

another symposium on the "Reform of the Calendar," and a number of miscellaneous scientific papers. Although the American Astronomical Society was holding its annual meeting at Poughkeepsie, N. Y., at the time, the sessions of Section D were well attended and aroused much interest, especially the first symposium. The discussion of the question of the infinity of the physical universe was introduced by Professor F. R. Moulton, of the University of Chicago. The speaker explained that the question was one to which no definite and final answer can be given either now or in the future. Nevertheless the subject deserves discussion, because it is one which the human mind ever persists in attacking; it has powerful influence on our general philosophy of science, and the ideas of astronomers respecting the extent of the visible universe and the duration of celestial bodies are now undergoing rapid expansions. It was explained that if the universe is built up of an unending succession of cosmic units which at each stage make larger units, as electrons make up atoms, atoms make up molecules, molecules make up worlds, worlds make up solar systems, solar systems make up galaxies, galaxies make up super-galaxies, and so on—each unit separated from its neighbors by distances that are great compared to their diameters—then the universe is not only infinite in extent, but it has an infinite number of each type of cosmic units, the total mass is infinite, there is no center or absolute position in it, and it may have infinite duration, both past and future. Although there can be no absolute proof of the soundness of such a conclusion, the speaker adopted as a working hypothesis that the physical universe is infinite in space and in time, and that all phenomena are in a general way cyclical. Professor Wm. D. MacMillan, of the University of Chicago, continued the discussion and made clear the rôle played by postulates in scientific theories, particularly in the one under discussion. He enumerated certain postulates that he wished to adopt and agreed with the first speaker in accepting the hypothesis that the universe is infinite in space and time. The relationship of the doctrine of general relativity to the question was discussed by Dr. Horace Levinson, of Ohio State University. Dr. Levinson explained the basis of the Einstein theory, the meaning of the curvature of space, the different forms of the solutions that have been found for the Einstein differential equations, and the astronomical consequences of the different solutions. He made clear the fact that the implications of the Einstein theory that bear on this question are neither fully developed nor unique.

The reform of the calendar was discussed by Mr. M. B. Cotsworth, secretary of the International Fixed Calendar League; Dr. Charles F. Marvin, Chief of U. S. Weather Bureau; Professor Benjamin F. Yanney, of Wooster College, Ohio, and other speakers.

The grave defects and inconveniences of the present calendar were pointed out, and the simplicity of a calendar consisting of thirteen months of four weeks each was explained. An interesting feature is that, in order that the same dates shall fall on the same day of the week on successive years, it is necessary to have one "skip day" in each ordinary year, the last one in the year, that does not have a week-day name, and two such days on leap years. In spite of the fact that this interrupts the regular recurrence of the Sabbath on every seven days, the plan has received the highest ecclesiastical indorsement all over the world. It is also supported widely by commercial and governmental agencies. An international conference on the subject will be held in Geneva, Switzerland, next summer, and it is hoped that concerted action will be taken at that time.

Professor E. S. Manson, of Ohio State University, established the famous solutions of the problem of three bodies, due to Lagrange, by a method whose directness and simplicity leave nothing to be desired. Professor W. Carl Rufus, of the University of Michigan, gave a new and simple method of determining the character of the oscillations of Eta Aquilae and other variable stars of the Cepheid type. Dr. Elliott Smith, of the Cincinnati Observatory, gave an interesting illustrated paper on the effects of non-luminous matter in reducing and cutting off the light of the stars. Dr. Louis A. Bauer, of the Carnegie Institution of Washington, gave a paper on the relations between solar activities and terrestrial magnetic and electric phenomena. He presented evidence of an annual period in the solar activity.

A telegram announcing the death, on December 28, of Dr. Otto Klotz, eminent director of the Dominion Observatory, Ottawa, Canada—who would have given the retiring vice-presidential address at this meeting of Section D, had his health permitted, almost on the hour at which he passed away—cast a shadow over the meeting of the section.

SECTION E (GEOLOGY AND GEOGRAPHY)

Vice-president and chairman, Nevin M. Fenneman.
Retiring vice-president, H. W. Shimer.

Secretary, Elwood S. Moore, University of Toronto, Toronto, Ontario.

(Report by E. S. Moore)

The celebration of the seventy-fifth anniversary of the association added greatly to the importance of the Cincinnati sessions of Section E, which were unusually successful. Friday was devoted to joint sessions with the Association of American Geographers, arranged with the kind cooperation of Richard E. Dodge, secretary of that association. Two of the outstanding papers presented were those of T. C. Chamberlin, on

"Seventy-five years of American geology," and William M. Davis, on "The development of geography in the United States." These will be published elsewhere in SCIENCE. C. H. Birdseye gave a splendidly illustrated address, "Through the canyon of the Colorado river." He vividly recounted a perilous journey from Lee's Ferry, Arizona, to Needles, California, undertaken last summer by himself and seven others. The trip was made chiefly in the interests of the U. S. Reclamation Service. Only two earlier expeditions have accomplished this trip. Friday afternoon was spent in the club rooms of the Cincinnati Literary Society, following a subscription luncheon, which was largely attended. The retiring presidential address of the Association of American Geographers was given by Ellsworth Huntington, who spoke on "Geography and natural selection." Hervey W. Shimer, retiring vice-president of the American Association for the Advancement of Science for Section E, delivered a paper on "Some forces in man's social evolution." These two papers will be published in SCIENCE. T. A. Jaggar, Jr., lately returned from Japan, gave a remarkable account of the causes of the Japanese earthquake with moving pictures of the great fire. Thursday afternoon and Saturday were occupied with the regular program of Section E. In his paper on "Clockwork measurements of the internal shearing in the Glacier de la Brenva, Italian Alps," R. T. Chamberlin described experiments with an automatic recording shear meter, and concluded that glacier behavior may be compared to that of other rocks in the following particulars: (1) Glacier ice in the névé region resembles sedimentary rock, while below this region it has many of the characteristics of metamorphic rock; (2) recumbent folds and other phenomena show that rock flow by recrystallization is an important means of glacier movement; (3) shearing of slices and thrust faults, displacing older structures, give testimony of the importance of rock fracture in glacier motion. A paper by T. A. Jaggar, Jr., on "External evidences of regular internal magmatic movement in active volcanoes" furnished much new information on subjects that have long been of great interest to geologists. He presented a large number of measurements and interpretations of Hawaiian lava activity. In another paper, on "The Tokyo earthquake, a study of the economics of disaster," Dr. Jaggar stated that the average annual toll of earthquakes and volcanoes is about 30,000 persons and half a billion dollars in property. Danger to many American cities was emphasized, since they are not immune to earthquakes. Papers of great general interest were by Charles D. Walcott, on his work in the Canadian Rockies; by J. Paul Goode, on "Progress in map presentation of the earth's surface entire," and by S. W. McCallie, on Stone Mountain, Georgia, the

huge granite intrusion on which the great memorial is being carved. A fuller report of papers presented before Section E will appear in a later issue of SCIENCE.

Dr. William M. Davis presented a report of the American Association for the Advancement of Science committee on "Geological features of city parks," consisting of Dr. Davis, C. D. Walcott and E. S. Moore, appointed at the Boston meeting to look after the carrying out of a resolution passed by Section E and approved by the association council at that meeting. The resolution urged the development of geological features in city parks as a matter of education. Many replies to the circular letters sent out have been received, and a considerable number of geologists are taking up this matter in earnest.

The Association of American Geographers

President, Ellsworth Huntington.

Secretary, Richard E. Dodge, Connecticut Agricultural College, Storrs, Conn.

(Report by Richard E. Dodge)

The twentieth annual meeting consisted of three sessions of the Association of Geographers and two sessions arranged jointly with Section E, American Association for the Advancement of Science. The meeting lasted from Thursday afternoon to Saturday afternoon. It was largely attended and interest was maintained until nearly 6 o'clock Saturday evening. Thirty-three members of this association were present and twenty papers were read in its sessions. The next meeting will occur at Washington with the American Association for the Advancement of Science, a year hence. The following officers for 1924 are announced: *President*, Curtis F. Marbut, U. S. Bureau of Soils; *vice-president*, Oliver E. Baker, U. S. Bureau of Agricultural Economics; *treasurer*, Vernon C. Finch, University of Wisconsin; *secretary*, Charles C. Colby, University of Chicago; *editor*, Almon E. Parkins, George Peabody College for Teachers; *councillors*, W. L. G. Joerg, American Geographical Society, George R. Mansfield, U. S. Geological Survey, Wellington D. Jones, University of Chicago, Harlan H. Barrows, University of Chicago, Ellsworth Huntington, Yale University.

The first session was opened by Professor R. deC. Ward, of Harvard University, with an illustrated paper on the work of the International Ice Patrol in the North Atlantic. As a result of several seasons' operations, it is now possible to state with reasonable accuracy the extreme limit of iceberg distribution, and steamer lines are arranged accordingly. The seasonal weather types in a number of selected cities in North America, with special emphasis on Mexico, were presented by two advanced students of Clark Uni-

versity, George F. Howe and J. Elmer Switzer. These indicated clearly how modern meteorology is making weather summaries more definite and usable. Professor A. E. Waller, of Ohio State University, showed the evolution of the American flax industry from its beginning in the cool, moist east, where the plant was raised for fiber, to its later development in the dry northwest, where seed is grown. The session closed with two papers on Ohio geography: one an illustrated description of the plant geography of Ohio, by Professor E. N. Transeau (of Ohio State University), and the other by Professor R. H. Whitbeck (of the University of Wisconsin), a summary of the trend in American water-borne commerce, as illustrated on the Ohio River.

The Saturday afternoon session was devoted primarily to economic geography. Professor E. C. Case, of the University of Cincinnati, presented an analysis of manufacturing in the Valley of East Tennessee. This paper was admirably supplemented by one on the "Growth of southern cotton manufactures," by Professor A. E. Parkins, of Peabody College for Teachers. The reasons for the growth of these industries were analyzed and comparisons were made with the conditions that prevail in the textile section of New England. Professor P. E. James, of Clark University, spoke briefly of the development of transportation in South America, showing by a series of maps that the routes of the Incas were practically the only land routes developed until after 1880. He showed the increase in navigated waterways due to the rubber industry. A good illustration of a careful study of a small area was given by Professor N. A. Bengtson, of the University of Nebraska, a detailed analysis of the conditions of occupation and development in the Santa Elena Peninsula, an oil-bearing region of Ecuador. Another striking regional analysis was that of the "Apple industry in the Annapolis valley of Nova Scotia," by C. C. Colby, of the University of Chicago. He considers the rôles played by location, surface features, climate and supplementary industries in making this great apple region successful. The closing session opened with a paper by Professor J. Paul Goode, of the University of Chicago, devoted to an analysis of the significant features of the best known and most used map projections, from the time of Mercator's map until to-day. The accompanying illustrations came to a climax in a presentation of the Homolosine projections recently perfected by Professor Goode—a projection which seems better than any other to present the globe as a flat surface without considerable distortion. Several papers given at this session indicate rapidly growing interest in economic geography, which is fast developing into an interpretive science. Complete abstracts of all papers

given at this meeting will be published in the 1924 volume of the "Annals."

The National Council of Geography Teachers

President, R. M. Brown.

Secretary, George J. Miller, State Teachers College, Mankato, Minn.

(Report by Geo. J. Miller)

Three sessions were held this year, one of which was a "dinner meeting," and all were well attended. The meeting was characterized by strong and carefully prepared papers, by freedom and thoroughness of discussion, and by evidence of a maturing opinion as to what should be accomplished at the various levels of geographic education. Committees dealing with specific problems were instructed to complete tentative conclusions and submit the same for consideration and publication at the earliest possible date. The three outstanding papers dealt with junior high school geography, the use of geographic principles and traditional geography and present trends. These papers will appear in full in the *Journal of Geography*. The council took a definite stand against the great body of detail now incorporated in elementary school textbooks. It also has undertaken to prepare a score card for judging textbooks. It is probable that junior high school geography and the use of geographic principles in teaching will be the central theme of the next meeting. W. R. McConnell, of Miami University, was elected president for 1924.

SECTION F (ZOOLOGICAL SCIENCES)

Vice-president and chairman, E. L. Rice.

Retiring vice-president, M. M. Metcalf.

Secretary, Herbert W. Rand, Harvard University, Cambridge, Mass.

(Report by Herbert W. Rand)

Of special interest to Section F this year was the address of the retiring president of the association, Professor J. P. McMurrich, of the University of Toronto. The privilege of a complimentary visit to the exceptionally fine collection of animals maintained by the Cincinnati Zoological Park Association was greatly appreciated by all zoologists. The collection is well worth visiting. The exhibits presented by the zoological societies, while not extensive, included many matters of special interest. Demonstrations relating to genetics, especially the cytology of genetics, predominated. Embryological models, neurology, protozoology, skin regeneration in amphibians, and technical apparatus also figured among the exhibits. An instructive group of demonstrations and exhibits in entomology was arranged by the Entomological Society of America. The address of the retiring vice-president of Section F, Dr. Maynard M. Metcalf, of

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SECTION E (GEOLOGY AND GEOGRAPHY)

E. S. Moore, Richard E. Dodge and Geo. J. Miller

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