

This will give a focal image of the sun about 16 inches in diameter, in which small spots, as well as large ones, can be studied.

Although it now seems to be

Doublet
 $\lambda 6301.72$

Triplet
 $\lambda 6302.71$

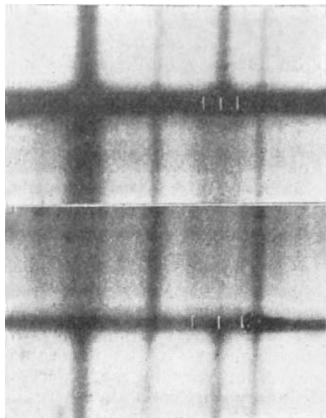


FIG. 8.—Iron Doublet ($\lambda 6301.72$) and Triplet ($\lambda 6302.71$) in Two Spot Spectra, showing Field Strengths of 2900 and 4500 Gauss respectively.

of the strength of the field in spots would prevent this field from having an appreciable influence on the higher solar atmosphere. At the distance of the earth, as Schuster has shown, the combined magnetic effect of several spots, all assumed to be of the same polarity, and having no such rapid decrease in field strength at higher levels as is actually observed, would be altogether incompetent to account for terrestrial magnetic storms.

In concluding, I wish to express my appreciation of the assistance I have received from my colleagues at Mount Wilson. I am particularly indebted to Messrs. Adams, Ellerman, King, Nichols, and St. John for aid in connection with the present investigation.

THE NEW ROOMS OF THE ROYAL SOCIETY OF EDINBURGH.

ON Monday, November 8, the new rooms of the Royal Society of Edinburgh were formally opened by an appropriate inaugural address from the president, Sir William Turner, followed by a brilliant reception. For the purposes of the reception the ordinary meeting-room was transformed into the cloak-room, and the president's address was delivered in the Freemasons' Hall, a few blocks further west in George Street. After the address the audience re-assembled in the society's new abode, and had every opportunity of inspecting the arrangements which had been made for the accommodation of the large and growing library and for other possessions of the society.

The important events which led up to the migration of the society from its historic haunts in the beautiful building in Princes Street were described by the president in his address. The National Galleries of Scotland Bill, introduced into the House of Commons in 1906, provided that the Royal Institution, so long the home of the society, should form a part of the National Gallery of Scotland and be applied to the promotion of the Fine Arts. As the result of representations made by the society, a clause was introduced into the Bill by which the Treasury was empowered to provide funds both for the purchase and equipment of a new habitation for the society, and for an annual grant of 600*l.* to assist in the discharge of the scientific work. The natural feeling of regret at having had to give up one of the finest sites to be found in any city of the world is partly balanced by the knowledge that now the society has, for the first time in forty or fifty years, ample accommodation for its valuable library.

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demonstrated that sun-spots are electric vortices, judgment should be reserved as to the various theories which have been advanced to account for their origin. Many of the results I have described appear favourable to Emden's solar theory, but it seems to be opposed by the important investigations of Evershed, who has found that the metallic vapours in sun-spots flow radially outward from the umbra, parallel to the photosphere. The further development of Evershed's work, and the continued study of solar vortices and magnetic fields, should soon permit a trustworthy theory of sun-spots to be formulated.

It is evident that the rapid decrease upward

When the building now occupied by the society was vacated two years ago by the Edinburgh Life Assurance Company, operations were at once begun by the Board of Works to fit it for its new function. No structural changes of magnitude were needed to make the rooms effective for their purpose. The late librarian, Mr. Hardy, whose lamented death last spring deprived the society of a singularly efficient and devoted officer, had meanwhile been planning the whole arrangements of the library, and what is now seen is largely the result of his forethought and attention to details.

The building is entered by two doors. The east door is open daily, and through it entrance is at once gained to the front saloon, where there is every convenience for reading and writing. The west door is opened only on meeting days. It leads directly into a staircase, by which immediate ingress is gained to the meeting-room, which is fitted with a lecture table and appliances of various kinds. By the same staircase, also, access is had to the reception room on the first floor and to various library rooms on the second floor.

The guests on the night of the reception passed up the west staircase, at the first turn of which a fine bust of Cuvier greeted them with calm dignity.

Along the walls of the meeting-room (transformed for the occasion into the cloak-room) some other interesting busts are to be seen—Berzelius, John Playfair, Rev. Sir H. Moncrieff Wellwood, and Sir Walter Scott; also an engraving of the statue of Sir Joseph Banks in the British Museum, executed by Chantrey. A photograph of Sir Richard Griffith and an engraving of D. Milne Horne also decorate the walls.

Passing out of the meeting-room and up a few steps we come to the ante-room, with oil portraits of James Watt and William Murdock, one of the pioneers of gas lighting. In the handsome reception-room immediately adjoining are portraits of former well-known presidents and secretaries—Sir T. Makdougall Brisbane, Sir James Hall, Prof. J. D. Forbes and John Robison, the last a Raeburn; also a bust of Sir Roderick Murchison occupies one corner. Passing across the reception-room we emerge at the head of the east staircase, which leads down to the front saloon and to the east door. The portraits which decorate the walls of this fine staircase are (beginning from the top) those of Piazz Smyth, Patrick Neill, Sir David Brewster, Sir Robert Christison, Sir Walter Scott, and the first president, Henry, Duke of Buccleuch. In addition to these there are several good engravings of portraits of Henry Mackenzie (the "Man of Feeling"), the Right Hon. Jas. Moncrieff, and Dr. William Robertson, the historian (a fine engraving by J. Dixon from the portrait by Sir Joshua Reynolds).

The front saloon has its walls covered with books, and contains a life-like bust of James Gordon, the late librarian. Opening off it at the north-west corner is the librarian's room or office, with a portrait of Sir Humphry Davy over the mantelpiece. Adjoining it is the council-room, with the well-known portrait of Prof. Tait (by Sir George Reid) hanging above the fireplace, and on each side a drawing of the birthplace of Sir Isaac Newton, presented to the society by a son of Prof. Robison. The same donor also gave a small carved door, which formed part of a book-press belonging to Newton. Passing out of the council-room by a door in front of the foot of the east staircase, and turning along a passage to the right, we come to a large oblong room called the back saloon. Round the walls are steel book-cases filled with the Transactions and Proceedings of various scientific societies of foreign countries. The countries are arranged alphabetically, and under each country the towns are similarly arranged, so that a visitor has not the least difficulty in finding the shelves on which the publications of any given society are placed.

Near the council-room door a staircase leads down to the basement, where, in addition to rooms set apart for shelving books, are strong-rooms for storing the society's own Transactions and Proceedings, and the blocks and plates of illustrations. These are all admirably arranged, so that the stock in hand can be estimated almost at a glance.

Taking a general survey of the contents of the many book-cases which line the walls of the various rooms, we soon recognise the guiding principle of the whole. The

front saloon or reading-room contains such journals and periodicals of a general scientific character as are most in demand. The librarian's room contains mathematical journals, the society's own publications, and the various scientific catalogues and dictionaries. In the council-room the reports of scientific expeditions find a place, and the quarto volumes of the American and Indian Geological Surveys, and much of a connected nature. The back saloon has already been described. In the basement we find journals of zoology, botany and medicine, electrical engineering, meteorology, geodesy, geology, &c.

There are no book-cases in the meeting-room or reception-room, but on the second floor there are three fairly large rooms and one small room filled with books. In one we find periodicals and books bearing on geography, biography, philosophy, philology, in another astronomy, and in a third the literary weeklies, monthlies, and quarterlies.

This description is not, of course, exhaustive, for, besides the periodical publications, the Royal Society of Edinburgh possesses many books of historic value and antiquarian interest; also the complete works of famous men of science from Galileo down the centuries. It will serve, however, to show that, as regards the accessibility to their literary treasures, the society has distinctly benefitted by their change of location.

The reception-room on the first floor, where the fellows meet for tea and talk before the afternoon meetings and after the evening meetings, has been beautifully designed, largely under the advice of Sir George Reid.

The least satisfactory of all the arrangements is the meeting-room for the reading of papers, but it is difficult to see how anything better could have been done. The lecture table, with gas fittings, occupies part of one of the long sides. The lantern-screen partly covers the black boards on the wall behind, the lantern being ensconced in a niche in the opposite wall. The hangings and decorative busts have practically killed the echo which was heard when the room was first tried. Yet to the many fellows who remember what used to be, the present arrangement lacks a certain undefinable flavour of old-world dignity. There is too much of the modern lecture-room and too little of the feeling of a scientific and literary society met for the interchange of views.

In other respects, however, the society has gained much by its removal from the limited space at its disposal in the Royal Institution to the spacious accommodation in George Street. Its remarkable collection of portraits and busts can now be seen to advantage, and the ready accessibility to its valuable library of books and periodical literature in all departments of science and in many departments of philosophy and art cannot but confer a great boon to the fellows and others engaged in research work.

The reception on Monday night was a large gathering, representing all phases of national life, such as Parliament, the Church, the Bench and the Bar, other legal bodies, the Scottish universities and leading educational institutions, the Royal Academy, municipalities, parish councils, &c.

THE INTERNATIONAL INVESTIGATIONS IN THE NORTH SEA AND THE SCOTTISH BOARD'S ANNUAL REPORT.¹

SIX years have now elapsed since the commencement of the international fisheries' work by the seven nations concerned, and with the bulky literature and masses of tables and plates in hand it may be thought that now a stage has been reached which will demonstrate one way or another the position of the sea-fisheries, especially as it was stated that results of importance were early to be forthcoming. Yet in scanning the various publications no

¹ Conseil permanent international pour l'Exploration de la Mer. Bulletin statistique des Pêches maritimes des Pays du Nord de l'Europe, vol. iii. pour l'Année 1906. Pp. 83. (Copenhagen: A. F. Host and Fils, 1909.)

Rapports et Procès-verbaux des Réunions, vol. xi., Juillet, 1907-Juillet, 1908. Pp. xxv+176+51. (Same publishers, 1909.)

Rapports, &c., vol. x., Rapport sur les Travaux de la Commission dans la Période 1902-7. (Same publishers, 1909.)

Twenty-seventh Annual Report of the Fishery Board for Scotland for the Year 1908. Part i., General Report. (Edinburgh: Oliver and Boyd.)

very definite general conclusions are apparent, and the question of primary importance to this country remains—excepting the statistics of the bureau—as far from solution as ever. To take the publications in the order above-mentioned, the first is Dr. Kyle's important statistics of the North Sea fisheries for 1906. So far as can be observed, the total of the sea-fisheries of each nation shows an increase both in quantity and value on the previous year (1905), with the exception of Ireland. In the case of such fishes as the cod and the haddock, the ever-recurring variability displays itself in an increase of both in Denmark and the Netherlands, a diminution in Germany, an increase of cod and a diminution of haddock in Belgium, an increase of cod in Sweden, and a great increase of the same fish in England and in Scotland. Along with this is a considerable diminution of plaice in Sweden, England, and Belgium, and a considerable increase in Scotland and the Netherlands, a great increase in Denmark, and a nearly stationary condition in Germany. Dr. Kyle points out, however, that this decrease is due to a diminished capture of the smaller sizes of plaice (*e.g.* in England, Holland, Germany, and Belgium). Much has been written about the decrease of the lemon-dab (or so-called "lemon sole") in Scottish waters, yet in 1908 it brought 70,134*l.*, or 1400*l.* more than in the previous year. In the same way, whilst the sole and the turbot vary in the different nations, the dab remains stationary in Scotland, where it was supposed by its increase to be ousting the plaice. These statistics, which cover a much wider area than it is possible to allude to here, are perhaps the most important result of the international scheme, and they show how uncertain and variable sea-fishing is. Moreover, they demonstrate that whilst in one country the capture of a species may temporarily be diminished, in another it is increased. The comparative constancy of the totals and the large amount of fluctuation in individual species are points emphasised by Dr. Kyle. Further, no Continental nation approaches the share taken by Britain in this industry, England having 39 per cent. and Scotland 34 per cent. as their respective shares, the nearest being Holland with 12 per cent., Germany having only 4.7 per cent.

The report of the International Council between July, 1907, and July, 1908, is chiefly occupied with the record of changes in the *personnel* and an epitome of the seventh annual meeting at Copenhagen. It is noteworthy that the council is still in want of information concerning important fishes, such as the plaice, flounder, and other flat fishes, the haddock and other gadoids, and the herring and mackerel of the North Sea. Anything like finality in its labours seems as far distant as ever, yet hydrographical and "plankton" work still hold it. Prof. Garstang, moreover, gives an interesting account of the distribution of the plaice in the North Sea, Skagerak, and Kattegat according to size, age, and frequency, no fewer than 2048 hauls of the trawl and 327,000 examples of plaice having been dealt with; yet the decline in the returns from Sweden and Belgium after 1904, and from Scotland after 1905, must seriously affect the scope of the results. In regard to general distribution, the facts corroborate those elicited in 1884,¹ viz., the occurrence of small plaice in shallow water and of large in the deeper water, with a constant interchange between the two areas. Yet it is impossible to establish a hard-and-fast correlation between the size of the plaice and depth. The very general distribution of this species over the North Sea is a further guarantee for its safety. Mention is made of "dense" accumulations of plaice in the "protected Scottish Firths," but such accumulations were there before protection existed. It is stated that from fifteen to twenty plaice of 35 cm. were caught per hour in the inner part of St. Andrews Bay, information which will cheer the fishermen there, since for thirty years at least the uniform sizes caught for sale have been from 10 inches to 13 inches. The idea that many large plaice leave the Firth of Forth and enter St. Andrews Bay during the autumn, thereafter proceeding to deeper water to spawn, and again swell the ranks in the Forth, is in need of confirmation. Similar remarks apply to the changes noted in the large plaice

¹ Scientific Trawling Report, pp. 21, 25, 43, 76, &c., 1884, and in General Report, 1885, correspondingly.