Meetings

Introductory Physics Courses

A CONFERENCE on Improving the Quality and Effectiveness of Introductory Physics Courses, sponsored by the American Association of Physics Teachers and supported by a grant from the General Electric Company, was held September 5–8 at Carleton College in Northfield, Minnesota. The Conference was attended by twenty-seven participants, including members of the American Association of Physics Teachers, the American Physical Society, the Optical Society of America, and the American Society for Engineering Education, as well as representatives of the research laboratories of some industrial concerns employing physicists. The planning committee for the Conference consisted of R. Ronald Palmer, Chairman, Walter C. Michels, Francis W. Sears, and Frank Verbrugge. Robert A. Reitz served as Chairman of the local arrangements committee. The initiative for this conference grew out of a conference on production of physicists sponsored jointly by the National Research Council and the American Institute of Physics, which was held in the spring of 1955 at the Greenbrier Hotel in White Sulfur Springs, West Virginia. One of the recommendations of this conference made by its Physics Committee was the following: [1]

> "The greatest possible effort should be devoted to improving the quality and effectiveness of introductory college physics courses and directing them to present needs and conditions. This effort is believed to be one of the most promising means of increasing the number of physics majors, for careers both in teaching and research. It is recommended that this task be the prime responsibility of the American Association of Physics Teachers. In discharging this responsibility it is recommended that the AAPT make every effort to encourage and recruit the participation of professional physicists outside their own organization."

Delegates to the Conference included the following college and university physicists: Robert B. Brode, Vernet E. Eaton, Ira M. Freeman, Z. V. Harvalik, Gerald Holton, William C. Kelly, Walter C. Michels, Leo Nedelsky, George E. Pake, R. Ronald Palmer, Thomas J. Parmley, Robert A. Reitz, Robert Resnick, Ralph A. Sawyer, Francis W. Sears, Raymond J. Seeger, Frank Verbrugge, Clifford Wall, Randall M. Whaley, Marsh W. White, Mark W. Zemansky.

Physicists from industry included W. F. Brown, Minnesota Mining and Manufacturing Company Research Laboratory, St. Paul, Minn.; George W. Hazzard, General Electric Research Laboratory, Schenectady, N. Y.; G. C. Higgins, Eastman Kodak Research Laboratories, Rochester, N. Y.; A. N. Holden, Bell Telephone Laboratories, Murray Hill, N. J.; Kenneth A. Meade, General Motors Technical Center, North End Station, Detroit, Mich.; George W. Shortley, Research Center, Borg-Warner Corp., Des Plaines, Ill.

Each participant was asked, in advance of the conference, to prepare a short statement outlining his views on introductory physics courses, the way in which they fail to meet present needs, and how they might be improved. These statements served as a basis for preparing a tentative agenda. No one maintained that our introductory physics courses cannot be improved, although some expressed the opinion that these courses in general do not fail to meet present needs. A majority of the participants, however, in their statements ex-

[1] *NRC–AIP Conference on the Production of Physicists.* Physics Today, 8, June 1955, p. 13.

pressed the opinion that there was need for revision in content, in aim, and in emphasis, as well as for a reduction in the amount of subject matter covered, with a concomitant increase in depth of treatment. The conferees agreed that all types of physics courses were the proper concern of the Conference, and that the statement of aims so ably expressed by the AIP Committee on the Role of Physics in Engineering Education [2] should apply to all courses in introductory physics. There was agreement that physics teachers have not devoted as much conscious thought to the establishment of specific goals as is desirable. The conferees urged that instructors of introductory physics courses in planning their work consider carefully the goals as expressed by the AIP Committee.

Regarding the content of the introductory physics courses, the Conference reached the following conclusions:

(a) The selection of subject matter together with the depth and intellectual rigor with which each topic is presented determines in large measure the success with which the above goals will be achieved. The content of each course and the mathematical level of presentation should be responsive to the interests and needs of the type of student for which the course is designed and consistent with his level of mathematical and analytical sophistication.

(b) A selection of topics is necessitated by the fact that physics, as a body of knowledge, is now far too extensive to receive adequate general coverage in an introductory course; also that depth and understanding must not be sacrificed by attempts to cover too many topics in encyclopedic fashion. This selection is the responsibility of the instructor; he should not assume that the author of the textbook adopted is infallible in this regard.

(c) It is apparent that differences in content can and should exist among courses. However, whatever content is selected, it should:

(1) Consist of sufficiently few topics so that each can be treated with thoroughness and intellectual rigor.

(2) Present both classical and modern physics as growing subjects, having present-day frontiers in all areas, and include at least one or two instances as illustrations of this fact.

[2] Physics Today, 8, December 1955, p. 17.

Delegates (and visitors) at Carleton Conference on Introductory College Physics. Delegates included representatives from industrial laboratories, government agencies, and academic institutions. Delegates from universities and colleges were chosen on a national basis to represent both undergraduate and graduate teaching interests.

Left to right in front row: R. A. Reitz, G. Holton, L. Nedelsky, K. A. Meade, M. W. Zemansky, T. J. Parmley, R. Carnick, P. Fossum, R. R. Palmer, W. A. Butler.

Back rows: W. F. Brown, Jr., M. W. White, F. W. Sears, V. Eaton, R. J. Seeger, R. M. Whaley, W. C. Kelly, R. A. Sawyer, G. W. Shortley, Z. V. Harvalik, W. C. Michels, R. Brode, A. N. Holden, I. M. Freeman, G. W. Hazzard, I. Harbour, G. C. Higgins, G. E. Pake, C. N. Wall, F. Verbrugge.

(3) Contribute to an understanding and appreciation of the logical elegance and unity of physics.

(d) All introductory physics courses should be based on a sound presentation of physics, challenging the student's intellectual capacity in a manner worthy of the subject and of himself.

There was a discussion regarding the minimal content which must be included in every course in introductory physics which provides a satisfactory analysis of present-day physics. The tentative report of the Conference includes suggestions regarding content though there was agreement that the Conference should produce no syllabus. This tentative report of the Conference is being printed, and will be mailed not only to all members of the AAPT but also to most of the physics departments of the colleges and universities in the United States and Canada. On the basis of criticisms received, the final report of the Conference will be prepared. This report will include suggestions and recommendations regarding content.

Other items on the agenda of the Conference included: (a) length and level of the course for pre-engineering students and for majors in physics, for students majoring in other sciences, and for nonscience majors; (b) the problem of participation of senior staff members in introductory physics courses and the supervision of junior staff members concerned with courses; (c) the various teaching techniques including demonstration lectures, recitations, discussions, laboratory hours, quizzes and examinations, independent reading, and other special assignments; (d) and the relative importance of presenting physics (1) as a body of knowledge and (2) as a process of inquiry.

A session at the January 1957 meeting of the AAPT will be devoted to a consideration of the report and to the comments and criticism which will be solicited from members of the Association and from the various departments in the United States and Canada. At the conclusion of the January meeting the members of the Conference will reassemble to complete a final report. In this way the Association will continue to implement its responsibility for the improvement of the quality and effectiveness of physics teaching. It will encourage experimentation along the line outlined in the report of the Greenbrier Conference, the AIP report on Physics in Engineering Education, and on the report of the Carleton Conference on Introductory Physics Courses. It will encourage the preparation and publication of instructional materials to implement the recommendations of these conferences.

Frank Verbrugge
University of Minnesota

Nuclear Power in Britain

GREAT BRITAIN'S nuclear power station at Calder Hall will be the subject of a symposium to be held November 22–23 in London. Sponsoring the event is the British Nuclear Energy Conference, embracing the Institutions of Civil, Mechanical, Electrical, and