Xántus. After preliminary reports, Major Alex. von Homeyer gave his reminiscences of travel in West Africa some years ago, and his imitations of the notes of African birds were strikingly rendered. Four different sections of the Congress were appointed, the names of the different delegates from foreign countries were read out, as well as letters of apology for their absence from several naturalists, Prof. Fürbringer, Baron de Selys Longchamps, and others.

The officers of the different sections were constituted as follows:—(1) Systematic Section: Presidents, Dr. Bowdler Sharpe (London) and Prof. Claus (Vienna); Vice-Presidents, Dr. A. Reichenow (Berlin) and Mr. C. G. Danford (Siebenburgen). (2) Biology and Oology: President, Dr. Rudolph Blasius. (3) Avigeographia: President, Dr. Palacky (Prag). (4) Economic Ornithology: President, Major Alex. von Homeyer.

On the afternoon of May 17 many of the members of the Congress ascended the Blocksberg, to enjoy a view of the city of Budapest and the Danube flowing below—a view not to be surpassed in beauty and interest in any country.

On Monday, May 18, the Systematic Section met in the lecture-theatre of the Polytechnicum, which was placed at the disposal of the Congress by Prof. Szabo, whose work is well known and appreciated in Great Britain. Papers were read by Prof. Klug, on some points in the anatomy of the stomach in birds, and by Dr. Bowdler Sharpe on the classification of birds, the latter lecture being illustrated by several large diagrams and a wax model of the phylogenetic tree, in which Prof. Fürbringer traces the evolution of birds from a reptilian stock. The remainder of the work of the Systematic Section consisted in the passing of the rules of nomenclature, as put forward by a committee consisting of Prof. Möbius, Dr. A. Reichenow, Count von Berlepoch, Dr. A. B. Meyer, and Dr. W. Blasius. The recommendations of this committee were adopted almost in their entirety by the meeting, after a two-days' discussion, notwithstanding some protests of Dr. Sharpe, and Mr. Büttikofer of the Royal Museum of Leyden, who found themselves in a hopeless minority. The chief points carried were: the adoption of the 10th instead of the 12th edition of the "Systema Naturæ" of Linnæus, the recognition of trinomial names in certain cases, and the adoption of names, even faulty in construction or misspelt, with all the consequences. The tone of the report, however, is so moderate, and exhibits so much consideration for the methods of other ornithologists, that it ought to be possible now to arrive at a definite conclusion for European usage at least; and then it would be easy to assimilate the American and European methods of nomenclature.

In the afternoon of the 18th, the Congress met in the Museum, and Dr. Otto Herman, M.P., gave an account of the distribution of birds in Hungary, and explained the collections which had been made specially for the Congress. These consisted of beautifully mounted cases of Hungarian birds with nests and natural surroundings: some very rare species were included in the collection, which was the work of four ornithologists—Dr. O. Herman, M.P., Dr. Julius von Madarász, Mr. Chernel, and Prof. Szikla. These gentlemen had each occupied a station in different parts of Hungary, and had not only collected the series of birds exhibited, but had also made exact observations on migration and distribution. The Hungarian National Museum is a very fine building, and contains a collection which fairly surprised most of the visitors, the series of native birds being especially complete. Large groups of Laemmergeiers, Sea Eagles, Ospreys, &c., with their nests, eggs, and young birds, are to be seen in the Bird-galleries, and these are principally the work of a well-known Hungarian ornithologist, Dr. J. von Madarász. The collection of Mammalia also comprises some great rarities, and the whole Museum teems with specimens procured by the veteran explorer, Mr. J. von Xántus, whose labours in Lower California and Central America, as well as in Borneo and the Sunda Islands, are also widely known. The Museum likewise contains a fine series of insects, especially Coleoptera, which were shown with much natural pride by Dr. Frivaldszky, who is responsible for the beautiful arrangement of the latter groups. The afternoon closed with an adjournment to the Hungarian Academy of Sciences, where Prof. Robert Collett read a paper on Arctic Bird-life before a crowded audience; and the evening concluded with a banquet at the "Archiduc Stephan" Hotel.

On Tuesday the debate on nomenclature was continued; and in the afternoon the Congress assembled on St. Margaret's Island, which forms a most delightful summer retreat for the inhabitants of Budapest, with its dozens of nightingales, its ruined cloisters, and its sulphur springs.

On Wednesday, the 20th, the general meeting of the Congress was held to receive the reports of the different sections and committees, and the business was concluded. A farewell banquet took place in the evening, and the second Ornithological Congress came to an end.

Next day the members were scattered in different directions—some to their homes, some to join one of the pre-arranged excursions. These were three in number—one to the Hanság marshes and Fertö, a second to the Platten-See, and a third to the districts of the Drave. Of the first excursion, in which the writer took part, he can only say that, under the direction of Dr. von Madarász, the members of the Congress who accompanied it underwent a never-to-be-forgotten experience. The species of birds observed were mostly those unknown to an English naturalist, and the hospitality dispensed by Prince Esterhazy, Baron von Berg, and Count Széchenyi, is not likely to disappear from the memory of those who had the good fortune to partake of it.

THE IMPERIAL PHYSICAL AND TECHNICAL INSTITUTION AT BERLIN.

THE Imperial Physical and Technical Institution which was founded in 1887 at Charlottenburg, near Berlin, under the auspices of the German Government, has now been for some time in active operation, and recently there has been issued by the executive Director, Dr. L. Loewenherz, a Report on the work of the Institution up to the end of last year.

It may be remembered that the Institution has two main objects in view: first, that of physical and technical research appropriate to the practical development of manufacture—researches for instance as to the qualities of metals and materials and as to methods of construction and measurement; the second object being that of fundamental research in theoretical problems in physics, and the testing of all kinds of measuring apparatus applicable for use in science, art, and manufacture. It appears to undertake, therefore, investigations and verifications similar to those undertaken in this country by the Board of Trade, or at the Kew Observatory; and, in France, by the Bureau International des Poids et Mesures. Its staff includes (exclusive of the clerical staff) a President, nominated by the Reichstag; a Director, with a Committee of seven members; seven scientific officers in the department of research; four technical assistants, and several mechanics and machinists.

From time to time, as new methods of testing are adopted, or as fresh work is undertaken, explanatory papers are issued by the responsible officers of the Institution (printed by Julius Springer, Berlin); and the following papers have, amongst others, been already issued:—Karl Scheel, H. F. Wiebe, and Allr. Böttcher, on

meteorological measurements; Dr. K. Feussner and Dr. St. Lindeck, on electrical measurements; Dr. O. Lummer and Dr. E. Brodhun, on optical measurements, including photometry; Dr. F. Foerster and Dr. F. Milius, on chemical analysis of glass.

We gather from the Director's Report above referred to, that the Institution has provided itself with fundamental standards of length and mass; with primary thermometers and barometers; with electrical standards of resistance, current, and pressure; and with apparatus for testing the flashing point of petroleum and inflammable liquids. Its metrological work for the public has included the proving of clinical thermometers, pyrometers, aneroid barometers, manometers, alcohol thermometers for low temperature, and thermometers for chemical research.

In October 1888, the official testing of thermometers was transferred from the Normal Aichungs Commission at Berlin to the Imperial Institution, and all thermometers are still tested on the basis of the regulations laid down by the Commission on November 10, 1885; excepting that, in place of basing the errors of scientific thermometers on a mercurial thermometer, thermometer readings are now reduced to the more accurate scale of the air-thermometer or hydrogen-thermometer.

The use of thermometers for determining pressures, or altitudes, &c., on the occasion of journeys of exploration, &c., seems of late to have increased, for many such have been already presented for examination at the Institution. If the thermometers are made of Jena glass (or of other hard thermometer glass), it would appear to be possible to ascertain pressures with but little trouble to $\pm$ 0·25 millimetre. The necessity for using proper glass is shown in an experiment carried out at the Institution with two thermometers, Nos. 42 and 43, made of ordinary Thuringian and crystal glass. On September 7, 1888, the corrections of these thermometers at 87° C. were found to be—

No. 42, $-$ 0°·05; No. 43, $-$ 0°·24 C.

The thermometers were then heated for 15 minutes to a temperature of 100° C.; they were then allowed to cool, and subsequently retested on September 10, when their errors were found to be—

No. 42, $+$ 0°·08; No. 43, $-$ 0°·09 C.

Such variation in the reading of a thermometer after its exposure to a high temperature would unfit it for use in the exact determination of pressures or altitudes.

With reference to the testing of various sorts of glass Dr. F. Milius points out that Weber's process, generally made use of, and which consists in exposing the body to be examined to an atmosphere of muriatic acid vapour for a space of twenty-four hours, is not always trustworthy. Thus, according to the quality of the glass, it appears to be covered more or less, after exposure to the acid vapour, by a thick rime (or hoar frost); and that although the experienced observer finds Weber's method tolerably certain, yet the less experienced observer may sometimes be left in doubt, particularly where rough surfaces are treated, as to whether the rime exists or not; Dr. Milius therefore proposes an optical form of test other than that of the muriatic acid test, as is explained at length in his paper.

Dr. Milius, in conjunction with Dr. F. Foerster, has also investigated the solubility, in water, of potash and soda glass, particularly with reference to Schott's experiments as to the capacity of potash water-glass for absorbing water without losing its vitreous quality. This latter fact can be ascertained by keeping pulverized water-glass under water, when, as in the case of hydraulic cement, a hardening of the paste begins to take place. This process is connected with a development of heat; in the case of water-glass in which there was one atom of potash to three of silicic acid it was observed at the Institution that within a quarter of an hour the moistened matter had been heated 10° Centigrade, and it became hard in one day; if the proportion of silicic acid is larger, the glass requires from two to three days for solidification. Their researches appear to show that for purposes connected with mercurial electrical standards, the glass used should be very little soluble in water and acids; hard glass, for instance, which had a base of soda, and not potash, being little hygrometric.

In the important field of electrical measurements, the Institution appears also to be doing good work. It is preparing to undertake the verification of all kinds of apparatus; including voltmeters, ammeters, meters for the measurement of power and efficiency, galvanometers, and resistance coils.

In the field of practical photometry we have to compare the intensities of different sources of light as experienced by the eye; but unfortunately we have not, even for commercial purposes, any satisfactory method by which intercomparisons may be made between the relative intensities of coal-gas, electric and oil lights respectively. In practical photometry much is being done in this country by Abney, Vernon-Harcourt, Chaney, and others, as well as by Lummer, Brodhun, and others in Germany, but as yet no standard photometer has been produced. The standard light is still also the ancient "sperm-candle," and the method of comparison is still the old-fashioned "grease-spot" Bunsen photometer more or less modified. The German authorities appear to be fully alive to the necessity of improvement in this field of technical research; and have investigated M. Violle's incandescent platinum-standard of light, and also the Hefner lamp and Aubert's apparatus; and for electrical light purposes they have followed a form of standard glow lamp.

Among the papers above referred to, we notice also one by Dr. Loewenherz, on the testing of tuning-forks. The Institution undertakes the testing of tuning-forks, on payment of a small fee, the object of the examination being to ascertain the correctness of the height of the tone of the fork in terms of an international diapason; or the number of the vibrations of the fork per second, at the temperature of 15° Centigrade, the pitch of the note A being fixed at 435 entire vibrations per second, or 870 half or single vibrations according to the French method of counting. Tuning-forks sent to the Institution for examination are required to be constructed in accordance with conditions laid down by the Institution. Unity of pitch is of fundamental importance in music and in the construction of musical instruments, and it is to be desired that some authoritative testing of tuning-forks might be similarly undertaken in this country.

In metallurgy the work of the chemical laboratories of the Institution does not appear to be extensive; it has included more particularly analyses of the metals platinum, cadmium, and rhodium. In the Physical Laboratory, measuring instruments of precision for workshop use, such as speed and power indicators, screw-thread gauges, have also been examined by the Institution; and its geodetical work has included the verification of instruments of precision for General Schreiber, of the Imperial Prussian Land Survey. The department has undertaken also the verification of polariscopes, lenses, prisms, and other optical instruments, to a limited extent.

The above observations may serve to show that the Institution is alike prepared to verify a standard—as a measurer of electrical resistance—with the utmost accuracy, or to test an instrument for common purposes—as a gas meter. How far the Institution may be self-supporting is not stated in the Director's Report; but as the demands for verification work of this kind are largely voluntary, it would appear to be evident that the excellent staff of the Institution could not be maintained unless it received valuable support from the State.