the journal editor, the book publisher, the writer of scientific feature articles, the press syndicates and the editor of a metropolitan newspaper.

The fifth Josiah Willard Gibbs Lecture of the American Mathematical Society was delivered at a general session on Wednesday afternoon at 4:30. In this session, as in recent years, the association joined with the American Mathematical Society, under the auspices of which the Gibbs lecture is given. The lecturer this year was Professor Ernest W. Brown, eminent mathematician and astronomer, of Yale University. Professor Brown's subject was "Resonance in the Solar System."

"Edward Emerson Barnard, his Life and Work" was the subject of an illustrated lecture by Dr. Robert G. Aitken, of the Lick Observatory, given at the general session Wednesday evening, in the auditorium of the War-Memorial Building. This was the retiring vice-presidential address for Section D (Astronomy). Edward Emerson Barnard was a son of Nashville. Born in this city in 1857, Barnard was graduated from Vanderbilt University in 1886. He made many very valuable contributions to astronomy and was a leader and authority in his field. He died in 1923.

Two general sessions occurred on Thursday afternoon, one presenting a symposium on the "Economic Relations of Science Workers" and the other a symposium on "Aquiculture." The former of these was under the auspices of the association's Committee of One Hundred on Scientific Research, of which Dr. Rodney H. True, of the University of Pennsylvania, is secretary. At this symposium President Noyes gave the opening address, which was followed by papers on the "Relation of Research to Wealth Increase," by Harrison E. Howe; "Comparative Salary Scales of Trained Men," by Rodney H. True; and "Family Budgets of University Faculty Members," by Jessica B. Peixotto. A discussion followed.

The symposium on Aquiculture was arranged under the auspices of the Committee on Aquiculture, recently organized through the National Research Council. The program was in charge of Dr. Robert E. Coker, of the University of North Carolina. Several important papers on various aspects of marine biology were presented. The Committee on Aquiculture invites the counsel and cooperation of those interested in hydrobiological research or in the practical development of aquiculture. It is hoped that botanists, zoologists, geologists, chemists, meteorologists, engineers, economists and others may cooperate to promote the utilization of water areas for the culture of fishes, water birds, crustacea, pearl mussels, fur-bearing mammals, aquatic and swamp plants, etc.

The Thursday evening session was devoted to a lecture on "Science and the Newspapers," by Dr.

William E. Ritter, president of Science Service. One of Dr. Ritter's main thoughts in this lecture is expressed as follows: "Science and journalism are both very powerful influences in modern civilization, but they have developed independently in large measure and they are sometimes more or less antagonistic. A study of the work of such men as Benjamin Franklin and Thomas Jefferson, who combined scientific research with ardent support of the newspapers and who mightily influenced our material development, leads to the thought that closer cooperation is needed between the scientists and the journalists."

An illustrated lecture on "Slow-Motion Pictures of Sounds and their Bearing on Speech and the Psychology of Audition" was given at the Friday evening symposium, by Professor Mark H. Liddell, of Purdue University. He presented some of the results of his recent studies on the physics of the sounds of human speech, in which new and highly refined physical methods have been employed. Records of sound waves were shown and different kinds of sounds and noises were produced and compared.

Four non-technical lectures were arranged for the week of the meeting, complimentary to the people of Nashville, including school and college students. These were well attended. The speakers and their topics were as follows:

Tuesday evening. Dr. William M. Mann, director of the National Zoological Park, Washington, D. C. "Collecting Wild Animals for Our National Zoo," with motion pictures.

Wednesday evening. Dr. C. E. K. Mees, director of the research laboratory of the Eastman Kodak Co., Rochester, N. Y. "Production of a Photographic Image," with lantern slides and motion pictures.

Thursday evening. F. R. Moulton, of Chicago. "Science and Civilization."

Friday evening. Mr. Arthur Sterry Coggeshall, curator of education in the Carnegie Museum, Pittsburgh. "Turning Back the Clock Ten Million Years, an account of the Age of Dinosaurs," with slides and motion pictures.

Seven radio talks were given, as shown in the preceding section.

THE COUNCIL ROLL AT NASHVILLE

The affairs of the association are entirely in the charge of the council, which consists of the president, the fifteen vice-presidents, the treasurer, the general secretary, the permanent secretary, the fifteen section secretaries, the council representatives of the affiliated societies and state academies, the eight elected council members and those members of the executive committee who are not otherwise members of the council. Past presidents of the association and the presidents of the divisions and local branches are officially invited to attend council sessions. The council meets only at the annual meetings of the association. Four sessions were held at Nashville.

The complete roll of the council for the eightyfourth meeting is shown below, arranged alphabetically. Each member's name is followed by an italic phrase, showing his status in the council. The record of attendance at the four Nashville sessions is shown by numerals that precede the members' names. these numbers representing, respectively, the sessions on Monday, Tuesday, Wednesday, and Thursday, December 26 to December 29. Thus, the numerals 2 and 3 before a name indicate that the member whose name is so marked was present at the Tuesday and Wednesday sessions but was absent from the other sessions. Each member's record of attendance was submitted to him by mail before this list was prepared, with the request that needed corrections be made, but it is possible that a few errors may still require correction. In such cases the permanent secretary's office should be promptly informed. A few substitutes took the places of members who could not come to Nashville, and these are named and so indicated in the list.

MEMBERS AND INVITED GUESTS OF THE COUNCIL FOR THE SECOND NASHVILLE MEETING, WITH NOTES AS

TO THEIR STATUS AND RECORDS OF

THEIR ATTENDANCE

(Prepared by Sam F. Trelease, secretary of the council.)

Adams, Roger, Vice-President for Section C.

- Adams, Walter S., Vice-President for Section C. Aitken, Robert G., Rep. Astronom. Soc. Pacific. 2.3 Aldrich, J. M., Rep. Entomol. Soc. Amer. (H. E. Ewing, substitute for the Nashville meeting.)
- 1, 2, 3, 4 Alexander, William H., Rep. Ohio Acad. Science.
 - Anderson, John E., Rep. Amer. Psychol. Assoc. (S. C. Garrison, substitute for the Nashville meeting.)
 - 3,4 Archibald, R. C., Secretary of Section A.
 - Ashley, George H., Rep. Pennsylvania Acad. Science.
 - Bailey, L. H., Past President (1926) and Rep. Bot. Soc. Amer.
- Bakke, A. L., Rep. Honor Soc. Phi Kappa Phi. 1, 2, 3, 4
 - Ball, C. R., Rep. Honor Soc. Phi Kappa Phi. 3.4 Barnes, Harry Elmer, Vice-President for Section L.
 - Barr, A. S., Secretary of Section Q. 2,4 Bartlett, Harley Harris, Rep. Amer. Soc. Naturalists.
 - Bergey, David H., Rep. Soc. Amer. Bacteriolo-gists. (H. M. Weeter, substitute for the Nashville meeting.)

 - Berkey, Charles P., Rep. Geol. Soc. Amer. Bishop, E. L., Rep. Amer. Public Health Assoc. 1 Bloom, Lansing B., President of the Southwestern Division.
 - Boose, M. C., Rep. Amer. Ceramic Soc.

Boring, Edwin G., Rep. Amer. Psuchol. Assoc. Bowman, Isaiah, Rep. Amer. Geographical Soc. Brasch, Frederick E., Secretary of Section L. Breckenridge, J. M., Rep. Amer. Chem. Soc.

- 1, 2, 3, 4 Breed, Robert S., *Rep. Soc. Amer. Bacteriolo-*gists. (H. N. Parker, substitute for the Nashville meeting.)
 - 1 Brown, Harold, Rep. Amer. Soc. Parasitolo-
 - gists. (Substitute for M. C. Hall.) Brown, P. E., Secretary of Section O. Buchanan, H. E., Rep. New Orleans Acad. 2.3Sciences. (Substitute for H. W. Moseley.)
 - 2,3,4 Budington, Robert A., Rep. Amer. Soc. Naturalists.
- Cairns, W. D., Rep. Math. Assoc. Amer. 1, 2, 3, 4
 - Cajori, Florian, Rep. History Science Soc. Caldwell, Otis W., Rep. National Education 2.3 Assoc.
 - Call, L. E., Vice-President for Section O. 3.4 Campbell, W. W., Past President (1915).
 - 1,2 Cattell, J. McKeen, Exec. Comm. Member and Past President (1924). Chamberlin, T. C., Past President (1908). Clinton, G. P., Rep. Amer. Phytopathol. Soc. Coates, Charles E., Rep. Amer. Oil Chemists'
 - Soc. Cole, Fay-Cooper, Secretary of Section H.
- 1, 2, 3, 4 3,4
 - Cole, Leon J., Rep. Amer. Genetic Assoc. Collingwood, Harris, Rep. Soc. Amer. Foresters. 2, 3, 4 Compton, Arthur H., Vice-President for Section B Compton, Karl T., Rep. Amer. Physical Soc. and Optical Soc. Amer.
 - Coulter, John Merle, Rep. Amer. Assoc. Univ. Professors and Past President (1918) 3 Courtis, Stuart A., Rep. Nat. Soc. Coll. Teach-
 - ers Éducation. Crittenden. E. C., Rep. Illuminating Engineer-
 - ing Soc. Crocker, William, Vice-President for Section G. 3, 4
 - 1, 2, 3Cunningham, Bert, Rep. North Carolina Acad. Science.
 - Curtis, W. C., Rep. Amer. Soc. Zoologists. (Substitute for H. V. Neal.)
 - Curtiss, Ralph H., Rep. Amer. Astronom. Soc. Dains, F. B., Rep. History Science Soc.
 - 3,4 Dean, George A., Rep. Amer. Assoc. Econ. Entomol.

Dellinger, J. H., Rep. Inst. Radio Engineers. Dice, Lee R., Rep. Amer. Soc. Mammalogists. Dickson, L. E., Elected Member.

- 2, 3, 4Dietrichson, Gerhard, Secretary of Section C. Dorsey, Maxwell Jay, Rep. Amer. Soc. Horticultural Science.
 - Downing, E. R., Rep. Nat. Education Assoc. (Substitute for O. W. Caldwell.) 4 Dresden, Arnold, Rep. Amer. Math. Soc.
 - 3,4 Drushel, J. Andrew, Rep. Amer. Nature-Study
 - Soc. Dunlap, Knight, Vice-President for Section I. 1 Dunn, Gano, Rep. Amer. Inst. Electrical Engineers.
 - 1,2 Eaton, S. V., Rep. Amer. Soc. Plant Physiologists. (Substitute for R. P. Hibbard.) Ellery, Edward, Rep. Sigma Xi.
- 1, 2, 3, 4 Enders, Howard E., Rep. Indiana Acad. Science. Estabrook, Arthur H., Rep. Eugenics Research Assoc.
 - 4 Ewing, H. E., Rep. Entomol. Soc. Amer. (Sub-stitute for J. M. Aldrich.) Faig, John T., Rep. Amer. Soc. Mechanical Engineers.
- 1, 2, 3, 4 Fairchild, H. L., Exec. Comm. Member.
 - 3,4 Fenneman, N. M., Rep. Assoc. Amer. Geographers. Flexner, Simon, Past President (1919).

- Flint, W. P., Rep. Illinois Acad. Science. Focke, T. M., Rep. Math. Assoc. Amer.
 Fort, Tomlinson, Rep. Amer. Math. Soc.

- 1, 2, 3 Fox, Philip, Secretary of Section D and Rep. Amer. Astronom. Soc. 1,2,3 Freeman, Frank N., Secretary of Section I and
- - Rep. Nat. Soc. Study of Education. Garber, R. J., Rep. Amer. Soc. Agronomy. (M. M. Hoover, substitute for the Nashville
- meeting.) 1,2,3,4 Gardner, Wright A., Rep. Alabama Acad. Science.
 - Garrison, S. C., Rep. Amer. Psychol. Assoc. (Substitute for John E. Anderson.)
 - Gates, Arthur I., Vice-President for Section Q. Giddings, N. J., Rep. West Virginia Acad. Science.
 - 1 Glenn, Leonidas C., Rep. Amer. Inst. Mining and Metallurgical Engineers. (Substitute for G. R. Mansfield and for David White.)
 - 2,3,4 Goldforb, A. J., Secretary of Section N and Rep. Soc. Exp. Biology and Medicine. Good, E. S., Rep. Amer. Soc. Animal Produc
 - tion. (Substitute for E. W. Sheets.) Goode, J. Paul, Rep. Assoc. Amer. Geog-
 - raphers.
 - Guthe, C. E., Rep. Amer. Anthropol. Assoc. Guy, J. Sam, Rep. Georgia Acad. Science. (T. 2, 3, 4 H. McHatton, substitute for the Nashville meeting.) Hall, M. C., Rep. Amer. Soc. Parasitologists.
 - (Harold Brown, substitute for the Nashville meeting.)
 - 3,4
- Hargitt, Geo. T., Secretary of Section F. Harnly, Henry J., Rep. Kansas Acad. Science. Harper, Robert Almer, Rep. Torrey Bot. Club. (Å. B. Stout, substitute for the Nashville 1, 2, 3, 4 meeting.)
 - Harris, J. Arthur, Rep. Torrey Bot. Club.
 - Harshberger, John W., Rep. Ecol. Soc. Amer. Hartwell, Burt L., Rep. Amer. Soc. Agronomy. (Forman T. McLean, substitute for the Nashville meeting.)
 - Heck, N. H., Secretary of Section M. 2.4
 - Hedrick, William A., Rep. Amer. Fed. Teachers of Math. and Nat. Sciences. 2,3,4 Herrick, Glenn W., Rep. Amer. Assoc. Econ.
 - Entomol.
 - Hess, Alfred F., Rep. Soc. Exp. Biology and Medicine.
 - Hibbard, R. P., Rep. Amer. Soc. Plant Physi-ologists. (S. V. Eaton and C. A. Shull, sub-stitutes for the Nashville meeting.)
 - 3,4 Hoover, M. M., Rep. Alabama Acad. Science. (Substitute for R. J. Garber.)
 - Howard, L. O., Elected Member and Past 2, 3, 4 President (1920).
- 4 Hughes, A. L., Secretary of Section B. 1,2,3,4 Humphreys, W. J., General Secretary of the Association and Rep. Amer. Meteorol. Soc.
 - Jackson, Dunham, Vice-President for Section A. Joerg, W. L. G., Rep. Amer. Geographical Soc. Jones, Lauder W., Rep. Amer. Chem. Soc. Jordan, David Starr, Past President (1909). Juday, Chancey, Rep. Wisconsin Acad. Sciences. Keith, Arthur, Rep. Geol. Soc. Amer.
 - 3,4 Kellogg, Vernon, Exec. Comm. Member. Kemp, W. W., Rep. Nat. Soc. Coll. Teachers Education.
 - Kober, George M., Rep. Amer. Medical Assoc. Koch, Julius A., Rep. Amer. Pharmaceutical Assoc.
 - Kofoid, Charles A., President of the Pacific Division.
 - Laughlin, H. H., Rep. Eugenics Research Assoc.

Leathers, W. S., Vice-President for Section K

- and rep. Amer. Public Health Assoc.
 Leighty, C. E., Rep. Amer. Genetic Assoc.
 2,3,4 Lewis, I. F., Rep. Bot. Soc. Amer.
 Lidbury, F. A., Rep. Amer. Electrochem. Soc.
 1,2,3,4 Livingston, Burton E., Permanent Secretary of the Association.
 - 3,4 Lloyd, Francis E., Rep. Amer. Soc. Plant Physiologists.
 - Loomis, F. B., Rep. Paleontological Soc. Amer. 2,3,4 Lutz, Frank Eugene, Rep. Amer. Soc. Zoologists.
 - 1, 3, 4 Lyon, Marcus Ward, Jr., Rep. Amer. Soc. Mammalogists.
 - MacDougal, D. T., Elected Member. Macelwane, James B., Rep. Seismol. Soc. Amer. Mansfield, G. B., Secretary of Section E. 1, 2, 4(Leonidas C. Glenn, substitute for the Nashville meeting.)
 - McClung, C. E., Vice-President for Section F.
- 1, 2, 3, 41, 2, 4McGill, John T., Rep. Tennessee Acad. Science. McHatton, T. H., Rep. Georgia Acad. Science. (Substitute for J. Sam Guy.)
 - McLean, Forman T., Rep. Amer. Soc. Agron-omy. (Substitute for Burt L. Hartwell.) McMurrich, J. Playfair, Rep. Amer. Assoc. Anatomists, and Past President (1922). Merriam, John C., Elected Member.
 - 3,4
 - Metcalf, Ciell Lee, Rep. Entomol. Soc. Amer. Metcalf, Z. P., Rep. Amer. Microscopical Soc. Michelson, A. A., Past President (1910). Michelson, Truman, Rep. Amer. Anthropol. 3,4
 - 3,4 Assoc.
 - 1, 3, 4 Middleton, Austin R., Rep. Kentucky Acad. Science.
- Miller, E. C. L., Rep. Amer. Electrochem. Soc. 1, 2, 3, 4 Mitchell, S. A., Rep. Amer. Assoc. Univ. Professors.
- Moore, E. H., Past President (1921).
 Morchouse, D. W., Rep. Iowa Acad. Science.
 Moseley, H. W., Rep. New Orleans Acad. Sciences. (H. E. Buchanan, substitute for the 1, 2, 3, 4
 - Nashville meeting.) 2,3,4 Moulton, F. R., Exec. Comm. Member and Rep. Sigmá Xi.
 - Neal, H. V., Rep. Amer. Soc. Zoologists. (W. C. Curtis, substitute for the Nashville meeting.)

Nicholas, Francis C., Rep. Maryland Acad. Sciences.

- Nichols, E. L., Past President (1907). Noyes, A. A., President of the Association. Noyes, W. A., Exec. Comm. Member.
- 1, 3, 4
- 1, 2, 3 1, 3
 - O'Kane, Walter C., Rep. New Hampshire Acad. Science. 3
 - Okkelberg, Peter, Rep. Michigan Acad. Science. Oldfather, W. A., Elected Member. Osburn, Raymond C., Rep. Ecol. Soc. Amer.
- 1, 2, 3, 4 Parker, H. N., Rep. Soc. Amer. Bacteriologists. (Substitute for Robert S. Breed.)
 - 1,2 Patterson, Herbert, Rep. Oklahoma Acad. Science.

Piersol, George M., Rep. Amer. Medical Assoc. Pratt, Joseph H., Rep. Amer. Soc. Civil Engineers.

Pupin, M. I., Exec. Comm. Member, Rep. Amer. Inst. Electrical Engineers, and Past President (1925)

Reddick, Donald, Rep. Amer. Phytopath. Soc. Richards, C. R., Rep. Amer. Soc. Mechanical

Engineers. Richards, Theodore W., Past President (1917).

- Richtmyer, F. K., Rep. Optical Soc. Amer. Robinson, G. Canby, Vice-President for Section N.
- 3,4 Salter, R. M., Rep. Amer. Soc. Agronomy.

- 1 Sanders, George E., Rep. Canadian Soc. Tech. Agriculturists.
- Sapir. Edward. Rep. Linguistic Soc. Amer. 4 Sauveur, Albert, Rep. Amer. Inst. Mining and Metallurgical Engineers.
 - Schroeder, E. C., Rep. Amer. Veterinary Med. Assoc. Schuchert, Charles, Vice-President for Sec-
- 1 tion E.

Senior, H. D., Rep. Amer. Assoc. Anatomists. Sharp, Clayton H., Rep. Illuminating Engineering Soc.

- Sheets, E. W., Rep. Amer. Soc. Animal Production. (E. S. Good, substitute for the Nashville meeting.)
- 1, 3, 4 Shull, C. A., Rep. Amer. Soc. Plant Physiologists. (Substitute for R. P. Hibbard.) Stewart, G. W., Elected Member.
 - Stout, A. B., Kep. Torrey Bot. Club. (Substi tute for R. A. Harper.)
 - Studebaker, J. W., Rep. National Education Assoc.
- Talbot, A. N., Vice-President for Section M. Terry, R. J., Vice-President for Section H. Townley, S. D., Rep. Seismol. Soc. Amer. 1, 2, 3, 4
- 1, 2, 3, 4 Trelease, Sam F., Secretary of Section G.
- True, Rodney H., Elected Member.
 - 3.4 Van Cleave, H. J., Rep. Amer. Microscopical Soc.

Van Horn, Frank R., Rep. Mineralogical Soc. Amer.

- 1 Waddell, John A. L., Rep. Amer. Soc. Civil Engineers.
- Ward, Henry B., Exec. Comm. Member. 1, 2, 3, 4
 - Warwick, C. L., Rep. Amer. Soc. Testing Materials.
 - Weaver, John Ernst, Rep. Nebraska Acad. Science.
 - Webb, Harold W., Rep. Amer. Physical Soc.
 - Weeter, H. M., Rep. Soc. Amer. Bacteriologists. (Substitute for David H. Bergey.)

 - Welch, William H., Past President (1906). Whipple, Guy M., Rep. Nat. Soc. Study of Education
 - White, David, Elected Member and Rep. Paléontological Soc. Amer. (Leonidas C. Glenn, substitute for the Nashville meeting.) Wilson, Edmund B., Past President (1913). Wilson, Edwin B., Exec. Comm. Member. Wirt, John L., Treasurer of the Association.

THE ROLL OF THE EXECUTIVE COMMIT-TEE AT NASHVILLE*

The executive committee held sessions on Monday, Tuesday and Wednesday mornings. The first session was in the Andrew Jackson Hotel, while the others were in the council room in the Industrial Arts Building. George Peabody College for Teachers. Following is the roll of the committee. The numbers preceding each name indicate the sessions at which the member was present, as in the case of the council roll above. The number in parenthesis after each name denotes the calendar year at the end of which the member's term of office was to expire. Dr. H. L. Fairchild and Dr. W. A. Noyes automatically retired

* The number in parenthesis denotes the year at the end of which the member's term of office was to expire.

from the committee at the end of this Nashville meeting, and Dr. John Johnston, U. S. Steel Corporation, New York City, and Dr. David R. Curtiss. Northwestern University, were elected as their successors.

- 1.2 J. McKeen Cattell (1930), chairman, Garrisonon-Hudson, N. Y.
- A. A. Noyes (1927), president of the association, Pasadena. Calif. 1.3
- 1,2 W. J. Humphreys (1928), general secretary of the association, Washington, D. C.
- 1, 2, 3 Burton E. Livingston (1928), permanent secretary of the association, Baltimore, Md., and Washington, D. C.
- washington, D. C. H. L. Fairchild (1927), Rochester, N. Y. Vernon Kellogg (1928), Washington, D. C. F. R. Moulton (1929), Chicago, Ill. W. A. Noyes (1927), Urbana, Ill. M. I. Pupin (1929), New York City. H. B. Ward (1930), Urbana, Ill. 1.2.3

 - 1.3
- 1, 2, 3 Edwin B. Wilson (1928), Boston, Mass.

LEGISLATIVE AND EXECUTIVE PROCEED-INGS AT NASHVILLE

The executive committee of the council met in the Andrew Jackson Hotel on Monday morning, December 26. and held two other sessions, in the council room, Industrial Arts Building, George Peabody College for Teachers, on Tuesday and Wednesday mornings, following the council sessions. The council met at the Andrew Jackson Hotel on Monday afternoon, December 26, and in the council room on Tuesday, Wednesday and Thursday mornings. No business was transacted at any of the general sessions at Nashville. The following paragraphs summarize the business proceedings at this meeting:

(1) The council minutes of December 31, 1926, and of December 26, 27 and 28, 1927, were read and approved by the council.

(2) The audited report of the treasurer for the fiscal year ending September 30, 1927, was accepted by the council and ordered to be printed in SCIENCE in the usual manner. It appears elsewhere in this issue of SCIENCE.

(3) The audited financial report of the permanent secretary, for the association year ending September 30, 1927, was accepted and ordered printed in SCIENCE. It also appears elsewhere in the present issue.

(4) The following appropriations were made from the treasurer's funds available for the current year:

For journal subscriptions for 418 life members...\$1,254.00 For life-membership fees of three emeritus life

members, on account of the Jane M. Smith Fund for this special purpose
For rental of treasurer's safety-deposit box
For grants for research, to be allotted by the
Committee on Grants
To the Naples Zoological Station
To the Annual Tables of Physical and Chemical
Constants 200.00

To these should be added an appropriation of \$100 to the National Conference on Outdoor Recreation, author-