

puzzle, though whether it has been inserted in the correct place remains to be seen. There occur a number of perplexing difficulties which the authors do not set out. Thus, although they do not find as great a proportion of bivalents as Jenkins in the pollen mother-cells in their undoubled  $F_1$ , it is still high. This, together with the report of seven perfectly normal bivalents and fairly regular tetrad formation in the hybrid *Aegilops speltoides*  $\times$  *T. monococcum* (Chizaki, 1932) and the 6-7 bivalents reported by Lilienfeld and Kihara (1934), as usually occurring in the hybrid *A. speltoides*  $\times$  *T. Timopheevi* (*AA GG*), are difficult to reconcile with the assumption that *A. speltoides* contains the *C* sets of chromosomes. Again, the authors make no mention of the number of nucleoli in their new wheat. In both *A. speltoides* and the emmer wheats there are four nucleoli (Pathak, 1940), so that the resulting amphidiploid will probably have 8 nucleoli, whereas true vulgare wheats have only 6. It may well be that the new type in reality has the constitution *AA BB A'A'* rather than the elusive *AA BB CC*. B. C. S.

## ROOTS OF MOUNTAINS

PROF. BENO GUTENBERG, of Pasadena, California, has been doing a considerable amount of work recently on problems connected with the earth's crust immediately beneath high mountains. He has investigated in great detail the structure of Southern California as it may be interpreted in the light of data from 'near' earthquakes. In a recent paper he summarizes our present knowledge (much of which is due to himself) concerning the roots of mountains throughout the world ("Seismological Evidence for Roots of Mountains", by Beno Gutenberg, *Bull. Geol. Soc. Amer.*, 54, 473-498; April 1, 1943).

Prof. Gutenberg states that all results based on the study of seismograms of nearby continental earthquakes indicate that below the sediments is a layer in which the velocity for longitudinal waves is between 5.55 and 5.60 km./sec. It is considered granitic. Below it, intermediate layers showing higher velocities definitely show regional differences. Their lower boundary is the Mohorovičić discontinuity, below which a material, probably ultra-basic, in which the velocity is about 8.0 km./sec., is found nearly everywhere. The velocities through the granitic as well as those through the ultra-basic layers are the same in different regions, within  $\pm 0.4$  km./sec.

The maximum thickness (60-70 km.) of the 'continental layers' above the Mohorovičić discontinuity thus far has been found under the southern Alps and about the same under the Sierra Nevada. Whereas the root of the Alps seems to be due mainly to an increase in the thickness of the granitic layer, present indications are that the granitic layer under the Sierra Nevada extends roughly down to the same depth (about 20 km.) as generally in Southern California; mainly the intermediate layers are thicker under the Sierra. In other continental regions, the Mohorovičić discontinuity is in general at a depth of about 50 km. under areas with moderately high mountains, and of about 40 km. near oceanic coasts. An especially low value of 30 km. has been found in New Zealand. Under the Atlantic and Indian Oceans these layers have probably an even smaller total thickness and are practically absent under the Pacific Basin. The boundary of the crystalline crust is within the ultra-basic material.

## DESIGN OF ALTERNATORS FOR SWITCHGEAR TESTING

A PAPER by V. Easton (*J. Inst. Elec. Eng.*, 90, Pt. 2, No. 16; August 1943) deals with some of the factors which affect alternator design. Due to the rapid growth of interconnexions on many systems during the last fifteen years, the greatly increased voltage and current likely to be caused by a fault at many switching stations has necessitated the design of circuit-breakers of larger capacity, and in turn this has made desirable improved facilities for technical investigations and for proving the rating of the breakers. The paper discusses the mechanical and electrical factors which affect the design of alternators supplying power for switchgear testing, and a review is made of several methods of increasing the output of such alternators, the merits of each being critically examined.

In the section on electrical design the author deals with reactance, time-constants and damping circuits, recovery voltage, and speed of plant and losses. The section on mechanical design covers slot conductors, end windings, foundations and couplings. Finally, the author discusses various methods of increasing output and considers the effect of external reactance, increased initial voltage, shorter duration of test, super-excitation, and parallel operation of plant. All the methods to increase output may be applied to existing plant, the most suitable probably being an increase in the initial voltage or a reduction in the duration of the test period. Super-excitation may also be adopted, but if complete neutralization of the stator M.M.F. is desired the super-exciter set must be of large capacity, probably designed for a high voltage, and the arrangement may be relatively inefficient.

The method to be adopted for an extension to existing plant may be influenced by the arrangement of the sets with which it is required to run in parallel, but for a new installation some degree of super-excitation should be provided. The choice lies between a large excitation set capable of maintaining the stator current at the initial value and a small set with controlled switching to eliminate the d.c. component of the stator current and permit the switch under test to be opened a few cycles after the master switch closes. Technically, the former scheme is the more satisfactory from the point of view of the flexibility of the testing procedure, the severity of the test conditions, and ease in interpreting the results. Economic considerations may, however, be of sufficient importance to offset the complications and the reduction in the severity of the test introduced by controlled switching.

## RIVER CONTROL IN BRITAIN

AMONG the terms of reference of the Central Advisory Water Committee was a consideration of what enactments, if any, were required to co-ordinate the various river interests, and the desirability of constituting new river authorities with responsibility for some or all of the functions now exercised by existing bodies. There were found\*, on examination of the subject, a great many bodies each exercising limited control generally of one or

\* Ministry of Health. Third Report of the Central Advisory Water Committee: River Boards. (Cmd. 6465.) Pp. 77. (London: H.M. Stationery Office, 1943.) 1s. 3d. net.

other aspect of river water. Pollution, drainage, fisheries, inland navigation, tidal navigation, ports, water supply, sewage disposal, etc., each has for most rivers a separate supervising body. The complex administration for this diversity of closely interrelated problems has led the Committee to suggest means of more closely co-ordinating administrative control.

The defects of the present system are most apparent as regards the mitigation of pollution, a problem in which the local government areas bear no relation to watershed areas. Thus there is a patchwork of control, actuated by varying standards of purity, over the same river. Moreover, an overlapping of functions in this and other problems does not encourage efficiency and smooth working. In certain river interests no authority is directly concerned with amenities and public use. Again, an authority concerned only with drainage may well interfere with underground water resources in other parts of the river valley, and there may be considerable divergence between the interests of bodies charged with conservation of fisheries, use of tidal waters, sewage discharge and industrial work.

The Committee finds, however, that the principal defect of the existing system is not the overlapping function, nor the possibility of conflict between interests, but the fact that no single body is charged with the duty of co-ordinating various river interests, or the duty of weighing fully all questions under review and so ensuring that the river water is used to the best advantage of all concerned. It suggests, therefore, the formation of new river boards in place of certain of the existing bodies. Tidal waters, except as regards pollution, should be left under the authority of navigation and other similar authorities. Probably the same restriction should apply to inland navigation which, generally speaking, should be left under the administration of existing authority. The administrative area of each of the new boards should be a watershed area in the case of the larger rivers, or two or more watershed areas grouped together.

A map of the twenty-nine suggested river boards is attached to the report, which concludes with consideration of constitution and finance.

## A SYNTHESIS OF NEW WORLD ARCHÆOLOGICAL FINDS

SO many local publications have been appearing lately, some of considerable interest, that it is a relief to turn to a work of synthesis. A recent publication of the American Philosophical Society (*Proc. Amer. Phil. Soc.*, "Recent Advances in American Archaeology", 86, No. 2; February 10, 1943) is extremely interesting in that it attempts to bring up to date, or rather to the end of 1942, the more important archaeological discoveries in the New World. There are fourteen articles, and it is to be regretted that space will only allow of one or two of these to be referred to.

Archæologists interested in Maya problems will turn at once to the first article, but the second, which deals with Eskimo archæology and its bearing on the problem of man's antiquity in America, is also of great interest. A new site has been examined, and the culture there discovered (Ipiutak) does not readily fit in with the accepted chronological sequence of cultures, although it is clearly related to that

known as the 'Old Bering Sea', and may even be earlier in date. Much material is turning up in the Lake Baikal region in northern Asia, and this has been dated as Mesolithic to Neolithic. The finds are definitely earlier than the Bronze Age Glazkovski and Tiverski cultures. These early northern Asian finds recall intimately the early stages of Eskimo cultural development. Indeed, it would seem certain that the two cultural areas can be equated. But neither near Lake Baikal nor in early Eskimo sites have such earlier types of tool as the Sandia or Folsom points come to light, and in the Baikal district only one example recalling the Yuma point has turned up. The Yuma point occurs in American sites later in time than either the Sandia or the Folsom, and it would thus appear that there were folk in America at an earlier date than this Lake Baikal complex, which gave rise afterwards to the Eskimo migrations into the New World. Whether the Sandia and Folsom cultures represent the results of earlier migrations into America from northern Asia—perhaps of upper palæolithic date—remains to be proved. The upper palæolithic finds eastward of Lake Baikal are at present too scanty to furnish any evidence. The very early discoveries at the Sandia Cave may not yet be assimilated by every archæologist, as they are fairly recent news. Articles both on Sandia Cave and on the problem of the Folsom and Yuma points can be read in these *Proceedings*.

A long account of the burial of an early American magician, illustrated by no less than three plates in colour, is of considerable interest.

The above notice mentions only a few of the articles which help to bring up to date the recent archæological discoveries, and the whole forms an important symposium for anyone interested in the archæology of northern America. M. C. B.

## FORTHCOMING EVENTS

(Meetings marked with an asterisk \* are open to the public)

### Saturday, November 13

BIOCHEMICAL SOCIETY (in the Department of Organic Chemistry, Imperial College of Science and Technology, South Kensington, London, S.W.7), at 11 a.m.—Discussion on "The Tetrapyrrolic Pigments".

At 11.15 a.m.—Prof. D. Keilin, F.R.S.: "Properties and Function of Natural Tetrapyrrolic Compounds".

At 12.10 p.m.—Prof. H. Munro Fox, F.R.S.: "Varieties of Hemoglobin".

At 1.45 p.m.—Mr. R. Hill: "Tetrapyrrolic Compounds in Plants".

At 2.35 p.m.—Dr. E. F. Hartree: "The Constitution of Catalase".

At 3.15 p.m.—Mr. J. R. P. O'Brien: "The Metabolism of Blood Tetrapyrrolic Pigments".

At 4.30 p.m.—Dr. C. Rimington: "The Porphyrinopathies".

### Monday, November 15

ROYAL GEOGRAPHICAL SOCIETY (at Kensington Gore, London, S.W.7), at 3 p.m.—Mr. Otto Popper: "The International Regime of the Danube".

ASSOCIATION OF AUSTRIAN ENGINEERS, CHEMISTS AND SCIENTIFIC WORKERS IN GREAT BRITAIN (at the Institution of Structural Engineers, 11 Upper Belgrave Street, London, S.W.1), at 7.15 p.m.—Dr. O. P. Eimerl: "Present and Future Application of Light Alloys".

### Tuesday, November 16

ROYAL SOCIETY FOR THE PREVENTION OF ACCIDENTS (BIRMINGHAM AND DISTRICT INDUSTRIAL COMMITTEE) (in the Council House, Birmingham), at 10 a.m.—Conference on "Industrial Safety" (to be opened by Mr. Geo. Tomlinson, M.P.).

At 10.30 a.m.—Sir Wilfrid Garrett: "The Future of Accident Prevention".

At 11.45 a.m.—Mr. W. Higgs, M.P.: "Economics of Safety".

At 2.15 p.m.—Dr. J. M. Davidson and Mr. S. H. Wilkes: "Chemical Hazards—New and Old".

At 3.15 p.m.—Mr. A. P. Young: "Education and Propaganda".

EUGENICS SOCIETY (at the Royal Society, Burlington House, Piccadilly, London, W.1), at 5 p.m.—Mr. R. M. Titmuss: "Social Environment and Eugenics".