

have induced the Council to recommend that the next autumn meeting should be held in Paris. A sum of 2,318*l.* has been raised by the Institute for the widow and family of Mr. Jones, the late general secretary.

The President stated that the Bessemer medal had been awarded to Prof. Tunner, of Leoben, Austria, in consequence of the great distinction that gentleman had earned for himself in his researches in that branch of science which the Institute so specially represented.

One of the most important papers read was by Mr. I. Lowthian Bell, M.P., F.R.S., on the separation of phosphorus from pig iron. In this paper Mr. Bell detailed his further experiences in his endeavours to eliminate the phosphorus from the iron, its presence having a weakening effect on the metal. Fully five-sixths of the pig iron manufactured in Great Britain is made from ores which, when smelted, give a product containing from three-tenths of a unit to nearly 2 per cent. of phosphorus. When, however, this element exists in pig iron to the extent of much more than one-tenth of a unit per cent. it is unfit for the Bessemer converter—at all events when ordinary spiegel iron, containing 10 or 12 per cent. of manganese, is used for its final purification. Bessemer steel rail-makers are, therefore, obliged to reject iron which formerly sufficed for the manufacture of iron rails, an iron comparatively free from phosphorus being necessary. That, therefore, affected the prosperity of the mines which formerly supplied the rail makers with ore, as well as the blast furnaces which produced the pig iron from that ore. Mr. Bell explained that at the high temperature of the Bessemer converter, while the carbon was removed by the air during its passage through the metal, the phosphorus was not affected. This he stated was also the case to a certain extent in the ordinary refinery furnaces; with a more moderate temperature, however, the conditions which bound carbon and phosphorus with iron were materially changed. The iron was more or less oxidised, and the oxide of iron so formed acted on the carbon and phosphorus. When the phosphorus is removed its loss is accompanied by a separation of the carbon contained in the pig iron. Loss of carbon, however, deprives the metal of its susceptibility of fusion at the temperatures at which the operation of refining and puddling are carried on, and when once the metal is solid the further elimination of phosphorus is very difficult, if not impossible. Mr. Bell expressed the opinion that a lower temperature probably weakened the affinity of phosphorus for iron, as they existed in the crude metal, or strengthened the affinity between oxide of iron and phosphoric acid. A third condition involved in the mere condition of heat might be a diminution of the power possessed by oxide of iron in attacking the carbon, that element which enabled the crude metal to maintain fluidity when moderately heated. The author said that whichever one or more than one of the three conditions was required, the fact remained that melted crude iron might be maintained in contact with melted oxide of iron, and still retain carbon enough to prevent it solidifying, while the phosphorus rapidly disappeared. Instances were given of 95 per cent. of phosphorus being removed, while only 10 per cent. of the carbon had been dissipated. The process consists in the more rapid agitation of the two substances while in a liquid condition. The iron so heated may be puddled for the production of malleable iron, or used for the manufacture of steel. Specimens of steel of the highest quality which had been so produced at the Royal Arsenal, Woolwich, were exhibited.

Dr. Percy, F.R.S., gave some particulars as to the manufacture of Japanese copper. Bars of this metal present a beautiful rose-coloured tint on their surface, which is due to an extremely thin and pertinaciously adherent film of red oxide of copper or cuprous oxide. This tint is not in the least degree affected by free exposure to the atmosphere. Dr. Percy placed before the meeting bars which he had possessed for thirty years, and which had undergone no change, although freely exposed to the atmosphere. The secret of this result lies in casting the copper under water, the metal being very highly heated and the water being also made hot. Dr. Percy stated that he had succeeded in casting copper in this way, and had produced similar results to those shown in the Japanese metal.

Other papers read were:—"On some Recent Improvements in the Manufacture of Iron Sponge by the Blair Process," by Mr. J. Ireland; "Statistics on the Production and Depreciation of Rails," by Mr. Charles Wood; "On Steel-casting Apparatus," by Mr. Michael Scott; "On Railway Joints," by Mr. C. H. Halcomb; and "On the Manufacture of Bessemer Steel and Steel Rails," by Mr. C. B. Holland.

## UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—The Council of the Senate recommend that the application of Prof. C. C. Babington for skilled assistance at the Botanical Museum be granted, and that an assistant curator of the Herbarium be appointed at a salary of 100*l.* per annum, the appointment to be made by the Professor with the consent of the Vice-Chancellor, and to be for a period of four years. It is in contemplation to appoint a non-collegiate student.

BALTIMORE.—The Anniversary of the Johns Hopkins University was celebrated on February 22, when addresses were given by some of the professors and others. So far the progress of the University has been thoroughly satisfactory. One of its principal aims is to encourage original research, both among professors and students, and fellowships are granted to those who show aptitude for such work. Prof. Remsen, in his address, showed that a lofty idea of what original research really is, is entertained at the University; it is not merely the establishing of an isolated fact, the devising of a new piece of apparatus, the simple analysis of a new mineral, the discovery of an extra tooth in some abnormal animal; it is, rather, a systematic attempt to solve a definite problem, involving the use of a variety of methods peculiar to the special branch in which the attempt is made. In the three laboratories, biological, physical, and chemical, a variety of important work is being carried on, and altogether, both in the kind and amount of work which is being done under the auspices of the university, the trustees and professors show that they have a thorough appreciation of the spirit of the founder's legacy.

## SOCIETIES AND ACADEMIES

LONDON

Mathematical Society, March 14.—Lord Rayleigh, F.R.S., president, in the chair.—Mr. Artemas Martin, Erie, Pa., was proposed for election.—The Secretary communicated a paper by Prof. J. Clerk Maxwell, on the electrical capacity of a long narrow cylinder and of a disc of sensible thickness. Prof. Cayley, Mr. J. W. L. Glaisher, Mr. Roberts, and the President made short communications.

Royal Astronomical Society, March 8.—Lord Lindsay, president, in the chair.—Mr. Neison read a paper on Hansen's terms of long period in the lunar theory. Mr. Proctor drew some diagrams referring to the position of the axis of Mars, and spoke upon Mr. Stone's paper of last January. Mr. Neison made some illustrative remarks thereon.—A paper by Mr. Plummer was read on the supposed influence of a mass of brickwork upon the errors of a transit instrument in its neighbourhood. Several Fellows commented upon this paper and described the lively behaviour of their transit-piers; Mr. Dunkin said there was nothing new about it.—A paper by Mr. Stone was read on telescopic observations of the Transit of Venus. Mr. Gill spoke on the difficulties concerning contacts, and some discussion followed.—A paper was announced by Prof. Sedley Taylor on Galileo's trial before the Inquisition in the light of recent researches; likewise an atlas of the ecliptic, by Heiss, of stars down to the fifth magnitude on Mercator's projection, made in order to get people to lay down the zodiacal light.—There were several other papers.

Entomological Society, March 6.—H. W. Bates, F.L.S., F.Z.S., president, in the chair.—Mr. John Woodgate was elected a Member of the Society.—Mr. F. Moore, at the request of Sir W. H. Gregory, late governor of Ceylon, exhibited a large series of drawings, executed by native artists, of the transformations of the lepidoptera of the island. These drawings were made under the direction of Dr. Thwaites, and represented, for the first time, the life-history of many species.—Mr. McLachlan exhibited some entomological parts of the great Russian work "Fedtschenkos' Travels in Turkestan."—Mr. H. Goss exhibited a small collection of fossil insects obtained by Mr. Gardner from the Bournemouth leaf beds (middle eocene). The collection comprised numerous elytra of coleoptera, and wings of neuroptera, &c.—Mr. J. Mansel Weale read some notes on South African insects. These referred to variation in *Pteris severina* and *Pteris mesentina*; to the secretion of formic acid in *Termes trinitarius*, and the probable localisation of the same in a cephalic process, and also to the larvæ of some Hesperidæ in relation to the subject of protective resemblance.—Mr. Ed. Saunders read a paper entitled "Remarks on the Hairs of some of our British Hymen-