Scientific Meetings

Religion in the Age of Science

From the point of view of perhaps most theologians and scientists, it would seem unlikely that in the middle of the 20th century a group of reputable scientists and theologians would meet together, at least for any common professional business. And it might be considered improbable that they should come to some common understanding of a positive relationship between theology and science, or that they should proceed to set up a joint program for the creative advance of religion hand in hand with science. Yet this seems to be what took place at the second summer Conference on Religion in the Age of Science, which was held on Star Island, off Portsmouth, N.H., during the week of 30 July to 6 August.

At the end of the week, conference leaders announced the establishment of the Institute on Religion in an Age of Science "to promote creative efforts leading to the formulation, in the light of contemporary knowledge, of more effective doctrines and practices for human welfare." The following 22 persons, who were leading contributors to the thinking of the conferences, were elected to the governing board of the institute: Carl Bihldorff, First Parish, Brookline, Mass.; Edwin P. Booth, Boston University, president; Marion J. Bradshaw, Bangor Theological School; Ralph W. Burhoe, American Academy of Arts and Sciences, secretary-treasurer; Karl W. Deutsch, Massachusetts Institute of Technology; Alfred E. Emerson, University of Chicago; Philipp Frank, Harvard University; Dana McL. Greeley, Arlington Street Church, Boston, Mass.; Gerald Holton, Harvard University; Roy G. Hoskins, Office of Naval Research, Boston, Mass.; A. G. Huntsman, University of Toronto; Edwin C. Kemble, Harvard University; Henry Margenau, Yale University; M. F. Ashley Montagu, Princeton, N.J.; Henry A. Murray, Harvard University; Henry Bayard Phillips, emeritus, Massachusetts Institute of Technology; Lyman V. Rutledge, Community Church, Dublin, N.H.; Paul E. Sabine, Colorado Springs, Colo.; Harlow Shapley, Harvard University; B. F. Skinner, Harvard University; George Wald, Harvard University; and Henry N. Wieman, emeritus, University of Chicago.

In this list there are what William James designated "tough-minded" or hardboiled scientists, including leaders of such seemingly unlikely sources for religious sympathy as the logical positivists, evolutionists, and behaviorists. One may expect to read occasionally of a scientist who says something in favor of religion, although he seldom if ever says that his science offers much real help for it. And one may expect also to read of the efforts to support religion by those usually sincere defenders of a faith who come up with superficially plausible arguments in scientific jargon that for the most part fall down when they are examined by more competent scientists or by good common sense and that are often not even felt pertinent by the more sophisticated religious scholars; these arguments run from claims that scientific evidence supports the idea that the sun stood still to claims of evidence for spiritual beings. However, one does not often expect to read that leaders of those scientific and philosophical schools that are most often held aloft by religionists and humanists as the incarnation of "materialism," "mechanism," and other spiritual demons are seriously involved intellectually in religion. In a brief report for *Science* there is not space to explain the equally (although on different grounds) anomalous position of the theologians in this institute.

But the unexpected has happened. In this age when the unsplittable has been split, we find the beginning of the fusing of the seemingly irreparable split between the domains of our knowledge of "values" and our knowledge of "facts." There was at this conference a genuine meeting of minds that bids fair to let theology down from the embarrassing hook that has held it up and out of contact with the world of reality as pictured by science. At the same time, science is brought into a more creative relationship with problems of human destiny at a level "higher" than that usually designated as material. Perhaps the following quotation from the institute's statement of purpose will give some idea of what is afoot:

"The program of the Institute proceeds in the faith that there is no wall isolating any department of human understanding, and that, therefore, any doctrine of human salvation cannot successfully be separated from the realities pictured by science. We believe that science provides rich new insights into the problems of human welfare and offers the possibility of a reformulation of the doctrines about the nature of man and about the nature of that in which he lives and moves and has his being. We think any scientifically substantiated notions may command wider acceptance and provide more effective programs of living for both the individual and society. We believe that any department of human knowledge may yield important contributions, including the physical, biological, and psychological sciences, as well as all fields of scholarship and interpretation of human culture.

"We suspect that, in this search for a clear and modern statement of human values, much of what has been revealed by the great religious teachers of the past will stand forth in new brightness and detail, although we welcome any clearing away of misunderstandings or inadequate doctrines about the nature of reality and values. Certainly, for our times as for any time in the past, it seems that the first and most important task of man is to discover the highest values of his own nature and to orient himself properly with respect to the requirements placed upon his development by the complex and many-dimensioned cosmos."

These purposes and understandings were subscribed to fully as much by the theologians and clergymen as by the scientists at the conference, whose approximately 200 members came from 26 states and Canada and included 2 or 3 dozen who are professionally engaged in scientific work and an equivalent number who are professionally engaged in religious work, as well as laymen of various backgrounds. Included were persons of 15 different Christian denominations and two non-Christian faiths. Representative of the degree to which the theologians concurred with the scientists about the nature of knowledge was the statement by Edwin P. Booth, professor of historical theology at Boston University and a cofounder of the conference, who said, "I do not believe there is a revelational knowledge *and* a rational knowledge. . . . There is no division of knowledge. Science and religion are of the same great pattern, aspects of man's knowledge applied to different areas of his life."

Henry Nelson Wieman said, "It will be a great gain for religion to recognize that no knowledge is possible outside the world of time, space, and process. When this truth is recognized and adopted by religion it will be saved from innumerable illusions, phantasies, and wild aberrations which have driven thousands to disaster." These are not the words of a scientist but of a man who was for many years a teacher and formulator of the

philosophy of religion in the Federated Theological Faculty of the University of Chicago.

Perhaps even more unusual are the following statements of Wieman, which sound as though they could have come from the pages of some logical empiricist: "We know that every instance of knowledge is a proposition about some process going on in the temporal world. To be sure, pure mathematics is not about any process; but mathematics cannot give us knowledge of any actuality until it is applied to the world of process, otherwise called the world of events or happenings or temporality. Any alleged knowledge about an actuality transcending the temporal world is mistaken. One can have beliefs and can speculate about alleged realities which transcend the temporal world. But one can have no knowledge of such Being."

The conferees agreed pretty generally also on what they meant by religion. Psychologist Murray joined theologian Wieman in defining religion not in terms of any particular system of beliefs or concepts but in terms of a problem to be answered: what is the sphere of most concern for man? This is at once a question of fact and of value, and value thus becomes a special class of fact. Zoologist Emerson joined these two men in asserting that it is quite obvious that science has succeeded in discovering elements of the "optimal conditions for living." Emerson put forth his concept of homeostasis, "emerging from physiology and applicable to social science," as "a criterion for moral judgment that is measurable and applicable. It is a concept that enables man to understand ethical values through scientific inquiry and research."

What in fact are optimal conditions or highest objectives of life were in general considered to be questions to be answered not only by instinct, intuition, and cultural traditions, but also, at a new and more rapid evolutionary rate, by scientific research. The question of ultimate values or ends (as contrasted with means) such as why is life good or desirable, why should man seek optimal conditions, and so forth, was no more disturbing to the conference than questions of ultimate facts about anything—these ultimates all seemed to lie beyond the reach of the biggest telescopes and the most advanced methods of discovering the structure of the universe, as part of that seemingly inexhaustible mystery that it is our lot to explore.

With this common base concerning the nature of knowledge and religion, the conference proceeded toward the sketching of doctrines about (i) the nature of creation or that from which and in which man has his being, (ii) the nature of man, and (iii) some consequent elements of a program for human welfare. While there was great care not to violate the well-established elements of scientific knowledge, the perspective of the conference was not limited to the rather mundane and limited problems where science offers succor to man in the most obvious ways; instead, it was extended over the larger perspectives that are common in religious ideas.

The process of creation or evolution was set forth in a thoroughly scientific way by men quite familiar with it—men such as astronomer Shapley, biologists Emerson and Huntsman, anthropologist Montagu, and psychologist Murray. But they went further than the scientist goes ordinarily to cover the purposes of interpreting the restricted field of relationships between the theoretical framework of some special area of the natural sciences and the observed phenomena. They sought to find how this new picture of the nature of creation could be useful from the religious point of view, or, in what way the picture is particularly signficant for man's hopes and for guiding human conduct. Since this report cannot go into detail on each of the contributions, readers are referred to the paper in *The Scientific Monthly* [**73**, 67 (1954)], "Dynamic homeostasis, a unifying principle in organic, social, and ethical evolution" by Alfred E. Emerson, for a sample of the kind of approach that was made to develop elements of a modern religion in the light of science.

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Theoretical Physics

A colloquium on theoretical physics was held at the Canadian National Research Council in Ottawa 9 to 17 June 1955 in honor of P. A. M. Dirac, who was to visit the Division of Pure Physics of the council last summer. Unfortunately, owing to illness, Dirac's visit was delayed until July and August; hence he could not be present at the meeting. However, the occasion provided a major landmark in the organization of physics teaching and research in Canada by bringing together for the first time almost all Canadian theoretical physicists and many of the experimental physicists for the discussion and presentation of their research and for meeting visiting physicists from all parts of the United States.

The success of the meeting was not only a tribute to the principal organizer, G. Herzberg, but was also an indication of the importance that meetings and discussions must play in theoretical physics, particularly in Canada where the great distances make it difficult to visit between universities during the academic year. If Canadian physics is not to suffer through work in isolation, it is very important that a colloquium or a summer school or some similar occasion should be arranged annually. This need was noted at a business meeting held during the colloquium, where it was decided to ask the Canadian Association of Physics to form a theoretical section. It was recognized, however, that the problems involved can be solved only with the cooperation of other scientists, and it is a good sign that the National Research Council was the authority that provided the support necessary for the colloquium last June.

The invited speakers included S. Chandrasekhar who gave a series of five lectures on problems of stability and turbulence in hydrodynamics and hydromagnetics. His lectures on stablity were concerned mainly with the development of a theory to describe the onset of thermal instability in a layer of fluid heated below when it is subject to rotation and/or a magnetic field. The theoretical predictions were confirmed by the experiments of D. Fultz and Y. Nakagawa. In his lectures on turbulence, Chandrasekhar described his work in developing a deductive theory of turbulence using the similarity principles of Kolmogoroff. His final lecture presented a theory of hydromagnetic turbulence and described its bearing on the character of the interstellar magnetic field and on Fermi's ideas on the origin of cosmic rays.

Three lectures were given by H. A. Bethe on the scattering of pi-mesons. He showed how the main properties of the meson-nucleon system could be deduced from experiment and gave an account of recent attempts by Chew and Low to relate meson field theory to the observed experimental results. A comprehensive survey of nucleon-nucleon scattering was given by G. Breit in a series of three lectures. This survey included a careful analysis of the experimental data and a discussion of its interpretation in terms of interactions between two nucleons. Other invited speakers included W. A. Watson on the theory of liquid helium, G. M. Volkoff on the Bohr-Mottelson model of the nucleus, R. J. Eden on the Brueckner many-body method in nuclear structure, G. Wentzel on rotational states of nuclei, and V. Weisskopf, who lectured on nuclear reactions, on the neutron-proton mass difference, and on his work with K. Gottfried on an independent particle model of the nucleus using a nonspherical potential.

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Meeting Notes

■ The 12th annual Conference on Protein Metabolism, which is sponsored by the Bureau of Biological Research of Rutgers University, will be held 27–28 Jan. The subtitle for the conference is "Amino acid supplementation."

The speakers and their topics are as follows: Edmund S. Nasset of the University of Rochester, "Essential amino acids and nitrogen balance"; Conrad A. Elvehjem of the University of Wisconsin, "The effects of amino acid imbalance on maintenance and growth"; Leon L. Miller of the University of Rochester, "Amino acid metabolism in the perfused liver"; Paul György of the University of Pennsylvania, "The liver in protein nutrition"; L. Emmett Holt, Jr., of New York University, "The amino acid pattern for children in health and in disease"; James B. Allison of Rutgers University, "Supplementation with methionine." All those interested in attending should write for registration blanks to William H. Cole, Rutgers University, New Brunswick, N.J.

■ The tenth annual Symposium on Fundamental Cancer Research will be held 29–31 Mar. at the University of Texas M. D. Anderson Hospital and Tumor Institute in the Texas Medical Center, Houston. A panel discussion on "Nucleic acid metabolism in tumors" will be under the direction of Van R. Potter, professor of oncology at the University of Wisconsin Medical School. Darrell Ward, department of biochemistry, M. D. Anderson Hospital, is in charge of the reports on recent developments in cancer research. Grant Taylor, dean of the University of Texas Postgraduate School of Medicine, is general chairman of the symposium.

■ The American Public Health Association's 83rd annual meeting, which took place in Kansas City, Mo., 14–18 Nov., gave public health practitioners on international, national, state, and local levels, "new perspective which should be invaluable in future program planning," according to Reginald M. Atwater, executive secretary of the association. The meeting, which was held in conjunction with meetings of 40 related organizations, was attended by 3501 public health workers from public and voluntary agencies and institutions in this country and abroad. Those attending the sessions were brought up to date on developments in the field by a display of 65 scientific exhibits and 82 technical exhibits.

The theme of the meeting, "Where are we going in public health?" was developed in two symposium sessions as well as in smaller meetings that were devoted to the present status and future trends of many specialized areas of health. The discussions pointed up mental health and care of the chronically ill as major problems of the future that undoubtedly will be emphasized during the association's 84th annual meeting in Atlantic City, N.J., 12–16 Nov. 1956.

Of special interest was an address by former President Harry S. Truman in connection with presentation of the Albert D. Lasker awards of the APHA. Another feature was a symposium on practical experience with the Salk polio vaccine in which many of the key figures in the development and utilization of the vaccine participated, including Jonas E. Salk and Leonard A. Scheele.

The association cited the following for the excellence of scientific exhibits: the Missouri Division of Health, the Divison of International Health of the U.S. Public Health Service together with the Public Health Division of the International Cooperation Administration, the Equitable Life Assurance Society of the United States, the U.S. Public Health Service, the Metropolitan Life Insurance Company, the Canadian Department of National Health and Welfare, the American Dietetic Association, the National Sanitation Foundation, the Pan American Sanitary Bureau, World Health Organization, and the Health Insurance Plan of Greater New York. In addition, special recognition was given to a health-careers exhibit that was sponsored jointly by the National Health Council and the Equitable Life Assurance Society of the United States.

■ A symposium on Perspectives in Marine Biology will be held at the University of California's Scripps Institution of Oceanography 24–31 Mar. under the joint sponsorship of the Office of Naval Research and the Scripps Institution. The symposium has been officially approved by the International Union of Biological Sciences.

Discussion will center on potential developments in marine biology rather than on past accomplishments. Among the participants will be the following: from abroad, E. Baldwin, C. Barigozzi, H. Barnes, C. Boquet, P. Dohrn, P. Drach, J. Hämmerling, A. C. Hardy, S. K. Kon, R. Margalef, Y. Matsui, D. Miyadi, G. Montalenti, R. J. Pumphrey, K. M. Rae, A. Remane, R. Riedl, W. Rodhe, W. H. Thorpe, G. Thorson, V. and L. Tonolli, D. P. Wilson, C. M. Yonge, L. Zenkevitch, and E. Zeuthen; from the United States, D. I. Arnon, L. R. Blinks, F. A. Brown, T. H. Bullock, E. W. Caspari, E. S. Guzman Barron, A. D. Hasler, G. E. Hutchinson, V. L. Loosanoff, D. Mazia, A. Novick, C. S. Pittendrigh, C. L. Prosser, L. Provasoli, D. L. Ray, A. C. Redfield, F. K. Skoog, S. Spiegelman, H. Staiger, R. Y. Stanier, A. Szent-Györgyi, L. Szilard, T. H. Waterman, W. Weiser, and P. Weiss.

Accommodations are available for approximately 25 additional participants. Some of these may be graduate students in biology, who may attend upon recommendation by the heads of their departments and upon acceptance by the Scripps Institution; some financial support will be made available to graduate students.

The proceedings will be published by the University of California Press. Persons wishing to attend should write to: A. A. Buzzati-Traverso, Scripps Institution of Oceanography, La Jolla, Calif.

Forthcoming Events

January

26–27. Engineers Joint Council General Assembly, New York. (Engineering Manpower Commission, EJC, 29 West 39 St., New York 18.)

26–27. Western Spectroscopy Assoc. 3rd annual, Berkeley, Calif. (J. W. Otvos, Shell Development Co., Emeryville, Calif.)

27–28. Conf. on Protein Metabolism, 12th annual, New Brunswick, N.J. (W. H. Cole, Rutgers Univ., New Brunswick.)

27–28. Western Soc. for Clinical Research, 9th annual, Carmel-by-the-Sea, Calif. (A. J. Seaman, Univ. of Oregon Medical School, Portland 1.)

30–1. International Conf. on Fatigue in Aircraft Structures, New York, N.Y. (A. M. Freudenthal, 716 Engineering, Columbia Univ., New York 27.)

30–3. American Inst. of Electrical Engineers, New York, N.Y. (N. S. Hibshman, AIEE, 33 W. 39 St., New York 18.)

31–3. American Soc. of Sugar Beet Technologists, 9th biennial conf., San Francisco, Calif. (Western Beet Sugar Producers, Inc., 461 Market St., San Francisco 5.)

31–4. American Physical Soc., New York, N.Y. (K. K. Darrow, Columbia Univ., New York 27.)

February

1. National Advisory Committee on Local Health Depts., 8th annual, New York. N.Y. (National Health Council 1790 Broadway, New York 19.)

1–2. Armour Research Foundation Midwest Welding Conf., Chicago, Ill. (H. Schwartzbart, Armour Research Foundation, Illinois Inst. of Technology, Chicago.)

1–3. Case Studies in Operations Research, Cleveland, Ohio. (Operations Research Group, Dept. of Engineering Administration, Case Inst. of Technology, 10900 Euclid Ave., Cleveland 6.)

2–3. National Symposium on Microwave Techniques, Philadelphia, Pa. (S. M. King, Inst. of Radio Engineers, 1 E. 79 St., New York 21.)

5–8. National Citizens' Planning Conf., Washington, D.C. (Miss H. James, 901 Union Trust Bldg., Washington 5.)

9–10. Soc. of American Military Engineers, annual, Chicago, Ill. (D. A. Sullivan, 72 W. Adams St., Chicago 90.)

13–17. American Soc. of Civil Engineers, Dallas, Tex. (ASCE, 33 W. 39 St., New York 18.)

16–17. National Conf. on Transistor Circuits, 3rd, Philadelphia, Pa. (J. D.

Chapline, Remington Rand, Inc., 2300 W. Allegheny Ave., Philadelphia 29.)

19–23. American Inst. of Mining and Metallurgical Engineers, New York, N.Y. (E. O. Kirkendall, AIME, 29 W. 39 St., New York 18.)

19–23. Soc. of Economic Geologists, New York, N.Y. (O. N. Rove, Union Carbide and Carbon Corp., New York 17.)

20–22. American Educational Research Assoc., annual, Atlantic City, N.J. (F. W. Hubbard, AERA, 1201 16 St., NW, Washington 6.)

23–25. National Soc. of College Teachers of Education, Chicago, Ill. (C. A. Eggertsen, School of Education, Univ. of Michigan, Ann Arbor.)

24–25. American Physical Soc. Houston, Tex. (K. K. Darrow, APS, Columbia Univ., New York 27.)

26–29. American Inst. of Chemical Engineers, Los Angeles, Calif. (F. J. Van Antwerpen, AIChE, 25 W. 45 St., New York 36.)

28–29. Scintillation Counter Symposium, 5th, Washington, D.C. (G. A. Morton, RCA Laboratories, Princeton, N.J.)

March

12–16. National Assoc. of Corrosion Engineers, 12th annual, New York, N. Y. (Secretary, NACE, Southern Standard Bldg., Houston 2, Tex.)

14–17. National Science Teachers Assoc., Washington, D.C. (R. H. Carleton, NSTA, 1201 16 St., NW, Washington 6.)

15–16. Food Physics Symposium, 1st international, San Antonio, Tex. (C. W. Smith, Southwest Research Inst., San Antonio.)

15–17. American Orthopsychiatric Assoc., 33rd annual, New York, N.Y. (M. F. Langer, AOA, 1790 Broadway, New York 19.)

15–17. American Physical Soc., Pittsburgh, Pa. (K. K. Darrow, APS, Columbia Univ., New York 27.)

15–17. Kappa Delta Pi, annual, Stillwater, Okla. (E. I. F. Williams, 238 E. Perry St., Tiffin, Ohio.)

16–18. International Assoc. for Dental Research, St. Louis, Mo. (D. Y. Burrill, 129 E. Broadway, Louisville 2, Ky.)

18–24. American Soc. of Photogrammetry, annual, joint meeting with American Cong. on Surveying and Mapping, Washington, D.C. (ACSM–ASP, Box 470, Washington 4.)

19–22. American Acad. of General Practice Scientific Assembly, 8th annual, Washington, D.C. (AAGP, Broadway at 34th, Kansas City 11, Mo.)

19–22. Inst. of Radio Engineers National Convention, New York. (E. K. Gammett, IRE, 1 E. 79 St., New York 21.)

19–23. American Soc. of Tool Engineers, Chicago, Ill. (H. C. Miller, Armour Research Foundation, 35 W. 33 St., Chicago 16.)

21–22. National Health Forum, New York, N.Y. (T. G. Klumpp, National Health Council, 1790 Broadway, New York 19.)

21–23. American Power Conf., 18th annual, Chicago, Ill. (R. A. Budenholzer, Illinois Inst. of Technology, Chicago 16.)

21-24. American Astronomical Soc. Columbus, Ohio. (J. A. Hynek, McMillin Observatory, Ohio State Univ., Columbus 10.)

23–24. Eastern Psychological Assoc., Atlantic City, N.J. (G. G. Lane, Univ. of Delaware, Newark.)

24–25. American Psychosomatic Soc., 13th annual, Boston, Mass. (T. Lidz, APS, 551 Madison Ave., New York 22.)

24–31. Perspectives in Marine Biology, La Jolla, Calif. (A. A. Buzzati-Traverso, Scripps Institution of Oceanography, La Jolla.)

25–28. American Assoc. of Dental Schools, annual, St. Louis, Mo. (M. W. McCrea, 42 S. Greene St., Baltimore 1, Md.)

25–29. American College Personnel Assoc., Washington, D.C. (Miss C. M. Northrup, Univ. of Denver, Denver, Colo.)

28–3. Colloquium on Frontiers in Physical Optics, Boston, Mass. (S. S. Ballard, Visibility Laboratory, Scripps Institution of Oceanography, San Diego 52, Calif.)

29–31. Pennsylvania Acad. of Science, Indiana. (K. Dearolf, Public Museum and Art Gallery, Reading, Pa.)

(*See 16 Dec. issue for comprehensive list*)