

sulted from the discoveries of modern physics. He showed, with the aid of lantern illustrations, some of the recent discoveries relating to the structure of the atom, contrasting the view-point of thirty years ago (when the atom was considered to be a rigid sphere) with the present highly developed knowledge of various kinds of radiations, which have shown the atom to be a type of solar system with a central (sun-like) nucleus built up out of hydrogen-nuclei and electrons with other (planetary) electrons circulating around it. He dwelt on the chemical aspects of the subject, since these have received less attention than the physical ones, showing what the new knowledge of the structure of atoms has contributed to chemical science and indicating what this new knowledge may mean for the future development of chemistry. Dr. Noyes's stimulating and informative address has been published in *SCIENCE* for January 11.

Another very enjoyable and profitable reception, with refreshments, followed the Monday evening general session, in Education Hall, the Morgan Memorial Hall and other halls of the American Museum of Natural History.

The final and closing general session of the fifth New York meeting was held at the American Museum of Natural History on Tuesday evening, followed by the last of the series of receptions for which the association is so greatly indebted to the American Museum. President Osborn made some happily chosen remarks on the successful accomplishment of this, the greatest of the association meetings, and he was followed by Dean George B. Pegram, Dr. J. McKeen Cattell and Dr. Burton E. Livingston, who also spoke briefly on the fine outcome of this meeting. The address of the evening was given by Dr. Harlow Shapley, director of the Harvard College Observatory and Paine professor of astronomy in Harvard University, who was introduced by Professor H. H. Turner, official representative of the British Association at this meeting.

Dr. Shapley's address was on "The Galaxy of Galaxies—New Developments in the Study of the Super-Organizations Outside the Milky Way." He is a leader in American astronomical investigation. His principal researches have dealt with photometry and spectroscopy, especially in connection with investigations of the so-called spiral nebulae, which are now known to be extra-galactic universes. He has greatly advanced our knowledge of these extra-galactic systems and has recently done outstanding work in locating the center of our own Milky Way system. The address dealt with our rapidly increasing knowledge of the external galaxies, those very remote systems that seem to resemble our own galaxy in many ways, being considered now as each made up of millions of stars. Among the external galaxies

are included the typical spiral nebulae. Others are like the two Magellanic clouds, which are visible from southern countries to the unaided eye, being more irregular. Dr. Shapley himself has demonstrated that the Magellanic clouds are definitely outside our own universe. Our own galaxy appears to have a diameter from ten to twenty times as great as that of any of the others with which we are acquainted, with the exception of the Andromeda nebula, which may be a fifth as large as our system. In the oceans of space, our galaxy is like a continent, whereas the hundreds of thousands of extra-galactic nebulae may be called "island universes," as Herschel and others termed them a hundred years ago. But these "islands" are not isolated. They are organized into higher systems, into galaxies of galaxies, which are enormously larger than our own galaxy. Analysis has shown that the Coma-Virgo group of galaxies is itself composed of between two hundred and three hundred galaxies. Lying in the same general direction, though much more remote, are at least three other clouds of galaxies, indicating a scattering of such systems through space as far as we can fathom.

"In analyzing the Coma-Virgo region we hit upon the major discovery of all our work—the apparent proof that intergalactic space is effectively transparent. This gives us the assurance that the distances we are measuring are correct and that veils of meteoric dust and of electrons can not obscure the light of remote systems and lead us to false conclusions concerning their distances. This permits us to say that the remotest galaxies we study are more than a hundred million light years distant; that the great Coma-Virgo galaxy of galaxies is ten million light years away and extends throughout two million light years of space; and that the individual systems in this organization have diameters of from five thousand to twenty thousand light years. Our own galaxy probably much exceeds two hundred thousand light years in diameter. It is possible that an enormous galaxy such as ours may have resulted from the condensation or amalgamation of many smaller galaxies, as from the concentration into one system of a hundred or so of the members of a super-system such as that in Coma-Virgo."

#### ENTERTAINMENT AND SUNDAY FEATURES

This New York meeting was exceptional in its entertainment features. Afternoon tea was served daily in the Philosophy Hall of Columbia University, at the general science exhibition in University Hall, Columbia University, and in the Grace Dodge Room of Teachers College. Tea was served Saturday afternoon at the Museums of the Peaceful Arts. As has been mentioned, a reception followed each of the five

evening general sessions at the American Museum of Natural History. These teas and receptions were all very enjoyable indeed and very useful in furnishing welcome opportunities for relaxation and for general intercourse among those who were in attendance at the meeting. The association and the societies are very grateful for the fine courtesies thus shown.

On Sunday morning many of those attending the meeting visited points of interest in and about New York, especially the New York Botanical Garden, the New York Zoological Park, the Brooklyn Botanic Garden, the Metropolitan Museum of Art and the Boyce Thompson Institute for Plant Research, at Yonkers. The trip to Yonkers was by means of autobuses, arrangements for which had been very efficiently made by Dr. Tracy Hazen, of Barnard College, Columbia University. About 150 persons accepted the cordial invitation extended by Dr. William Crocker, director of the Boyce Thompson Institute, and were given a rare opportunity to inspect the facilities and work of the institute. A buffet luncheon was served and the staff of the institute very obligingly demonstrated many interesting and important lines of research. This feature of the meeting was highly appreciated by all who took part.

About fifteen pastors of New York churches of many denominations expressly invited members of the association and the associated societies to attend religious services on Sunday and large numbers took advantage of these kind invitations. The New York Philharmonic-Symphony Society gave a complimentary concert on Sunday afternoon in Carnegie Hall, especially for the visiting men and women of science, which was arranged through the generosity of a friend of the American Association. The concert was under the direction of Dr. Willem Mengelberg. It was attended by about twenty-five hundred persons, who were greatly appreciative of this unusually fine entertainment feature, for which this meeting will long be remembered.

On Sunday evening a remarkably enjoyable and profitable reception, with music, was given to the members and friends of the American Association by the president and trustees of the Metropolitan Museum of Art, which very suitably brought the Sunday features of this meeting to a close. Many of the galleries and rare collections of the museum were open for inspection and the large number who attended were very grateful for this unusual opportunity.

#### THE COUNCIL AT NEW YORK

The following list, compiled by Dr. Sam F. Trelease, secretary of the council, shows the names of those who attended New York council sessions, together with each member's official status in the council.

- Alexander, William H., *Rep. Ohio Acad. Science.*  
 Allee, Warder Clyde, *Rep. Amer. Soc. Zoologists.*  
 Allen, Charles E., *Vice-President for Section G.*  
 Anderson, Esther S., *Rep. Nebraska Acad. Science.* (Substitute for W. C. Brenke.)  
 Ball, C. R., *Rep. Honor Soc. Phi Kappa Phi.*  
 Bingham, W. V., *Rep. Amer. Psychological Assoc.*  
 Breed, Robert S., *Rep. Soc. Amer. Bacteriologists.*  
 Bridgman, P. W., *Vice-President for Section B.*  
 Brown, William M., *Rep. Virginia Acad. Science.*  
 Budington, Robert A., *Rep. Amer. Soc. Naturalists.*  
 Cairns, W. D., *Rep. Mathematical Assoc. Amer.*  
 Caldwell, Otis W., *Rep. National Education Assoc.*  
 Calver, Homer N., *Rep. Amer. Public Health Assoc.*  
 Cattell, J. McKeen, *Exec. Comm. Member and Past President (1924).*  
 Clark, Austin H., *Elected Member.*  
 Cole, Fay-Cooper, *Vice-President for Section H.*  
 Cole, Leon J., *Rep. Amer. Genetic Assoc.*  
 Craver, Harrison Warwick, *Rep. Amer. Library Assoc.*  
 Cunningham, Bert, *Rep. North Carolina Acad. Science.*  
 Danforth, Charles H., *Secretary of Section H.*  
 Dean, George A., *Rep. Amer. Assn. Economic Entomologists.*  
 Dietrichson, Gerhard, *Secretary of Section C.*  
 Drushel, J. Andrew, *Rep. Amer. Nature-Study Soc.*  
 Enders, Howard E., *Rep. Indiana Acad. Science.*  
 Estabrook, Arthur H., *Rep. Eugenics Research Assoc.*  
 Fenneman, N. M., *Rep. Assoc. Amer. Geographers.*  
 Fort, Tomlinson, *Rep. Amer. Mathematical Soc.*  
 Fox, Philip, *Secretary of Section D.*  
 Freeman, Frank N., *Secretary of Section I.*  
 Gardner, Wright A., *Rep. Alabama Acad. Science.*  
 Gibbs, George, *Rep. Amer. Soc. Civil Engineers.*  
 Giltner, Ward, *Rep. Amer. Veterinary Med. Assoc.*  
 Goldforb, A. J., *Vice-President for Section N and Rep. Soc. Experimental Biology and Medicine.*  
 Grindley, Fred H., *Rep. Canadian Soc. Technical Agriculturists.*  
 Guthe, C. E., *Rep. Amer. Anthropological Assoc.*  
 Hargitt, Geo. T., *Secretary of Section F.*  
 Heck, N. H., *Secretary of Section M.*  
 Hendren, L. L., *Rep. Georgia Acad. Science.* (Substitute for T. H. McHatton.)  
 Herriek, Glenn W., *Rep. Amer. Assoc. Economic Entomologists.*  
 Howard, L. O., *Elected Member and Past President (1920).*  
 Hughes, A. L., *Secretary of Section B.*  
 Humphreys, W. J., *General Secretary of the Association and Rep. Amer. Meteorological Soc.*  
 Ives, Herbert E., *Rep. Optical Soc. Amer.*  
 Juday, Chancey, *Rep. Ecological Soc. Amer. and Wisconsin Acad. Sciences.*  
 Koch, Julius A., *Rep. Amer. Pharmaceutical Assoc.*  
 Koos, Leonard V., *Rep. Nat. Soc. Study Education.*  
 Livingston, Burton E., *Permanent Secretary of the Association.*  
 Lutz, Frank Eugene, *Rep. Amer. Soc. Zoologists.*  
 Lynch, J. Joseph, *Rep. Seismological Soc. Amer.*  
 Lyon, Marcus Ward, Jr., *Rep. Amer. Soc. Mammalogists.*  
 McGill, John T., *Rep. Tennessee Acad. Science.*  
 Mance, Grover C., *Rep. South Carolina Acad. Science.*  
 Mansfield, G. R., *Secretary of Section E.*  
 Mayer, Joseph, *Rep. History Science Soc.*  
 Mees, C. E. Kenneth, *Vice-President for Section C.*  
 Merrill, M. C., *Rep. Honor Soc. Phi Kappa Phi.*  
 Middletown, Austin R., *Rep. Kentucky Acad. Science.*  
 Mitchell, S. A., *Rep. Amer. Assoc. Univ. Professors.*  
 Mooers, Charles Ansel, *Vice-President for Section O.*  
 Moore, Charles N., *Secretary of Section A.*  
 Morehouse, D. W., *Rep. Iowa Acad. Science.*  
 Murnaghan, Francis D., *Rep. Mathematical Assoc. Amer.*  
 Ogden, Robert Morris, *Rep. Amer. Psychological Assoc.*  
 Okkelberg, Peter, *Rep. Michigan Acad. Science.*  
 Reddick, Donald, *Rep. Amer. Phytopathological Soc.*

## ENTERTAINMENT AND SUNDAY FEATURES

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