Community"; "Science and Music"; "Some Unpublished Psychology"; "How Can Deaf Children Best Be Taught?"; "What About Cosmic Rays?"; "Newer Knowledge of Learning Processes"; "Science as a Career"; "Radio Engineering"; "Greenhouses and Illuminating Gas"; "The Science of Potato Growth"; "Our Community's Health"; "Why Not Live Longer?"; and many others. Science has now accumulated so much knowledge that a year's program may consist of almost anything which interests the members.

The success and usefulness of a local branch depends upon the quality of the local leadership. The inherent need and opportunity for the work of a branch seems to exist in almost any community. Possibly a few regions are already so well organized that no field of service remains for such an organization. Certainly most science men hardly need to join anything more in order to keep their time well filled. It is peculiarly true, however, that busy people are the ones most likely to find the time and inclination and to have acquired habits of organizing themselves and other people for new productive efforts.

OTIS W. CALDWELL,
General Secretary, American Association for the Advancement of Science

THE NATIONAL ACADEMY OF SCIENCES. II.

ABSTRACTS OF PAPERS PRESENTED AT THE AUTUMN MEETING[1]

(*Continued from page 541*)

Calcium as a factor in the nutritional improvement of health: H. C. SHERMAN. Starting with a food supply already adequate to the support of normal health, generation after generation, it was found possible to induce a higher degree of nutritional well-being (a superior internal environment for the life process) with resultant improvement of "positive" or "buoyant" health throughout the life cycle, by enrichment of the dietary in certain of its chemical factors. In the original experiments the improvement was brought about by adjustment of the quantitative proportions of the natural articles of food which composed the dietary. In terms of the actual foods there was only one experimental variable; but in terms of the chemical interpretation, four factors may have been involved, namely, calcium, protein and vitamins A and G (B_2). New experiments dealing separately with calcium are here reported. These show that the improvement of nutritional well-being and health previously noted was largely but not wholly due to the more liberal intake of calcium. When the original food supply (Diet A) was enriched in calcium only, and only to the same extent as in the previous experiments, there resulted improvement in the rate, efficiency and uniformity of growth, a decrease of death rates at all ages, a higher level of adult vitality with longer period between the attainment of maturity and the onset of senility and an increase in the average length of life. Experiments with diets of still more liberal calcium content are now in progress, and the effects of enrichment of intake of protein, of vitamin A and of vitamin G are also being studied.

An analysis of color-blindness in eleven thousand museum visitors: W. R. MILES.

Action potentials of various layers of the cerebral cortex of the monkey: J. G. DUSSER DE BARENNE and WARREN S. MCCULLOCH. It is well known that "spontaneous" action potentials are obtainable from the cerebral cortex of animals and man, even when deeply anesthetized. These action potentials, amplified with a 2-stage d.c. amplifier and recorded with a cathode ray oscillograph, were investigated in the cortex of monkeys under Dial anesthesia. Small silver—silver chloride electrodes, 2 to 3 mm apart, were used throughout. In combination with the method of laminar thermocoagulation, which permits one to destroy, at will, any number of consecutive layers of the cortex, it is possible to approach the problem of the action potentials originating in various layers of the cortex. After thermocoagulation, involving in each instance an area of 5×7 millimeters, the electrodes were replaced exactly in their original positions, well within the area coagulated. The results to be reported here are the following: (1) Thermocoagulation of the entire thickness of the cortex (80° C. for 5 seconds) immediately and permanently abolishes the action potentials normally found in the particular cortical area. (2) Laminar thermocoagulation of the outer four layers (70° C. for from 4 to 4½ seconds) reduces the local action potentials almost completely and permanently. (3) Destruction of the outer three layers (70° C. for 3 seconds) reduces the local action potentials markedly with little or no evidence of any return to their original size and form. This reduction is much less than that noted sub 2. (4) Laminar thermocoagulation of the outer two layers (65° C. for 3 seconds) results in a definite reduction in the action potentials from which there is some recovery, though they do not regain their initial size and shape at the end of one hour. The finding sub 1 shows that the electrical phenomena recorded under the conditions of these experiments arise in the cortical area under investigation. The findings sub 2, 3 and 4 show that the action potentials remaining after any thermocoagulation originate in the remaining layers of the cortex. (5) Laminar thermocoagulation of the outer three layers (70° C. for 3 seconds) of one area (5×7 mm) in the precentral, postcentral or frontal region produces changes in the local action potentials

[1] Charlottesville, Va., November 18, 19 and 20, 1935.

within each of the other two regions. Without thermocoagulation, even in the course of several hours, no such reduction occurs. These findings demonstrate the existence of a functional interrelation among these three regions.

Biographical memoir of Edgar Fahs Smith: GEORGE H. MEEKER.

The extinct giant ground-sloths of North and South America: W. B. SCOTT.

The great tree of proboscidean descent: summary of our knowledge of the origin, adaptive radiation and geographic distribution of the proboscidea of the world: THE LATE HENRY FAIRFIELD OSBORN.

The mechanism of geysers: ARTHUR L. DAY. Bunsen's theory of geysers was published in 1847 in explanation of the behavior of the Great Geyser of Iceland. Although Bunsen himself did not extend his explanation to cover other geysers which he had not seen, nevertheless his theory has found general acceptance among geologists as a satisfactory explanation of all geyser action, apparently without question of the appropriateness of the generalization. One of the reasons for this is perhaps found in the fact that the literature records more studies of laboratory models of geyser action than of field studies of the geysers themselves and that these models are uniformly designed in accord with the conditions assumed in Bunsen's theory, namely, a constant heat supply and a limited (constant) water supply. In an investigation of the hot springs of Yellowstone Park covering a number of years, some study has been given to the behavior of well-known geysers in that region and to the behavior of models based on Bunsen's theory. There is wide divergence of behavior between the actual geysers and the conventional models which extends to many important details and brings out a number of facts not hitherto noticed, which are of considerable interest to students of geyser action, whether they be physicists or geologists. Conspicuous among these differences is the fact that the Great Geyser of Iceland and all the models since made for laboratory study erupt for periods more or less uniform in length and the time intervals between eruptions also are more or less constant. Except for Old Faithful, few of the 200 geysers in Yellowstone Park which are known to us present this constancy of behavior. Neither do they conserve or return to its source any considerable proportion of the water erupted, as the Great Geyser does. The problem is therefore considerably more complicated and perhaps more interesting than Bunsen found it to be. This paper will therefore endeavor to present the results of a considerable number of field and laboratory observations and some conclusions and generalizations which may be drawn from them.

The frequency distribution of lunar craters with reference to size: F. E. WRIGHT. In a recent publication by M. A. Blagg and K. Mueller, entitled "Named Lunar Formations" (Vol. I, Catalogue; Vol. II, Maps) and issued by the International Astronomical Union, the designations and coordinate locations of 6,019 lunar surface features are listed. In this number there are included 3,119 craters (walled craters, holes, ring plains); 485 crater formations not fully enclosed; and 235 irregular and indistinctly walled plains. The diameter of each crater is given; all craters in the list have a diameter of at least two miles. With these data as basis, plots have been prepared which show the frequency distribution of lunar craters with reference to size. The distribution curves are remarkably smooth and approximately exponential in character. It is known that the different types of lunar craters pass in all gradations from one to the other. However, a satisfactory explanation of the character of the frequency distribution curves has not yet been found. A comparison of the frequency distribution of terrestrial craters of different sizes with that of lunar craters has not been possible because of the paucity of available data on terrestrial craters.

Geological setting of the archeology of Lake Tacarigua, Venezuela: EDWARD W. BERRY. An attempt will be made to set forth what is known of the geology of Lake Tacarigua, a region in northern Venezuela, which was thickly settled in pre-Columbian times, and one which has yielded extensive archeological and anthropological materials. The conclusion is reached that the cultural horizons extend back to ancient historic times but are much younger geologically than has been supposed.

Ferrous metasilicate in nature: NORMAN L. BOWEN. In the laboratory synthesis of minerals, with the purpose of throwing light upon the conditions of their formation in nature, it is found that metasilicates of most of the common oxides can be prepared without difficulty and their thermodynamic relations can be fully established. Attempts to prepare ferrous metasilicate ($FeSiO_3$) have, however, failed and the conclusion has been reached that ferrous oxide does not combine with silica in the metasilicate ratio, a conclusion that seemed justified because a natural mineral of that composition has not been found hitherto. Compounds related to $FeSiO_3$ and solid solutions approaching the composition $FeSiO_3$ rather closely are well known among natural and synthetic minerals and the variation of their properties with change of composition has been carefully determined. The properties of $FeSiO_3$ may therefore be said to be rather accurately known, in spite of the fact that no one has ever had any crystals of that composition for purposes of measurement. In the lithophysae of an obsidian from Lake Naivasha, Kenya, minute crystals have now been found whose properties agree entirely with the deduced properties of $FeSiO_3$, and there seems no escape from the conclusion that they have substantially that composition. Efforts to determine by laboratory methods the conditions under which $FeSiO_3$ may be formed must therefore be renewed. The indications from the natural occurrence are that the crystals were formed at low temperatures, a relation that may account for failure to prepare them synthetically. Silicate reactions proceed so slowly at low temperatures

that it may be necessary to have recourse to some stimulus such as a "catalyst" to ensure equilibrium in reasonable time. Nature has at her disposal an abundance of "catalysts" and limitless time.

William Barton Rogers and his contribution to the geology of Virginia: JOSEPH K. ROBERTS.

Geographic distribution of sea-level cosmic-ray intensities: R. A. MILLIKAN and H. VICTOR NEHER. With Neher self-recording electroscopes sent to many parts of the globe on ten different ships a precision survey has now been completed of the variation of cosmic-ray intensities with both latitude and longitude, so that the earth as a whole can now be covered with sea-level equal intensity cosmic-ray lines. The electroscopes run automatically for three months without attention, save for the occasional winding of a clock. The films are developed after return to the laboratory at Pasadena, and are measured by different observers so that the personal equation is largely eliminated. The major changes in sea-level cosmic-ray intensities can be described as follows: In going along the longitude line 75° W., which runs from the far north through Washington and along the west coast of South America, there is no appreciable change until the magnetic latitude of about 42° is reached. The equatorial dip then begins to set in and shows a maximum decline of 8 per cent. off Peru and returns again to its normal value off Cape Horn. In going south from Liverpool through the Atlantic Ocean—Longitude 30° W.—and around Cape Horn the maximum dip is 8.5 per cent. In going south from Alaska in Latitude 165 W. to New Zealand the maximum dip is 10 per cent. In going along Longitude line 80° E. through southern India the maximum dip is 12 per cent. In the region most accurately studied—the west coast of the United States—the intensity remains remarkably constant until the latitude of Pasadena—about 42° magnetic—is reached, and then drops remarkably suddenly. In the Atlantic Ocean the drop sets in at about the same magnetic latitude with equal suddenness. It appears also to take place quite suddenly at about magnetic latitude 42° in the southern hemisphere. Nevertheless, the existence of a longitude effect shows that in strictness there is no such thing as magnetic latitude. In other words, the earth's magnetic field, even at the remote distances of thousands of miles at which these deflections occur, is strikingly dissymmetrical with respect to any line passing through the earth's center. This method of study opens up the possibility of determining these dissymmetries at large distances from the earth. The observed magnetic effects are to be expected quite independently of whether cosmic rays are in their origin photonic or corpuscular. This survey has been carried on with the aid of a grant made by the Carnegie Corporation of New York, administered under the Carnegie Institution of Washington. The authors wish to express appreciation for this assistance.

Anthropological excavations on Kodiak Island: A. HRDLIČKA.

Exploration of a mound at Belle Glade, Florida: M. W. STIRLING. The site consists of a habitation mound rich in artifacts of bone, shell, stone, wood and pottery, and a burial mound which revealed three periods of construction. It was composed of a primary mound of muck with two later additions built of sand, the latter containing objects of sixteenth century Spanish origin. Unique architectural features were a limestone pavement in front of the mound and a log stairway leading up the face. More than 1,000 burials were encountered. Here for the first time in Florida was recovered a representative collection of kitchen midden artifacts, burial furniture and skeletal material all from one site. Historical information links the site with the now extinct Calusa Indians, enabling the identification of other sites exhibiting the same culture.

Relations of symmetry in the developing ear of amblystoma: ROSS G. HARRISON.

The copper beech and the sugar maple: WILDER D. BANCROFT and JOHN E. RUTZLER, JR. The leaves of the copper beech may vary in color in different parts of the tree at the same time, and the same leaves may vary in color from week to week. Some years, the sugar maples in Ithaca turn a wonderful red and other years they will be yellow with only spots of red. The ultra-violet light which passes through glass develops the red in the copper beech; but it acts by stimulating enzymes and not directly. Sunshine and cool nights are factors in turning maple leaves red; but no direct correlation between weather conditions and red maple leaves is possible at present. What Willstätter calls internal factors are of tremendous importance, because the leaves of the copper beech turn yellow in the fall under weather and soil conditions which produce red in a sugar maple alongside. The problem of autumn coloring is primarily an enzyme problem and must be studied as such.

(To be continued)

BOOKS RECEIVED

Annals of the Dearborn Observatory of Northwestern University. Vol. III: *Stellar Parallaxes* by PHILIP FOX. Pp. 194. 18 figures, 3 plates. The University.

HARDING, ARTHUR M. *Astronomy.* Pp. x + 418. Illustrated. Garden City Publishing Co., Garden City, N. Y. $1.98.

JENNINGS, H. S. *Genetic Variations in Relation to Evolution.* Pp. 139. 21 figures. Princeton University Press. $2.00.

MOORE, ELIAKIM H. *General Analysis. Part I.* Vol. I, 1935 of the *Memoirs of the American Philosophical Society.* Pp. 231. The Society, Philadelphia.

Second Report of the Science Advisory Board, September 1, 1934 to August 1, 1935. Pp. 494. 6 figures. National Research Council, Washington, D. C.

Erratum: In the Scientific Event entitled "The Simplification of International Weather Reports" in the issue of SCIENCE for November 29, in the fifth line from the bottom of the first column "now" should be substituted for "not."