

- Read, Mr. W. H. Rudston 12 Ferns and Plants.
 Watson, Mrs. H. Tree Fern, from New Zealand.



MISCELLANEOUS.

- Cobb, Mr. W. Preston .. Wool of the Vicugna, from Upper Peru.
 Knapton, Miss Portrait, in Oil, of the late Philip Knapton, her father.
 Norcliffe, Mr. F. B. A Lapland Lasso.
 Two Esquimaux Pulleys, two Harpoons, a Fish-hook, a Dagger, a Sling, and four Bone Ornaments.



ANTIQUITIES.

- Allen, Mr. E. Part of a Roman Glass Vessel.
 Anderson, T., M. D. Middle Brass Coin of Trajan.
 A Nuremberg Token, found in York.
 Balmford, Mr. A Nuremberg Token, found in Coney Street.
 Cattle, Mrs., *Selby* Mediæval Key, 15th sæc., found at Selby.
 The Dean and Chapter of } Pillars and Bases of Purbeck Marble
 York } and other Sculptured Stones, from the South Transept of the Minster.
 Dixon, Mr. W. Early Spring Lock.
 Dutton, Mr. A round Cup, perhaps Mediæval.
 Gibson, J. H., M. D. Two Roman Vases, one of Samian Ware with ivy leaves, found in Bootham Terrace.
 Gott, Mr. Thos., *Knaresbro'* A collection of Roman Utensils, Bronze and Iron, found at Knaresborough.
 Greenwell, Rev. Canon .. Roman Knife-handle of Bone, found in York.

Morrell, Mr. W. W.	} Two Saxon Coffins and a Head-post of Wood, found at Selby.
Atkinson, Mr. J. T.	
Woods, Mr. G.	
N. E. Railway, Directors of	A Lead Coffin. A large Stone Phallus. A Carved Capital. Two Suites of Jet Ornaments. A Jet Armlet. An Enamelled Silver Fibula. Urns, &c. A small Child's Coffin, with Lime impression. An Enamelled Fibula, in shape of S.
<i>Purchased</i>	A Series of Implements, Pottery, &c., from the Swiss Lake Dwellings.
Raine, Rev. Canon	A Leaden Bulla of Pope John XXIII., found in Durham. A Foreign Jetton. Two old English Glass Bottles.
Swaine, Mr. E.	A Leaden Bulla of Pope Nicholas IV. A middle Brass Coin of Hadrian, with Britannia in the Exergue on the reverse. A Halfpenny Token of Fran. Bray, the Globe, in York, 1666.
Wade, Rev. G. F.	The Head of a richly Carved Stall of Derbyshire Marble, found in Law- rence Street.

—o—

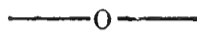
LIBRARY.

Association, British, for the Advancement of Science	} Report for 1875.
Association, Geologists' ..	
Author, The	Note on a proposed International Code of Symbols for use on Archæolo- gical Maps, by J. Evans, F. R. S.
Author, The	Yorkshire Mints under the Danish Kings, by Rev. D. H. Haigh.

- Author, The Where was Cambodunum? by Rev. D. H. Haigh.
- Author, The North Sea Dredging, by J. Leckenby, F. G. S.
- Author, The On a Roman Villa near Maidstone, by C. Roach Smith.
- Author, The The Abbé Cochet, by C. Roach Smith.
- Author, The Macbeth, Earl Siward and Dundee, by Prof. G. Stephens.
- Author, The Tables of Temperatures of the Sea at different depths beneath the surface, by Jos. Prestwich, M. A., F. R. S.
- Committee, The Catalogue of the Yorkshire Exhibition, held at Leeds, 1875.
- Club, Warwickshire Field Proceedings for 1875.
- Davies, Mrs. Gale's Antonini Iter Britanniarum.
Gordon's Itinerarium Septentrionale.
Rud's Codicum Manuscriptorum ecclesie Cathedralis Dunelmensis Catalogus Classicus.
Buckman and Newmarch's Illustrations of Roman Art in Cirencester.
Akerman's Coins of the Romans relating to Britain.
Collectanea Antiqua, 6 vols., 8vo., by C. Roach Smith, F. S. A.
Antiquities of Richborough, Reculver and Lymne, in Kent, by C. Roach Smith, F. S. A.
- India, Geological Survey of Palæontologia Indica, series ix., pts. 2—4.
Memoirs, vol. xi., pt. 2.
Records, vol. viii., pts. 1—4, vol. ix., pt. 1.
- Institution, Royal, of Great Britain } Proceedings, No. 62, 63.
- Institution, Smithsonian .. Report for 1874.
Report of the U. S. Geological Survey of the Territories, vol. ii.

- Mayer, Mr. Joseph Catalogue of the Library and Museum
of the Historic Society of Lanca-
shire and Cheshire.
- Procter, W., M. D. La Normandie Souterraine par M.
L'Abbé Cochet.
- Publishers, The Nature (Journal) for 1876.
- Purchased* Lapidarium Septentrionale, by Rev.
J. C. Bruce, L. L. D.
- Hübner's (E.) Inscriptiones Britanniae
Christianæ.
- Read, Mr. W. H. Rudston Transactions of the Linnean Society,
vol. xxix., pt. 3.
- Journal of the Linnean Society:
Zoology, Nos. 60—65.
Botany, Nos. 83—86.
- Richardson, Rev. H., *Etchil-* } Stonehenge and its Barrows, by Wm.
hampton, Devizes } Long, M. A., F. S. A.
- Society, Chemical Journal for 1876.
- Society, Geological Journal, Nos. 125—128.
- Society, Leeds Literary and }
Philosophical } Report for 1875-76.
- Society, Leicester Literary }
and Philosophical } Report for 1875.
- Society, Liverpool Literary }
and Philosophical } Proceedings, No. 30.
- Society, Manchester Liter- }
ary and Philosophical . . . } Memoirs, vol. v., 3 series.
} Proceedings, vol. xv.
- Catalogue of Books in the Library.
- Society, Meteorological . . Contribution to the Meteorology of
Japan, by T. H. Tizard, Staff
Commander.
- Quarterly Weather Report, pt. 2, 1874.
Report for 1875.
- Toynbee's Physical Geography of the
Atlantic.
- Society, Royal Astronomical Astronomical, Magnetical and Meteoro-
logical Observations at Greenwich
in 1873.
- Society, Royal, of Edin- }
burgh } Transactions, vol. xxvii., pt. 3.
} Proceedings, Session 1874-75.

- Society, Warwickshire }
 Natural History and } Report for 1875.
 Archæological }
- Society, Zoological Transactions, vol. ix., pts. 5—9.
- Superintendent, The Geological and Geographical Survey
 of Colorado and adjacent territory,
 1874.



SERIAL WORKS SUBSCRIBED FOR.

- Corpus Inscriptionum Latinarum (4 vols. with Atlas of Plates and Supplement published).
- Birds of Asia, by John Gould, F. R. S. (28 parts published).
- Natural History of the Tineina, by H. T. Stainton, F. R. S. (13 vols. published).
- Nautical Almanack.
- Proceedings of the Zoological Society, with Illustrations.
- Publications of the Palæontographical Society (28 vols. published).
- Publications of the Ray Society.
- Sowerby's Thesaurus Conchyliorum, col. plates (32 parts published).
- London, Edinburgh, and Dublin Philosophical Magazine.
- Annals and Magazine of Natural History.
- Geological Magazine.
- Journal of the British Archæological Association.
- Numismatic Chronicle.
- Memoires de la Société Paléontologique Suisse.

COMMUNICATIONS
TO THE
MONTHLY MEETINGS
OF THE
YORKSHIRE PHILOSOPHICAL SOCIETY,
1876.

JANUARY 4TH.—The REV. CANON RAINE read the following paper on Roman cemeteries at York, their arrangements and the mode of burial in them:—He said: ‘The recent excavations in one of the large Roman cemeteries of Eburacum have added much to our knowledge of the rites of sepulture in use among the great nation of the world, and have given us some idea of the very large population of our city in those early times. These cemeteries were outside the Roman towns and cities, although they were occasionally disregarded when the population overflowed the camp, and extra-mural habitations became necessary. This is especially observable in Micklegate. In the earliest period of the Roman settlement, Micklegate-hill was used as a burial ground, especially the neighbourhood of the old Trinity Gardens; in process of time the hill was needed for temples and houses, and the previous interments were forgotten. Under the city wall, close to Micklegate Bar, is the pavement of a building of this description, which shows how a part of an old burial ground had been encroached upon and passed by. There is another point also about which we must disabuse ourselves. The old Roman laws decreed the sanctity of the grave, but Roman practice, at least under the later empire, most certainly disregarded it. We find bodies interred, sometimes, two or three deep. We often find sepulchral urns which have been broken by persons who have been digging out a place to deposit some similar vessels. Even the large

Roman coffins were, I believe, used more than once. There was evidence of this in the discovery on the Mount of the large sarcophagus of Ælia Severa, which was covered with an inscribed slab commemorating a very different family. Nay, more; we have proof in various places that the Romans themselves, when in want of stone, were not deterred by religious feeling from breaking up monumental slabs and using them as building materials. Christians, as we know, have followed in this respect the Pagan custom.

The cemeteries at Eburacum were for the most part by the sides of the chief roads. They were probably fenced in and planted with shrubs and flowers, among which every here and there stood or lay a headstone or cippus bearing an inscription to the dead. Beyond the fence, in the open field, other interments would take place, but in no regular order. The cemetery for the richest classes at Eburacum was that on both sides of the road to Tadcaster, which has yielded, and will no doubt continue to yield, many treasures to the York Museum. You trace these interments over the crest of the Mount, in Mount Vale, and as far as Dringhouses, if not beyond it. You find burials and tombs in Clementhorpe, and in the direction of Bishopthorpe. On the other side of the river many interments have been discovered, in the direction of the Castle and Fisher-gate. You find them also outside Monk Bar, near the Malton road; whilst down Bootham, on both sides of the way to Aldbrough, there have from time to time been discovered traces of a very large cemetery. It was in the brickfields between the road and the river that the antiquaries of the 17th century used to get the urns which adorned their museums, and vast numbers must be still in the ground on both sides of the road, for at least a mile from the Bar. Sepulchral memorials have been found in great quantities at Burton-lane and in Clifton. The pair of fine stone coffins now in St. Leonard's Hospital came from the corner of Clifton-green; and there is another, used as a horse-trough, lying on the left-hand side of the road before you come to that place.

It is to the excavations for the North Eastern Railway that we are indebted for the discovery of the great cemetery on the

opposite bank of the river, in what used to be called the Bishop's Fields. The explorations which began five-and-thirty years ago, have, as you know, been recently continued with very great advantage to the collections in this Museum and the cause of historical inquiry. The extent of this great cemetery on the west-bank of the Ouse cannot easily be defined. It certainly reached from the river as far as the old railway lines towards the north, and extended in length for the greater part of a mile from the city walls, whilst beyond this distance graves have been discovered. They were found, for instance, on the slope of the hill fronting the Gas Works. I told you in a recent paper that the chief approach to this great burial ground seems to have been by a carefully prepared road running from close to the baths, which were partly on the site of the present railway station, towards the north. It was a carefully constructed cart-road, able to bear very heavy weights. On either side of this road, just across the moat of the city wall, graves were found in profusion, but chiefly those of women and children, and close to the way were several large wrought stones, placed there as if for coffin rests. After this the interments spread far and wide in vast numbers. The excavations, as you know, have been irregularly made; still I cannot be under the mark in stating that the remains of at least 2,000 persons must have been disturbed. It was evident also that the ground had been used as a cemetery for a very long period.

It is, I believe, generally allowed by scholars that the burning of the bodies of the dead was an early method of sepulture among the Romans. In a particular part of this large cemetery running northwards for about a quarter of a mile from a point a little to the north of Mr. Close's late house, we came upon a distinct portion in which none but burnt bodies were laid. How far this extended towards the west we cannot tell, as we were unable to trace it, but towards the east it ended in a line so straight that this could only have been preserved by some fence or hedge on the surface. There were no traces of a wall. The sepulchral urns found in this inclosure were not only numerous, but of a comparatively high style of

art, and there is evidence, I think, to show that the ground was being used during the reigns of Trajan and Hadrian, in the beginning of the second century of our era. No trace of an *ustrinum*, or the paved square on which the bodies were burnt, has as yet been discovered. The disuse of the custom of burning the bodies of the dead is ascribed to the influence of Christianity, and, no doubt, with truth. Still it is probable that during the period of the Roman occupation of Britain the practice of cremation was never wholly disused. Outside this enclosure, of which I have been speaking, we find burnt and unburnt bodies in close proximity, but irregularly laid, and, for the most part, without any crowding, as if the space had been originally an open field, where each person might choose his own burial place. At some five or six feet below the present surface you come to the bones. At the depth of eighteen inches or two feet you reach the old Roman surface, and in the space towards the river it is easy to see that this was a promenade and playground. Fragments of vessels and other things are tossing about. A number of rounded bases of Samian vessels tell us that the Roman boys used to play here at something like our present game of hopscotch—the quality of the clay always making even a fragment of the vessel prized, and the colour making it discernible among the grass. In one instance the roundlet had been inverted, and in the hollow cavity some Roman youngster had put his *minium*, or red paint, which still comes off when you touch it with your finger. All this was done among the graves of the dead. Other days come back to us with a vivid freshness. We seem also to see the process of levelling the inequalities of the ground, just as it may be observed at the present day on the other side of the river. At a particular place not very far from the Scarbro' Railway Bridge, we found the debris of some Roman house which had been carted away out of Eburacum and utilised here. Numerous specimens of stucco, or wall-painting, were discovered, mingled with pieces of tessellated pavement and other things as well, just as they were shot out by the Roman carters, fifteen hundred years since. I have stated already that the westernmost portion of the cemetery of which we have

been speaking, was reserved for burnt bodies; with the much larger part of it which lies between that enclosed space and the river we have now to deal. From the position of the graves in certain directions I am decidedly of opinion that it was laid out in walks, and that here and there little enclosures were reserved for particular families. This may be inferred, I think, from the stone coffins, which were always underground, and which are peculiarly arranged, for the most part, in groups, and from the line in which they are often deposited. I shall speak about these stone coffins on some future occasion. How, it may be asked, was the site of a grave generally marked? As a general rule it is probable that there was no mark whatever. The mound would fall away. There were few sculptured memorials out in this open field. In some cases we found at the head or the foot of the grave, or at both, a small block of wrought sandstone some two feet long, which was originally visible on the surface. Some specimens of these stones may be seen on the south side of the Hospitium lying against the wall in the footway. In other cases a flat stone was laid over a grave; in others, again, there was above a grave or an urn a few cobbles to show the intruding digger that there was something below. It is quite possible, also, that just as in the poorer portions of the cemeteries of the present day, the interments may have been marked by little blocks of wood, possibly with some inscription painted upon them. Let me now speak about the different modes of interment. The most expensive method was the use of a large stone coffin, of an average weight of two tons; of these, I believe, at least fifty have been discovered during the two excavations for the North Eastern Railway, but I must reserve my remarks on this part of my subject for some future occasion, as there is scant time to do justice to it now. Passing by also the domed brick tomb which is under Mr. Flower's house on the Mount, and a brick room or *columbarium* that was discovered in Bootham some two hundred years ago, which is now destroyed, I may remark that two other brick graves have been discovered during the railway excavations, one of which is now in the Museum. A large coffin of wood was originally deposited in it over which

several large roofing tiles were laid as its only protection. There have also been found during the two excavations for the railway, as far as I can make out, some six or seven tombs made of large tiles, resembling those which may be seen in our Museum, arranged like the roof of a house, under which were deposited the burnt bones of some Roman gentleman or lady, occasionally with vessels and ornaments. Two of these are now in the Hospitium, and a third found its way many years ago to Mr. Bateman's Museum in Derbyshire. They are generally stamped with the mark of one of the two legions which had their head quarters at York, thus showing to which regiment, as we may say, the deceased person was attached. Another mode of interment was by coffins of lead generally enclosed in wood. Six of these, of various sizes, have been brought to the Museum from the excavations during the last few years, the finest of which is that laid inside the stone coffin, which contained the lady with the hair. Another lead coffin of a large size was found, with the iron bands nearly complete, by which the wood and the lead were kept together. This will be set up before long, and exhibited in the lower room of the Hospitium. In several instances we came upon the fragments of a lead coffin, so decayed that it was impossible to preserve them. We have also found in the course of these excavations two *ossuaria* or leaden urns, containing burnt bones; one of them, as I have already told you, is inscribed. The number of persons who have been buried in coffins of wood is considerable. We can trace these by the iron coffin nails. In some instances we find that gypsum has been poured into the coffin. But there are also a great number of persons who seem to have been laid in the ground without any coffin at all. As a general rule the bodies face the south or the east; sometimes with a point of west in the direction, but in no instance have we found any one laid with his head towards the north. Into the question of urn-burial I must go at some future time. But, in conclusion, let me chronicle a most interesting discovery. In two instances, on the outskirts of the ground, just where we should expect to find them, we came upon two *putei* or pits, used for the burial of slaves and persons of mean repute. They were

contiguous to each other, perhaps ten or twelve feet deep, some fifteen or twenty in width, and thirty perhaps in length. Into these the bodies seem to have been thrown without any order or respect, the feet being often higher than the head. A thin covering of earth seems to have been cast over each corpse until a certain distance from the surface was reached. Each of these pits contained a large number of skeletons—that they were of the Roman period was evident from the fragments of pottery which were found near and among them.’

APRIL 4TH.—W. H. HUDLESTON, M. A., F. G. S., and JOHN FRANCIS WALKER, M. A., F. G. S., &c., “On the distribution of the Brachiopoda in the Oolitic strata of Yorkshire.”

In preparing this list of the species of Brachiopoda found in the Oolitic strata of Yorkshire, we have not attempted to reprint a complete list of all the species which have been said to occur in these strata, but have only enumerated those species which we have ourselves found, or of which we have authentic information as regards locality and horizon. The references are made to sections in Mr. Hudleston’s Papers on the “Yorkshire Oolites,” which have appeared in the Proceedings of the Geologists’ Association. The new species are, or will be, fully described and figured in Mr. Davidson’s supplement to his great monograph on Jurassic Brachiopoda. We include in our list 27 species, of which 7 occur in the Dogger beds of the Inferior Oolite, 4 in the Millepore series and its inland equivalents, one of these also occurs in the Scarbro’ Limestone, 5 in the Cornbrash and *Avicula*-shales, 2 in the Kelloway Rock, 2 in the Oxford Clay, 5 in the Lower Calcareous Grit and Passage beds, 1 in the Coral Rag, and 3 in the Kimmeridge Clay. The number of species of each genus is, *Lingula*, 2 species. *Discina*, 2; *Terebratula* 7; *Waldheimia*, 7; *Rhynchonella*, 9. The number of species contained in the Inferior Oolite of Yorkshire is very small when compared with that of the South of England; the estuarine conditions under which the upper part of this formation was deposited in this area appear to have been unfavourable to their development. The specimens

found in the Dogger beds occur often as casts, or with their shells so badly preserved that it is difficult to determine whether more than one species is present, so they are referred to *Terebratula trilineata*, a species which was founded by Young and Bird, on internal casts. Another peculiarity of the distribution of this group in Yorkshire is the number of species which occur in the Lower Calcareous grit and Passage beds. The following Yorkshire species are very rare: *Terebratula Bentleyi*, Dav., *Waldheimia bucculenta*, Sow., *Waldheimia impressa*, v. Buch., *Rhynchonella lacunosa*, Schlot., *Rhynchonella inconstans*, Sow. Among the species which are rather scarce are *Terebratula bullata*, Sow., *Terebratula Fileyensis*, Walk., *Terebratula insignis*, var., *Maltonensis*, Oppel., *Terebratula intermedia*, Sow., *Rhynchonella spinosa*, Sow. The following species are very abundant, viz., *Lingula Beanii*, Phil., *Discina reflexa*, Sow., *Terebratula trilineata*, Y. and B., *Waldheimia Hudlestoni*, Walk., *Waldheimia obovata*, Sow., *Rhynchonella Leedsii*, Walk., *Rhynchonella socialis*, Phil., and *Rhynchonella Thurmanni*, Voltz. The other species are moderately common.

Lingula Beanii, Phil. This species is very plentiful in the grey micaceous sands of Blue Wyke (lower part of B, fig. 3). It also occurs in a ferruginous stone at Castle Howard station (2. a., fig. 7).

Discina reflexa, Sow. It occurs at Blue Wyke along with the above species, but scarcely ascends to the top of the Grey Sands. Found also in the ferruginous bed at Castle Howard.

Rhynchonella cynocephala, Rich. Occurs chiefly at Blue Wyke in the upper part of the Yellow Sands (C. fig. 3), but usually below the *Terebratula*-bed.

Waldheimia? *sp. n.?* Found in blocks of shelly dogger, belonging to the Yellow Sands, which have fallen from the cliffs; these are in position probably a few feet below the *Terebratula*-bed.

This shell is small, circular or ovate, the smaller valve carinated, somewhat resembling *Waldheimia Walkeri* from the Neocomian of Tealby.

Terebratula submaxillata, Dav. Specimens resembling this species occur in the Rosedale Ironstone, but their precise

position is unknown. Some of the specimens found in the *Terebratula*-bed (C. b, fig. 3) may belong to this species.

Terebratula trilineata, Y. and B. This species occurs at Blue Wyke (C. b, fig. 3). Also in fallen blocks along the coast as Casts in a chocolate-coloured matrix. It is found in the shelly bed of the Dogger at Crag Hall (D. z, fig. 4). Also at Rose-dale, Grosmont, Glaizedale, &c. This species appears to be closely allied to *Terebratula Haresfieldensis*, Dav., which occurs in the Midford sands of Haresfield and Frocester in Glostershire.

Rhynchonella subobsoleta, Dav. Occurs in the Dogger proper. (D. fig. 3).

Terebratula submaxillata, Dav. There is a fine specimen in the York Museum from the Whitwell limestone; we also have found it in this quarry. There are some crushed specimens in the York Museum which probably belong to this species, they are supposed to have been found in the blue marly shales of Gristhorpe, where Mr. Hudleston has obtained a specimen which is also crushed. These marly shales belong to the Scarborough Limestone series.

Terebratula bullata, Sow. This is a form intermediate between *T. globata* and *T. spheroidalis*. It occurs in the blue sandy limestone (6, fig. 7,) a little above the Whitwell Oolite at Crambeck.

Rhynchonella spinosa, Sow., var., occurs in the same blue limestone.

Rhynchonella Crossii, Walk., is common in the Lincolnshire Limestones of Brough, near Hull, crushed specimens of a *Terebratula*, probably *T. bullata*, occur in the same stone.

Waldheimia lagenalis, Schlot. This species is common in the Cornbrash of Scarborough, it also occurs in the *Avicula*-shales.

Waldheimia obovata, Sow. Is very abundant in the Cornbrash. Besides the typical variety, a narrow form occurs which has been confounded with *W. digona*, from which it is quite distinct; the curious rhomboidal globose variety also occurs.

Terebratula intermedia, Sow., as a small variety.

Terebratula Bentleyi, Dav. This rare species has been found by Mr. Leckenby in the Cornbrash on the north side of Scarborough.

Rhynchonella Leedsii, Walk. This species used to be confounded with *R. concinna*, and *R. varians*. It is a globose species, the folds extending little more than half the length of the valves. This species occurs in the Cornbrash north of Scarborough. It is plentiful at Stilton, near Peterborough.

Waldheimia ornithocephala, var. *W. umbonella*, Lam. This species is found in the Kelloway Rock of Scarborough Castle-Hill. It is a thicker and rounder shell than the typical *W. ornithocephala* from the Fuller's Earth Rock.

Rhynchonella socialis, Phil. *R. varians* pars. This species occurs in great numbers in the Kelloway Rock, it has also been found in the Oxford Clay of Scarborough Castle Hill, where it is rare.

Waldheimia impressa, v. Buch. A single specimen of this species from the Bean collection is in the York Museum. It was named by Bean, *Terebratula levigata*. It is from the Oxford Clay of Scarborough.

Waldheimia bucculenta, Sow. This species occurs sparingly in the Passage-Beds of the Lower calcareous grit of Appleton near Malton. Mr. Walker has found it on the same horizon at Filey Brigg (B. d. fig. 13).

Waldheimia Hudlestoni, Walk. This is a small narrow elongate ovate species, it occurs abundantly at Filey Brigg, (lower part of B. d. fig. 13,) also at Hackness, in an intercoral-line brash of a Lower Coral Rag which is about the same geological horizon. A large mass full of this species is in the York Museum.

Terebratula Fileyensis, Walk.

A species formerly supposed to be *T. globata*; it somewhat resembles some of Quenstedt's figures of *T. bisuffarcinata*. It is found at Filey, principally in the Lower Passage-beds, (B. d. fig. 13,) and has been obtained at Snainton. Mr. Hudleston has found a single specimen in the Lower Calcareous Grit proper of Scarborough Castle-Hill.

Rhynchonella Thurmanni, Voltz., part of *R. varians*. This is very abundant both in the Passage-Beds and in the Lower Calcareous Grit proper. It has been found at Filey, Appleton, Castle Howard, and many other places.

Rhynchonella lacunosa, Schlot. One or two specimens of this species have been found in the Lower Calcareous Grit of Oliver's Mount near Scarborough, and in Beedale above Wykeham.

Terebratula insignis, Schübler, var. *Maltonensis*, Opper. This species appears to be confined to the Coral-Rag or *Cidaris florigemma*-zone. It is somewhat locally distributed. Good specimens have been found at Whitewall near Malton, and at Oswaldkirk. In the Echinoderm-bed at North Grimston it has occasionally been found in the soft and almost chalk-like limestone associated with the marly Oolite in which the sea-urchins are so plentiful. Found also on Cawton Heights, and near Helmsley. Generally speaking, this fossil may be said to occur in the intercoralline brash of the *Cidaris florigemma*-zone.

Lingula ovalis, Sow. Has been found by Mr. Hudleston in the Kimmeridge clay of Burdale, and by Mr. Walker in the same formation at Speeton Cliffs.

We add to our list, on the authority of Mr. Judd, (Proc. Geol. Soc., Vol. xxiv, page 224,) *Discina latissima*, Sow., and *Rhynchonella inconstans*, Sow., from the Kimmeridge clay of Speeton Cliffs.

It is difficult to explain why the great coral reefs of the Middle Oolite in England were unfavourable to the development of Brachiopoda, which are so abundant in the same formation in Germany.

The Inferior Oolite of the South of England, which was probably deposited under somewhat similar conditions, is also crowded with Brachiopoda.

The following species of Brachiopoda have as yet only been found in Yorkshire, viz., *Terebratula Fileyensis*, Walk., *Terebratula insignis*, var. *Maltonensis*, Opper., *Terebratula trilineata*, Y. and B., *Waldheimia bucculenta*, Sow., *Waldheimia Hudlestoni*, Walk., *Waldheimia* sp. n., from the Yellow Sands below the Dogger.

The following table shows the distribution of the species.

OOLITIC BRACHIOPODA

FOUND IN
YORKSHIRE.

	Blue Wyke Sands and Dogger, Passage beds and base of Inferior Oolite.	Millpore series and its inland equivalents, the Whitwell and Crambeck limestones.	Scarborough Limestone.	Corb rash and <i>Arvicula</i> -shales.	Kelloway Rock.	Oxford Clay.	Lower Calcareous Grit, and Passage beds.	Coralline Oolite.	Coral rag.	Supra-coralline Beds.	Kimmeridge Clay.
<i>Lingula Beanii</i> , <i>Phil.</i>	*
<i>Lingula ovalis</i> , <i>Sow.</i>	*
<i>Discina reflexa</i> , <i>Sow.</i>	*
<i>Discina latissima</i> , <i>Sow.</i>	*
<i>Terebratula Bentleyi</i> , <i>Dav.</i>	*
<i>Terebratula bullata</i> , <i>Sow.</i>	*
<i>Terebratula Fileyensis</i> , <i>Walk.</i>	*
<i>Terebratula insignis</i> , var. <i>Maltonensis</i> , <i>Oppel.</i>	*
<i>Terebratula intermedia</i> , <i>Sow.</i>	*
<i>Terebratula submaxillata</i> , <i>Dav.</i>	*
<i>Terebratula trilineata</i> , <i>Y. and B.</i>	*
<i>Waldheimia Blakei</i> , <i>Walk.</i>	*
<i>Waldheimia bucculenta</i> , <i>Sow.</i>	*
<i>Waldheimia Hudlestoni</i> , <i>Walk.</i>	*
<i>Waldheimia impressa</i> , v. <i>Buch.</i>	*
<i>Waldheimia lagenalis</i> , <i>Schlot.</i>	*
* <i>Waldheimia obovata</i> , <i>Sow.</i>	*
<i>Waldheimia ornithocephala</i> , var. <i>W. umbonella</i> , <i>Lam.</i>	*
<i>Rhynchonella Crossii</i> , <i>Walk.</i>	*
<i>Rhynchonella cynocephala</i> , <i>Rich.</i>	*
<i>Rhynchonella inconstans</i> , <i>Sow.</i>	*
<i>Rhynchonella lacunosa</i> , <i>Schlot.</i>	*
<i>Rhynchonella Leedsii</i> , <i>Walk.</i>	*
<i>Rhynchonella socialis</i> , <i>Phil.</i>	*
<i>Rhynchonella spinosa</i> , <i>Sow.</i> , var.	*
<i>Rhynchonella subobsoleta</i> , <i>Dav.</i>	*
<i>Rhynchonella Thurmanni</i> , <i>Voltz.</i>	*

* Three varieties of *Waldheimia obovata* occur, viz., typical, narrow, and rhomboidal.

MAY 2ND.—The REV. CANON RAINE read a paper on “Roman Children and their Burial.” He said :—‘The object of the few remarks that I shall make to day is to give some slight explanation and illustration of the curious relics which are before you upon the table. They bring back to you the amusements of Roman Children, and the vessels and ornaments with which they were laid in their graves. Children in their games seem to have been much the same in all times. Of the *pila* or ball, the Romans were very fond; nay, it was the favourite exercise of many of all ages. The most popular, and surely the most difficult game of this kind, was what was called the *pila trigonalis*, played by three persons who stood in the form of a triangle, and manifested their skill by throwing and catching the ball in the left hand. The roundlet of baked clay upon the table is, as I suppose, the heart or core of a *pila*, and was covered originally with some soft material. It was discovered some years ago under the residence of Dr. Gibson in Bootham, in a little place which might be considered the baby house of a child. The whistle, of which there is a specimen exhibited, has been the delight of the young in all ages; the *flagrum* or whip, made of less durable material, has perished long ago; so has the top, the *volubile buxum*, to which it was often applied; so the *arundo longa* on which the Roman youngster galloped off to his Banbury Cross; so also the *trochus*, or hoop, which was driven along like ours by a stick with a hook at the end. Unlike ours, however, the Roman hoop had sometimes bells attached to it. There are in our museum several pieces of glass which we may call marbles. The little roundlets of stone and glass before you are the bases of vessels prepared with the greatest care for a game somewhat resembling our hopscotch, if not identical with it. Below them is a solitary die of jet, probably for the amusement of a child, as it is not truly formed. As far back as the days of Horace the Roman lad is rebuked for his ignorance of horsemanship and the chase, and his love of the Greek hoop and the forbidden dice. The same unhappy tendency at a still later period aroused the indignation of the great Roman satirist.

The photograph which I exhibit represents the favourite

toys of some little child, which were taken out of its grave at Cologne, and are now preserved in the Mayer Museum at Liverpool. They are embedded, you will observe, in a kind of plateau to display them properly. In the centre is the doll, made of ivory, with those wonderfully pendulous legs which are the child's delight. Around it is a remarkable collection of pots and pans, with which the little one would mess and cook; water bottles too; a little bronze pounder to crush or work with; a plate to hold the result of the young housewife's labour; a spoon to eat it with; and, there too, in a conspicuous place, is the inevitable die. It is evident that people in those days entered earlier into the school of cookery than they do with us. Which of the two, I wonder, could supply the best dinner.

The other relics upon the table are funereal, taken out of the graves of children, and are all of them curious. You will observe several little feeding bottles, to which tubes have in all probability been appended. One or two of these were the first vessels of the kind that were found in England, and the late Sir James Simpson wrote a paper on the subject. Others have been found since, but very few, and it is curious to know that vessels of a similar form are a part of M. Schleiman's celebrated find at Troy, although that distinguished investigator seems to be ignorant of the purpose to which they were devoted. You observe a vessel of reddish clay moulded in imitation of the hoops on a barrel. That contained the bones of a child. The two vessels beside it were filled with food and drink for the youngster for a future state. They are of better material than ordinary, and suggest relatives of wealth as well as affection.

Several little stands upon the table exhibit the ornaments which were deposited in the graves of children—armlets of jet, bronze, or bone, among other things. Like the contents of many a nursery now-a-days, they are not the works of high art, and criticism must be disarmed. On one side is the small brass coin, which was put into the infant's mouth to pay its fare across the Styx to the inexorable ferryman. It is a coin of one of the Constantines—fifteen hundred years ago and more.

To another collection of curious objects a remarkable history belongs. They were found on the Mount. An urn, unhappily

broken into fragments, was discovered, containing the ashes of a child. Below it, in what had been originally a wooden box, were the little creature's ornaments, chains of bronze and beads, bracelets of various substances, and two silver earrings, uncouth somewhat in shape, but earrings still. It is a touching picture both to heart and mind.

Still more interesting is the story of the two damaged glass bottles and the covered cups in the centre of the table. Some two or three years ago, under the New Station Hotel, we came upon the pair of large stone coffins which are now laid side by side on the south side of the Hospitium, just as they were originally found. In one of the two were laid the remains of a mother and a child. The body of the woman was so twisted as to leave room for the child, whose head was laid against the foot of the coffin. The coffin itself contained nothing except the bodies, as was almost always the case. But on the outside, at the head of the sarcophagus, were laid the vessels I am alluding to, which were filled originally, no doubt, with milk and farinaceous food for the use of the pair that were mouldering within. The two earthen saucers might seem to be parts of the same vessel, but they were not. They were separate when found, and each must have had originally a cover of its own. The Romans had a habit of visiting at certain times the graves of their friends, and of renewing on such occasions the offerings of food and other things. The coffins of children were of various materials. We have them in the Museum both of lead and stone. It was not the custom to commit to the funeral pile the remains of children who had not cut their first teeth. They were buried, as Pliny tells us, in places called *suggrundaria* by themselves. But this prohibition only extended to infants. Those of a more advanced age were treated in all respects as adults. The leaden coffin which is exhibited is a somewhat peculiar specimen of that kind of sepulture. Instead of being enclosed wholly in wood, a board seems to have been laid over the top, and fastened down to the overlapping edges. This is evident from the marks of the nails.'

OCT. 3RD.—THE REV. CANON RAINE read the following paper on “Roman Bronze Vessels found near Knaresbro’” :—

‘The vessels and implements of bronze and iron upon the table were discovered by some drainers a little to the north of Knaresbro’, at the depth of three or four feet, about the year 1860. The finders brought the things, which filled a large sack, to Mr. Thomas Gott, of Knaresbro’, who, in 1864, was good enough to present a selection from them to this Museum. Mr. Gott’s donation consisted of eight vessels and the fragments of one or two others. The most conspicuous of these is a large bronze basin, 18 in. in diameter and $3\frac{1}{2}$ in depth, slightly ribbed and crimped, with a small hole in the centre, showing, I think, that some time or other it had been fixed upon a screw or something of the kind. With this there were three or four basins of the same material, of various sizes, but running from 12 to 8 in. in diameter, and 4 to $4\frac{1}{2}$ in. in depth. With these were a bronze dish, round and plain, having a nicely cast base; and portions of two colanders and handles, each of which has been pierced in the side and base with holes arranged in various elegant designs.

Within the last few weeks I learnt that many other things had been discovered at the same time. These Mr. Gott was good enough to show to me, and, without any solicitation on my part, in the kindest manner he most generously added them to the collection which he had already bestowed upon the Museum in 1864. These additions consist of—1. A fine bronze vase, of undoubted Roman type and character, 12 in. high, 9 in. in diameter across the top, and $4\frac{1}{2}$ across the base. The bottom, which has been renewed sometime, is gone. 2. Two bowls similar to those previously described, and respectively 12 and 8 in. in diameter. 3. A large basin, 11 in. across, and about 2 in depth, with the edges very prettily ornamented with a raised pattern. 4. Parts of two colanders, with handles similar to those given to us in 1864, and ornamented in a similar way. Also, the basins of two others, each beautifully ornamented with small holes in devices. On one of these the gammadion, or gamma shaped cross, occurs, an ornament in use among the Romans, and other races of man-

kind. I do not think that it has occurred in Yorkshire before. 5. Another colander of thicker material, $7\frac{1}{2}$ in. across and $2\frac{1}{2}$ deep. 6. A plate, 9 in. wide and $1\frac{1}{2}$ deep, with a small cavity in the centre with some traces of a handle. 7. A scale bowl, $3\frac{1}{2}$ in. across and 1 deep, with the four little rings in the edges to which the chains have been fastened. 8. Five bronze rings, from $3\frac{1}{2}$ to 2 in. in diameter, and varying in thickness. 9. Part of a spur, and four axe heads, all of iron, and of various sizes and shapes. The iron is so well preserved that several of the axes have been in very recent use. Another axe-head, with a hammer at the end, is in the possession of Mr. Gott, and a bronze cup, which I have not seen, is in private hands. These objects which I have described, constitute the whole of this important find that is now in existence. But these unfortunately were not all. Through the accidental mistake of a servant a number of other objects were consigned to the melting pot. Among these were several other 9-inch plates; some flat plates with handles, somewhat oval in form, and with rims slightly ornamented; portions of other basins, dishes, &c., a number of bridle bits; a great quantity of iron nails and implements; and among them what seemed a fire grate with some four bars. The loss of these curiosities is greatly to be regretted, but in the remnant the York Museum possesses a series of bronze vessels of Roman use and manufacture, unrivalled in number and importance. We have been somewhat doubtful hitherto to what race and age these utensils were to be ascribed. From a consideration of these objects themselves, and from comparing them with others that have subsequently been discovered, it is certain, I think, that they are Roman. There is a network of Roman roads in the neighbourhood of the place where they were discovered. Whether they were secreted or lost, it is impossible to say. Many of the bronze vessels are patched and in decay, and it is probable enough that they were so when they were laid in their long resting place.

In the last number of the Transactions of the United Architectural Societies there is a valuable paper upon Roman bronze vessels by Mr. Baker, of Hargrave, Northants. That gentleman has much to say about the vessels which Mr. Gott

was kind enough to present to this Museum in 1864, but he has never seen the addition which has just been made to them. Mr. Baker, however, compares what we had with some recent discoveries in other parts of the country, and makes some valuable suggestions as to the use to which these vessels were put. In 1856 a nest of five bronze vessels, resembling shallow pans, was found at Stittenham. They were laid one inside the other, and each has a somewhat long handle. They differ from ours in fabric, and probably in use. They are now preserved in the Museum at Castle Howard. Similar vessels have been not unfrequently found. We have one in our own Museum. Two sets of bronze vessels, however, have been recently discovered, with which ours may be advantageously compared. One was found in the far north, in Sutherlandshire, consisting of two perforated colanders, a shallow pan or dish, a basin, and three bowls of different sizes—seven objects in all, which were laid one inside the other, like the vessels at Stittenham. The other find was made in 1874 in a Roman cemetery at Irchester, Northants. It consisted of eight vessels, in very excellent preservation, one inside the other, and all deposited in a kind of bucket or pail. Mr. Baker gives a most minute description of these curiosities, and, better still, his account is accompanied by drawings which enable us to see at once how closely these vessels resemble those which we possess ourselves. There are four bowls, a basin with crimped edges, and three perforated colanders. Like ours, several of them have been patched and mended, but they are in so good a condition on the whole that Mr. Baker speaks of the burnish remaining upon them, to such an extent as almost to resemble gilding.

Now, although there is some similiarity between Celtic and Roman metal-work, there can be no hesitation in saying that all the vessels that I have been describing are of Roman workmanship. The urn upon the table is sufficient to decide that, if every other proof were wanting. But to what special purposes were they applied? The first thought is that they were part of the ordinary furniture of a kitchen. But Mr. Baker very pertinently observes that the thinness of the metal and the condition which they are in at present contradict

the theory of their having been subjected to fire. It seems more probable, as Mr. Baker, and Mr. Edmund Oldfield before him, suggest, that these have been wine vessels. Mr. Baker goes into elaborate calculations in order to show the number of ounces and pints that the bowls would contain, and these he translates into the measures in vogue among the Romans. Whether he is exact or not in his measures, it is not easy to say, without a close examination of the subject; but it is, I think, more than probable that we have before us a collection of Roman wine vessels. The wine which the Romans made was full of sediment and dregs, and one of the processes of clearing it required the use of one of these finely perforated colanders, such as you see upon the table. Again, these colanders were made use of to cool the wine with ice or snow, and to dilute it also, for the Romans were very fond of diluted wines. Filled with such a beverage the bowls before me, even when brimming over, would not alarm or injure the Roman drinker. He thought even more at times of the quantity than of the quality of the wine that he swallowed. In the vessels before us I seem to see the means by which the juice of the grape was strained or tempered for him. These are the *cola* or strainers through which the liquid passed from one vessel to another. The plates and dishes were probably for the snow or ice with which it was cooled or diluted.

NOVEMBER 7TH.—THE REV. CANON RAINE read the following “Account of an early Cemetery recently discovered at Selby.”—In the summer of 1857, when the Selby Board of Health were making a drain in a part of that ancient town which is generally known as the Church Hill, the workmen, at a depth of some eight feet, came upon an early cemetery. The interments in it were of a remarkable and most unusual character. In every instance the body was laid in the trunk of an oak tree which had been split, and then hollowed out to permit the reception of the corpse. There was nothing to show that the two divided parts had been fastened together with bolts or pegs, but the lid seemed to have been simply laid down upon the coffin. Mr. Morrell, in his valuable history of Selby,

informs us that as many as fourteen of these coffins were discovered, the greater part of which it would no doubt be impossible to raise in consequence of the shape of the drain. One, however, is in private hands at Selby, and another, by the kindness of Mr. C. T. Newstead, was presented to our Museum shortly after its discovery. This coffin, which has been considerably injured, is over five feet in length, and seems to have been shaped with an axe. It contains the skeleton of a female in a good state of preservation, although the bones have taken the colour of the wood and of the soil with which they were covered. A peculiarity in the head requires a remark. In the centre of the skull there is a small round hole discernible, which has evidently been made with an instrument. A similar hole was discovered in the skull of a Roman lady which was dug up in the recent excavations for the new railway station at York. What means this handiwork of very rude and early surgery? Professor Rolleston suggested to me that it might possibly have been intended to prevent epilepsy. At the neck of the lady from Selby, on whose skull this rude operation had been performed, was a set of seven large beads, (now destroyed) of which, unhappily, we possess only a drawing. They are of graduated sizes, with a large bead in the centre, and of an elegant shape. As far as I can gather, they were of hard clay, with lines of red running around the edges. Another bead, of plain brown stone-colour, from the same place, was presented to our museum by Mr. Morrell in 1864. In the course of the summer of this present year the re-building of a public-house on the Church Hill at Selby afforded a better opportunity of examining this ancient burial ground, and by the great kindness of the owner of the property and of Messrs. Woods and Atkinson, every facility was given to Dr. Gibson and myself for making a more minute investigation than was possible in 1857. The space excavated would not, I think, be more than thirty feet by twenty. In this coffins were discovered at various levels from five feet to about eight. Of these there were between fifteen and twenty uncovered, either entire or in fragments. The whole were in black earth saturated and dripping with moisture, and in many instances the wood was

so rotten that it was impossible to lift it up. The coffins as may be imagined, were closely packed together; in several instances two or three were side by side. As to position, all lay east and west, although by no means towards the same point. When the coffins were opened it was found that they had been subjected some time or other to the tidal action of the river. Warp, stones, and pieces of wood had been washed in, and in several instances the lighter bones of the body had been thrown by the water into a heap at the head of the coffin. The fact that the lower part of the Church Hill next to the river is a deposit of recent times, goes far to explain this. It is evident that the river has been nearer to this cemetery than it is at present, and that through some drain, perhaps, the tidal water has been able to penetrate and leave its deposits among the remains of the dead. Out of this excavation seven coffins were taken, two of which, through the kindness of our friends in that town, have found their way to the Museum at York. The neighbouring ground is no doubt filled with similar remains; when the next house was rebuilt some time ago they were found in the soil which it covers, and there will no doubt be ample opportunity in coming years of continuing investigations into this most interesting graveyard. I shall now give a more detailed account of the seven coffins that have been preserved. It must be remarked before I begin to do so, that they are all of oak:—

1. A coffin 7ft. 5in. in length, 22in. wide at the head and 16½in. at the feet. The interior is hollowed out by the axe, leaving a thickness of 2in. The two ends are solid, about 5in. thick. The lid, which is broken, is rounded, and when put together the whole must have closely resembled the trunk of a tree. In the inside, which was filled with warp and stones and wood from the river, was the skeleton of a man in good preservation. The teeth were considerably worn. Extending from the right hand to the foot of the coffin, and laid under the left leg, were the remains of three long, thin, hazel rods or sticks.

2. The coffin of a child, 3ft. 6½in. long, and of uncertain width. It has been made of boards, neatly fastened into each

other with wooden pegs, and very ingeniously wrought. The whole, unfortunately, is in great decay. Some of the bones were preserved, and we found the remains of a hazel stick, laid over the body from the right hand to the left foot.

3. A coffin, of which the sides are gone, but the bottom is in good order, and is nearly flat. The outside length is 5ft. 8½in.; the width at the shoulder 18in., and at the foot 9in. The wood is three inches thick. The body in this instance has been too long for the coffin, and it has been necessary to cut away the wood to make a place for the head. The lid is flat. This coffin was examined by Dr. Parsons, of Goole, who found the bones in confusion, no doubt through the action of the tide. The skull is broken. The deceased person was, I believe, a woman.

4. A long thin coffin 6ft. 6½in. long, each end being 6in. thick. It contains the bones of a man who has been six feet in height. The skull is injured. In the left hand was a hazel twig.

5. A coffin 5ft. 8½in. long by outside measurement, 18in. wide at the head, and 13½in. at the foot. The sides are 1½in. and the bottom 3in. thick. This coffin is in excellent preservation, and is very well made. The lid is flat, in one piece. The coffin seems to have been too short for its tenant, and the difficulty was met by sawing off the end, which was laid against the feet of the corpse. The skeleton is that of a woman in very good preservation. By the action of the tide the smaller bones were heaped in confusion at the upper end of the coffin. This coffin is now in the possession of the Society.

6. A coffin 6ft. 7in. in length, 15in. wide at the head, and 11in. at the feet, with a flat lid, in two pieces. The depth inside is 19in. The skull is broken by the lid pressing upon it. In the right hand of the skeleton, which was probably that of a woman, was found a small bunch of hazel twigs.

7. The coffin of a woman, long and narrow, being 6ft. 9in. long, 19½in. wide at the head, and 15in. at the foot. The lid is rounded, and so is the interior. The hollow of the coffin, (now in the possession of the Society) seems to have been filled up to make a bed for the skeleton, the right arm of which is

laid across the breast. The coffin has not yet been minutely examined to see whether there are any hazels in it. The earth at the bottom of the coffin was almost of a metallic hardness, and to ascertain its composition a portion of it was submitted to Dr. Procter, who obligingly favoured me with the following analysis of it :—

ANALYSIS OF THE DRY EARTH.

Organic matter	6·95
Phosphate and oxide of iron	42·30
Phosphate of alumina, and magnesia, and carbonates	15·60
Insoluble silicious matter (sand)	35·15
	100·00

In coffins Nos. 3 and 5 the same accomplished analyst detected the presence of Vivianite.

We have, therefore, seven coffins in all, four of which are rounded inside and out; two others have flat lids; and the seventh, that of a child, seems to have been made more after the modern fashion, of five boards fastened together with pegs. The wood has been cut and smoothed with the axe. The bodies have been laid upon their backs, with their hands stretched out by their sides; in one case only the right hand is laid across the breast. In four instances we detected the presence of hazel rods or twigs in the hands of the deceased. In coffin No. 6 I found a sherd of unmistakable Samian ware, but this had drifted in no doubt from the river. Not an ornament or utensil was found inside or outside, except a small bronze stud, of early character, upon which no argument can be based. This was discovered among the loose earth in the cemetery. I must not forget to remark that in two or three cases an oaken headpost, some two or three feet long by one foot, and perhaps ten or twelve inches thick, was found at the head of the coffin, to mark the place of sepulture. This must originally have been above the surface of the ground, so that the depth at which these coffins were laid must have been extremely shallow. Such was the system of burial among the Saxons or English.

We must now consider the date of this cemetery. One daily

print, deceived by the presence of a stolen mail bag which was found among the rafters of the inn, and imagining that the character given by the author of *Guy Mannering* to a well-known northern hostelry belonged to other baiting houses as well, stated boldly in a leading article that mine host of Selby, in days not so far gone by, robbed and murdered his guests, and hid their bodies beneath the cellars of his house! This theory may only be mentioned to be dismissed.

Another view is that this is a Christian cemetery of the eleventh and twelfth centuries, and that the name of Church Hill, which the place bears, is evidence of the existence of the first Christian church or monastery upon the site. To consider this we must enter very briefly into the early history of the ecclesiastical colonisation of the place. The chronicle of Selby tells us how, soon after the Conquest, Benedict of Auxerre came over the sea on a mission to Selby. After many adventures he found the place he was in quest of, and landed, probably, at the bottom of Ousegate, setting up upon the river's bank a cross of wood. On this site, which would be regarded with sacred interest thenceforward, Benedict erected some temporary buildings for residence and worship. They were probably of wood. A stone church was begun in a very short time upon a different site. It is evident there was no ecclesiastical building at Selby, when Benedict came to it. The church at the end of the present Ousegate was only a temporary structure, and the Christian dead would be laid, not around it, but within the enclosure devoted to the church of stone, which seems to have been almost immediately begun. If any member of the sacred brotherhood died in the interval, we are only following analogy if we suppose that his body was afterwards removed to the consecrated enclosure. In 1274 we learn that there was a chapel in the town of Selby bearing the name of St. Germanus, but that it was not consecrated, seeing that the dead were interred in the burial ground of the monastery. The historical argument therefore is against the idea of there having been any Christian cemetery at the Church Hill. The name may have its origin in the erection on the spot of a temporary church before the present abbey

was built, but the mere fact of the site having belonged in after days to the abbey is a sufficient reason for the name, just as Bishophill in York signifies the hill or property of the Archbishop.

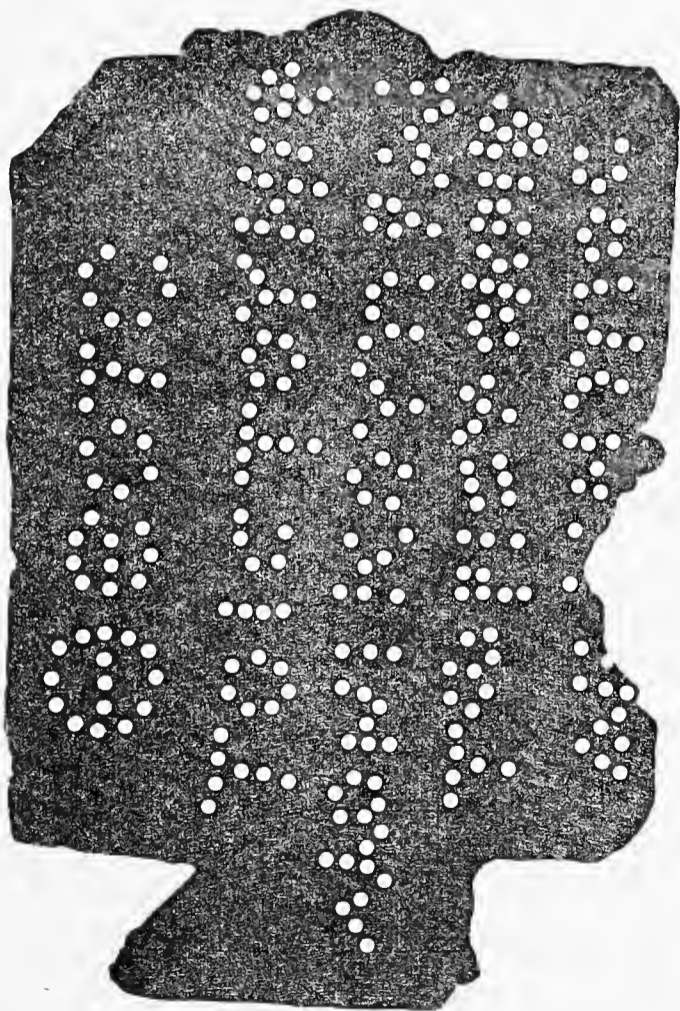
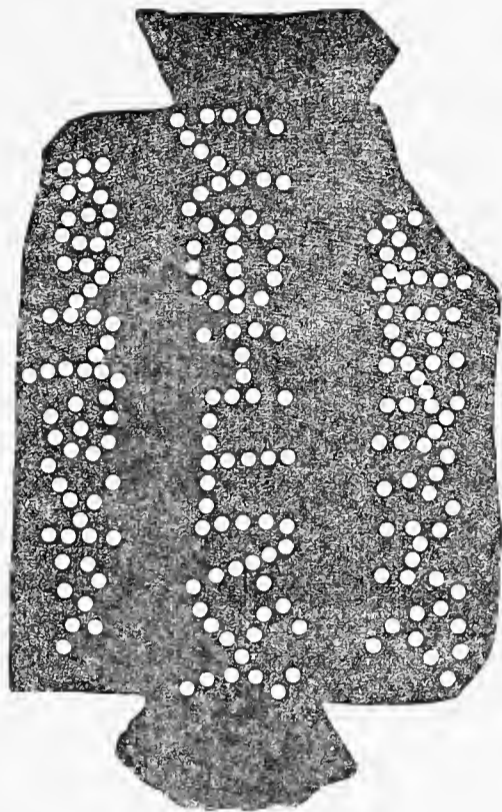
We must go back to an earlier period than Abbot Benedict and the Norman Conquest for the origin of the Selby Cemetery. When he set up the cross upon the river's bank these forgotten members of an ancient race were laid in their wooden tombs below it. They had been there probably for many a long century even then. Instances of a similar mode of interring are attainable, although by no means frequent. At Gristhorpe, near Scarbro', a remarkable coffin has been found, which is ascribed to the bronze age, and this is nearly identical in shape with the best of those found at Selby. Near Haltwhistle, in Northumberland, a similar cemetery has been discovered, in which the dead are all laid in trunks of trees. Professor Worsaae records the finding of one or two similar burials in Denmark, which he ascribes to the same chronological period. I do not see why these at Selby may not be also of a very early date. The beads found in them in 1857 point most probably to English or Saxon workmanship. The cemetery is in a position which our Teutonic ancestors were fond of selecting. In the wooden tombs in which they were interred there is the idea of a canoe or boat to carry them over the dark water which was to be crossed by the dead. The oaken trunk is the *totden baum* of our German forefathers. A most remarkable illustration of the Selby cemetery is to be found in a paper by Mr. Wylie, in 1855, describing an ancient graveyard at Oberflacht, in Suabia, which he ascribes to the fourth or fifth century. Here in little chambers of wood was laid the *baum* or coffin-tree of the dead. *Ingentem quercum, decisis undique ramis, constituit tumulo.* In these trees were evidences of wealth and importance—such as we may look for in vain at Selby—weapons, domestic utensils, and a great variety of ornaments. Beads are common to both. On the coffin lids in Suabia the forms of serpents were sculptured, a mysterious symbol which has not been observed in a like position in England, except on stone. There was, however, one remarkable point in which the two

cemeteries are alike. I mean the existence of hazel rods in the coffins. In Germany there were nuts as well, but these have not been detected here. The presence of hazel rods or twigs has never yet been observed in any early tomb in this country. Obviously it is only in such coffins as these that it would be possible to find them preserved. A veneration for the hazel lingers still in the superstitions of Germany. In this instance the superstitions are evidence of an ancient belief common to the whole Teutonic family, whether at home or in England. In the cemetery at Selby we have, I believe, the remains of what—*pace* Mr Freeman—we may still venture to call an old Saxon community, poor in worldly wealth, which lived by hunting in the woods and fishing in the Ouse. When anyone died, the oaks under which he so often followed the chase saw one of their brethren fall to be roughly shaped into a coffin for the dead. Even in Abbot Benedict's time those oaks were in profusion at Selby. Where are they now? The only remnant of them that survives may be found in Stainer wood. But here they are far inferior in size to their sylvan ancestry. There were giants in those days.

DEC. 5TH.—THE REV. CANON RAINE read the following paper by the Rev. S. S. Lewis, of Cambridge, “On two Greek Inscriptions found at York” :—

“Of the eleven inscriptions in the Greek language which are known to have been found in England not the least interesting, and from various points of view, are the two of which an exact fac-simile, made from the originals, is given on the opposite page. The tablets on which they are punctured were found about thirty-five years ago in digging foundations for the old Railway-station at York, and are happily exhibited in the Museum of this Society: they seem to have been originally suspended, but rust (or some other cause) has joined them back to back, and thus helped to preserve these curious monuments of Greek speech and Roman dominion which may probably, from the shape of the letters and the rudeness of the puncturing, be assigned to the second or third century A.D.

The material is thin bronze which in the course of time



has become overlaid with a dark green patina, but still shows some traces of having been coated with silver. The inscriptions have been mentioned by Professor E. Hübner in his very valuable work entitled *Inscriptiones Britanniae Latinae* (Berol. 1873, p. 62), but as yet no thoroughly satisfactory reading and interpretation have been published.

The following appears to be the purport:—

(1)	Θ Ε Ο · Ι · Σ ΤΟΙΣ ΤΟΥΗΓΕ ΜΟΝΙΚΟΥ ΠΡΑΙ ΤΩΡΙΟΥ ΣΚΡΙΒ. ΔΗΨΗΤΡΙΟΣ	(2)	Ω Κ Ε Α Ν Ω Ι Κ Α Ι Τ Η Θ Υ Ι Δ Η Μ Η Τ Ρ Ι
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that is,

- (1) θεοῖς τοῖς τοῦ ἡγεμονικοῦ πραιτωρίου Σκριβ. Δημήτριος.
 (2) Ωκεανῶ καὶ Τηθύι Δημήτριος.

The second inscription is a natural invocation or thanksgiving to the marine powers on the part of Demetrius, and presents no difficulty beyond that of deciphering it, in which I received material help from Canon Raine; the occurrence however of two different forms of *ω* in the same word is notable, as being also found in the legends on Bactrian coins. The latter form, as M. Longpérier has suggested, occurs in the well-known ΓΝΩΘΙ ΣΑΥΤΟΝ on the field of the Vatican mosaic which bears the portrait of Chilon (cf. Winckelmann, *Mon. Ined.* i. p. 222, tav. 165, Roma 1767).

But I feel great doubt as to the letters at the end of the fourth line in no. (1); if they be ΣΚΡΙΒ., as I have ventured to read them, they may stand for *Scribonius* the gentile name, or *Scriba* the profession, of Demetrius, though in this latter case they would more naturally have followed the personal name. In the days of decadence, to which this inscription may be assigned, such mongrel nomenclature is by no means uncommon; cf. ΕΓΝΑΤΙΟΣ · ΠΑΚΤΟΡ and ΕΓΝ(ατιος) ΔΥΟΝΙΣΙΟΣ (sic) (Hübner, *Inscr. Brit. Lat.* pp. 85 and 98), σπεκουλατιέρ, κήνσος (Ev. S. Marc. vi. 27, xii. 14). Professor Churchill Babington suggests that these letters should be read as ΟΚΡΙΚ or ΟΚΡΙΝ, referring in the former case to Oriculum (the modern *Otricoli*), in the latter to Ocrinum, the Roman name of the *Lizard Point*:

but from the letter at the end of the fourth line B appears to me to be more obviously extracted.* A parallel to the dotted *ι* in the first line is presented by the word ·Ι·ΑΝΟΥΑΡΙΟC, occurring in a Christian inscription on stone found at Saïda, which is preserved in the Louvre.

The words *θεοῖς τοῖς τοῦ ἡγεμονικοῦ πραιτωρίου* 'To the Gods of the Governor's praetorium' give an interesting example of the worship of special *dei castrenses* to which Tacitus more than once alludes (*Ann.* I. 39 : II. 17 : *Hist.* III. 10), and also (as has been suggested by Mr. Kenrick) throw light upon a passage which has cost commentators much fruitless labour in explanation:—*καὶ αὐτοὶ οὐκ εἰσῆλθον εἰς τὸ πραιτώριον ἵνα μὴ μιν θύσωσιν* (Ev. S. Joh. xviii. 28) : for no strict Jew could under any circumstances, but least of all at Passover-tide, enter a Praetorium, if it was manifestly dedicated to heathen Gods and contained an altar for their worship. *Primum militiae vinculum est religio* according to Seneca (Ep. xciv. 35) : a commander was officially priest as well as general of his troops, and offered prayers for them every morning ; so that a Praetorium without an altar would be like an ambassador's palace without a chaplain.

Two Latin inscriptions, punctured on bronze tablets of similar size and shape, are exhibited in the bronze room of the British Museum ; around the boss of a bronze shield, preserved at Newcastle, some punctured letters have also been recognised (Hübner, l. c. p. 116, no. 570), but have not been very satisfactorily explained."

DEC. 5TH.—W. REED, Esq., F. G. S., read a paper on "An Artesian Well at Masham in the North Riding," prefacing the account with some observations and remarks on other deep borings showing their great value for a water supply and other purposes.

The term artesian is derived from the Province of Artois in French Flanders, where these wells have long been known,

* This opinion has received the high sanction of Professor Em. Egger, (University of Paris,) who has contributed a translation of this paper to the *Revue Archéologique*.

as also in Lombardy and the Adriatic Provinces of Northern Italy, from a very early period. At the beginning of the present century they were made with great success in the valley of the Thames near Waltham and Tottenham.

But one of the most celebrated and best known was the one at Grenelle, situated south-west of Paris on the right bank of the Seine. This boring was undertaken at the strong recommendation and advice of Arago the distinguished Astronomer, based upon his knowledge of the Geological structure of the district. When he suggested it, the water supply of Paris was not equal to the demand. This well, commenced in 1833, was carried to the depth of 1806 ft. 9 in. through the whole of the Chalk into the lower Green Sands. The water-bearing stratum was reached February, 1841, the water rose to the height of 122 ft., the quantity being 600 gallons per minute, temperature 82° Fahr. On the opposite bank of the Seine at Passy, a well was bored by the Saxon Engineer, Kind, the total depth being about 1923 ft. and through the same strata with a diameter of 2 ft. 4 in. at the bottom, the well continues to throw up a continuous stream at the rate of 5,582,000 gallons per day to a height of 54 ft., temperature 82° Fahr. In the United States there are several of these wells. At St. Louis, State of Missouri, an artesian well was carried down 3147 ft., but only brine was obtained, temperature 73½° Fahr. But the deepest boring in the world is at Sperenberg, 25 miles South of Berlin in the Triassic series or New Red Sandstone, for the purpose of obtaining Rock Salt, and was carried down to a depth of 5570 English feet. Salt began at 280 ft. The process of boring was by percussion borers worked by rods, the time occupied being about four years, and the total expenditure £8717 14s., or, £1 11s. 6d. per English foot: the first 1297¼ English feet were made by manual labour, for the remaining distance by means of a steam engine. At Bourne, in Lincolnshire, there is an artesian well 95 ft. deep, which yields over half-a-million gallons per day, the pressure being sufficient to force the water to the top of the houses; this boring is in the Oolitic strata, the average rate of increase of heat is 1° of Fahr. for every 40 to 55 ft. in descent in those wells.

The necessary conditions have been found in the Desert of Sahara for their formation, and up to June 1860, no less than 60 have been executed, which are fed by the waters falling on the exposed edges of the Atlas chain: they yield 4000 quarts per minute, depth 160 ft., temperature 86° Fahr.

In our own country one of the most important borings is at Middlesbro'-on-Tees, on the property of the Messrs. Bolckow and Vaughan, in the Triassic-beds, where at a depth of 1067 ft. Rock Salt was found in four distinct layers or beds, the aggregate thickness being 100 ft. making a total of 1306 ft. The borings went through two beds of Gypsum of 2 and 6 ft.: upon analysis by Mr. Marley, 100 parts yielded 96 of Chloride of Sodium and 3 of Sulphate of Lime, with minute portions of the Sulphates of Soda and Magnesia, Silica, Iron, and Water. At Saltholme on the Durham side of the Tees, Bell Brothers had a boring made 1100 ft. deep, two separate beds of Rock Salt of a thickness together of 100 ft. were found; as commercial speculations those deep borings would at present most probably prove a failure, as they would not be able to compete with the Salt works long established in Cheshire and Worcestershire. In Nantwich and other places in Cheshire, the beds containing the Salt are reached at a depth of from 50 to 150 yards below the surface, and they vary in thickness from six inches to nearly 40 ft. Those saliferous beds are situated in the upper division of the New Red Sandstone the Keuper; the lower division of the New Red, or the Bunter beds are generally free from Salt and yield water of very good quality, as in the case of large districts in the centre and North of England. The store-house of Salt beds is the New Red Sandstone.

The artesian boring at the Well Garth Brewery, Masham, the property of Mr. Thos. Lightfoot, commenced in October, 1875, was completed March, 1876, and undertaken in order to obtain a pure and permanent water supply. The level of the Brewery is 260 ft. above that of the Sea, and about 25 ft. above the level of the adjacent river Ure or Yore; the boring was carried to a depth of 435 ft. The first attempts, before the Diamond Rock boring was resorted to, left off about 35 ft. below the level of the Brewery, and at this point the Diamond boring

began and was continued 400 ft. further. The first 35 ft. were composed of Gravel, Blue Clay and Marl, and the remaining 400 ft. were situated in the Millstone Grit, one of the series of the Carboniferous Rocks. The cores are composed of coarse Grits, dark Shales and Sandstones, and, as they were brought up, were carefully preserved and arranged in proper order and sequence in eight boxes with longitudinal divisions, giving an accurate section of the strata in perpendicular depth; they are of different lengths, many having been broken in the process of extracting them from the hollow cylinder; some have the ends polished which is caused by a broken piece in the cylinder revolving with the crown, grinding its own end and that of the portion next to it. They are three inches in diameter. On careful examination no traces of organic remains could be found in any of the cores.

The daily rate of progress in the boring varied much with the nature of the Rock; when through Shale the progress was very slow, hardly four feet a day, but through the hard Grits and Sandstones, as much as 20 ft. was attained: the average rate may be taken as 9 ft. per day of eight hours.

Water was first "struck" at a depth of 126 ft., but it was neither sufficient in quantity or pure enough in quality for the purposes of brewing; 179 ft. of five in. iron tubing were then put down to keep out this supply and all other kinds of water except what comes from the lowest point. This is a true artesian well, the water flowing out by its own pressure and with considerable force; it would rise 35 ft. higher than the outlet if the tubing were continued, and just flow over. The water is confined by a convex hollow iron cap or cover, connected with the iron tube in the well, and comes out in a sheet round the margin: it is clear and bright, very soft to the taste, in great contrast to the waters from the neighbouring springs; there has been no intermission in the flow nor has any diminution in the quantity or qualities been observed; at least 2000 gallons run out every hour which would be amply sufficient, not only for all the brewing purposes, but enough for the whole population of the town of Masham. From its purity and softness it is valuable not only for the brewery but for

various domestic purposes, as making tea, washing, bathing, &c. The temperature of this water taken on the 1st inst. by Mr. Thomson the Manager, was 55° Fahr.; in the surface well 50° Fahr. In the artesian well there has been little variation; in summer the surface well was often as much as 10° colder than the artesian, or five less than it is at present.

The first brewing made from it was in May last, and experiments were tried with various kinds of ale, all of which have turned out satisfactory and kept good during the hot summer months.

Dr. Stephenson Macadam, of Edinburgh, after the most careful analysis of the water found it perfectly free from any impurities either organic or inorganic, and to be eminently suitable for its intended purpose, as stated in the General Geological Report. The cores were generously presented by Mr. Lightfoot, to the Museum, and are placed in the Geological Room containing the Yorkshire Series of Fossils to which they form a most important unique and permanently valuable addition, as illustrating the nature of the strata to a perpendicular depth of 400 feet.

The working and many other details were kindly supplied conjointly by Mr. Lightfoot and Mr. Bowes, of Masham, who watched with great interest its daily progress until completed.

Methods of boring: in the old one the apparatus formed a sort of large gimlet, the steel boring tool or chisel being fixed to iron rods which were screwed together and turned by two men, the tool being raised and suddenly dropped by a man at the end of a lever connected by a rope or chain with the gimlet head, but modern engineering skill has superseded, at least for large works, this primitive method, by the substitution of steam, by which a boring tool of several tons weight can be used, the percussion being sufficient to pierce the hardest rock. The latest advance is the adoption of the Diamond Rock Drill, where feet instead of inches may be bored through in some strata. The drill called the Crown is a ring of soft steel from three to seven inches and upwards in diameter, having 15 to 24 diamonds set at regular intervals round its lower edge: this ring is attached to a cylindrical tube of steel ten or twelve

feet long, but to this any number of similar tubes may be firmly welded; above this are the long hollow boring rods, the whole being set in motion and made to revolve on its axis by suitable machinery driven by steam; the rock as it is cut rises in the form of round solid pillars in the cylinder, when full it is drawn up to the surface and the cores extracted, sometimes in lengths of six feet, at others in broken fragments. At the Sub-Wealden Exploration at Netherfield, near Battle, in Sussex, the crown revolved from 150 turns a minute in soft strata to 300 in hard rock. Water is pumped down the centre and rising at the sides conveys the debris in suspension to the surface. The so-called Diamonds in the Rock Drill are in reality a mineral found in Brazil, and called by the Miners "Carbonado;" when first offered for sale the price was fourpence a carat, now it is from 15 to 20 shillings; it is not brilliant and has no cleavage planes. Among English Diamond Merchants this substance is known as and called "Carbonate."

These pieces of Carbonate being firmly set in a crown, form a drill, which when driven by steam will pierce the hardest rocks: the wear of the Carbonate is so small that in boring quartz to a depth of 30 feet not more than one sixty-fourth of an inch would be worn off.

The conditions necessary for carrying out successfully the borings for an artesian well are the following: The existence of a mass of permeable stratum or material, enclosed, except at its outcrop, by two layers of impermeable strata. The lowest point on the exposed surface of the porous matter through which the water filters should be above the level of the point where the well is proposed to be sunk. The mass or cubical capacity for water of the permeable stratum should be sufficient to meet the demands upon it, and there must be continuity of the permeable bed for the uninterrupted passage of water, and no flaw or break in either of the confining layers by which the water might escape; and this is a frequent source of failure; sometimes in deepening the bore instead of increasing the flow it ceases altogether, the water escaping through another outlet, and the existence of one spring is no guarantee that another will be found at the same depth in the neighbour-

hood, the subterranean pool being frequently of small extent, and of the nature of a channel, and may circulate in irregular trenches between impermeable strata. The determination of the existence of these wells beforehand is a very difficult matter, especially in a locality where no borings have been previously made; when a hole is bored down through this upper impervious stratum to the surface of the Lake below, the water will be forced by the natural law of water seeking its level, to a greater or less height according to the elevation of the feeding column.

Presented
13 MAR 1886





UTTING.

21 in. by 10 in.



UTTING.

19½ in. by 16 in.



UTTING.

13 in. by 7¾ in.

