November 30, 1880.

ANNIVERSARY MEETING.

THE PRESIDENT in the Chair.

The Report of the Auditors of the Treasurer's Accounts on the part of the Council was presented, by which it appears that the total receipts during the past year, including a balance of £1,264 6*s.* 8*d.* carried from the preceding year, amount to £8,592 12*s.* 9*d.*; and that the total expenditure in the same period, including purchase of stock, amounts to £7,397 7*s.* 8*d.*, leaving a balance at the Bankers' of £1,178 9*s.* 7*d.*, and £16 15*s.* 6*d.* in the hands of the Treasurer.

The thanks of the Society were voted to the Treasurer and Auditors.

The Secretary read the following Lists:—

Fellows deceased since the last Anniversary.

On the Home List.

Ansted, David Thomas, M.A.
Bell, Thomas, F.L.S.
Belper, Edward, Lord, M.A.
Brodie, Sir Benjamin Collins, Bart., M.A., D.C.L.
Budd, William, M.D.
Clarke, Jacob Lockhart, M.D.
Cooke, Edward William, R.A.
Erle, Right Hon. Sir William, D.C.L.
Guest, Edwin, D.C.L., LL.D.
Hamilton, The Very Rev. H. Parr, Dean of Salisbury.
Hampton, John Somerset Pakington, Lord, G.C.B.
Lassell, William, LL.D.
Macneill, Sir John, LL.D.
Miller, William Hallowes, M.A., D.C.L.
Napier, James Robert.
Plowden, William Henry Chicheley.
Sharpey, William, M.D., LL.D.
Stephens, Archibald John, Q.C., LL.D.
Taylor, Alfred Swaine, M.D.

On the Foreign List.

Peirce, Benjamin.

Withdrawn.

Robert Bickersteth, Lord Bishop of Ripon.

Change of Name and Title.

Lane-Fox, General, *to* Pitt-Rivers.
Lowe, Right Hon. Robert, *to* Viscount Sherbrooke.

Fellows elected since the last Anniversary.

Attfield, Prof. John, Ph.D., F.C.S.
Beresford-Hope, Alexander James Beresford, LL.D.
Blanford, Henry Francis, F.G.S.
Clifford-Allbutt, Thomas, M.A., M.D., F.L.S.
Dallinger, Rev. William Henry.
Dyer, William Turner Thiselton, M.A., F.L.S.
Godwin-Austen, Lieut.-Col. Henry Haversham.
Graves, The Right Rev. Charles, D.D., Bishop of Limerick.
Hughes, Prof. David Edward.
Jeffery, Henry M., M.A.
Jessel, Right Hon. Sir George, Knt.
M'Coy, Prof. Frederick, F.G.S.
Moulton, J. Fletcher, M.A.
Niven, Prof. Charles, M.A., F.R.A.S.
Northbrook, Thomas George Baring, Earl of, D.C.L., G.C.S.I.
Rae, John, LL.D.
Reynolds, Prof. J. Emerson, M.D.
Tilden, William A., D.Sc.

The President then addressed the Society as follows:—

"Happy is the nation that has no history,"—none, that is to say, in the matter of political events, of diplomatic victories or defeats, of warlike achievements, or other staple topics of record, as history is wont to be written. And such, in fact, has been the state of our own community during the past year. We have no great convulsions to chronicle, nor changes to relate, no controversies with other bodies, nor grievances at issue between us and the State. But, as with a nation, so also with a society, an absence of these more striking, and perhaps superficial, features, is certainly compatible with a healthful internal growth, and with a steady development of the purposes for which our organisation was originally intended.

In the course of the year now ended, we have, naturally, lost some of our elder Fellows; but, numerically at least, our losses have not been so great as during the previous year, nor have they fallen so heavily on our younger members. Among those who have dropped from our ranks, several had already, on account of declining powers, withdrawn from active participation in our proceedings, and had thereby prepared us for their final departure. Among these, two stand prominently forward, men who, through long and faithful service to science and to our Society, deserve to live a long and oft-repeated life in the memory of their friends.

Of Professor Miller it is difficult adequately to speak. His scientific work has been well, but not too fully, described in the obituary notice published in our "Proceedings." Older than myself, and older than other existing officers of the Society, he seemed to belong to an earlier generation. Whether it was due to the number of his years, to the plenitude of his knowledge, to the judicial character of his mind, to his calm but ever ready response to an inquiry, or still more probably to a combination of all these qualities, certain it is

that his friends generally by a tacit consent regarded him as a mentor in the scientific world. And yet, notwithstanding this gravity of demeanour and severity to himself, no one imbibed more thoroughly, nor more liberally contributed to the genial spirit which has always actuated our officers, and even to the good stories which sometimes circulate about a scientific gathering.

Of Dr. Sharpey I might speak in almost the selfsame terms, excepting only that more constant intercourse on the business of the Society, and on other occasions elsewhere, drew our ties of friendship somewhat more closely than in the former case. Dr. Sharpey's life and work are too well told in the obituary notice by an old comrade of his, he was himself too well known, and too widely esteemed, to need any comment of mine; and I will not disappoint my own feelings, nor those of my hearers, by any inadequate words on my part.

The name of Mr. Lassell is one which, whether regarded from the point of view of his scientific work, or from that of private friendship, would be passed over by no one who had the advantage of a knowledge of the former, or of experience of the latter. His name seems to fall in so naturally with those of Herschel and Lord Rosse, that we are apt to class him with the old school. He was, however, of that school only in the best sense; he carried the weight, and earned the dignity which we accord to them; but to his last days, he was as fresh and sympathetic with modern work as the generation which is now succeeding to his. The details of his achievements in instrumental construction, themselves real contributions to science, and of his astronomical discoveries, will be given elsewhere. I will here only add, that in him we have lost a Fellow whose presence was always welcome, and whose assistance and advice were as valuable as they were freely given.

In Professor Ansted we have lost a familiar face, a pleasant writer on science and its accompaniments, and an active promoter of its applications.

I turn now to another who has passed away, and find in him another type of character among our Fellows, namely, Lord Belper. From the member of his family best able to judge, I have the following account of the chief occupations of Lord Belper's life. From his early years his attention was engaged in all questions of political and social interest, especially in free trade, law reform, political economy, and the advance of education. He enjoyed the society of Jeremy Bentham, and an intimate and frequent intercourse with James Mill and John Stuart Mill. Among the friendships formed in his youth, and terminated only by their death, I may mention the names of Macaulay, John Romilly, McCulloch, John and Charles Austen, George Grote, and Charles Buller. And, to use his own words, "Days passed in the society of such men can never be forgotten."

Throughout his life he loved and honoured science. To this he had an hereditary claim. His father, Mr. William Strutt, was for many years the centre of all philosophical and scientific interest in Derby, and the intimate friend and associate of Dr. Darwin. Lord Belper loved to recall this while delighting in the researches of Dr. Darwin's far more illustrious grandson. Although he never devoted himself to any special branch of science, he maintained the deepest interest in all scientific research, and in every new discovery. His life had comprised a period of great and active progress, the development of which he had watched with an interest which appeared to deepen as he grew older; and the great solace of his declining years was the thought (which would often rouse him to enthusiasm) of what had been achieved within his memory towards advancing the comfort and happiness of mankind. During his long connexion with University College, of which he became President at Mr. Grote's death, in 1871, few things gave him greater satisfaction than the generous endowment by his friend, Mr. Jodrell, of the Professorship at that College for the furtherance of Physiological Science.

If in Lord Belper we have an example of one of the many ties which link our body with the outer world, in Mr. E. W. Cooke we have another. Art as well as Politics may have a scientific aspect; and the faithful delineation of the features of nature is an aid with which science could not easily dispense. Mr. Cooke was a keen observer of natural objects, which he viewed with a trained eye and a cultivated mind; and much as he rejoiced in sketching the busy scenes of the seaboard towns of Europe, he never was more happy than when producing, among the rocks, pictures which may almost be described as geological.

On the last of our fallen leaves is inscribed the name of Sir Benjamin Collins Brodie, son of our late President; himself no mean contributor to the science which he cultivated, and no unworthy representative of the firmness of character and independence of thought which have always been connected with his father's name.

Others there are, whom we have lost, to a full tale of twenty; but the narration of their story would be both sad and long.

In regard to our property, I have little to report. The regulations respecting the income arising from the Fees Reduction Fund have been duly carried out by our Treasurer; and the other special funds stand much as at last anniversary.

Several improvements have been effected in the Acton Estate, under the sanction of the Council; and some negociations have been entered into for the sale of the entire estate, which are still pending.

The Society's finances generally are, as the balance-sheet will show, in a healthy condition, and appear to justify the hope that they will suffice for the large claims upon them for printing our publications.

Although we are more concerned with the quality than with the quantity of communications made to the Society, it may not be without interest to observe that the number of papers received this year has been in excess of that in any previous year, at all events since 1872, inclusive. The following is a table of the numbers during the last nine years:—

1872	.. ..	99 papers received.
1873	.. ..	92 ,, ,,
1874	.. ..	98 ,, ,,
1875	.. ..	88 ,, ,,
1876	.. ..	113 ,, ,,
1877	.. ..	97 ,, ,,
1878	.. ..	110 ,, ,,
1879	.. ..	118 ,, ,,
1880	.. ..	123 ,, ,,

and we may conclude that these have contained good matter from the fact that of the "Philosophical Transactions" for the current year, Parts 1 and 2, already published, contain no less than 900 pages and 33 plates. We have reason to hope that the volume will be completed very early in 1881.

Of the "Proceedings," volume 29 was completed in February, and volume 30 in August last.

In my address last year, I suggested that the hour of our weekly meetings might, perhaps, with advantage, be changed from the evening to the afternoon. That suggestion was approved by the Council, and by their direction a circular was addressed to all the Fellows of the Society, inviting an expression of opinion upon the question. Those of the Fellows who, living at a distance, are unable to attend our meetings, mostly abstained from making a reply. But in the answers actually received, the preponderance of opinion was so strongly in favour of the change, that the Council took the necessary steps for altering the statute by which the hour of meeting was formerly fixed. Notice of the alteration was sent to all the Fellows. The regulation of the hour of meeting is now in the hands of the President and Council. The attendance at our meetings has certainly not diminished since the change, and some of our Fellows, to whom the evening hour was inconvenient, have become constant attendants.

The Council now usually meet at 2.0 P.M., instead of 3.0 P.M., in order to be ready for the meeting of the Society at 4.30 P.M.; and I am happy to add that it has not yet been found necessary to call the Council or the Committee of Papers together on any other than the usual days.

In the permanent staff of the Society no change has taken place.

I regret, however, to record the death of Mr. Henry White, who for many years was chief assistant in the compilation of the great Catalogue of Scientific Papers. At an earlier stage of the work his loss would have been still more serious; but in a long course of training he succeeded so well in imparting his own careful and methodical mode of work to those under him, that the Council felt justified in making trial of his son to take his place. With the result of this trial, as shown in continuing the preparation of a new edition of the catalogue of the Society's Library, the Council have reason to be satisfied.

Of this new edition, the first portion, 220 pages, containing our large collection of "Transactions" and "Proceedings" of Academies and Societies, and other scientific periodicals, is in type, and will shortly be printed off. The verification of titles of our scientific books generally is so far advanced as to warrant the expectation that a large instalment of this portion of the catalogue will soon be in the printers' hands; after which we anticipate no further delay.

In regard to the Library, a question has arisen as to how far purely literary works, which occupy much space, should be retained. Among them there are doubtless some which add neither to the utility nor to the scientific importance of our Library, but there are also some early printed books, bibliographical treasures, which are worthy of a place in any collection. It is proposed to have these carefully put in order, and to place them in a case by themselves. Among these, there may be mentioned:—

Caxton's Chaucer, 1480.
Pynson's Chaucer, 1492.
Speght's Folio Chaucer, 1598.
Ciceronis Officia et paradoxa, *Fust.* 1466, *vellum.*
The generall historie of Virginia, *Lond.* 1632.
Bonifacius. Sextus decretalium liber. *Ven.* 1566–7.

Plautus, 1482.	Seneca, 1490.
Ovid, 1485.	Statius, 1490.
Plutarch, 1485.	Herodotus, 1494.
Homer, 1488.	

For bringing into prominence these as well as other features of our miscellaneous, *i.e.*, non-scientific, books, we are greatly indebted to the care and knowledge brought to bear on the subject by Mr. Tomlinson, and by our Treasurer.

Although it is doubtless undesirable to propose, without sufficient cause, alterations in our Statutes, or even in our practice, it is still often worth while from time to time to discuss questions involving such alterations in order that we may be prepared for a deliberate judgment whenever occasion may arise. Among such questions there

is one upon which I have often heard opinion expressed, and upon which opinion has always weighed in the same direction: I allude to the period of office of those elected to serve on the Council of the Society. By the terms of our charter ten of the ordinary members retire every year; and as it is our custom to remove six according to seniority and four in respect of least attendance, it rarely happens, although the contrary is possible, that any Fellow, except those holding the posts of President, Treasurer, or Secretary, should remain in office more than two years. Experience, however, appears to show, that for a member serving on the Council for the first time, there is so much to learn, so many heads of business demanding attention which do not in general come before the Fellows at large, that his first year is occupied quite as much in ascertaining his duties as in actively performing them. This objection is in some degree met by selecting for the ten incoming members five who have served before and five who have not so served; but, nevertheless, there is usually an interval of several years between two periods of office, and as a matter of fact we often lose a member of Council at the moment when his advice is becoming most valuable to our body.

I am aware of the great convenience attaching to our present impersonal mode of selecting the members to retire in each year, and am not at present prepared to suggest any specific alteration. But the great confidence which the Society has, especially of late years, placed in its more permanent officers, and the power which naturally accrues to them from the comparatively short tenure of office by the other Members of Council, appear to me to be points of which the Society should not lose sight. On the part of the officers, I think it right to state that we are very sensible both of the honour which is thus done to us, and of the responsibility which is thereby entailed, and that we hope never to discredit the one, nor to abuse the other. And having said so much, we are quite willing to leave the matter in the hands of the Society to be taken up whenever they see reason so to do.

It will be in the recollection of the Fellows that the position of the Royal Society in respect of the Government Fund of £4,000 per annum is different from that in relation to the Government Grant of £1,000 per annum. In the latter case the sum is placed unreservedly in the hands of the Society for promoting scientific investigation, subject only to an annual report to the Treasury of the sums granted; and, in administering it, the Society has in no case applied it to the personal remuneration of the applicant. In the former case, the Society has been requested to advise the Science and Art Department as to the distribution of the grant, not only for the direct expenses of investigations but also for personal remuneration for the time expended on them, whenever the circumstances and wishes of the applicant appeared to render this desirable. The responsibility of this advice lies with a

Committee similar to that of the Government Grant, but with the addition of the Presidents of certain learned bodies and societies, nominated for that purpose by the Government.

The recommendations made by the Committee each year are annually published in the "Proceedings," so that the public will have had full information as to the distribution of the grant; while the Fellows have the opportunity of seeing the nature of applications made, and the extent to which it has been found practicable to meet them, as recorded in the minutes of the Council of the Society.

One of the points which is perhaps beset with the greatest difficulty is that of the so-called "personal" grants. On the one hand, it has been argued that it is desirable to enable the man of small means to devote to research a part of his time which he could not otherwise afford to give; but, on the other, the question has been raised whether it be wise, even in the interests of science, to encourage anyone not yet of independent income to interrupt the main business of his life. It is too often assumed that a profession or a business may be worked at half speed, or may be laid down and taken up again, whenever we like. But this is not so, and a profession temporarily or even partially laid aside, may prove irrecoverable; and the temptation to diverge from the dull and laborious path of business may prove to have been a snare. Without proposing to exclude from possible aid in some shape or other those cases where personal assistance may be safely offered, it has been suggested that many such cases may be practically met by grants for the employment of an assistant, instead of grants to the applicant himself.

There is another fundamental difference between the position of the Government Grant of £1,000 per annum and the Government Fund of £4,000 per annum, which appears to me to be of material importance in the interests of science. The former is an absolute grant from the Treasury made to the Society for scientific purposes. It may be used wholly, or in part, during the year in which it is made, and the balance, if any, may be carried over by the Society to the next or even to succeeding years. The latter is a vote to the Science and Art Department, on the disposal of which the Society is consulted. Like all other similar votes, any unused balance reverts to the Treasury, and is to that extent lost to the purpose for which it was intended. I cannot help thinking that, if any such balances could be reserved and kept in hand, provision might be made for some larger purposes than those to which the fund has hitherto been devoted. And, even if having this end in view, the Committee should not see its way to recommend some of the smaller applications, it may be fairly questioned whether the smaller grants might not find a more appropriate place among those of the Donation Fund of this Society, or of the British Association, or among some of those separate funds which, through the

liberality of individuals, are now growing up among the special societies.

I am glad to record the fact that, upon the recommendation of men of science, Her Majesty has been pleased to grant pensions on the Civil List to the widows of two of our late Fellows, viz., to Mrs. John Allan Broun and to Mrs. Clifford.

Last year two volumes containing a collection of the late Professor Clifford's general lectures and essays were brought out. It is hoped that during the present winter a collection of his mathematical papers will be published. The contributions to science by the late Professor Rankine have recently been placed in the hands of the public. While very sensible of the obligations under which the scientific world is placed by these posthumous publications, I cannot refrain from alluding to our obligations, even greater if possible, to those who during their lifetime are willing to re-issue their own scientific memoirs, and to give us thereby not only the convenience of ready access, but also the advantage of their own subsequent reflections on the subjects of which they have treated. And at this moment I desire to mention more particularly the mathematical and physical papers of our Senior Secretary, Professor G. G. Stokes; and, while expressing our gratitude for the volume which has already appeared, I would express also our sincere hope that another instalment from the same source may shortly follow.

Among the subjects which at one period of the last session of Parliament engaged the attention of the Government was that of the law relating to vaccination; and a Bill was introduced intended to remove some of the practical difficulties in carrying out the existing law. While fully admitting the difficulties in question, the remedy proposed appeared to trench so closely upon the application at least of a scientific principle, and at the same time to be so important in its practical aspect, that I ventured (although the Council was not sitting) to consult the Presidents of the Colleges of Physicians and of Surgeons, and that of the Medical Council, about addressing the Government on the subject. This resulted in a joint deputation to the President of the Local Government Board, in which I took part as President of the Royal Society. The Council on my reporting the matter to them at their first meeting after the recess, expressed their approval. The Bill in question was withdrawn.

The Royal Commission on Accidents in Coal Mines, the appointment of which I mentioned in my address of last year, have been occupied principally in bringing together a body of valuable evidence on the causes and prevention of accidents in mines generally. The Commission have also visited a number of mines in which serious accidents by explosion have taken place, or in which certain phenomena connected with the occurrence of fire-damp were to be studied. They

have also instituted a series of experiments on the behaviour of various safety lamps in mixtures of natural fire-damp and air. These experiments they are about to renew during the winter. They also contemplate carrying out experiments in blasting rock and coal by methods which will check the production of flame, and which are thereby calculated to obviate the danger of igniting fire-damp.

The report of the voyage of H.M.S. "Challenger," to which the scientific world has been looking forward with so much interest, is now so far advanced that one volume of the "Zoological Memoirs" will appear immediately. In addition to this a second volume may be expected within a year. The first volume of the whole work, "containing a short narrative of the voyage, with all necessary hydrographical details, an account of the appliances and methods of observation, a running outline of the results of the different observations; and a chapter epitomising the general results of the voyage," together with the second volume containing the meteorological, magnetic, and hydrographic observations, will probably be published within the same period. "The general report on the zoology of the expedition will consist of about fifty distinct memoirs, which will occupy from ten to twelve volumes." It has been arranged "to print the Zoological Reports as they are prepared, and to publish them as soon as a sufficient bulk of memoirs is ready to form a volume. Copies of each memoir may also be had separately, in order that working naturalists may have them in their hands at the earliest possible date." Two more volumes on the geology and petrology, and one on the general chemical and physical results, will probably complete the series. Into zoological details I am not competent to enter, but one among them is of great interest, namely, the fact that notwithstanding the pressure and absence of light, there is no depth-limit to animal life.

As the Council of the Meteorological Office is nominated by the Council of the Royal Society, and as the Annual Report of the Office is submitted to the Royal Society, I think it right to mention a few points connected with the work of that Department during the past year.

1. A method of recording the duration of bright sunshine by the charring of an object placed in the focus of a glass sphere, freely exposed to the rays of the sun, was devised by Mr. J. F. Campbell, of Islay, in 1856; and instruments, being modified forms of that originally proposed, have been employed for some time at Greenwich, at Kew, and at a few private observatories. Certain difficulties in adjusting the paper about to be charred to the path of the burning spot, which had hitherto prevented the adoption of Mr. Campbell's invention as a part of the ordinary equipment of a meteorological observing station, have been at last successfully overcome by an arrangement designed by Professor Stokes; and thirty stations in the

British Isles have now been supplied with instruments of the pattern proposed by him. We may thus hope to obtain in future a sufficient record of a meteorological element, which is of primary importance in its relations to agriculture, and to the public health, but which has hitherto been very imperfectly registered.

2. The climatology of the Arctic regions, in addition to its importance as a part of the general physics of the globe, possesses a special interest in connexion with geographical exploration. As a contribution to our knowledge of this subject, the Meteorological Office has entrusted to Mr. R. Strachan the task of bringing together, and discussing on an uniform plan, the results of the observations taken at intervals during the last sixty years, in the region extending from the meridian of 45° W. to that of 120° W., and from the parallel of 60° to that of 80°, either at land stations or at the winter quarters of British and American expeditions. A considerable portion of this discussion has been already published; the remainder may be expected in the course of next year.

3. Another publication of the Meteorological Office may be mentioned as serving to mark the advance in meteorological theory, which has been achieved during the last fifteen years. The old "Barometer Manual and Weather Guide" of the Board of Trade has been replaced, so far as it relates to the weather of the British Isles, by a work entitled "Aids to the Study and Forecast of Weather," prepared under the direction of the Meteorological Office by the Rev. W. Clement Ley. Though some of the views put forward in the later work may, perhaps, be regarded as not sufficiently established by observation, yet a comparisou of the two works cannot fail to leave upon the reader's mind the impression that in the interval between their respective dates of publication, some real progress has been made in meteorology. Perhaps this is most conspicuous in the enlarged ideas that are now entertained concerning the conditions upon which the changes of weather depend. Local weather was first discovered to be contingent upon travelling areas of disturbance, each of which averaged many hundreds of miles in diameter, while, at the present time, the relation of these areas to one another, as parts of a single terrestrial system, has become a prominent topic of inquiry. If meteorology has thus been, to a certain extent, rescued from the ever accumulating chaos of numerical tabulations, which threatened to engulf the whole science, the improvement is mainly due to the development in recent times of the synoptic study of weather over large regions of the earth's surface, to which so great an impetus has been given by the extended facilities of telegraphic communication.

4. Balloon ascents, with a view to military purposes, are now systematically carried on under the direction of the War Office; and the endeavour has been made to take advantage of these ascents for

observations of the thickness of the aërial current which causes our winds, and of the peculiarities of the currents above it in the upper strata of the atmosphere. The military authorities have offered their co-operation in the most cordial manner; but the attention of an aëronaut is often so much engrossed by the operations necessary for working his balloon, that he has but little leisure for taking systematic records. Nevertheless, observations of considerable interest have already been obtained, relating especially to the velocity and direction of the upper air currents; and there can be no doubt that a continuance of such observations affords the best prospect at present open to us of adding to the very scanty knowledge which we possess of the movements of the atmosphere, even at a moderate height above the earth's surface.

Among the various duties which the President of the Royal Society is called upon to fulfil there are those of a Trustee of the British Museum; and, as an operation of great importance to Science, namely the removal of the natural history collections to the new building at South Kensington, is now going on, the Fellows may be interested to hear what progress has been made in the work.

The plans for the new building were approved as long ago as April, 1868; but the works were not commenced until the early part of 1873. Their progress was retarded by difficulties in the supply of the terra cotta with which the building is faced within and without, and in which the mouldings of arches and other ornamental features are executed.

The building was finally handed over to the Trustees in the month of June of the present year. It contains cases for three only of the Departments for which it is intended, namely, Mineralogy, Geology, and Botany; the necessary funds for the Zoological Department not having been yet voted. As the latter collections are equal in bulk to the other three collectively, it follows that half only of the new building can at present be actually occupied. The removal of the collections for which cases had been provided, commenced in the last week of July, and was virtually completed by the end of September.

Geology, which was very inadequately displayed in the old building, is now more commodiously accommodated than heretofore. It occupies a gallery 280 feet in length by 52 in breadth, forming the ground floor of the east wing of the new museum, together with eight other galleries covering an area of 200 × 170 feet at the back, and admirably adapted for the exhibition of the specimens. One of these galleries will be devoted to the illustration of stratification.

The principal part of the minerals has been moved and replaced in the cases in which they were arranged in the old building. This collection now occupies the first floor of the east wing of the new museum, and the space devoted to it is 280 × 50 feet in area. It is already arranged for exhibition.

The Botanical collections are placed in the gallery over the minerals, where the space for exhibition and the conveniences for study are much greater than in their old quarters.

The construction of the cases for the Zoological specimens, and the ultimate removal of these collections, must depend upon the amount of the Parliamentary vote for the purpose; but under the most favourable conditions it can hardly be hoped that this Department can be open to the public or to students in less than two years from the present time.

The "Index Museum," designed by Professor Owen, will form a prominent feature in the new museum. The object of it, in his words, is "to show the type characters of the principal groups of organised beings;" and "to convey to the great majority of visitors, who are not naturalists, as much information and general notions of its aim as the hall they will first enter and survey could be made to afford."

One of the principal difficulties attending the transfer of the Natural History Departments to a separate building consists in the provision of books for the use of the keepers and their staff, as well as for students who may visit the museum. Hitherto the separate collections of books, known as departmental libraries, supplemented as occasion might require from the main library of the museum, have sufficed for all purposes. But now, when the departmental libraries have to stand by themselves, it is impracticable to carry on even the current work of arrangement without additional resources. For an adequate supply of the necessary works a very large outlay would be required, supposing that the works were in the market. But many of them are out of print and have become scarce; and a large grant of public money would perhaps raise the market price almost in proportion to its magnitude. This being so, it has been thought best, on the whole, by the Government to make an annual grant to be expended from time to time as favourable opportunities for purchase may offer. If it should prove possible, and on other grounds desirable, to allow the Banks' Library to follow the collections with which it has always been practically connected, the wants of the Natural History Departments would (so far as books up to the date of its bequeathment are concerned) be in a great measure supplied.

Another of the duties which falls officially on your President is to take part in the organisation of technical education as promoted by the City and Guilds of London Institute, which is now incorporated under the Companies Acts, 1862–80 as a registered association, and of which the Presidents of the Royal Society, the Chemical Society, the Institute of Civil Engineers, and the Chairman of the Council of the Society of Arts, are members. In the Memorandum and Articles of Association of the Institute, its objects are fully set forth. They may be summarised under the following heads:—

1st. The establishment of a central technical institution for instruction in the application of science and art to productive industry.

2nd. The establishment of trade and technical schools in London and in the country.

3rd. The development of technical education by means of examinations held at the Central Institution, or at other places.

4th. To assist by means of grants existing institutions in which technical education is being promoted.

5th. To accept gifts, bequests, and endowments, for the purposes of the Institute.

The Institute is supported by subscriptions from sixteen of the City Companies, of which the largest contributors are the Mercers, Drapers, Fishmongers, Goldsmiths, and Clothworkers.

The Institute has been in active operation not much more than a year, and during the last six months the work of the Institute has developed considerably in each of its several departments. These may be considered under the following heads:—

1. Technical Instruction.
2. Examinations in Technology.
3. Assistance to other Institutions.

1. Since November last, courses of lectures and laboratory instruction have been given in the temporary class rooms of the Institute, at the Cowper Street Schools, under the direction of Professor Armstrong, F.R.S., and of Professor Ayrton. The subjects of instruction have included Inorganic and Organic Chemistry, with special reference to their industrial applications; Fuel, Electro-depositions of Metals, and Photographic Chemistry; General Physics, Steam, Electrical Engineering, Electrical Instrument Making, Electric Lighting, Weighing Appliances, and Motor Machinery.

During the term ending July last, the number of tickets issued to students, most of whom belonged to the artizan class, exceeded three hundred. A considerable accession of students is expected as soon as the building in Tabernacle Row, the plans of which are already settled, shall be erected. This building, which is estimated to cost £20,000, will provide accommodation for schools of Technical Physics, Technical Chemistry, and Applied Mechanics. Many of the day students at these classes are pupils of the Cowper Street Schools, and it is hoped that, by adapting the course of technical instruction to be given in the College to the wants of these boys, a very complete technical school for the children of artizans will have been established.

The evening lectures and laboratory instruction, which are more advanced and more special, are attended very largely by external students, for whom the present temporary accommodation is already too limited.

At Kennington, schools have been established in which practical

instruction is given in various art subjects, such as Painting and Drawing, Modelling, Designing, and Wood Engraving. These schools are attended by both sexes, and are under the immediate direction of Mr. Sparkes. The numbers in attendance last term were as follows:—

Wood Engraving.....	8 Students,	3 Men,	5 Women.
Modelling.....	28 „	26 „	2 „
Drawing and Painting from Life.	42 „	19 „	23 „
Designing.....	33 „	3 „	30 „

The Central Institution for instruction in the application of the higher branches of science to industrial pursuits is about to be erected on a plot of ground in Exhibition Road, granted by the Commissioners of 1851. The construction of this building, which, when completed, will cost £50,000, has been entrusted to Mr. Alfred Waterhouse, who is now engaged in the preparation of plans.

2. In the year 1879, the examinations in Technology, which had been initiated by the Society of Arts, were transferred to this Institute. Various changes were introduced into the regulations. New subjects were added, and, in order to stimulate the teaching of Technology throughout the country, the principle of payment to teachers on the results of the examinations was adopted. The encouragement thus afforded to teachers gave a great impetus to the formation of classes throughout the country in technological subjects. Last year the number of candidates for examination was 202, while at the recent examination, held in May, 816 candidates presented themselves, of whom 515 satisfied the Examiners. During the last few months the number of classes throughout the country, in which technical instruction is being given, has considerably increased, and, judging from the returns already received, there is reason to believe that the number of candidates who will present themselves for examination next May will be much greater than in either of the preceding years. The new programme, which is just issued, contains a syllabus of each subject of examination, and every effort has been made, short of testing the candidate's practical skill, to make the examinations as efficient as possible. To obtain the Institute's full certificate, each candidate is required to give evidence of having obtained some preliminary scientific knowledge.

3. In order to take advantage of efforts that are already being made to advance technical education, the Institute has given sums of money for specific objects to several institutions in which technical instruction is provided. The schools, colleges, and other bodies to which grants have been made by this Institute, are University College and King's College, London, the School of Art, Wood Carving, and Mining Association of Devon and Cornwall, the Nottingham Trade and

Science Schools, the Artizans' Institute, the Birkbeck Institute, the Lancashire and Cheshire Union, and the Horological Institute.

The Artizans' Institute gives practical instruction in several of the humbler crafts in which artizans are engaged, such as carpentry, zinc work, and plumbers' work; and corresponds, therefore, to some slight extent, with the apprenticeship schools of the Continent, from which, however, it differs in many important particulars. A similar experiment is being tried at the Horological Institute, where, at the expense of the Guilds, classes have been organised in which apprentices are practically instructed in the various branches of the watch-making trade.

It is found that the demand for technical instruction in London and throughout the provinces is very great, and the efforts that have been so far made by the City and Guilds of London Institute, have afforded considerable satisfaction to artizans and others engaged in industrial pursuits, and promise, when further extended, to be of the utmost service in the development of technical education in this country.

Turning now more particularly to the progress and the applications of science, I venture to make mention of a few topics which have come under my own observation:—

The aspect of spectrum analysis has become much complicated by two sets of facts. First, the increased dispersion, the improved definition, the enlarged electrical power at our command, and, above all, the substitution of photography for eye observations, have revealed to us an almost overwhelming array of lines belonging to each substance. And, secondly, the same means have shown that many substances present different spectra when in different molecular states. These complications have led spectroscopists to seek some relief in theories of simplification. Lecoq de Boisbaudran, Stoney, Soret, and others, have suggested that many of the lines, or groups of lines, may be regarded as the harmonics of a fundamental vibration; and they have shown that in certain cases this view will account for the phenomena observed. Professors Liveing and Dewar have contributed largely to our knowledge of the subject, by their observations on the reversed lines. Looking in another direction, Mr. Lockyer considers that in increased temperature we have the means not only of resolving compound bodies into their elements, but even of dissociating bodies hitherto regarded as elementary into still more simple substances. There still remain serious difficulties connected with Mr. Lockyer's views; but it is to be hoped that his indefatigable energy will in some way or other ultimately overcome them.

The outlying parts of the spectrum, beyond the visible range, must always be a subject of interest; and while MM. Cornu and Mascart, and others, have extended our knowledge of the ultra-violet end,

Captain Abney has opened out to us a new region beyond the red. Lord Rayleigh and others before him have, however, proved that there must be a limit at the least refrangible end of the spectrum. Professor Stokes, long since, noticed the difference in length between the spectrum of the sun and that of the electric arc; and M. Cornu has recently shown by observations at elevated stations that the great rapidity of atmospheric absorption must preclude the hope of any great extension of the solar spectrum toward the more refrangible end.

The striking advances made in electricity during the last few years, and marked by, among other things, the inventions of the telephone and the microphone, have been followed by a step not less daring in its conception, nor less successful in its execution; I allude, of course, to the photophone, the result of the researches of Mr. Graham Bell and Mr. Sumner Tainter. The principle of this instrument is already known. A powerful beam of light is first thrown upon a flexible mirror, the curvature of which is modified through vibrations set up in it by the human voice. The reflected beam is then received by a selenium "cell," forming part of an electric circuit. The intensity of the light so received, and with it the resistance in the circuit due to the selenium, varies with the varying curvature of the flexible mirror. A large parabolic mirror is used at the distant station to concentrate the light on the selenium "cell;" and a telephone in the circuit reproduces the variations in the form of sound.

Mr. Bell has, however, also shown that rays from the sun, or an electric lamp, when rendered intermittent by any convenient means, will set up in a plate of almost any substance vibrations corresponding to the intermittence. The substances as yet tried are: metals of various kinds, wood, india-rubber, ebonite, and many others, and among them zinc appears to be one of the best suited for the purpose. This result, which is independent of any electric action, is, perhaps, due to heat rather than to light.

In these, as in many other issues of scientific research, we can hardly fail to be impressed by the almost inexhaustible resources which lie ready to hand, if we only knew how to use them, for the interpretation of nature, or for the practical purposes of mankind.

During the past year Professor Hughes employed his induction balance for the detection of very minute impurities in small masses of gold. Mr. Preece also has shown how slight increments of temperature in fine wires transmitting telephonic currents of electricity, will suffice to reproduce sonorous vibrations; and even articulate speech at a distant station by their influence on thin platinum wires, only six inches in length.

Mr. Stroh has shown that, at the point of contact of two metals carrying strong electric currents, adhesion takes place, varying with

the nature of the surfaces in contact; and that many of the effects at points of contact, previously attributed to induction, may be due to the peculiar action now for the first time brought under notice.

It is worthy of record, that two Atlantic cables have been successfully laid during the present year; but success in cable-laying has become so much a matter of course, that its occurrence has attracted little public attention. Two cables, each of more than 500 miles in length, have been laid across the Mediterranean; and the Cape Colony has been placed in telegraphic communication with this country, by a cable of not less than 4,400 miles.

Constant attention is paid in the General Post Office to the introduction of improved methods for the furtherance of the telegraphic communication throughout the country.

Steady progress has been made in bringing the electric light into practical use. The illumination of the Albert Dock of the London and St. Katherine's Dock Company, the Liverpool Street Station of the Great Eastern Railway, the St. Enoch's Station of the Glasgow and South-Western Railway, and last, but not least, that of the reading room of the British Museum, has become an accomplished fact; while the city authorities have decided to extend the use of this light over various thoroughfares under their control. The subdivision of the light for domestic purposes is a problem which appears to have found a solution in the incandescent carbon lamp of Mr. Swan. Beside this, Mr. J. H. Gordon has devised, for the same purpose, a very ingenious application of rapid sparks from alternating machines, such as that of De Méritens, to produce incandescence in refractory metals. Lamps constructed on this principle completely fulfil the conditions of subdivision, but some difficulties of detail still retard their adoption for general use. There is, however, every reason to hope that the experience already gained, and the intelligence at present brought to bear upon the subject, will before long supply us with more than one form of domestic light.

The chief question of interest which has occupied the attention of the Iron and Steel Institute has been the adaptation of the "basic" process to the production of steel from pig metal containing a considerable percentage of phosphorus. Hitherto only pure hæmatite and spathic ironstones have been used for the production of steel; but it has now been shown that, by the employment of basic linings and basic slags, the metal is almost completely cleared of its phosphorus, and that steel of good quality may be produced from inferior ore.

The Conference on Lightning Conductors, composed of delegates from the Royal Institute of British Architects, the Society of Telegraph Engineers, the Physical Society, and the Meteorological Society, is steadily pursuing its labours. A large mass of facts has been accumulated; several leading questions have been decided; and

it is hoped that, in the course of the coming year, the Report of the Conference will be issued.

One of the most interesting, and at the same time useful, applications of the dynamo-machines, is that of transmitting mechanical power to spots, or under circumstances, where the ordinary appliances cannot be conveniently used. Perhaps one of the most remarkable instances of the application of the principle, is that by Dr. Werner Siemens to the propulsion of railway carriages in Berlin. Other applications will doubtless by degrees extend themselves over a wide range of industry; especially in localities where water-power is abundant.

Our Fellow, Dr. C. W. Siemens in London, and M. De Méritens in Paris, have demonstrated the use of the high temperature of the electric arc in fusing refractory metals. The method of operation, while peculiarly convenient for laboratory purposes, and for demonstration, promises to be capable of extension, even to the large demands of commerce and manufacture.

I should not, moreover, omit mention of the very beautiful experiments by Dr. C. W. Siemens, on the effect of the electric light on the growth of plants, on the opening of flowers, and on the ripening of fruit. On this subject we hope to hear more after the experiments which, already commenced, he contemplates continuing during the coming winter.

I am not sure how far the fact is known to the Fellows of the Royal Society, that the Society of Telegraph Engineers have thrown open to the scientific world a remarkable collection of books on electrical science, collected by our late Fellow, Sir Francis Ronalds, and bequeathed by him to that Society. The catalogue, compiled by the collector, is a monument of concentrated and well-directed labour.

As regards the Transit of Venus in 1874, the printing of the observations is complete for the two groups of stations in the Sandwich Islands and Egypt, and that for others is in progress.

Preparations are already being made with a view to the observation of the Transit of Venus in 1882. As a preliminary step for this operation, as well as for general purposes, it had been decided that the longitude of the Cape Observatory should be definitively determined by telegraphic connexion with Aden, which place is already telegraphically referred to Greenwich; and, notwithstanding a temporary interruption on the land line, Cape Town–Durban, it may be hoped that the determination will be effected at no distant period. Mr. Gill is prepared to undertake the main share of the work. With the same objects in view, on the urgent representation of the Astronomer Royal, it has also been determined to connect one of the Australian Observatories with Greenwich, through Madras, the longitude of which is well known; and this operation will be very much facilitated by the share which Mr. Todd, Government Astronomer

and Superintendent of Telegraphs at Adelaide, would be prepared to take in it under the auspices of his Government. The eastern boundary of the colony having been defined by Imperial Act as the 141st meridian, a wish has been expressed officially for the accurate connexion of Adelaide with Greenwich, independently of the Transit of Venus.

The Astronomer Royal has explained in detail the preparations which he considers necessary, so far at least as this country is concerned, for the effective observation of the transit, and he has introduced several alterations in the plan which he had formerly suggested. The experience of the transit of 1874 points to the desirability of sacrificing something in the magnitude of the parallax-factor for the sake of securing a higher elevation of the sun; thus, for retarded ingress, Sir George Airy had at first proposed to refer principally to the coasts of the Canadian Dominion and the United States of North America, where the sun's elevation is from 15° to 18°; he now proposes to substitute for this the whole chain of West India Islands, from the eastern extremity of Cuba to Barbadoes, or stations on the neighbouring continent of Central America. Bermuda is also included as a favourable point for observation. Most, if not all, of the longitudes required have been determined with great precision by the Hydrographic Department of the United States. For ingress accelerated, Sir George Airy relies entirely upon stations in the Cape Colony. For the accelerated egress, all the stations suggested for ingress retarded will be available. For egress retarded, although the fixed Observatories at Melbourne and Sydney will contribute to the observation of the phenomenon, they will have the sun at a somewhat low elevation (10—14°); it is therefore proposed to rely mainly upon New Zealand, with which we are in telegraphic communication *viâ* Sydney. Considerable correspondence has taken place on the subject of Australian longitude, and it is expected that the necessary steps to effect the connexion of one of the Observatories, probably Adelaide, with Madras, will be taken early in the ensuing year.

Sir G. B. Airy has completed the laborious calculations in his Numerical Lunar Theory, from which the corrections to the coefficients of Delaunay's Lunar Theory are to be deduced; and in connexion with this work, he has made an investigation of the value of the Moon's Secular Acceleration, for which he finally obtained the value 5″·477, thus confirming the results obtained by Professor Adams, and subsequently by Mr. Delaunay. On this important question, Professor Adams has also published an investigation. ("Monthly Notices," vol. xl, Nos. 411 and 472.)

A new determination of the Physical Libration of the Moon from a large number of lunar photographs taken with the De La Rue reflector at the Oxford University Observatory has been recently made by

Professor Pritchard, the result being to indicate the existence of a small rotational inequality.

Messrs. J. Campbell and Neison have made use of the Greenwich Observations, 1862 to 1876, to determine the Lunar Parallactic Inequality, from which they deduce for the value of the Solar Parallax, 8″·778, or 8″·848, according as the existence of a forty-five year inequality, apparently indicated by the observations, is admitted or not ("Monthly Notices," vol. xl, Nos. 7 and 8). The Sun's Parallax has also been determined by Mr. Downing, from N.P.D. observations of Mars at Leyden and Melbourne, in 1877. The value thus found is 8″·96. ("Astronomische Nachrichten," No. 2,288.)

In continuation of his researches on tidal retardation from the action of a satellite on a viscous planet, Mr. G. H. Darwin has investigated the secular changes in the orbit of a satellite, deducing the early history of the earth and moon from the time when they were initially in contact, each revolving in the same period of from two to four hours. This leads to the suggestion that the moon was produced by the rupture of the primeval planet. In another memoir, Mr. G. H. Darwin gives analytical expressions for the history of a planet and a single satellite. ("Phil. Trans.," 1879, "Proc. Roy. Soc.," vol. xxx, pp. 1, 255.)

An important work in connexion with the United States Northern Boundary Commission has been published by Mr. Lewis Boss, on the Declination of Fixed Stars. The systematic corrections to some seventy catalogues have been discussed, and, from the mean of the whole, standard declinations of 500 stars have been deduced.

Dr. Gould's "Uranometria Argentina" and M. Houzeau's "Uranométrie Générale," are of especial value as giving important information on the brightness and distribution of the stars in the southern hemisphere.

Interesting results as to the diameters of satellites have been obtained by Professor Pickering from photometric observations, on the assumption that their albedos do not differ greatly from those of their respective primaries. ("Annals Harvard College Observatory," vol. xi.) He has further investigated, on somewhat similar principles, the dimensions of the fixed stars, with especial reference to binaries and variables of the Algol type. ("Proc. Amer. Acad.," vol. xvi.) Professor Pickering has also commenced a photometric survey of the heavens in which the brightness of every star visible to the naked eye is to be determined. He has further undertaken a search for planetary nebulæ by a new method, in which, by the use of a direct-vision prism in front of the eye-piece, the nebula is at once detected by its monochromatic spectrum, focussing a point of light instead of a coloured line as in the case of a star. About a hundred thousand stars have been examined, and four new planetary nebulæ

have been detected. ("American Journal of Science," October, 1880.)

From the grouping of the aphelia of certain periodic comets, Professor G. Forbes has inferred the existence of two ultra-Neptunian planets, and has indicated their approximate positions. ("Trans. Roy. Soc., Edinburgh.") Mr. D. P. Todd has deduced from the perturbation of Uranus, a position for an ultra-Neptunian planet closely agreeing with that found by Professor G. Forbes. So far, the search for the hypothetical planet with the 26-inch Washington refractor has been unsuccessful. ("American Journal of Science," September, 1880.)

Professor Bredichin's researches on the tails of comets have led him to the classification of these appendages according to the value of the solar repulsive force which would have generated them. Having discussed the forms of the tails of thirty-three comets, he finds that they belong to three types, corresponding respectively to repulsive forces 11, 1·4 and 0·3 (the sun's gravitation being taken as 1), and adopting Zöllner's hypothesis of a repulsive force, due to electricity and inversely proportional to the specific gravity, he infers that the tails of the three types are composed respectively of hydrogen, carbon, and iron. In the case of the second and third types other elements of nearly the same atomic weight may replace or be mixed with the carbon and iron, and in such a comet as Donati's a number of substances may be mixed in the tail, which will consequently spread out in the plane of the orbit. The first type composed of hydrogen will always remain separated from the others. ("Annales de l'Observatoire de Moscou," vols. iii—vi.)

The appearance, at the beginning of this year, of a great comet in the southern hemisphere, recalling by the length of its tail and the smallness of its head the remarkable comet of 1843, has excited great interest, more especially as it was found that the orbits of the two comets were sensibly the same. The observations of the comet of 1843, however, do not appear to be compatible with so short a period as thirty-seven years, and Professor Oppolzer has shown that the action of a resisting medium would not meet the case. ("Astronomische Nachrichten," Nos. 2314, 2315.) Under these circumstances Professor D. Kirkwood has suggested that the two bodies may be fragments of one original comet, viz., that of 370 B.C., which is said to have separated into two parts like Biela's comet. ("Observatory," No. 43.) Five other comets (including Faye's periodical comet) have been discovered this year, but two of them were lost through cloudy weather before a second observation could be made.

In astronomical physics Mr. Huggins has obtained photographs of stellar spectra, which establish the existence of a remarkable group of nine bands in the ultra-violet, probably due to hydrogen, and further

lead him to an arrangement of the stars in a continuous series according to the breadth and marginal differences of the typical lines, particularly of the K line. Mr. Lockyer continues his researches on dissociation, as indicated in solar outbursts, and in connexion with this work is engaged on a systematic observation of the spectra of sun-spots. At the request of the Committee on Solar Physics, corresponding observations are being made at Greenwich.

From the series of Greenwich photographs of the sun, 1874—1879, the mean heliographic latitude of spots and mean distance from the sun's equator, have been deduced for each rotation and for each year. ("Greenwich Spectroscopic and Photographic Results, 1879.)"

A fine 36-inch silver-on-glass reflector has been recently constructed by Mr. Common, and with this instrument he has obtained photographs of Jupiter, showing the red spot, and of the satellites. ("Observatory," No. 34.)

At the outset of an undertaking one figures to oneself in imagination what may be done; towards the close of it one sees in actual fact what has been done. In commencing this address I had hoped to say something of the progress of mathematics; before bringing it to a conclusion, I find my space filled and my time exhausted. How far the good intentions of this year may be realised in the next, cannot yet be seen; but the difficulties of a task do not always diminish the fascination of making an attempt.

On the motion of Mr. Scott Russell, seconded by Mr. Merrifield, it was resolved:—"That the thanks of the Society be returned to the President for his Address, and that he be requested to allow it to be printed."

The President then proceeded to the presentation of the Medals:—

The Copley Medal has been awarded to Professor James Joseph Sylvester, F.R.S. His extensive and profound researches in pure mathematics, especially his contributions to the Theory of Invariants and Covariants, to the Theory of Numbers, and to Modern Geometry, may be regarded as fully establishing Mr. Sylvester's claim to the award of the Copley Medal.

A Royal Medal has been awarded to Professor Joseph Lister, F.R.S. Mr. Lister's claims to the honour of a Royal Medal are based upon his numerous and valuable contributions to physiological and biological science during the last thirty years.

By permission of its author, the Fellow of the Society best qualified, by his own extensive researches on the germ theory, to form a judgment, I quote the following account of Professor Lister's work and achievements:—

"In 1836 and 1837 it was proved independently by Cagniard de la Tour and Schwann, that vinous fermentation was due to the growth and multiplication of a microscopic plant. At the same time Schwann described experiments which illustrated and explained the conditions, now well known, by which flesh may be preserved from putrefaction. But Schwann's researches were overshadowed by the views of accepted authorities, and they continued so up to the publication of Pasteur's investigations. From this point forward the view gained ground that putrefaction is the work of floating microscopic organisms; and that if air be thoroughly cleansed of its suspended particles, neither its oxygen, nor any other gaseous constituent, is competent to provoke either fermentation or putrefaction.

"Condensed into a single sentence, the merit of Mr. Lister consists in the generalisation, to living matter, of the results obtained by Schwann and Pasteur with dead matter. He began with cases of compound fracture and with abscesses. In simple fracture the wound is internal, the uninjured skin forming a protecting envelope. Here nature works the cure after the proper setting of the injured parts. In compound fracture, on the other hand, the wound extends to the surface, where it comes in contact with the air; and here the operator can never be sure that the most consummate skill will not be neutralised by subsequent putrefaction.

"In the earliest of his published communications, Mr. Lister clearly enunciates, and illustrates by cases of a very impressive character, the scientific principles upon which the antiseptic system rests. He refers to the researches of Pasteur, and shows their bearing upon surgery. He points to the representative fact, then known but unexplained, that when a lung is wounded by a fractured rib, though the blood is copiously mixed with air, no inflammatory disturbance supervenes; while an external wound penetrating the chest, if it remains open, infallibly causes dangerous suppurative pleurisy. In the latter case the blood and serum are decomposed by the microscopic progeny of the germs which enter with the air; in the former case the air is filtered in the bronchial tubes, and all solid particles are arrested. Three years subsequently, this inference of Professor Lister's was shown to be capable of experimental demonstration.

"After enunciating the theoretic views which guided him, he thus expresses himself in his first paper:—

"'Applying these principles to the treatment of compound fracture; bearing in mind that it is from the vitality of the atmospheric particles that all the mischief arises, it appears that all that is requisite is to dress the wound with some material capable of killing these septic germs, provided that any substance can be found reliable for this purpose, yet not too potent as a caustic.'

"This is the thesis to the illustration and defence of which Pro-

fessor Lister has devoted himself for the last thirteen years. His thoughts and practice during this time have been in a state of growth. His insight has been progressive; and the improvement of experimental methods founded on that insight incessant. By contributions of a purely scientific character, which stamp their author as an accomplished experimenter, he has materially augmented our knowledge of the most minute forms of life. The titles of his papers indicate the direction of his labours from time to time; but they give no notion of the difficulties which he has encountered, and successfully overcome. He performs, without dread of evil consequences, the most dangerous operations. He ventures fearlessly upon treatment which, prior to the introduction of his system, would have been regarded as no less than criminal. In the Glasgow Royal Infirmary, when wards adjacent to his had to be abandoned, he operated with success in an atmosphere of deadly infectiveness. Vividly realising the character and habits of the 'invisible enemy' with which he has to cope, his precautions are minute and severe. This demand for exactitude of manipulation has rendered the acceptance of the Antiseptic System slower than it would otherwise have been; but a clear theoretic conception has this value among others: it renders pleasant a minuteness of precaution which would be intolerable were its reasons unknown.

"The operative surgeons of our day have raised their art to the highest pitch of efficiency. Their skill and daring are alike marvellous. Mr. Lister urges an extension of this skill from the operation to the subsequent treatment, contending that every surgeon ought to be so convinced of the greatness of the benefits within his reach, as to be induced to devote to the dressing of wounds the same kind of thought and pains which he now devotes to the planning and execution of an operation. His impressive earnestness; his clearness of exposition; his philosophic grasp of the principles on which his practice is founded—above all his demonstrated success—have borne their natural fruit in securing for him the recognition and esteem of the best intellects of the age."

"In a letter addressed to the writer on the 29th of September, 1880, Professor Helmholtz expresses himself thus:—

"'Professor Lister ist als einer der hervorragendsten Wohlthäter der Menschheit zu betrachten, und als eines der glänzendsten Beispiele, wie segensreich scheinbar minutiöse und abstruse wissenschaftliche Untersuchungen, wie die über die Erzeugung mikroskopischer Organismen, werden können, wenn sie von einem Manne von umfassendem geistigem Gesichtskreise aufgenommen werden.'"

"In a letter dated October 1st, 1880, Professor Du Bois Reymond writes:—

"'The period of bloody warfare through which we passed not long ago, just when Professor Lister's methods were matured enough to be

freely used even on the battlefield, has of course contributed to render his name popular throughout Germany; nay, to make it a household word in many homes. We use the word "listern" as a verb to designate the use of the carbol-spray while bandaging a wound. I do not hesitate to proclaim Lister the greatest benefactor of mankind since Jenner's wonderful discovery—far superior, indeed, to Jackson and Simpson; because, whatever may be the dread of pain and the blessing of being spared it, in Lister's invention health and life itself are concerned, as in hardly any other medical discovery except vaccination. Moreover, the general ideas which have led to Professor Lister's conception stamp his work with a peculiarly scientific character.'"

"In a letter dated from Vevey on the 10th of this month, Professor Klebs, of Prague, himself a distinguished worker in this field, expresses in the strongest terms his admiration of the profound philosophical intuition and practical success of Mr. Lister, as having not only reformed the whole art of Surgery, but given a new impulse to medical science generally. Professor Klebs's interpretation of the opposition encountered for a time by Mr. Lister is worthy of mention. He ascribes it to the high standard attained by British Surgery before the time of Lister. 'The operators,' he says, 'that work under the best hygienic conditions will not feel so acutely as others do the necessity of disinfecting wounds. But the good results of the former British Surgery are now surpassed by the new method, which is accepted at the present time by the whole world.'

"Such testimonies might be multiplied to any extent. The foregoing are the answers received from the only three gentlemen who have been requested to express an opinion as to the merits of Mr. Lister."

A Royal Medal has been awarded to Captain Andrew Noble, late R.A., F.R.S. Captain Noble is joint author with Professor Abel, of the "Researches on Explosives," "Phil. Trans.," 1875, which, in combination with other labours in the same field, procured for Professor Abel the honour of the Royal Medal in 1879. To Professor Abel is due mainly the chemical part of these investigations; to Captain Noble, the mechanical and mathematical part. Each is a complement of the other, but it may be safely affirmed that they could not have been presented to the world in the form in which they appear without the co-operation of Captain Noble's remarkable union of technical knowledge and mastery of mathematical analysis with the chemical science of Professor Abel. His beautiful invention of the Chronoscope, an instrument constructed by him at great cost, by which intervals of time as small as the one-millionth part of a second can be measured, has been of indispensable value in these

researches. He is the author of papers which have been translated into most European languages on subjects of gunnery and gunpowder; he is perhaps the highest authority we possess on the higher branches of artillery science, and the best known on the Continent. His great talents and attainments are not more conspicuous than his singular modesty, and his indefatigable industry. He has been engaged on these subjects about twenty years, having published the first experiments in this country with Navez' electroballistic apparatus, in 1862.

The Rumford Medal has been awarded to Dr. William Huggins, F.R.S. In 1866, a Royal Medal was awarded to Dr. Huggins for his important researches. Since that time he has been continually engaged in prosecuting his investigations and in extending them over a wider range. Thus he has determined the radial component of the velocity of the heavenly bodies relatively to our earth, by means of the alteration of the refrangibility of certain definite kinds of light which they emit, or which are stopped by their atmospheres. The smallness of the alteration corresponding to a relative velocity comparable with the velocity of the earth in its orbit makes the determination a matter of extreme delicacy. But as early as 1868, he had obtained such trustworthy determinations, that he was able to announce before the Royal Society that Sirius was receding from our solar system with a velocity of about 29·94 miles per second.

In a paper presented to the Royal Society in 1872, he has given the results obtained for a large number of stars, and has shown that some are receding and some approaching, and that there seems to be a balance of recession in those parts of the heavens, from which we have reason, from the observed proper motions, which of course can only be transversal, to conclude that the solar system is receding, and a balance in favour of approach in the opposite direction; while yet it does not appear that the motion of the solar system would alone account for the whole of the proper motions of the stars in a radial direction.

The same inquiry was extended to the nebulæ, the spectrum of which consists of bright lines, and in this case it presented greater difficulties. As those nebular lines which appear pretty certainly to be identifiable with hydrogen, are too faint to be employed in the investigation, and the others are not at present identified with those of any known element or compound, he was obliged to avail himself of a coincidence between the brightest nebular line and a line of lead. But as the coincidence is probably merely fortuitous, the results give only the *differences* of approach or recess of different nebulæ. The observations seem to show that, so far as has been observed, the nebulæ are objects of greater fixity as regards motion in space, than the stars.

The other subject to which Dr. Huggins has more particularly

devoted himself of late, is the mapping of the photographic spectra of stars. This was a research of great delicacy, partly on account of the small quantity of light at the disposal of the observer, partly from the great accuracy with which the comparison had to be made with the spectra of known substances, in order that satisfactory conclusions should be deducible as to the presence or absence of such or such substances in the stars. The results obtained, led to a remarkable division of the stars into two great classes, naturally with transition cases, namely, white stars, which showed a group of twelve dark lines belonging, apparently, to the same substance, probably hydrogen, and the group of stars, of which our own sun may be taken as a type.

Besides the researches already mentioned, other papers have been presented by Dr. Huggins to the Royal Society, on the spectra of comets, on the spectrum of Uranus, and in particular one in which he showed that it was possible to detect the heat of the stars, and has given the results obtained for several.

The Davy Medal has been awarded to Professor Charles Friedel, Member of the Institute of France.

From 1856 to the present time, the investigations of M. Charles Friedel, ranging over widely remote fields of chemical inquiry, have been continuous, numerous, and important. Mineralogical, theoretical, and general chemistry are indebted to him for many valuable contributions; but it is in the department of so-called organic chemistry that he has more especially laboured; and herein he has done much to assist in breaking down the barriers at one time regarded as impassably isolating the chemistry of carbon compounds.

Among the subjects of M. Friedel's successful work may be mentioned more particularly the chemistry of the 3-carbon family of organic bodies, to which belong propionic acid, lactic acid, glycerine, propylene, and acetone. The establishment of the constitution of lactic acid and of acetone, with the determination of the relationships to one another of the various, and in many cases isomeric, members of this large family, constituted for a long time one of the most fiercely contested as it was, and is, one of the most fundamental problems of organic chemistry. In the labours effecting the satisfactory solution of this problem, M. Friedel bore a large share.

Passing to another branch of investigation, M. Friedel, partly by himself, but largely in conjunction in some parts of the work with Mr. J. M. Crafts, and in other parts with M. A. Ladenburg, made out, or confirmed in a very striking manner, the analogy subsisting between the modes of combination of carbon and of silicon, the most characteristic elements of the organic and inorganic kingdoms respectively.

To mention but one more subject of M. Friedel's research, he has, in conjunction with Mr. J. M. Crafts, made out and defined a simple

method of wide application for effecting the synthesis of organic compounds. This method consists in bringing together a hydrocarbon and an organic chloride in presence of chloride of aluminum, whereby the residues of the two compounds enter into combination to form a more complex, frequently a highly complex body. Independently of its utility, this process of synthesis is of remarkable interest from the part taken in it by the chloride of aluminum, which, though essential to the reaction, is found unaltered at the end, and seems to act by suffering continuously, little by little, a correlative transformation and regeneration.

The Statutes relating to the election of Council and Officers were then read, and Mr. Francis Galton and Mr. Sorby having been, with the consent of the Society, nominated Scrutators, the votes of the Fellows present were taken, and the following were declared duly elected as Council and Officers for the ensuing year:—

President.—William Spottiswoode, M.A., D.C.L., LL.D.

Treasurer.—John Evans, D.C.L., LL.D.

Secretaries.— { Professor George Gabriel Stokes, M.A., D.C.L., LL.D.
Professor Thomas Henry Huxley, LL.D.

Foreign Secretary.—Alexander William Williamson, Ph.D.

Other Members of the Council.

William Henry Barlow, Pres. Inst. C.E.; Rev. Professor Thomas George Bonney, M.A.; George Busk, F.L.S.; Right Hon. Sir Richard Assheton Cross, D.C.L., LL.D.; Edwin Dunkin, V.P.R.A.S.; Alexander John Ellis, B.A.; Thomas Archer Hirst, Ph.D.; William Huggins, D.C.L., LL.D.; Professor John Marshall, F.R.C.S.; Professor Daniel Oliver, F.L.S.; Professor Alfred Newton, M.A., Pres. C.P.S.; Professor William Odling, M.B., V.P.C.S.; Henry Tibbats Stainton, F.G.S.; Sir James Paget, Bart., D.C.L.; William Henry Perkin, Sec. C.S.; Lieut.-Gen. Richard Strachey, R.E., C.S.I.

The thanks of the Society were given to the Scrutators.

The following Table shows the progress and present state of the Society with respect to the number of Fellows:—

	Patron and Royal.	Foreign.	Compounders.	£4 yearly.	£3 yearly.	Total.
Dec. 1, 1879 ..	4	48	241	236	11	540
Since Elected ..			+ 3	+ 1	+ 14	+ 18
Since Deceased..		— 1	— 8	— 11		— 20
Since Withdrawn				— 1		— 1
Nov. 30, 1880 ..	4	47	236	225	25	537

Statement of Receipts and Expenditure from November 20, 1879, to November 26, 1880.

	£	s.	d.
Annual Contributions, 231 at £4 ..... £924			
" 25 at £3 75	999	0	0
Admission Fees	20	0	0
Fee Reduction Fund, in lieu of Admission Fees and Annual Contributions	336	0	0
Compositions	120	0	0
Rents	201	9	7
Dividends (exclusive of Trust Funds)	1,146	4	2
" on Jodrell Fund	151	18	4
Interest on Mortgage Loan	586	13	10
Sale of Transactions and Proceedings	789	11	6
Donation from J. S. Budgett, Esq.	100	0	0
Sale of land at Acton	495	17	9
Petty Repayments	6	8	9
Deposit at Bankers' withdrawn	1,800	0	0
Interest on Do.	8	9	6
Balance at Bank, Dec., 1879 ..... 1,222 12 0			
On hand 41 14 8	1,264	6	8
	£8,026	0	1

	£	s.	d.	£	s.	d.
Salaries and Wages				1,089	11	0
The Library Catalogue				107	8	6
Books for the Library				169	10	0
Printing Transactions, Part III. 1879, Part I. 1880, and Separate Copies to Authors and Publisher	594	4	11			
Ditto Proceedings, Nos. 198–206	384	13	11			
Ditto Miscellaneous	53	4	1	2,121	14	7
Paper for Transactions and Proceedings	364	4	6			
Binding ditto	64	14	6			
Engraving and Lithography	660	12	8			
Soirée and Reception Expenses				78	9	4
Coal, Lighting, &c.	86	3	6			
Office Expenses	24	0	8			
House Expenses	238	7	6			
Tea Expenses	16	15	4			
Fire Insurance	41	15	0	538	5	11
Taxes	33	5	10			
Advertising	22	2	0			
Postage, Parcels, and Petty Charges	36	2	4			
Miscellaneous Expenses	39	13	9			
Purchase of Land at Acton				1,160	0	0
Roadmaking, Agency and Survey of Acton Estate				499	7	11
Agency and Survey of Mablethorpe Estate				20	18	0
Law Charges				77	13	2
Purchase of £952 12*s.* 3*d.* Reduced 3 per Cent. Annuities				925	4	6
Gassiot Trust, Loan repaid				200	0	0
Transferred to Fee Reduction Fund. Donation of G. Palmer, Esq., M.P.				200	0	0
				£7,188	2	11

Trust Funds.

	£	s.	d.	£	s.	d.
Donation Fund Dividends	240	16	8			
Handley Fund „	177	5	3			
Rumford Fund „	68	4	8			
Wintringham Fund „	35	5	0	566	12	8
Copley Medal Fund „	9	17	6			
Davy Medal Fund „	32	4	10			
Croonian Lecture Fund—Rent from College of Physicians	2	18	9			
				£8,592	12	9

	£	s.	d.	£	s.	d.
Donation Fund	130	0	0			
Davy Medal Fund	32	11	0			
Wintringham Fund	35	5	0	209	4	9
Copley Medal Fund	4	10	0			
Bakerian Lecture	4	0	0			
Croonian Lecture	2	18	9			
Balance at Bank				1,178	9	7
Balances on hand, Catalogue Account	4	14	3	16	15	6
„ „ Petty Cash	12	1	3			
				£8,592	12	9

JOHN EVANS,
Treasurer.

Estates and Property of the Royal Society, including Trust Funds.

Estate at Mablethorpe, Lincolnshire (55 A. 2 R. 2 P.), £136 per annum.
Estate at Acton, Middlesex (about 33 acres), £152 per annum (Contract for Sale sealed).
Fee Farm near Lewes, Sussex, rent £19 4*s.* per annum.
One-fifth of the clear rent of an estate at Lambeth Hill, from the College of Physicians, £3 per annum.
Stevenson Bequest. Chancery Dividend. One-fourth annual interest on £85,336, Government Annuities and Bank Stock (produced £484 5*s.* 2*d.* in 1879-80).
£21,000 Reduced 3 per Cent. Annuities.
£15,000 Mortgage Loan, 4 per Cent.
£16,588 6*s.* 2*d.* Consolidated Bank Annuities.
£200 " " —The Gassiot Trust.
£403 9*s.* 8*d.* New 2½ per Cent. Stock—Bakerian and Copley Medal Fund.
£11,511 6*s.* New Threes { £6,328 11s. 2*d.* Scientific Relief Fund. / 5,182 14*s.* 10*d.* Jodrell Fund.
£667 5*s.* 6*d.* India Fours.
£660 Madras Guaranteed 5 per Cent. Railway Stock.—Davy Medal Fund.
£10,000 Italian Irrigation Bonds.—The Gassiot Trust.
£1,396 Great Northern Railway 4 per Cent. Debentures—The Trevelyan Bequest.
£100 Metropolitan 3½ per Cent. Stock.—Scientific Relief Fund.
£1,300 " " —Fee Reduction Fund.
£7,000 London and North Western Railway 4 per Cent. Debentures. " "
Two Hundred Shares in the Whitworth Land Company, Limited. " "

We, the Auditors of the Treasurer's Accounts on the part of the Council, have examined these Accounts and found them correct, and we find that the Balance at the Bankers' is £1,178 9*s.* 7*d.*

W. SPOTTISWOODE.
T. H. HUXLEY.
GEO. BUSK.
H. CLERK.
W. H. PERKIN.

We, the Auditors of the Treasurer's Accounts on the part of the Society, have examined these Accounts and found them correct, and we find that the Balance at the Bankers' is £1,178 9*s.* 7*d.*

J. T. BOILEAU.
FREDK. CURREY.
WARREN DE LA RUE.
ROBERT HUDSON.
G. MATTHEY.

Trust Funds. 1880.

Scientific Relief Fund.

	£	s.	d.
New 3 per Cent. Annuities	6,328	11	2
Metropolitan 3½ Consols	100	0	0
	£6,428	11	2

Dr. *Cr.*

	£	s.	d.		£	s.	d.
To Balance	98	19	7	By Grants	190	0	0
„ Dividends	191	2	1	„ Balance	100	1	8
	£290	1	8		£290	1	8

Donation Fund.

£6,339 0*s.* 1*d.* Consols.

The Trevelyan Bequest.

£1,396 Great Northern Railway 4 per Cent. Debentures.

	£	s.	d.		£	s.	d.
To Balance	219	5	4	By Grants	130	0	0
„ Dividends	240	16	8	„ Balance	330	2	0
	£460	2	0		£460	2	0

Rumford Fund.

£2,322 19*s.* Consols.

	£	*s.*	*d.*		£	*s.*	*d.*
To Balance, 1879	68	4	8	By Balance	136	9	4
„ „ 1880	68	4	8				
	£136	9	4		£136	9	4

Bakerian and Copley Medal Fund.

£403 9*s.* 8*d.* New 2½ per Cent.

	£	*s.*	*d.*		£	*s.*	*d.*
To Balance	75	1	6	By Gold Medal	4	10	0
„ Dividends	9	17	6	„ Bakerian Lecture	4	0	0
				„ Balance	76	9	0
	£84	19	0		£84	19	0

Wintringham Fund.

£1,200 Consols.

	£	*s.*	*d.*		£	*s.*	*d.*
To Balance, 1879	35	5	0	By Payment to Foundling Hospital, 1880	35	5	0
„ Dividends, 1880	35	5	0	„ Balance	35	5	0
	£70	10	0		£70	10	0

Croonian Lecture Fund.

	£	s.	d.		£	s.	d.
To Balance, 1879	2	18	9	By Croonian Lecture	2	18	9
„ One-fifth of Rent of Estate at Lambeth Hill, payable by the College of Physicians	2	18	9	„ Balance	2	18	9
	£5	17	6		£5	17	6

Davy Medal Fund.

£660 Madras Guaranteed 5 per Cent. Railway Stock.

	£	s.	d.		£	s.	d.
To Balance	139	11	2	By Gold Medal	32	11	0
„ Dividends	32	4	10	„ Balance	139	5	0
	£171	16	0		£171	16	0

The Gassiot Trust.

£10,000 Italian Irrigation Bonds.

	£	s.	d.		£	s.	d.
To Balance	291	0	0	By 2 Italian Bonds bought	203	5	0
„ Dividends	499	12	2	„ £200 Consols bought	194	5	0
„ Bonds drawn	234	10	0	„ Payments to Kew Committee	496	13	8
				„ Balance	130	18	6
	£1,025	2	2		£1,025	2	2

The Jodrell Fund.

£5,182 14*s.* 10*d.* New 3 per Cent. Stock.

	£	*s.*	*d.*		£	*s.*	*d.*
To Dividends, 1880	151	18	4	By transferred to Royal Society General Account	151	18	4

The Handley Fund.

£6,047 7*s.* 9*d.* Reduced 3 per Cent. Stock.

	£	*s.*	*d.*		£	*s.*	*d.*
To Balance, 1879	177	12	10	Transferred to Royal Society General Account	354	18	1
„ Dividends, 1880	177	5	3				
	£354	18	1		£354	18	1

Fee Reduction Fund.

£1,300 Metropolitan Consols 3½ per Cent.
£7,000 London and North Western Railway 4 per Cent. Debentures.
Two Hundred Shares in the Whitworth Land Company, Limited.

	£	*s.*	*d.*		£	*s.*	*d*
To Balance (1879)	996	6	6	By Transferred to Royal Society General Account (1879)	161	0	0
„ Donations	555	0	0	„ Transferred to Royal Society General Account (1880)	175	0	0
„ Dividends	307	9	7	„ Purchase of £1,000 London and North Western Railway Company's 4 per Cent. Debenture Stock	1,103	2	3
				„ Purchase of £314 15*s.* 7*d.* Metropolitan Consols 3½ per Cent.	331	0	9
				„ Balance	88	13	1
	£1,858	16	1		£1,858	16	1

Account of Grants from the Donation Fund in 1879–80.

Professor W. C. Williamson, to aid in continuing his Investigations of the Fossil Plants of the Coal Measures	£30	0	0
Dr. Anton Dohrn, to aid in the publication of Monographs on the "Fauna and Flora of the Gulf of Naples, and adjacent parts of the Mediterranean"	£100	0	0
	£130	0	0

Account of the appropriation of the sum of £1,000 (the Government Grant) annually voted by Parliament to the Royal Society, to be employed in aiding the Advancement of Science (continued from Vol. XXIX, p. 440.)

1880.

1. J. N. Lockyer, for continuation of Researches on the Solar Spectrum £200

2. Professors Thorpe and Rücker, for continuation of the Comparison of the Air and Mercurial Thermometers 75

3. A. M. Worthington, for Researches on the Tension of Liquid Surfaces 10

4. W. G. Adams and E. B. Sargeant, for the Determination of the Ratio of the Lateral Contraction to the Longitudinal Extension in a Cylindrical Bar of a Homogeneous Elastic Solid subjected to simple Longitudinal Stress 100

5. W. Crookes, for continuation of Researches on Molecular Physics in High Vacua 300

6. W. C. Roberts, for assistance in Conducting Researches on the Passage of Molten Metals and Alloys through Capillary Tubes 25

7. Professor Rupert Jones, for continuing the Illustration of Fossil Entromostraca 25

8. G. E. Dobson, for Investigation of the Natural History of the Mammalian Order Insectivora, with the view of publishing as complete a Monograph as possible of this comparatively little studied order of Mammals, in which full descriptions, with the Anatomy and Geographical Distribution of every Species, will be given 50

Carried forward..... £785

Brought forward..... £785

9. Baron Ettingshausen, for the Investigation of the Eocene Flora of Alum Bay, Bournemouth, and other places 50

10. E. A. Schäfer, for Payment of an Assistant in continuing his Histological and Embryological Investigations 50

11. C. F. Cross, for the cost of a Balance and Materials to be employed in a Research on Rehydration of Metallic Oxides 20

£905

Dr.

	£	s.	d.
To Balance on hand, Nov. 30, 1879.....	1,022	9	11
Grant from Treasury, 1880	1,000	0	0
Interest	5	2	3
	£2,027	12	2

Cr.

	£	s.	d.
By Appropriations, as above.....	905	0	0
Printing, Postage, and Advertising	4	14	0
Balance on hand, Dec. 1, 1879	1117	18	2
	£2,027	12	2

Account of Appropriations from the Government Fund of £4,000 made by the Lords of the Committee of Council on Education, on the recommendation of the Council of the Royal Society.

G. J. Symons, for a Computation of the Mean Annual Rainfall at all known Rainfall Stations in the British Isles at which the requisite Data exist (α) during the ten years 1867–76 (β) and also during the ten years 1870–79; to thoroughly discuss the same, and to prepare a Monograph thereupon £120

R. H. M. Bosanquet, for the cost of an Engine with Clock, Bellows, and other appliances to be employed in the Solution of various Problems in Acoustics, the repetition and examination of König's Experiments, the Determination of Absolute Pitch, and the transformation of Sound into Periodic Electric Currents ... 152

Carried forward..... £272

Brought forward..... £272

A. Mallock, for the Construction of a Room and Foundation for the Diffraction Grating Ruling Machine, and for Water Power 50

G. Gore, for (1) further Investigation of the Thermoelectric Properties of Liquids; (2) Completion of a Research into the Phenomena of the Capillary Electroscope; and (probably) (3) Examination of the Effects of Electric Currents in Friction.... 100

Dr. Hopkinson, for continuing Experiments on the Residual Charge of the Leyden Jar, on Specific Inductive Capacity, and for other Electrostatic Experiments 150

E. Neison, for continuation of Computations in the Lunar Theory 75

D. Gill, for the Payment of Computers to aid in the Reduction of Heliometric Observations made by him at the Cape of Good Hope 75

J. Kerr, for continuation of Electro-Optic and Magneto-Optic Researches..... 100

J. Glaisher, towards the Expense of Printing the Factor Table of the Fourth Million..... 150

Professor R. Grant, for the expense of Printing a Catalogue of the Mean Places of 6,350 Stars, based on Observations made at the Glasgow Observatory..... 300

Professors Liveing and Dewar, for continuation of Experiments in relation to Spectroscopic Investigations..... 200

A. Buchan, for further Aid in the Construction of Isobaric Charts for the United Kingdom..... 100

T. Stevenson, for averaging and discussing a Register of 23 years' Observations of Temperature of the Barometer and Thermometer, and of Rain, kept at Rothesay 50

A. Tribe, for Researches into the Distribution of Radicals in Metals suspended in Electrolytes in the act of Electrolysis; and Analogies (or otherwise) between Phenomena in Dielectric and Electrolytic Media..... 50

J. E. H. Gordon, for continuation of Experimental Measurements of the Specific Inductive Capacity of Dielectrics..... 73

B. Stewart, for an Investigation of Inequalities of Short Period in a Series of Observations 60

H. Tomlinson, for continuation of Researches into the Effect of Strain and Pressure on Matter when under the Influences of the Forces of Heat, Electricity, Magnetism, and Chemical Affinity 100

Samuel Allport, for an accurate Investigation of the Pheno-

Carried forward..... £1,905

Brought forward..... £1,905

mena of Contact Metamorphism, especially that produced by the Intrusion of Granite among Sedimentary Deposits..... 100

W. K. Parker, for assistance in continuation of Researches on the Morphology of the Vertebrate Skeleton, and the Relations of the Nervous to the Skeletal Structure 300

Professor Heddle, for continuation of a Research connected with the Scientific Mineralogy and Geognosy of Scotland 150

H. T. Stainton, in aid of the Publication Fund of the Zoological Record Association 100

D. Mackintosh, for an Examination of the Southerly Extension of Northern Erratics into the Valleys and up the Hill Slopes of North Wales, with a particular reference to the Extreme Height by the great Glacial Submergence 15

Nicholson and Etheridge, for Further Assistance towards the Publication of the Third Fasciculus of their "Monograph of the Silurian Fossils of Girvan, Ayrshire" 75

R. Etheridge, jun., for the Cost of Illustrations of New or little known British and Australian Palæozoic Invertebrate Fossils..... 25

Major Godwin Austen (on behalf of British Association Committee), for Investigation of the Natural History of the Island of Socotra 125

J. M. Crombie, for aid in Researches on the Origin and Structure of the Vegetative and Reproductive Organs of Lichens, with special reference to the recent Theory that Lichens are not Autonomous Plants 100

B. T. Lowne, for further Researches on the Structure, Development, and Functions of the Eyes of Invertebrates 50

H. G. Seeley, for completion of Researches into the Structure, Affinities, and Classification of the extinct Reptilia and allied Animals 80

H. Woodward, for continuation of Work on the Fossil Crustacea, especially with reference to the Trilobita and other extinct Forms, and their publication by the Palæontographical Society 75

C. Lapworth, for Assistance in continuing Studies of the Graptolites, and of the Silurian Rocks of Britain 70

Rev. J. F. Blake, for travelling and other expenses in continuing a Correlation of the Upper Jurassic Deposits of England with those of the Continent 100

Professor Schorlemmer, for continuation of Researches into (1) Aurin; (2) the Normal Paraffins; (3) Suberone 200

Carried forward..... £3,470

Brought forward	£3,470
C. G. Williams, (1) for an Investigation of the Chemical History and Physiological Action of β Lutidine; and (2) to continue Researches on Emeralds and Beryls	50
C. R. A. Wright, for continuation of Investigations on the determination of Chemical Affinity in Terms of Electrical Magnitude	150
Dr. Dupré, for the cost of Apparatus and Materials in carrying out experiments with a Gravimetric Method in estimating extremely small quantities of Carbon, and its application to the Examination of Potable Waters	75
J. H. Collins, for continuation of Chemical, Mineralogical, Microscopical, Stratigraphic Observations on and Investigations of the Rocks of Cornwall	30
W. N. Hartley, for continuation of Researches on the Action of Organic Substances on the Ultra-violet Rays of the Spectrum	100
Professor A. H. Church, for continuation of Researches in Plant Chemistry	50
	£3,925
Administrative Expenses	75
	£4,000