











Yorkshire Philosophical Society.

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ANNUAL REPORT

FOR

MDCCLXI.





ANNUAL REPORT  
OF THE COUNCIL  
OF THE  
YORKSHIRE  
PHILOSOPHICAL SOCIETY

FOR

MDCCLXI.

PRESENTED TO THE ANNUAL MEETING,

FEBRUARY, 1862.



YORK:

H. SOTHERAN, BOOKSELLER, CONEYSTREET.

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1862.





TRUSTEES

OF

THE YORKSHIRE MUSEUM,

APPOINTED BY ROYAL GRANT.

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HON. AND VERY REV. HENRY HOWARD, D. D.

SIR WILLIAM LAWSON, BART., F. S. A.

ROBERT DENISON, ESQ.

REV. WILLIAM VERNON HARCOURT, F. R. S.

PATRONESS

OF THE

*W*orkshire *P*hilosophical *S*ociety.

HER MAJESTY THE QUEEN.

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PATRONS.

THE ARCHBISHOP OF YORK.

THE DUKE OF NORTHUMBERLAND, F. R. S.

THE EARL OF CARLISLE, K. G., F. R. S.

THE LORD FEVERSHAM.

# OFFICERS OF THE SOCIETY, 1862.

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THE EARL OF CARLISLE, K. G., F. R. S.

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LIBRARY . . . . .	REV. JOHN LEES.
BOTANY . . . . .	OSWALD ALLEN MOORE.
OBSERVATORY & METEOROLOGY, <i>under the Care of a Committee</i> <i>consisting of</i>	REV. W. V. HARCOURT, F. R. S.
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## KEEPER OF THE MUSEUM :

WILLIAM S. DALLAS, F. L. S.

## SUBCURATOR OF THE MUSEUM &amp; GARDENS :

HENRY BAINES.

Address of Condolence to Her Majesty the Queen,  
on the Decease of H. R. H. the Prince Consort,

ADOPTED BY THE ANNUAL MEETING OF THE YORKSHIRE  
PHILOSOPHICAL SOCIETY, 4TH FEB., 1862.

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*“ To the Queen’s Most Excellent Majesty.*

“ May it please your Majesty,—We, the members of the Yorkshire Philosophical Society, beg leave to express our heartfelt sympathy with your Majesty under the heavy affliction with which it has pleased Almighty God to visit your Majesty, your Royal family, and this nation, in the death of His Royal Highness the Prince Consort.

“ We feel the more solicitous to offer the tribute of our condolence on this melancholy occasion, as your Majesty has graciously condescended to be the Patroness of our Society.

“ While we deeply deplore the untimely decease of one who adorned a high station by his eminent virtues and varied attainments, we gratefully remember that His Royal Highness was ever foremost in aiding the advancement of science, and in the support of those measures which had for their object to alleviate suffering, to diffuse knowledge, and to promote the moral and social improvement of your Majesty’s people.

“ We believe that the beneficial effects of His Royal Highness’s illustrious example will not be confined to our own

country or to the present age ; and we trust that your Majesty will derive consolation under your bereavement from the thought that his life had been devoted to the noblest purposes, and the assurance that his memory is consecrated in the affectionate regret of all your Majesty's subjects, and the esteem of the wise and good in every quarter of the globe.

“ We hope and pray that your Majesty may receive strength to endure with Christian fortitude this heavy and unexpected sorrow, and that your Majesty's life may be prolonged in health and peace to watch over your Royal offspring, and to witness the progress of your people in virtue, knowledge, and social happiness.”

*Signed on behalf of the Meeting,*

W. V. HARCOURT,

CHAIRMAN.

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# REPORT OF THE COUNCIL

OF THE

## YORKSHIRE PHILOSOPHICAL SOCIETY.

FEB. 4, 1862.

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THE statement of the Financial position of the Yorkshire Philosophical Society in the Report for 1860 indicates that, although the Income of the Society during that year was considerably in excess of its Expenditure, the transfer of the liabilities on account of the Enlargement of the Museum to the debit of the Society's General Account gave rise to a considerable balance against the Society. The Council hoped, nevertheless, that at the close of the year just elapsed, this balance might have undergone some reduction, but in this hope they have been disappointed, several extraordinary expenses having been forced upon them in 1861, causing an excess of Expenditure about equal to the balance due from the Treasurer at 31st December, 1860. As, however, this deficiency is to be ascribed solely to an extraordinary Expenditure incurred during the past year, and not to any diminution in the Income of the Society, the Council hope it may be got rid of in the course of a year or two by strict adherence to a system of economy.

The Total Income of the Society for the year 1861 amounts to £1200 18s. 9d., or about £30 less than that of 1860. Of this £670 3s. consist of the Annual Subscriptions of Members, against £699 4s. in 1860. The deficiency has been caused in

part by the smaller amount of arrears recovered in 1861, and in part by the larger number of Subscriptions, especially amongst the County Members, still remaining unpaid. The amount received for the admission of new Members is £5 more than in 1860, and the sum paid for Keys of the Gates is also increased, as is likewise the amount received at the Swimming Baths, the latter being £93 15s. against £71 6s. 8d. in 1860. In the money received at the Gate for admission there is however a falling off, this being only £195 11s. 4d.; and the sums realised by the Sale of the Guide to the Antiquities, and for the hire of the Tent, are less than in former years.

The Expenditure of the Society for ordinary purposes calls for no observations. It consists of the usual disbursements, and is of about the usual amount; nevertheless, the Total Expenditure of the year reaches the sum of £1357 10s. 5d., showing an excess over the Income of £156 11s. 8d., more than half this excess of Expenditure being caused by the purchase of a new Tent at a cost of £105, the old Tent belonging to the Society having become quite worn out, and been at last almost destroyed by a storm in the Autumn of 1860. The Council thought it highly desirable that the Society should still possess a Tent, both in order to enable Flower Shows and other Exhibitions to be held in the Grounds, and on account of the profit to be derived from its hire. The new Tent was lent out twice during the Autumn of 1861, producing £9, or nearly 9 per cent. on its cost, and as it is far superior to the old one the Council hope that the purchase money may prove to have been profitably invested.

Another extra expenditure, which will in course of time be repaid with interest, is the printing of a new edition of the Catalogue of Antiquities, for the preparation of which the thanks of the Society are due to the Curator, the Rev. John Kenrick. The constant and rapid sale of this Guide induced the Council to print an edition of 1,500 copies, at a cost of £35. The new edition was issued to the public on the 1st of July, and its sale up to the end of the year produced £6 7s.

The Curator of the Library having stated that more accommodation for Books was required, the Council ordered two new



book cases to be made at a cost of £27. This addition will facilitate the rearrangement of the Library, and the present cases will then probably suffice for several years to come.

The last item of Expenditure to which the Council think it necessary to refer particularly, is the purchase of a Collection of Fossils from Mr. John Bainbridge. This Collection, which had been brought together with great pains by its owner, included many fine Specimens from the Yorkshire Strata, besides several highly interesting Fossils from other localities. It was offered to the Council at the price of £55, at which sum it was understood it would be taken by another purchaser; and as Mr. Procter, the Curator of Geology, and Mr. Wm. Reed, both declared that it was exceedingly desirable to secure many of the Specimens for the Museum, and considered the price asked to be a moderate one, the Council lost no time in accepting Mr. Bainbridge's offer. Mr. Dallas, under the direction of Mr. Procter and Mr. Reed, has since carefully examined the Collection, and those Specimens have been selected which it is thought necessary to retain for the Museum; the remainder, valued at about £18, will be sold as soon as an opportunity occurs; consequently, the Specimens purchased will probably cost the Society about £40.

Had it not been for the special Expenditure just referred to, amounting altogether to £222, the Society's Account would have shown a surplus of Income of about £65, instead of a deficiency of £156 11s. 8d., the result of the Account for 1861 being a balance of 6s. 4d. against the Society, independent of the balance due in respect of the Museum Enlargement Fund, transferred to the General Account of the Society in pursuance of a Resolution passed at the last Annual Meeting.

Owing to the non-payment of some promised Contributions to the Enlargement Fund, and to the charge for interest, &c., made by the Bankers, the amount transferred to the debit of the Society's Account was rather larger than the estimated balance stated in the Report for 1860, being £404 9s. 9d., instead of £384 1s. 9d. This sum added to the above amount of 6s. 4d., increases the final balance against the Society on the 31st December, 1861, to £404 16s. 1d. It is, of course, im-

possible for the Council to foresee what extra expenses they may be compelled to incur, but should no such necessities arise, there seems to be every reason, from the experience of former years, to hope that the surplus Income will soon pay off this debt.

Having been repeatedly urged by Members to attempt the revival of the Flower Shows which were formerly held in the Grounds, the Council resolved, in accordance with the powers vested in them by a Resolution passed at the last Annual Meeting, to have an Exhibition of this nature, and the 7th of July was fixed upon for the purpose. A considerable number of tickets was sold, especially to Members, who had the privilege of purchasing them at a reduced price, but unfortunately the afternoon of the day of Exhibition proved very wet, and the undertaking was unsuccessful in consequence. The expenses of the Show amounted to £62 4s. 5d., and the receipts only to £44 14s. 6d.

The Sub-Curator, Mr. Baines, observing that the Hot Houses and Conservatories belonging to the Society were falling into a state of dilapidation, at the same time that they were far too small to allow the Collection of growing Plants contained in them to be advantageously exhibited, obtained promises of pecuniary aid towards the building of new Conservatories from many of his personal friends and other well-wishers to the Society. Early last year he purchased the materials of a large Grapery, which, by additions and alterations, has been converted into a fine Conservatory, forming the centre of the new edifice, on each side of which is placed the half of one of the old Houses, forming a Conservatory in three compartments, which, by an ingenious and perfectly successful arrangement of the hot water apparatus, may be devoted to different purposes. Mr. Baines will thus obtain, not only an opportunity of displaying the interesting Collection of Stove Plants in the Society's possession, but also the means of preserving his bedding-out Plants through the winter, which will enable him, at little expense, to add greatly to the attractions of the Garden. The Conservatories stand on a Terrace of two elevations, the surfaces of which will be divided into geometrical colour-beds,

and the whole will, undoubtedly, form a most pleasing addition to the attractions of the Grounds. For this the Society will be indebted chiefly to the energy of Mr. Baines, who has not only superintended the whole of the work, but has already obtained a great part of the money to pay for it, and confidently expects to have the whole sum completed very shortly. The best thanks of the Society are also due to those gentlemen who have so liberally furnished Mr. Baines with the funds necessary to carry out his plans, and especially to the Hon. and Very Rev. the Dean for his munificent present of the sum of £40, the whole purchase money of the house, the materials of which constitute the greater part of the new structure.

The most important addition to the LIBRARY during the past year consists of a Second Part of the Facsimiles of Egyptian Papyri, presented to the Society by the Trustees of the British Museum. The Society has also received from Lord Londesborough a copy of the "Illustrated and Descriptive Catalogue of a Collection of Silver Plate," formed by the late Lord Londesborough, and from Mr. Burdekin, of Parliament Street, a series of the *York Courant* Newspaper, for twenty-eight years, from 1773 to 1800. The Curator of the Library hopes, now that additional book cases have been provided, to effect the rearrangement of the Library in such a manner as to leave room for any additions which are likely to be made for several years to come. He wishes also to call the attention of the Council to the very imperfect state of the Library, which, in many respects, is hardly worthy of an Institution holding the position of the Yorkshire Philosophical Society. On several Sciences, such, for example, as Chemistry, Physics, Mineralogy, and Botany, there is not a single standard modern work in the Collection, and even in those branches of Natural History to which the Museum is more especially devoted, such as Geology and Zoology, the Library is very imperfect.

From the Report of the Curator of ANTIQUITIES it appears that, among the Antiquarian discoveries in York during the past year, the most remarkable is that of a Sepulchral Tablet, containing a Latin Inscription in hexameter verse, by Q. Corellius Fortis, on his daughter Corellia Optata. Metrical Inscrip-

tions of any kind are rare among the Roman remains in Britain. In the Sepulchral class this is, perhaps, an unique example. Along with it were found a very perfect glass vessel, half filled with calcined bones, probably those of Corellia Optata, and some articles of pottery. The Excavations undertaken by Mr. Gray, on the site of the late Mr. Knapton's Foundry, near Monk Bar, have brought to light some further portions of the Roman Walls of York, and the foundations of buildings adjacent to them, apparently of the same age, but the destination of which is not clear. The Wall appears to connect itself with that which was found in the Rampart near Monk Bar, the line of direction and the material being the same, but it is of much inferior thickness, and it has been broken into by subsequent erections of uncertain age and purpose.

During the time when no Public Museum existed in York, various objects of Antiquity discovered here had been presented to the Dean and Chapter; one of these, the curious Mithraic Tablet which is affixed to the wall of the Vestibule of the Museum, was some years ago entrusted to the charge of the Yorkshire Philosophical Society, on the condition that it should be restored, if reclaimed. On the application of the Council, the Dean and Chapter have recently transferred to the care of the Society, under the same condition, the other Antiquities before alluded to, which will be found enumerated in the list of additions to the Museum. In acknowledging the kindness of the Dean and Chapter in acceding to their request, the Council cannot refrain from expressing a wish, that their example were more generally followed, and that the Museum were considered as the appropriate receptacle of the Antiquities which are brought to light in the City. Many things have been lost for the want of such a receptacle in former times; many things, since its establishment, have been diverted from their proper destination, and have passed into distant collections. And with whatever care private individuals may preserve the objects which come into their possession, it is too probable that after a few years they will be dispersed. In the Museum of the Society, being permanently united with objects from the same locality, they would derive illustration from them, and be open

to the inspection of all who are interested in Archæological pursuits.

While speaking of the Antiquities of York, the Council trust that they shall not be considered to exceed their proper province, by expressing the high gratification which they have felt in witnessing the measures adopted during the past year, for preserving and displaying the beauties of the Minster, the noblest monument which our Country exhibits of the piety, skill, and taste of the Middle Ages. It is satisfactory to observe that a feeling of respect for the remains of Antiquity prevails among the Citizens at large, as represented by the Municipal Body, who have shown, that in carrying out the improvements which modern convenience requires, they are not disposed to sanction any unnecessary interference with the memorials of older times.

The Curator of BOTANY has to report no particular additions to the Society's Collection during the year 1861.

The chief addition to the GEOLOGICAL Collection, calling for special mention, is the numerous Series of Fossils already referred to as having been purchased from Mr. John Bainbridge. This Collection comprises a great number of fine Specimens from the Strata of Yorkshire, some of them hitherto wanting to the Society's Collection, others in better condition, or otherwise preferable to those already in our possession. Amongst these may be noticed especially the beautiful series of Saurian Teeth, from the Coralline Oolite of Malton, of which the Museum was previously almost destitute; the Collection also included fine Ammonites, Fishes, and Saurian Remains, from the Lias of Yorkshire, and many valuable specimens from other beds. The Fossils from other parts of the country included a fine series from the Silurian Strata of Dudley and Ludlow, some beautiful Encrinites and Fishes from the Lias of Lyme Regis, and some magnificent fragments of the gigantic fish of the Carboniferous period, the *Megalichthys Hibberti*, from the Coal Shales of Burdie House, near Edinburgh. Mr. John Francis Walker, of Gillygate, has presented the Society with numerous Oolitic Fossils, from the beds in the neighbourhood of Cirencester.

To the MINERALOGICAL Collections no additions of importance have been made during the past year.

The principal addition to the ZOOLOGICAL Collections consists of a numerous series of Cowries and Olives, presented by W. Newby, Esq., of Liverpool. This Collection, although consisting for the most part of species already possessed by the Museum, included a few not previously in the Collection, and finer specimens of some of those which the Museum had long had in its cases.

The Curator of BRITISH ORNITHOLOGY reports that only a few additions have been made to the British Collection, the most remarkable one being a female of the Great Bustard, which was shot at Rufforth, near York, and having been purchased by subscription by several Ornithologists, was presented to the Rudston Collection. A curious variety of the common Snipe, shot near Cottingwith, and presented by Mr. Sleights, of that place, is also a very interesting acquisition. A thorough inspection of the cases, in order to prevent the generation of insects, is being made by Mr. Baines, who reports favourably of the condition of the specimens. The Society is greatly indebted to Captain Watt, of Bishop Burton, for his present of a magnificent head of a Royal Stag, sent from Sutherlandshire free of expense to York. The Curator thinks that a great source of attraction would be created by the formation of a Collection of British Mammalia, and as many of the species are already in the possession of the Society, and most of the others might easily be procured, he recommends that this should be commenced without delay, as it would be done at little expense, and would afford much amusement and instruction, especially to young visitors.

The Curator of ENTOMOLOGY has to report no additions of consequence during the past year, nor has he been able to make any progress with the arrangement of the Cabinet of British Insects. Liberal offers of assistance in completing the series of British Lepidoptera by donations of specimens have been received from Members of the York Entomological Society, conditional upon the rearrangement of the Collection in accordance with Mr. Doubleday's Lists. The Curator would suggest to the Council the propriety of endeavouring to get some Member of that Society to undertake the arrangement of the Lepidoptera,

as, from the peculiar characters of this group, an intimate practical acquaintance with the species is absolutely necessary for that purpose.

Mr. Ford, one of the Curators of METEOROLOGICAL INSTRUMENTS, reports —

From the annexed Table (see p. 18,) it will be seen that the mean height of the Mercurial Column for the year was 29·825 inches, being an exact mean of the last ten years, and nearly one-tenth of an inch higher than that of 1860.

The amount of Rain has been below a mean, viz., 20·27 inches, against 24·04 inches, the mean of the twenty years ending December 31st, 1861. The regularity of Meteorological phenomena, deduced from observations extended over a series of years, is in no case more marked than in that of Rain-fall. In the several series of years ending as follows, the observer might apparently have concluded that the Rain-fall of York was steadily diminishing.

For the ten years ending December 31st, 1850 . . .	24·834
"                              "          1853 . . .	24·452
"                              "          1855 . . .	23·356
"                              "          1858 . . .	22·243
"                              "          1859 . . .	22·017

Nevertheless, the mean of the twenty years ending December 31st, 1861, is 24·04 inches, being the ordinary mean given by observers in York for the last fifty years.\* In a period of twenty years February has the least amount of Rain, 1·3 inches; August the greatest, 2·83 inches. In 1861 April had the least Rain-fall, 0·24 inches; and September the greatest, 3·61 inches. August had a smaller amount of Rain than had been registered in that month for thirty years. The half-year in which most Rain falls at York is from June to November inclusive, viz., 14·65 inches; whilst from December to May only 9·11 inches fell on an average of twenty years.

In 1861 West and South-West were the prevailing Winds — W. 107 days, S.W. 62 days. The less genial, viz., N., N.E., E., and S.E., numbered 120 days, leaving 76 for S. and N.W.

\* See Phillips's Yorkshire, p. 155.

The temperature of the year has been one degree and six tenths above a mean of twenty years, viz, 49·1 against 47·5. Nine months out of the twelve were above a mean. The three below were January, May, and November. The important harvest month, August, was 3·3 degrees *above* a mean, with a Rain-fall of 1·7 inches below a mean. July had an excess of Rain of 0·24 inch, and September 1·5 above a mean. The lowest temperature of the year was 10·5 degrees, on February 13th; the highest 78·5 degrees, August 28th, making a range of 68 degrees in the year. In a mean of twenty years January is the coldest month, averaging 35 degrees, July the warmest, averaging 60 degrees. In 1861 August was the warmest month, averaging 62 degrees. Thunder and lightning were frequent in July. There is little to notice of these phenomena except in that month.

### METEOROLOGICAL REGISTER, YORK, 1861.

	BAROMETER.			RAIN.		THERMOMETER.					Frosts.	Prevailing Wind.
	Highest.	Lowest.	Mean.	Inches.	Days.	Average Max.	Average Min.	Mean Temp.	Highest.	Lowest.		
Jan.	30·356	29·648	30·082	0·65	7	38·4	30·8	34·6	55·5	14·5	16	S.E.
Feb.	30·600	29·138	29·739	2·42	14	45·6	35·2	40·4	56·0	10·5	5	S.W.
Mar.	30·312	28·826	29·570	2·20	17	50·1	38·5	44·3	58·0	30·5	2	W.
April	30·616	29·656	30·107	0·24	10	53·9	39·8	46·8	64·5	31·5	2	N.E.
May	30·414	29·596	29·927	0·60	8	60·3	43·7	52·0	76·5	30·5	1	N.
June	30·250	29·648	29·862	2·27	15	67·5	52·3	59·9	77·0	46·0	—	W.
July	30·130	29·270	29·602	3·03	19	67·1	54·2	60·7	72·0	48·5	—	S.W.
Aug.	30·248	29·546	29·826	0·86	9	69·3	55·3	62·3	78·5	48·0	—	W.
Sept.	30·198	29·123	29·712	3·61	15	62·8	49·0	55·9	74·5	41·0	—	W.
Oct.	30·378	29·296	29·926	0·72	14	59·1	46·7	52·9	70·0	34·0	—	N.W.
Nov.	30·356	28·960	29·523	2·60	19	45·6	34·5	40·1	56·5	24·0	10	S.W.
Dec.	30·576	29·078	30·028	1·07	12	43·7	35·5	39·6	54·5	22·0	9	S.W.
	30·616	28·960	29·825	20·27	159			49·1			45	



## RAIN-FALL, 1861.

	Scarbro'.	Middleton, near Beverley.	Malton.	Wheldrake.	York.	Ackworth.	Leeds.	Wakefield.	Sheffield.	Stones, near Todmorden.	Settle.
Jan.	0·7	0·96	0·90	0·54	0·65	0·18	0·1	0·2	0·76	1·37	2·10
Feb.	1·5	2·50	3·25	2·29	2·42	2·49	1·6	3·9	5·39	4·76	5·40
Mar.	1·8	2·16	2·22	1·91	2·20	2·12	3·4	3·6	5·20	5·82	5·12
April	1·1	0·88	0·80	1·16	0·24	1·25	1·5	1·7	2·29	5·02	0·47
May	1·3	0·77	0·94	0·80	0·60	0·93	0·8	0·7	0·88	1·19	0·39
June	1·7	2·30	2·58	1·68	2·27	1·74	1·8	2·0	2·51	1·52	2·20
July	2·9	5·00	2·90	3·39	3·03	2·57	3·9	2·5	3·69	5·55	4·20
Aug.	0·5	1·03	1·16	0·77	2·86	0·63	0·8	0·8	0·95	3·58	4·50
Sept.	2·6	4·60	3·61	3·44	3·61	1·89	3·3	2·5	2·19	6·93	5·48
Oct.	1·4	1·00	0·91	0·68	0·72	1·07	0·9	0·9	1·25	2·19	2·06
Nov.	2·3	3·93	3·76	2·69	2·60	2·23	2·7	2·5	2·87	6·66	7·52
Dec.	1·4	1·29	1·44	1·19	1·07	1·16	1·2	1·0	1·70	3·21	2·98
1861.	19·2	26·42	24·47	20·54	20·47	18·26	22·0	22·3	29·68	47·80	42·42

The LECTURES delivered in the Theatre of the Museum during the year 1861 were twelve in number. For three of these the Society was indebted to Mr. Procter; the Rev. Thomas Myers, the Rev. George Rowe, Mr. Dallas, and Professor Morris, each delivered two lectures, and Mr. O. A. Moore one. Abstracts of the Papers read at the Monthly Meetings will be appended to this Report.

The number of new members elected in 1861 was fifteen, and the loss by death and resignation ten, showing an increase of five ordinary members in the year. Four lady subscribers were admitted, and only one lost, giving an increase of three, and five associates were elected, without any counterbalancing loss. Hence, the Society's resources from subscriptions have been improved during the year just expired, by five ordinary members, and eight lady subscribers and associates.

The List of the Society's Honorary Members has sustained a loss of three names during the past year, and amongst these, that of one of the most distinguished of British Naturalists, the Rev. Professor Henslow. It is difficult to say in what department of Science the late Professor Henslow was most highly accomplished; his Mathematical knowledge was very great, and, doubtless had no little influence on his mode of working upon the Natural History Sciences, to which the peculiar bent of his mind led him to devote himself. His earliest appearance (about forty years ago) as a scientific writer was on a Geological subject, and he was soon appointed Professor of Mineralogy at Cambridge; after holding this office for three years, he became Professor of Botany at the same University, and retained this position up to the time of his death. In 1837 he was presented by the Crown to the living of Hitcham. During the remainder of his life he not only continued his Botanical Lectures at Cambridge, but devoted himself with great energy to the care of his Parish. Much of his success appears to have been due to his admirable method of communicating in an attractive form to the young and ignorant some portion of those vast stores of scientific knowledge to which he was continually adding.

W. H. Fitton, Esq., M. D., a Geologist of great reputation, and President of the Geological Society in 1827, had reached the advanced age of 82. Dr. Fitton is to be regarded as one of the founders of the British School of Geology. His early Papers on the Strata between the Chalk and the Oolite in the South-East of England and the Isle of Wight, gained him a European celebrity, and are still of great value. Numerous Memoirs from his pen are to be found in the publications of the Geological Society, and in 1852 that Society awarded him the Wollaston Medal, in testimony of the eminent services rendered by him to Science.

The Rev. Joseph Hunter had been from early life an earnest student of the Antiquities of this his native County, and in his History of its Southern portion, has left a work which, by its accuracy of research, clearness of arrangement, and comprehensiveness of view, has placed him in the first rank of topograph-

ical writers. Many points of interest in the civil and literary history of England have been illustrated by his writings, and as an Assistant Keeper of the Public Records he has borne an important part in the measures adopted for their preservation and use.

The Council propose for election as Honorary Members, William Fairbairn, Esq., President of the British Association, and Charles T. Newton, Esq., of the British Museum.

Of Mr. Fairbairn, it will suffice to say that he bears a name well known in the annals of Engineering Science, and that he is now the chief of one of the great Scientific Societies of the Country, which, like the one whose anniversary we celebrate this day, owes its origin and success to the same Founder.

Mr. Newton has published a Map of the Roman Roads in Yorkshire, and to his Researches in Asia Minor the National Museum owes the possession of some of its most interesting specimens of Greek art in sculpture and architecture.

By the demise of H. R. H. the Duchess of Kent the Society has lost one of its Patronesses. The Council feel that it is unnecessary for them to dwell upon the many estimable qualities of the deceased Princess, but they cannot refrain from expressing their deep sympathy with Her Majesty the Queen upon the mournful event of her mother's death, to be followed so soon by the severest of earthly bereavements.

The Address of Condolence to Her Majesty, which has been adopted by the present Meeting, bears with it, the Council feel assured, the heartfelt sympathy of every Member of the Society.

The Council propose the Hon. and Very Rev. the Dean as a Vice-President of the Society, and Edwin Wade, Esq., the Sheriff of York, Dr. Swaine, and the Rev. Robert Daniel, as the New Members of Council, in the room of Wm. Reed, Esq., F. G. S., and O. A. Moore, Esq., who retire by rotation, and the Hon. and Very Rev. the Dean, proposed as a Vice-President.

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THE  
TREASURER OF THE YORKSHIRE PHILOSOPHICAL SOCIETY  
IN ACCOUNT FOR THE YEAR 1861.

Cr.	RECEIPTS.		EXPENDITURE.	Dr.
1861.	£. s. d.    £. s. d.		£. s. d.    £. s. d.	
<i>Annual Subscriptions, &amp;c.:</i>				
Members - - -	592 2 0		Crown Rent - - -	1 0 0
Ladies - - -	40 0 0		Corporation Rent - - -	48 0 5
Associates - - -	22 0 0		Rates and Taxes - - -	9 19 7
Arrears - - -	16 0 0		Insurance & Water Rent	18 4 6
	670 2 0			77 4 6
<i>Admission Fees of New Members:</i>				
Paid in full - - -	18 0 0		<i>Salaries and Wages:</i>	
Paid by Instalments -	25 0 0		Keeper of the Museum -	200 0 0
	43 0 0		Sub-Curator - - -	100 0 0
Keys of the Gates - - -	42 11 0		Servant - - -	20 0 0
<i>Rents:</i>				
Miss Briskham's house	50 14 4		Lodge Keeper - . -	26 0 0
Prof. Phillips' House -	15 0 0		Attendant (Museum) -	35 14 0
Cottages in Marygate -	27 7 2		Attendant (Hospitium) -	8 14 0
	93 1 6		Collector - - -	6 12 6
Money received at the Gates - - -	195 11 4		Labourers - - -	155 10 6
Flower Show (Gross Receipts) - - -	44 14 6			552 11 0
Swimming Bath (Gross) - - -	93 1 5		<i>Interest on Debt to Insurance Com-</i>	
Sale of Guide to Antiquities - - -	9 13 0		pany to 31st December, 1861 - - -	73 1 4
„ Catalogue of Library - - -	0 4 0		Interest, &c., to Bankers - - -	2 8 6
Use of Tent - - -	9 0 0		<i>Museum, Gardens, &amp;c.:</i>	
	£1200 18 9		General Expenses and Repairs -	125 6 8
Excess of Expenditure, 1861 - - -	156 11 8		<i>Purchase of New Tent</i> - - -	105 0 0
	£1357 10 5		<i>Purchase and Preparation of Speci-</i>	
<i>Permanent Debt:</i>				
Yorkshire Insurance			<i>mens:</i>	
Company - - -	£1900 0 0		Purchase of Fossils	
Due to Five Members,			from Mr. Bainbridge	55 0 0
£50 each - - -	250 0 0		Sundries - - -	2 8 0
	2150 0 0			57 8 0
Balance in Treasurer's			<i>Library, for Books and Binding</i> -	26 19 3
hands 31st Dec., 1860	156 5 4		<i>Swimming Bath:</i>	
	1993 14 8		Keeper's Salary - - -	30 0 0
Excess of Expenditure,			Water Rent - - -	25 0 0
1861 - - -	156 11 8		Repairs and Incidental	
Balance of Museum En-			Expenses - - -	15 19 0
largement Account				70 19 0
transferred - - -	404 9 9		Flower Show Expenses - - -	62 4 5
	561 1 5		<i>Miscellaneous Expenses:</i>	
Total Debt - - -	£2554 16 1		Printing Report - - -	16 0 0
			Printing Catalogue of	
			Antiquities - - -	35 0 0
			Printing, Stationery,	
			&c. - - -	18 6 2
			Coals and Gas - - -	71 7 5
			Expenses connected	
			with Band - - -	26 8 11
			„ Lectures - - -	21 13 1
			Garden-seeds, &c. - - -	5 0 0
			Postages and Petty	
			Expenses - - -	10 12 2
				204 7 9
				£1357 10 5
			<i>Permanent Debt:</i>	
			Yorkshire Insurance	
			Company - - -	£1900 0 0
			Due to Five Members	
			at £50 each - - -	250 0 0
				2150 0 0
			Balance due to Treasurer	
			at 31st Dec., 1861 - - -	404 16 1
				£2554 16 1

## MEMBERS

ELECTED SINCE FEB., 1861.

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 1861.

His Grace the Archbishop of York.  
 John Blanchet, *Blake Street*.  
 C. L. Burdekin, *Parliament Street*.  
 Edwin Chadwick, *Grimston Lodge*.  
 Richd. Dresser, *Pavement*.  
 C. H. Dunhill, *St. Mary's*.  
 Tom L. Langdale, 28, *Blake Street*.  
 Mrs. Markham, *Museum Street*.  
 Miss Matterson, 25, *Bootham*.  
 Rev. B. Newenham, *The Crescent*.  
 John Nicholson, *St. Sampson's Square*.  
 Alfred C. Pope, *Bootham*.  
 W. Benson Richardson, *Marygate*.  
 Henry Steward, *Bootham*.  
 Joseph Todd, *Petergate*.

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 ASSOCIATES.

1861.

John Beckett, *Minster Yard*.  
 W. H. Bell, *Colliergate*.  
 Edward Crosby, *Penley Grove Street*.  
 John Hamilton, *Spurriergate*.  
 R. H. Scaife, *The Mount*.

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 LADY SUBSCRIBERS

ADMITTED 1861.

Mrs. Claridge, *Monkgate*.  
 Miss Clark, *Penley Grove Street*.  
 Mrs. C. Lane Fox, *Coney Street*.  
 Mrs. Hey, *Chapter House Street*.

## RESOLUTIONS

PASSED AT THE ANNUAL MEETING, FEB. 4TH, 1862.

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1. That Wm. Fairbairn, Esq., President of the British Association, and C. T. Newton, Esq., of the British Museum, be elected Honorary Members of the Society.

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

3. That the thanks of the Society be given to the Members of Council retiring from Office, and also to the Treasurer, the Secretary, and the Curators, for their valuable services.

4. That the Council be empowered to give Admission to the Museum, Hospitium, and Grounds, on Whit-Monday and Tuesday next, under the same regulations as last year.

5. That power be given to hold Horticultural Meetings, and to admit Temporary Subscribers on the usual terms.

6. That the thanks of the Meeting be given to the Chairman.

## LECTURES

DELIVERED DURING THE YEAR 1861.

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JAN. 30.—On the Languages and Philosophies of China; by the REV. THOMAS MYERS, M. A.

FEB. 7.—On the Coral Islands of the Pacific; by the REV. GEORGE ROWE, M. A.

FEB. 13.—On the Metamorphoses of Animals; by W. S. DALLAS, Esq., F. L. S.

FEB. 27.—The Tour of Mont Blanc; by O. A. MOORE, Esq.

MARCH 20.—On Accidents in Coal Mines, and the Principles of the Safety Lamp; by W. PROCTER, Esq., F. C. S.

APRIL 5 and 8.—On the Magnesian Limestone, New Red Sandstone, and Lower and Middle Lias, and on the Upper Lias and Oolites of Yorkshire; by PROFESSOR JOHN MORRIS, F. G. S.

OCT. 16 and 30.—On the Nature and Properties of Light; by W. PROCTER, Esq., F. C. S.

NOV. 13.—On some Recent Researches among the Valleys of Mount Sinai; by the REV. THOMAS MYERS, M. A.

NOV. 27.—On Sea Anemones and Corals; by W. S. DALLAS, Esq., F. L. S.

DEC. 11.—On New Zealand; by the REV. GEORGE ROWE, M. A.

COMMUNICATIONS  
TO THE  
MONTHLY MEETINGS,  
1861.

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MARCH 5.—WM. PROCTER, Esq., F. C. S., read a paper on "Aluminium." He traced the history of the discovery of Aluminium from the time of Davy to that of Wöhler and Deville, who first obtained it in any quantity, and described the process adopted by the latter chemist for procuring Aluminium by the decomposition of its chloride by metallic sodium. Certain difficulties attendant on this process led Dr. Percy to suggest the mineral called Cryolite, a fluoride of aluminium and sodium, as a source of aluminium. The process consists in heating the powdered mineral, with common salt and sodium, for two hours in a covered crucible; at its conclusion the metal is found at the bottom of the slag. The price of the metal, when it was first obtained, was £40 for thirty-five ounces. In 1806 Deville had reduced it to £3 per ounce, and is now usually worth five shillings per ounce, although Mr. Gerhard, who is engaged in preparing the metal from cryolite on a large scale at Battersea, stated at a meeting of the Society of Arts, that he had undertaken a contract at 3s. 9d. per ounce.

Aluminium is a white metal, with a bluish tinge, and a lustre inferior to that of silver. Its specific grav. is 2·6, or about one-fourth that of silver, a property of importance, as this lightness causes a given weight of aluminium to go as far in the manufacture of articles as four times the quantity of silver. It is malleable, and ductile, and possesses considerable tenacity; when pure it is as hard as silver, but it has no great elasticity, and requires rather a high temperature to fuse it. It is not oxidised by exposure to air, even at high temperatures; it resists the action of sulphur and sulphuretted hydrogen which so rapidly tarnish silver, and is insoluble in any of the ordinary acids, except the muriatic; potass, soda, and ammonia in solution dis-



solve it rapidly ; and the beautiful frosted appearance seen on articles manufactured of aluminium is produced by plunging them for a short time in a solution of potass at blood heat, and then immersing them in nitric acid.

It will easily be seen that a metal possessing the properties above described will be capable of many applications, and aluminium has already been employed in the manufacture of a great number of articles. Its chief use, however, will probably be in the production of alloys, as it gives increased hardness to whatever metal it is used with. An alloy of 3 parts aluminium, and 97 parts iron, has the brilliancy of pure silver, and does not tarnish. 100 parts silver, and 5 parts aluminium, form an alloy as hard as sterling silver, and as easily worked as the pure metal. Copper, with a quarter of its weight of aluminium, gives an alloy of the colour of gold, and very malleable. With 20 per cent. of aluminium the alloy is white ; and a mixture of 90 parts copper, and 10 parts aluminium, is harder than bronze, and has been used for the works of clocks and watches. Calvert describes an alloy of 15 aluminium and 78 iron, which does not rust in moist air, or water.

APRIL 2.—The REV. J. KENRICK read a paper on the Rev. Mr. M'Enery's researches in Kent's Hole, near Torquay. Kent's Hole is a fissure in the limestone rock, which belongs to the Old Red Sandstone formation. Its floor is covered with a stalagmitic deposit, under which lies a bed of mud and gravel, brought in by a flood of water. According to Mr. M'Enery the various contents of the cave follow each other in this order, proceeding downwards from the surface. First, black pottery, with traces of the lathe, human teeth and bones, beads, bone pins, and other articles, belonging to the Romano-British period, when the Romans had an encampment on the down above the cave. Lower down were found arrows and spear heads of flint, and stone axes, among fossil teeth and bones of herbivorous and carnivorous animals, but no pottery or other works of art ; lowest of all the bed of diluvial mud, containing merely animal remains, but no works of art, except some flint instruments adhering to its upper surface. Mr. M'Enery's description of the succession of deposits, however, has been called in question by a geologist of great eminence, Mr. Godwin Austen, who maintains, that the human remains and the arrow heads and knives of flint, occur promiscuously with the bones of the extinct animals in all parts of the cave, and through the entire thickness of

the clay ; and that no distinction, founded on condition, distribution, or relative position, can be established, whereby the human can be separated from the other relics.

Mr. M'Enery observed that the flint implements found in the lower deposit were rude, compared with those higher up. This is in accordance with what Mr. Worsaae and other antiquaries have remarked, that what has been called the *stone period* requires to be subdivided, and that there are marks of two stages of advancing civilization, discriminated by the different degrees of skill shewn in the manufacture of the implements of flint.

Mr. M'Enery's researches give a truly formidable view of the strength and ferocity of the carnivorous animals to whom Kent's Cavern served as a den or a sepulchre ; such as the *Machairodus latidens*, the *Ursus spelæus*, and the Hyæna. Even the large pachydermata, as the *Elephas primigenius* and *Rhinoceros tichorhinus*, whose bones were found here, must have been dangerous contemporaries to man, armed only with flint implements. Whether they were really contemporaries here is rendered doubtful by the conflicting accounts of Mr. M'Enery and Mr. Austen. Scientific enquirers, however, as Professors Owen and Phillips, have expressed themselves in favour of the opinion, that man may have been contemporary with some of the now extinct species of Mammalia. This can indeed furnish us with no exact measurement of time, but it seems to carry the history of man further back into past ages, than our ordinary chronology allows. Geology has shewn, that the progressive changes which the globe has undergone, have been a continued preparation for his residence. He could not want the means of subsistence, where the ox and the deer could live, and their bones have been found in the Kent Cavern. It seems in accordance with the wisdom and benevolence of his Creator, that the scene thus prepared for him should not wait long for his introduction.

MAY 7. — W. REED, F. G. S., read some "Remarks on the Fossil Fishes of Monte Bolca," in connection with a specimen of *Gasterone-mus rhombeus* from that locality, lately presented to the Society by R. Denison, Esq. Monte Bolca is a hill near Verona, capped with basalt, and composed chiefly of clayey and calcareous strata, with beds of a cream-coloured fissile limestone, in which the remains of fishes, in a most beautiful state of preservation, are very abundant. They are all flattened, but some retain traces of colour, and the scales, fins, and

bones are well preserved. From the great number of remains of fishes found in this limited space it appears probable, that the limestone in which they are imbedded was suddenly poured into the ocean by volcanic agency, surrounding and suffocating the fishes. There are, according to Agassiz, 127 species, which are wholly extinct; these belong to 77 genera, of which 38 are extinct, and 39 still living. The still existing genera appear for the first time in this formation. The beds belong to the Eocene Tertiary period, like the London clay, many of the fishes of which are nearly allied to those of Monte Bolca.

W. REED, Esq., also read a paper "On the Bovey Tracey Coal." This coal, which is considered to belong to the Middle Tertiary period, called Miocene by many writers, is found near the Dartmoor Hills, in Devonshire, and is of great geological interest. Alternately with clay and marl it rests in a depression of the Cretaceous system, having the Upper Green Sandstone beneath it. The Bovey beds consist of about seventy alternate layers of clay and lignite, varying in thickness from 4 inches to 4 feet 6 inches. The mass of the lignite appears to be made up of coniferous wood; the coal field extends for eight or ten miles in an irregular elongated form. It is a lacustrine deposit. The clay and sand are derived from the decomposition of the neighbouring granite, and carried down by streams; the clay is the same as that found in abundance in the neighbourhood, and extensively used in the potteries under the name of China clay. The clay in the Bovey beds is inapplicable to that purpose, from its being mixed with lignite. The lignite itself, however, is likely to become of great commercial importance. It may be converted into an excellent charcoal, and the South Devonshire Iron Company are now erecting works and furnaces for the purpose of smelting iron ore with it. The coal is obtained partly by sinking shafts, and partly by open quarries, the latter forming an excavation of several acres, in which the geologist may pursue his enquiries. From the investigations already made it would appear that these beds contain scarcely any traces of Animal life, but the lignite reveals to us a most luxuriant Flora, consisting chiefly of subtropical forms. Amongst other remains there occur numerous leaves, fruit, and small seeds of plants belonging to a group most nearly allied to ferns, and several of the other forms are closely related to plants found in the Brown Coal or Lignite beds of Germany, which are also of Middle Tertiary age.

O. A. MOORE, Esq., read some observations "On the Ancient Chinese Sepulchral Remains," presented by C. M. Jessop, Esq. (A full account of these interesting Remains, from the pen of Mr. Jessop himself, has been published in the *Gentleman's Magazine*, May, 1861, p. 483.)

JUNE 4.—The REV. J. KENRICK gave an account of some Roman antiquities lately discovered at the Mount, and now in the possession of Mr. Rush. The most remarkable of them is a stone tablet, part of a monument raised by Q. Corellius Fortis to his daughter Corellia Optata, who died at the age of thirteen. When perfect it had at the top a sculptured figure, of which only the feet remain. The inscription reads as follows.

[D] M.

CORELLIA OPTATA ANN. XIII.

SECRETI MANES QUI REGNA ACHERUSIA DITIS  
 INCOLITIS QUOS PARVA PETUNT POST LUMINA VITÆ  
 EXIGUUS CINIS ET SIMULACRUM CORPORIS UMBRA  
 INSONTIS GNATÆ GENITOR SPE CAPTUS INIQUA  
 SUPREMUM HUNC NATÆ MISERANDUS DEFLEO FINEM.

Q. CORE. FORTIS PATER F. C.

Inscriptions in verse are very rare in Britain, especially of the sepulchral kind. The name Corellius appears in Gruter, and Corellius Pansa was Consul A. D. 122. The daughter of the house usually bore the feminine form of the name of the *gens*, the second of the three names which belonged to a genuine Roman. The daughter of Q. Corellius Fortis was Corellia, as the daughter of P. Cornelius Scipio was Cornelia, the mother of the Gracchi.

The inscription, though possessed of no high poetical merit, is correct in grammar and rhythm. The author appears to have been a reader of the Latin poets, as there are traces of the imitation of their phraseology. "Acherusia templa" is borrowed from Lucretius. "Lumina vitæ" is a Virgilian phrase for life. "Spe captus iniqua" is a variation on Virgil's "spe captus inani." *Æn.* XI., 49.

Among the other remains from the same spot are a feeding bottle\* and a glass vase, which when found was half filled with bones, probably those of Corellia Optata. Similar glass vessels have been found elsewhere, filled with burnt bones. † From the Abbé Cochet's

\* See Descriptive Catalogue of Antiquities, p. 64.

† See Arch. Journal, Vol. vi. p. 110. *Archæologia*, vii. 96.

“Normandie Souterraine” we learn, that the Roman Cemeteries in that province contain glass urns, partially filled with bones.

In regard to the age of the interments at the Mount it is difficult to say anything precise. Cremation ceased soon after the age of Constantine; they probably therefore preceded that period. The form of the letters and the numerous ligatures would lead one to assign the inscription to the third century after Christ. Various articles of household pottery, not having any sepulchral use, were found near the tablet, others have been used to contain ashes. Why household vessels should have been placed in tombs is not clear. The most probable opinion is, that the practice arose from a desire to surround the deceased with objects associated with his domestic affections. To this desire the antiquary owes the preservation of many interesting and instructive relics, from the splendid vases of Greece and Sicily, Campania and Etruria, to the humbler vessels which are found in British, Roman, and Saxon sepulchres.

NOVEMBER 5.—The REV. J. KENRICK read a notice of the excavations which have been carried on at Wroxeter, near Shrewsbury, the Uriconium of the Romans. The paper was illustrated by a drawing of the remains of a public building, conjectured to be the Basilica, and a ground-plan of the extensive hypocausts of the public baths. In the mode of construction, and the nature of the objects of antiquity found within the walls, Uriconium closely resembled Eburacum, and the other Roman cities whose remains have been explored. An impression was exhibited from one of the medicine stamps, used by the Roman oculists, which has been found at Uriconium. The inscription reads:

TIB. C. L. M.

DIALIBA

AD. OM

NE UN

O EX O.

The Dialibanum was an ointment into which the fragrant resin *libanus* or *olibanum* entered as an ingredient. It was to be used *ad omne unguentum oculorum*, mixed (ex o.) with egg. Each Cohort had its *medicus*, subordinate to the *medicus* of the Legion.\* At the side

\* See Professor Simpson's Pamphlet, "Was the Roman Army provided with Medical Officers?" Wright, "The Celt, the Roman, and the Saxon," p. 249.

of the inscription a small branch is represented, probably the shrub whence the olibanum was derived. An exploration of the cemetery of Uriconium without the walls has been begun, which promises to be productive of interesting results.

DECEMBER 3.—A notice by the REV. J. KENRICK was read of a series of Casts, from inscriptions made by state prisoners in the Beauchamp Tower, Tower of London,\* presented to the Society by Lady Frankland Russell. They are nearly all of the reigns of Henry VIII., Edward VI., Mary, and Elizabeth. The civil and religious history of the sixteenth century shows sufficiently why so many eminent persons were confined in the Tower, commonly as a preliminary to their execution. Henry VIII. visited with equal severity those who denied his own supremacy or the real presence. The Pilgrimage of Grace, the overthrow of the Duke of Somerset in 1551, the attempt to place Lady Jane Gray on the throne, Wyatt's rebellion, the machinations of the Roman Catholics and the partizans of the Queen of Scots against Elizabeth, all in their turn brought prisoners to the Beauchamp Tower, many of whom have recorded their names, their armorial bearings, and the reflections which captivity and the prospect of death inspired. Among the most remarkable are Adam Sedbergh, the last Abbot of Jervaulx; Dr. Abel, who denotes himself by a rebus, A and a bell; the Duke of Northumberland, and Lady Jane Gray; the nephews of Cardinal Pole, and several Roman Catholic priests. Some of the inscriptions are in Italian, a language which our literary history shows to have been then extensively diffused in England.

DECEMBER 3.—W. PROCTER, Esq., F. C. S., read the first part of a paper "On the decay of Building Stones, and the means proposed for its prevention." After some introductory observations, he said that stones used for buildings were of four kinds—1st, granites and other igneous rocks; 2nd, sandstones; 3rd, limestones; 4th magnesian limestones. He described the mineralogical and lithological characters of those varieties, alluding at the same time to some of the circumstances under which they decay, and drawing especial attention to the importance of crystallization in limestones, and the manner in which they were put in a building, in relation to their planes of lami-

\* See a paper by the Rev. Mr. Brand, Secretary of the Society of Antiquaries, in the *Archæologia*, vol. xiii.

nation, as well as the varying character of stones in different parts of a quarry, and it was thought that inattention to these circumstances was one great cause of the rapid decay of many modern buildings. He then proceeded to detail the several causes of decay, and said that practically the destruction of absorbent stones is connected with exposure to a damp atmosphere, rendered impure by various acid and alkaline vapours, and also with changes of temperature, especially above and below  $38^{\circ}$ , at which water obtains its greatest density. The deleterious substances are oxygen, carbonic acid, nitric acid, ammonia, and water of the air, and to these, in towns, may be added sulphurous, sulphuric, and hydrochloric acids. Carbonic acid in solution, as in rain, is a powerful solvent of all kinds of calcareous matter; in calcareous and magnesian rocks it acts by transforming the insoluble into soluble carbonates, thus removing the lime and magnesia from the stone, for although the quantity is small the action of the solvent is continuous. On other rocks it assists disruption, by the solution of the material cementing the particles together, and eventually making all yield to its influence. The various acids mentioned must be looked upon as amongst the principal agents in effecting the destruction of stone. They result from combustion and various manufacturing processes carried on in towns. Dr. A. Smith has shown that the air of the central part of Manchester contains twenty-five parts of sulphuric acid in 100,000 of air. This acid acts directly on the magnesian limestones, and indirectly on sandstones, by the solution of the cementing materials, and thus, besides destruction, causes increased porosity of stone, rendering it more amenable to the action of water and frost. Besides this, in magnesian stones there is the formation of sulphate of magnesia, remarkable for the large amount of water of crystallization which it contains; the powerful mechanical effects resulting from the solidification of this water produces effects similar to those produced by the expansion of freezing water, and is the basis of Brard's test for the value of building stones. Nitrification is similar to the preceding, and arises from the formation of various nitrates or sulphates in the stone, under certain circumstances and in certain situations, which were detailed. This change displays itself by the formation of minute crystals, efflorescing from the interior to the exterior of the stone, and leading ultimately to its disruption. The porosity of a stone, either natural or induced by any of the previous causes, is important in estimating its stability, for water, when absorbed, acts upon stone quite as much, through the changes in its volume at

different temperatures, as it does by chemical solution. Water is absorbed, a frost sets in, the liquid freezes and expands, the result is that portions are mechanically, by the expansive force of the water, detached, or the entire face of the stone peels off. Practically, then, the great agent in the destruction of building stones is the water of the atmosphere, and the efforts of those who seek to prevent this destruction must be directed to this primary source of evil. It is a singular fact that in numerous instances modern structures have rapidly decayed, whilst ancient ones, built of the same stones, have stood for centuries but little affected. Perhaps the rapidity with which stone at the present time is obtained from the quarry, sent to its destination, and placed in a building without time for drying or weathering, may serve to explain this discrepancy.

JANUARY 7, 1862.—The REV. J. KENRICK announced that the Dean and Chapter had kindly consented, on the application of the Council, to deposit in the Museum some Roman and mediæval antiquities, hitherto kept in the Minster and the Library.\* Of these the most remarkable is the small altar to the Deæ Matres or Matronæ, which was found in Micklegate in 1752, and figured in the late Rev. C. Wellbeloved's *Eburacum*, Plate x, p. 87. As the inscription has given rise to several readings and interpretations, which may be seen in that work, it has been thought desirable to insert a lithograph of it, made from a rubbing of the stone. Mr. Kenrick remarked that GUBER. in the fourth line had created some difficulty, as GUBERNATOR, which the abbreviation must represent, was not the name of any legionary officer. He suggested, however, that as the Sixth Legion was so long settled at York, on the banks of a navigable river, the word might bear the ordinary sense of pilot or steersman; and that the dedicator of the tablet may have had the charge of the vessels, by means of which the legion communicated with places on the Ouse or the rivers which fall into it.

W. PROCTER, Esq., F. C. S., read the second part of his paper "On the Decay of Building Stones, and the means proposed for its prevention." He commenced by reference to the chief causes of decay, which he considered in detail last month, and stated that on this occasion he proposed to consider the remedies. The great object is to render the stone non-absorbent, and this has been attempted to

\* See List of Donations.



MATRE MATRE MATRE

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MATRE MATRE MATRE  
MATRE MATRE MATRE

INSCRIPTION ON THE ALTAR TO THE DEÆ MATRES.

(in the Museum of the Yorkshire Philosophical Society.)



be effected by covering them with paint or other oleaginous matters holding various substances in solution; but from their very nature these must all be ineffective, on account of the speedy decomposition they undergo. Bituminous or pitchy matters are the only solutions of this class which are at all likely to be permanent, but the unsightly appearance they give to the structures on which they are used is an insuperable objection to their use. Attention must then be directed to the mineral kingdom, and here we must find a substance or substances capable of firm adhesion, and not liable to be acted upon by those agencies which exist in the atmosphere, and are capable of effecting the destruction of stone. More than thirty years ago, Dr. Fuchs, of Munich, discovered a soluble compound of silica with an alkali, and called it water-glass. This solution, exposed to the air, becomes viscid, opaque, and then hard, in consequence of the carbonic acid of the air abstracting the alkali and liberating the silica. Dilute acids produce a similar result. Mr. Kuhlmann, of Lille, in 1841, began the publication of a series of papers on this subject, which were continued up to 1857. Observing the hardness produced in chalk by immersion in a solution of water-glass, he thought this might be used for the hardening of stone. He proposed to cover buildings with such a solution, after cleaning the surface. In 1844 Mr. Ransome, of Ipswich, took up the subject, and seems at the time to have been unacquainted with the researches of Fuchs and Kuhlmann. On operating with the solution of silica he found that rain or even damp at once removed the film of hardened matter before the separation of silica was completed, and this seems to be the case with part of the Houses of Parliament submitted to the process of the French chemist. The buildings similarly operated on in France are decaying, shewing that a simple and superficial deposit of silica is insufficient. Mr. Ransome then after saturating the stone with the solution, followed it by a weak acid, so as to precipitate the silica in the substance, but found it was separated in a state in which it had no cementing or cohesive power. He then thought that if he could precipitate into the stone itself a compound possessed of great durability and hardness as well as cementing power, the difficulty would be overcome. Considering that silicate of lime was the cause of the hardness of most cements and mortars, he produced that substance in this manner:—After the stone is cleaned it is washed over with a solution of silicate of soda, followed after a time by a solution of chloride of calcium. The result is that a decomposition takes place in the stone, attended by the pro-

duction of the cementing silicate of lime and chloride of sodium (common salt). The former is firmly attached around each grain of the stone, making it compact and unalterable by carbonic or even diluted mineral acids, and the latter salt is washed away by water. Mr. Procter then proceeded, by experiments, to show the change which takes place by mixing the two solutions in a glass, and showing the precipitation of the insoluble silicate of lime, which soon attached itself firmly to the glass. He also showed that dilute sulphuric acid acted violently on Caen stone, but had no action on a block of similar stone treated by Mr. Ransome's process, specimens of which he had kindly sent to the reader of this paper. This process has been applied to the Houses of Parliament at Westminster, the Baptist Chapel, Bloomsbury, and numerous other private and public buildings, from all of which, so far, the reports are of a highly satisfactory nature. The process is more than surface hardening, it is one of induration, increasing the density of the stone, instead of forming a superficial coating, and would seem to fulfil the conditions that the indurating material should enter the pores of the stone sufficiently, and that neither the grain nor colour should be affected. Another process, the "Silicat Zopissa," was introduced by a Hungarian gentleman of the name of Szerehuy. It is a secret process, and therefore little can be said about it. It seems to be Kuhlmann's process succeeded by a wash of bituminous material, which Mr. Warrington believes to consist of zinc paint thinned down with heavy oil of tar, and this diffused in a weak solution of silicate of soda by means of size. If this be so, it is open to the same objection as the process of the French chemist. Dr. Faraday gives a qualified opinion respecting it. He says that although it appeared to him that the composition of Mr. Szerehuy rendered the stone at the time of his inspection less absorbent of water than that of Mr. Ransome, yet the period of time did not enable him to come to any satisfactory conclusion as to which of the two would be more or less permanently beneficial; in this opinion Sir R. Murchison coincides. Dr. Frankland's examination would go to show that two or three different mixtures have been employed upon respective parts of the Houses of Parliament, and that the mixture with which the speaker's court was covered in 1858, had been so decomposed as to leave little indication of its original composition, and has required a re-application. If on sufficient experience, it is even found to preserve the stone, this will be effected at the sacrifice of appearance. In one of the small courts of the Palace at Westminster, where it has been tried, the colour is of a gloomy and unpleasant tint, not uniform, and the surface already suffering, appearing to possess no more tenacity or durability than a coating of any other

colouring matter. Mr. Procter, after mentioning the use of other silicates, then proceeded to speak of the processes of Field and Bernhays, of Crooke and of Jesse Rust, who proposed to use hydro-fluoric acid or hydro-fluo-silicic acid alone, or with various saline compounds, and also of that of Mr. Spiller, who, by the use of a wash of superphosphate of lime, proposes to deposit phosphate of lime on stones as the hardening and preservative material. The paper was concluded with extracts from the report of the Government chemical committee, composed of Dr. Hoffman, Dr. Frankland, and Mr. Abel, who seem to think that the experiments have not sufficiently stood the test of time to enable them to give a decided recommendation to any process, but say that several of the processes included in the first two subdivisions (the silicating processes) "will in the course of a few years furnish ample data for correct conclusions regarding their applicability, for the only conclusive test is that of actual application and protracted exposure to the corrosive influence of a London atmosphere."

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## DONATIONS TO THE MUSEUM.

## GEOLOGY AND MINERALOGY.

Denison, Robert, Esq. ....	A Fossil Crab.
Gibson, J. H., Esq., M. D. .	A Specimen of Cinnabar from California.
Harland, Mr. Thomas, } ( <i>Holme on the Wold</i> ) ... }	Fossil Sponges from the Chalk near Beverley.
Harrison, Wm., Esq. ....	Numerous Fossils from the Coal Measures,—presented through E. Swaine, Esq.
Milner, Sir W. M. E., Bart.	A large Specimen of <i>Lepidodendron</i> from a quarry at Aldwark, near Rotherham.
Walker, J. F., Esq., ( <i>Gillygate</i> ) .....	Fossils from the Oolitic Beds in the vicinity of Cirencester.

## ZOOLOGY.

Baines, Mr. H. ....	A pair of Goliath Beetles.
Graham, Mr. D. ....	A Sea Bream, taken at Scarbro'.
Holland, Mrs. F., ( <i>Alnwick</i> )	A Specimen of Coral ( <i>Explanaria</i> ).
Maskell, Miss .....	Specimen of the Whip Snake, from Bahia.
Newby, W., Esq., ( <i>Liverpool</i> ) .....	A Collection of Cowries and Olives.
Purchased by Subscription .	Female Specimen of the Great Bustard, shot at Rufforth, near York.
Watt, Capt., ( <i>Bishop Burton</i> ) .....	A Royal Stag's Head.

## ANTIQUITIES.

Bainbridge, John, Esq. ....	Four Stone Implements.
Buncombe, Rev. C. J. ....	Head of a Cross Flory, from the Church of Bishophill Junior.
Burdekin, Mr. C. L. ....	Three Clappers of the Old Minster Bells.
Cooper, Mr. T., ( <i>Walmgate</i> )	A Roman Urn, from the Parish of St. Dennis.
Coulman, W., Esq., ( <i>Goole Bank, Carwood</i> ) .....	} A Sword found in Hatfield Chase.
Dawson, Messrs., ( <i>Lincoln</i> )	
Jessop, C. M., Esq. ....	A Roman Mortar, found in Lincoln, presented through Jos. Wilkinson, Esq.
Kenrick, Rev. John .....	Chinese Sepulchral Antiquities, from Canton, presented through O. A. Moore, Esq.
Moore, O. A., Esq. ....	A Coin of Constantine, found in the Rampart covering the Roman Wall near Monk Bar.
Newstead, T. C., Esq. ....	A Stone Implement.
Noble, T. S., Esq. ....	A Silver Bodkin, found at Howden.
North, S. W., Esq. ....	Ancient Wooden Coffin, and Skeleton, found at Church Hill, Selby.
Scaife, R. H., Esq. ....	A Copper Coin of Allectus, and one of Salonina, found at a depth of 20 feet near Micklegate Bar.
Swaine, E., Esq. ....	Copper Tradesmen's Tokens, &c.
Swineard, Mrs., Executors of	A Plan of Roman York.
Webbe, W. F., Esq. ....	Fragments of Vases found on the Mount.
	Portions of a Shrine, in Blue Marble, found in Precentor's Court.
	A Quern, found at Cowton Castle.

## ANTIQUITIES DEPOSITED BY THE DEAN AND CHAPTER.

Two Stone Coffins.

Altar to the *Deæ Matres* (see p. 34).

Antefixum.

Tile of Legion IX.

Encaustic Tile.

Sculptured Stone.

Stone from the old Prison near the North West Tower of the Minster.

Stone inscribed "Civitati," formerly marking the boundary between the jurisdiction of the Castle and that of the City.

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## MISCELLANEOUS.

Gold, Miss ..... A Carved Wooden Stool, from Ashantee.  
 Whitaker, W. W., Esq. ... Belt, Pouch, Boots, &c., from Swedish  
 Lapland.

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## LIBRARY.

Admiralty, Board of ..... Astronomical, Magnetical, and Meteorological Observations made at the Royal Observatory, Greenwich, in the year 1859.

Association, British, for the }  
 Advancement of Science } Report for 1860.

The Author ..... De la Génération Spontanée, par M. Boucher de Perthes.

The Author ..... Nègre et Blanc, par M. Boucher de Perthes.

The Author ..... Flint Implements in the Drift, being an account of their discovery on the Continent and in England, by John Evans, Esq., F. S. A., F. G. S., &c.

The Author ..... The Motions of Fluids and Solids, relative to the Earth's Surface, by W. Ferrell, Esq., A. M.

The Author ..... The Scientific Principles of Medical Psychology, by T. Laycock, Esq., M. D., &c.

The Author ..... Plantes Vasculaires des Environs de Cherbourg, par Auguste Le Jolis.



- The Author ..... The Progress of Economic Science during the last thirty years, by W. Newmarch, Esq., F. R. S.
- The Author ..... Travels in England, by Dr. J. Shaw.
- The Author ..... Lyminge in Kent, by Chas. Roach Smith, Esq.
- The Author ..... A Memoir on Dax, by C. Roach Smith, Esq.
- The Author ..... Examination of a Chambered Barrow, at West Kennett, Wiltshire, by Dr. Thurnam.
- Bainbridge, John, Esq. .... Haidinger's Naturwissenschaftliche Abhandlungen, 2 vols.
- Barber, J. S., Esq. .... Columella on Husbandry, translated into English.
- Berwickshire Naturalists' Field Club ..... } Proceedings for 1860—61.
- Boucher de Perthes, M. ... Bibliographie des Ouvrages de M. Boucher de Perthes.
- British Museum, Trustees of Select Egyptian Papyri, part 3.
- Burdekin, Mr. C. L. .... The *York Courant* from 1773 to 1800.
- Dyson, Wm., Esq. .... British Almanac and Companion, 18 vols.
- Hey, Rev. Wm. .... Catalogue of British Coleoptera, by G. R. Waterhouse, sheets H. and I. (2 copies).
- Londesborough, The Lord .. An Illustrated and Descriptive Catalogue of the Collection of Antique Silver Plate formed by the late Lord Londesborough.
- Marsh, Mr. T. .... The English Atlas, vols. 1, 2, and 4, (1680).
- Patents, United States Commissioner of ..... } Report for 1859.
- Read, W. H. Rudston, Esq. Proceedings of the Linnean Society.
- Royal Institution of Great Britain ..... } Proceedings, part 11.
- Société Impériale des Sciences Naturelles de Cherbourg ..... } Mémoires, Tome VII.
- Society, Chemical ..... Quarterly Journal, Nos. 52—55.
- Society, Geological ..... Proceedings for 1861, part 65.

Society, Geological and Polytechnic, of the West Riding of Yorkshire.....	}	Proceedings for 1860.
Society, Hull Literary and Philosophical .....		
Society, Leeds Philosophical and Literary .....	}	Report for 1860—61.
Society, Liverpool Literary and Philosophical .....		
Society, Scarborough Philosophical & Archæological	}	Twenty-ninth Annual Report.
The Superintendent .....		
Tyneside Naturalists' Field Club .....	}	Transactions, vol. v., part 1.

### SERIAL WORKS SUBSCRIBED FOR.

- A Monograph of the Trochilidæ or Humming Birds, by John Gould, F. R. S. (completed ; 25 parts).
- Birds of Australia, by the same, supplementary parts (3 published).
- Birds of Asia, by the same (13 parts published).
- Exotic Butterflies, being illustrations of New Species chiefly selected from the Collections of W. Wilson Saunders and W. C. Hewitson. By W. C. Hewitson. (23 Nos. published.)
- Fauna Antiqua Sivalensis, or Geology of the Sewalik Hills, in the North of India, by Dr. Falconer and Major Cautley. (Parts 1 to 9 of illustrations, and part 1 of Letterpress.)
- Proceedings of the Zoological Society, with Illustrations.
- Publications of the Palæontographical Society.
- Publications of the Ray Society.
- Sowerby's Thesaurus Conchyliorum, col. plates (20 parts published).
- Crania Britannica, or Delineations and Descriptions of the Skulls of the Aboriginal and early Inhabitants of the British Islands, by J. B. Davies, F.S.A., and J. Thurnam, M.D., F.S.A. (4 Parts published).
- London, Edinburgh, and Dublin Philosophical Magazine.
- Annals and Magazine of Natural History.
- Archiv für Naturgeschichte.
- The Geologist.











