

### COMMITTEES ON RADIO-TELEGRAPHIC INVESTIGATIONS.

#### *Organisation of an International Commission.*

A MEETING was held in Brussels at the commencement of last month at which the question of organising an international commission to carry out wireless experiments was further discussed. At the International Time Conference in Paris last October a series of resolutions was passed with reference to the formation of an international organisation for the scientific study of Hertzian waves and their relationship to the medium through which they travel. At this conference Mr. Goldschmidt, of Brussels, placed his high-power station at Brussels and the sum of 1000*l.* for preliminary studies at the disposal of the proposed international commission.

Arising out of these resolutions the representatives of the different countries who were present at Brussels last month drafted a provisional constitution for the international commission and a scheme for its work.

The objects of the commission are:—(1) To carry out experiments on the propagation of electric waves. (2) To make wireless telegraph measurements and the study of the problems related thereto.

The provisional programme of the work of the commission will consist in making measurements in different countries and at different distances and in different directions of the strength of signals sent out from the station at Brussels. These measurements will be repeated from day to day or hour to hour as necessary in order to determine the variation of the strength of the signals both with time, with distance, and with direction, and later the effect of wave-length and decrement will be studied.

It is proposed to set up a receiving station near the transmitting station in Brussels in order accurately to control the strength of the waves sent out so that an allowance can be made for any unavoidable variation in reducing the final results.

The organisation consists of a number of national committees, one in each of the countries taking part. The national committees will send delegates to the international commission, and these delegates, together with the officers, will constitute the international commission. It is proposed that the international commission should meet once a year, or more often if the work is sufficiently advanced.

The Institution of Electrical Engineers has decided to undertake the formation of the national committee for Great Britain, under the scheme for the organisation and encouragement of electrical research which was announced at the institution meeting on December 12, 1912.

#### *The British Association Committee.*

The British Association Committee has now inaugurated an extensive scheme for the making of observations of natural electric waves by means of wireless telegraph receiving apparatus, and is addressing to wireless telegraph experimenters an invitation to cooperate in the making of observations. The records will be collected by the committee and compared and reduced by it.

These natural electric wave trains produce troublesome noises in the telephone receivers of wireless telegraph stations. Some proportion of them are due to lightning strokes within a few hundred miles of the receiving station; but even when there is no thunder weather recorded over the whole continent of Europe and the adjacent seas, they are received continuously by an antenna adjusted to a great wave-length. It has been suggested that some of these wave trains may be due to extraterrestrial causes, and it does not seem unreasonable to suppose that

electrical discharges may occur in the sun and may be the source of a proportion of the natural electric wave trains we receive. There is little likelihood of our gaining a knowledge of the causes at work until organised observations are carried out simultaneously at numerous points of the globe and collated at a single centre, such as the committee now affords.

Another and distinct inquiry which urgently needs pursuing is the action of the earth's atmosphere in causing variations of the electric waves used in transmitting messages over long distances. The laws of these variations, especially in respect of their connection with weather conditions, with position on the earth's surface, and with the time of day would, if unravelled, probably throw light on the electrical conditions of the highest parts of our atmosphere. The committee has undertaken this inquiry also.

In carrying on the work the committee looks very largely to private experimenters for the collection of data. But it has been a matter of extreme gratification to find that the Imperial Navy and the British Post Office were willing to help. The Marconi Company also has, with commendable public spirit, promised to give its powerful assistance to the committee. Thus the committee can already make sure that data will be collected on its behalf in all parts of the world. Meanwhile private experimenters who are willing to assist the committee by making observations should communicate with the secretary, Dr. W. Eccles, University College, Gower Street, London, England.

### APPLIED SCIENCE IN THE UNIVERSITY OF SHEFFIELD.

ON October 25 the completed buildings of the applied science department of Sheffield University were opened by Lord Haldane. These buildings have the largest frontage in Sheffield, being 350 ft. long, the architecture being of the Hampton Court Palace type. The cost of the additions has been approximately 45,000*l.* The central administrative block contains a very fine assembly-room, called the "Mappin Hall," after the late Sir Frederick Thorpe Mappin, first chairman of the applied science committee of Sheffield University, and a handsome departmental library which will house books having reference to applied science and pure science data more immediately bearing upon this subject. There are staff common-rooms, and the metallurgical record office included in this central block, and the department of pure geology is also housed here.

The south-east wing, a considerable portion of the cost of which was defrayed by the Drapers' Company of London, contains four floors; the two lower floors are devoted to non-ferrous metallurgy, the third floor to mining, and the fourth floor to applied chemistry which has particular reference to mining. The new non-ferrous department, which has been organised so as not in any way to overlap the metallurgy of the Royal School of Mines, has been designed to develop scientifically the silver industries of Sheffield. The course here is divided into two sections: first, the basis metal section, in which are produced on a works' scale ingots of German silver, Britannia metal, brass, and bronze, white metals, and other non-ferrous metals in use in Sheffield manufactures (for working these metals into the finished articles, the department has secured the friendly cooperation of silver manufacturers in Sheffield); secondly, the electroplating department, in which all classes of plating operations are carried on on a manufacturing scale. Each student's bench is fitted with a specially combined ammeter and voltmeter, so that the student may make his preliminary studies under exactly known

conditions. There are two large laboratories for the preparatory and advanced stages of this special study of non-ferrous metals as used in the Sheffield trades. The lecture-rooms are two in number, one seating 150 and the other fifty students, both being provided with up-to-date electric lantern arrangements.

The micrographic laboratory has been made to a specially thought out design, each block of the polishing battery being run by a separate electric motor of one-seventh h.p., revolving at 1400 revolutions per minute. Adjacent to the polishing and etching-room is a photomicrographic department complete with dark-room. The photomicrographic apparatus is by Zeiss, and is fitted with the new arc lamp of this firm. There is a large staff and research laboratory, one side of which is devoted to calorimetric work.

From the point of view of pure science the most important installation in the new metallurgical wing is a specially devised recalescence laboratory for observing with great accuracy the critical points of iron and steel, the freezing points of metals, and the phenomena of solid solution in metals. There are coke-fired and electric vacuum furnaces in which a complete vacuum can be obtained in about one minute by means of the "Fleuss" pump. The recalescence apparatus comprises an astronomical clock by the Synchronome Company, a chronographic recorder reading to a quarter of a second, and a delicate galvanometer reading direct or in connection with a potentiometer. This installation, which has been made to specification by the Cambridge Scientific Instrument Co., has cost about 400*l.*, and is the most complete extant.

The melting-shop for non-ferrous metal will register the comparative melting efficiencies of coke, oil, gas, and electricity, each method being capable of making ingots of about 90 lb. weight. The static and dynamic testing of non-ferrous metals will be made in the ferrous department, which is provided with a single-lever Buckton machine on two centres, so that the machine may be arranged to read off the stress either in 3-in. ton moments or 12-in. ton moments. For more delicate work there is a two-ton static machine. The dynamic testing will be carried out on Arnold's standard stress-strain machine, on which it is hoped to obtain important results on the adherence of silverplating of different thicknesses on different basis metals.

In declaring the building open, Lord Haldane insisted most strongly that the industrial success of this country in the future depends upon the cordial cooperation of pure and applied science, which are practically indivisible. He said:—"Without a Kelvin or a Clerk Maxwell, or a Lister, or a man, to go further back, like Sir Isaac Newton, many of the things which we do to-day, and do so well, would not be done, but we have also to remember that unless other men of a similar type are produced in the future we cannot keep up to the level we are now at, but we should be at a disadvantage compared with other countries. You have done a very practical thing in founding this great new department of applied science; you have done the right thing in keeping applied science and pure science in close relation, and bringing both into intimate organic relation with the spirit of the University, that great permeating spirit without which they cannot be on a high level.

"What will be done in the department of applied science will be to go still further than has been possible in the past in bringing the application of science to bear on the problems of industry. It will not be practical work merely; it will be work in the course of which the student will be trained in the highest knowledge. He also will be told that he must not stop short at the conclusions to which science leads

him, but must show his capacity to apply the conclusions at which he has arrived to the actual and practical solution of the difficulties which confront the industrial world. In the old days pure science appeared to be something no one was interested in from the point of view of practical education. Now the greatest commercial discoveries depend upon new ideas, new conceptions being developed by men who have genius which makes them devoted to their work, even though they have to starve to do it. It is only in universities and technical schools that we find these men, and if British industry is to hold its own in the future, we shall have to realise the necessity there is, not only to turn to science, but to see that pure science has an opportunity of developing itself and being brought in contact with daily work."

Lord Haldane went on to contrast the rapid strides that are being made in the development of universities in America with what is being done in this country. He has, he said, great faith in the capacity of the British nation, but unless we wake up thoroughly in the matter of education, and particularly higher education, he is a little nervous as to what we may find the state of things concerning our industrial supremacy some fifteen or twenty years hence.

"Nowadays not only Governments, but Government Departments are waking up about these things. For the last twelve months there has been a great deal of activity about the business of national education. Mr. Pease is carrying out what I believe to be a right line of policy. He is trusting the very highly expert officials at the Board of Education and consulting the education committees throughout the country. The local education committees have done splendid work, but the burden on them has been very heavy. The nation will have to make up its mind to give considerably more out of the taxes for this work. The plans are now fashioned. The Government knows exactly what to do to make advance if only it has the nation at its back. I hate any idea of increasing expenditure, whether it is out of local or national resources, if it can be avoided. This expenditure, however, cannot be avoided. Unless we spend it we shall go back as a nation. Our revenues, by which we keep up our fleets and armies, will shrink, because we shall not be holding our own with the industrial nations. What Sheffield has done will have to be done right through the country."

Lord Haldane also referred to the report of the Advisory Committee on University Grants, and mentioned that this Committee, amongst other matters, has practically decided recently to deal with a pension fund for professors (see *NATURE*, March 6, 1913, p. 21), which, he said, "meant that instead of a man having to cling on to his post as the alternative to starving when he felt himself old, he could retire, and let a young man take his place, and go on with the development still further of the teaching which the professor had carried so far."

## THE BRITISH ASSOCIATION AT BIRMINGHAM.

### SECTION M.

#### AGRICULTURE.

OPENING ADDRESS BY PROF. T. B. WOOD, PRESIDENT  
OF THE SECTION.

I PROPOSE to follow the example of my predecessor of last year, in that the remarks I wish to make to-day have to deal with the history of agriculture. Unlike Mr. Middleton, however, whose survey of the subject went back almost to prehistoric times, I pro-