

exhibitors were various departments of the British Museum. Its department of zoology sent a series of armadillos, an example of camouflage in a nightjar and turtles stranded on the coasts of the British Isles; its department of geology flexible sponges of Oligocene age from Ukraine and casts of the skull and other parts of a large fossil amphibian from New South Wales; and its department of mineralogy a beautiful specimen of Danburite, a rare gem stone from Burma; while its research laboratory and department of ethnography illustrated the application of x-rays to the study of old Peruvian pottery.

From Kew Gardens came specimens showing the resupination of the flowers of laburnum and other plants, and the origin of the garden plum was illustrated by the John Innes Horticultural Institution. The National Physical Laboratory showed radio-transmitting equipment for use with meteorological sounding balloons, and an apparatus for measuring extremely minute differences in water pressure, and the Cavendish Laboratory, Cambridge, a new form of x-ray microscope which converts a series of measurements on x-ray beams diffracted by a crystal into an optical image of the crystal that can be viewed through an eyepiece.

Among exhibits from the Imperial College of Science and Technology were instruments for the microscopy of ores, a small internal-combustion engine running on methane and apparatus for measuring the oxygen consumption of flying insects and determining the effect of atmospheric pressure on the frequency of their wingbeat.

The director of research of the Admiralty demonstrated the rapid spectro-chemical analysis of alloy steels, and Dr. W. H. Hatfield, of the Brown-Firth Research Laboratories, showed non-magnetic steels and examples of different methods of obtaining extremely hard metallic materials. Sir Robert Hadfield showed a quick-immersion thermo-electric pyrometer for measuring the temperature of liquid steel and apparatus for the rapid estimation of carbon in steel.

Photographic exhibits sent by George H. Gabb included examples of early Talbotypes and Daguerreotypes, among them being what is probably the earliest attempt to photograph the solar spectrum, dating from 1842.

#### A CONFERENCE ON THE CALCULUS OF VARIATIONS

A CONFERENCE on the calculus of variations will be held at the University of Chicago from June 27 to 30 under the auspices of the department of mathematics. The speakers and the topics which will form the basis for discussion at the conference are as follows: Tibor Rado, of Ohio State University, "Length and Area" and "Geometrical Approach to the Plateau Problem";

Jesse Douglas, of the Institute for Advanced Study, "The Problem of Plateau-Riemann" and "Minimal Surfaces of Higher Topological Structure"; Marston Morse, of the Institute for Advanced Study, "Functional Topology and Analysis in the Large" and "The Existence of Minimal Surfaces of General Critical Type"; Karl Menger, of the University of Notre Dame, "Logical Analysis of the Semi-continuity Properties of Line Integrals"; E. J. McShane, of the University of Virginia, "Existence Theorems for Minima of Simple and of Multiple Integrals"; Max Coral, of Wayne University, "The Equations of Haar and the Differentiability of their Solutions"; G. A. Bliss, of the University of Chicago, "The Field Theory for Multiple Integrals"; L. M. Graves, of the University of Chicago, "The Jacobi Condition for Minima of Multiple Integrals"; M. R. Hestenes, of the University of Chicago, "The Problem of Bolza"; W. T. Reid, of the University of Chicago, "Sufficiency Proofs for the Calculus of Variations by Expansion Methods"; H. H. Goldstine, of the University of Chicago, "Minimum Problems of Abstract Functional Calculus." Discussion of some of the problems and results presented in the lectures of the conference will be continued in a seminar on the calculus of variations conducted by G. A. Bliss, and lasting through the summer quarter. Among those who will participate in the seminar are Max Coral, H. H. Goldstine, L. M. Graves, M. R. Hestenes, E. J. McShane, W. T. Reid and M. F. Smiley. A series of lectures preparatory to the addresses of the conference will be given in the seminar in the preceding week, from June 21 to 24. All mathematicians and other scientists who may be interested are cordially invited to attend the conference and the preparatory lectures in the seminar. Requests for information concerning the conference and housing accommodations may be addressed to Professor M. R. Hestenes, Eckhart Hall, University of Chicago.

L. M. GRAVES

#### THE ATLANTIC CITY MEETING OF THE AMERICAN SOCIETY FOR TESTING MATERIALS

THE forty-second annual meeting of the American Society for Testing Materials will be held at Chalfonte-Haddon Hall, Atlantic City, from June 26 to 30. There will be given upwards of a hundred and ten technical papers and reports in the fields of standardization, research and testing of engineering materials. The subject of the annual address of the president, T. G. Delbridge, manager of the research and development department of the Atlantic Refining Company, will be "Glimpses at Petroleum," and the fourteenth Edgar Marburg Lecture will be by Professor H. F. Moore, on "Stress, Strain and Structural Damage."