bered Air Force for the area in which the Reservist resides.

National Guard—Requests for delays in call of Army and Air Force National Guardsmen should be made to the Adjutant General of the state concerned.

ON TEACHING PHYSICS

AAPT MEETING REPORTED

The summer meeting of the American Association of Physics Teachers (held June 20, 21, 22 at Wesleyan University in Middletown, Connecticut) was unique in many ways. For one thing, the meeting was completely a physics teachers meeting. No other organization or society was meeting in that vicinity at the time. This was a first for the physics teachers, some one hundred and fifty of whom were registered from at least twenty-five different states and Canada, and from over eighty different institutions. Of the registrants, about forty-five were accompanied by their wives or families, so well over two hundred were present, and the pleasingly cosmopolitan nature of the meetings contributed toward the friendly and informal tone of all the sessions. All this was made possible by the excellent program arranged, which everyone found stimulating and valuable, and above all by the graciously provided environment of that ideal campus of Connecticut Wesleyan. Nothing but praise was heard for the local setting.

Formal meetings began Tuesday afternoon. In discovering that the Scott Laboratory housed a vigorous research as well as teaching program, many of the visitors also learned how piezoelectricity was pronounced, even if they might not have followed all the details of the ten excellent demonstrations on the meaning and applications of this crystal phenomenon which were given by advanced students of Wesleyan under the direction of Professor Van Dyke. The film "Crystal Clear", presented by courtesy of the Bell Telephone Laboratories, charmed even the wives of physics teachers, several of whom may have been attending physics lectures for the first time in their lives.

At the banquet Tuesday evening President Roller presided and in introducing the speaker, L. W. McKeehan of Yale, proposed a problem for him, the particulars of which might be misunderstood in print, so they will not be given here. The problem was solved, however, and in the formal paper on teaching by publication a vigorous case was made for simple statements in physics, and in texts in particular. Flourishes (chit-chat) should be segregated in foot notes. The speaker also pointed out that unless physicists learned to concentrate their ideas better, librarians would soon be forced to use jet propulsion in making their rounds.

Wednesday morning in many respects provided the high lights of the meeting. Introduced by R. M. Sutton of Haverford, Professor Eaton of Wesleyan showed definitely that lecture demonstration in physics is an art. No one there failed to glimpse a new standard of excellence in the experiments performed. Possibilities of timing, visibility, simplicity, economy of motion and words were evident to a degree few can attain. We will try to imitate. Eric Rogers supplied the expected touch of drama and suspense—but he got written up in *Life*. Three internationally famous lecturers, Benjamin Snow, Arthur Foley, and Pohl of Göttingen, had their methods described by former students. Not one of the teachers present but felt the challenge of this meeting.

The pace of the Wednesday and Thursday afternoon sessions was sufficiently leisurely so that no alarm clock was needed. These two sessions were devoted to contributed papers and provided for the listeners a number of fine ideas, many of which will shortly be reported in more detail in the *American Journal of Physics*.

The papers presented Thursday morning were constructively interesting. Teachers present from the western schools were pleased to have Dr. Knapp of the Wesleyan Psychology Department announce statistics indicating that a larger percentage of students from western schools become scientists than do those from eastern schools. Some were puzzled perhaps by the fact that a larger percentage of scientists came from Republican rather than Democratic parentage. How this may influence the teaching of physics was left to the audience. All agreed that statistics can be interesting.

It was unanimously felt that such a meeting would be very desirable another year though the high standard set by Wesleyan in its Middletown setting would not be easy to attain elsewhere. R. F. Paton

PIEZOELECTRICITY

The first session of the AAPT meeting on Tuesday afternoon was devoted to a symposium on piezoelectricity. In his introductory remarks, W. G. Cady of Wesleyan University, the presiding officer, gave a brief account of the field's historical development. Emphasis was laid on the example thus offered of scientific reasoning and of cooperation between scientists. Present trends in piezoelectric research and applications were summarized.

Among the most important and instructive lines of research is that concerned with the "ferroelectrics". These are piezoelectric crystals, of which the first to be discovered was Rochelle salt and the latest barium titanate. Their dielectric properties offer a very striking and significant analogy to the ferromagnetism of such materials as iron.

Suggestions were offered concerning the treatment of piezoelectricity in physics texts, with the recommendation that the subject be introduced, if at all, in the chapter on dielectrics.

The second feature on the program, by K. S. Van Dyke of Wesleyan, was "Ten Demonstrations in Piezoelectricity". These experiments, some of which were shown for the first time in public, had been prepared and were demonstrated by members of Professor Van Dyke's class in electronics. They included the bouncing of steel balls from the end of a vibrating quartz rod, the "ringing" of a quartz resonator after the exciting current had ceased, the spinning and sliding of a quartz sphere on a track, the production of a jet of liquid by ultrasonic radiation from a concave barium titanate transducer (received through the kindness of The Brush

Development Company), and the converting of a drop of water into a fine mist by means of a vibrating quartz. The latter effect was first observed by Professor Van Dyke in 1924.

The concluding paper was given by Dr. Hans Jaffe, of the Brush Development Company, on the electromechanical properties of barium titanate. Crystals of this material undergo a transition from cubic to tetragonal structure as the temperature drops below 120° C. They are in the ferroelectric state at ordinary temperatures, exhibiting spontaneous polarization, a very high dielectric constant, hysteresis, and a large coefficient of electromechanical coupling. Dr. Jaffe discussed the relation between their piezoelectric and electrostrictive properties. When prepared in the form of ceramics, barium titanate has important applications, especially as transmitters and receivers for ultrasonic waves. The properties of this material were compared with those of other piezoelectric crystals.

After the presentation of the papers, a Bell Laboratories motion picture entitled "Crystal Clear", obtained through the courtesy of A. C. Walker, was shown. This film is a dramatic presentation of the growing of crystals of ethylene diamine tartrate (EDT). Crystals of this piezoelectric material have been developed for use as filters in communication networks. Walter G. Cady

THE DEMONSTRATION LECTURE AS AN ART

The chairman of the Wednesday morning session, R. M. Sutton, introduced the symposium with a review of the important part played by demonstration experiments in the meetings and publications of the Association of Physics Teachers throughout its history. The AAPT book, *Demonstration Experiments in Physics*, continues to serve the needs of physics teachers twelve years after its publication. Some 6500 copies have been sold. The time may be ripe for a second volume of experiments in view of the rapid advance of the art, the appearance of new apparatus and methods, and the wider sharing of experiments through publication.

La pièce de résistance of the session was given by V. E. Eaton, a member of the host department at Wesleyan University. In elegant style, he and his assistants showed more than thirty selected experiments. Many of these were familiar ones but they were shown with a flair for clear exposition to the onlookers, with emphasis upon simplicity, strong illumination, large-scale demonstration of small-scale effects either by use of large apparatus or by shadow projection of small apparatus. Of special note were the following: a two-phase induction motor made from a coffee can on an axle held between two open coils of wire set at right angles; a large-scale optical disk with cylindrical lenses of Lucite and mirrors of stainless steel; a large-scale electroscope with an 8-inch leaf —shadow-projected so that the student could follow both the operations of the demonstrator and the results without shifting his gaze; strong stroboscopic illumination of a synchronous motor and an induction motor to show the difference in their behavior when a brake was applied to each; color mixing with three filters illuminated by movable mirrors attached to a projector; and use of the same apparatus to put in register three separate photographs to produce a single image of a bowl of fruit in natural color. Professor Eaton's lecture closed with several experiments in mechanics, including the demonstration of some of the large-scale gyroscope experiments which he has developed.

Next, E. M. Rogers of Princeton University spoke on some of his "lecture experiences", especially those involving disasters that now and then overtake the lecturer when normal apparatus "suffers bewitchment". He stressed the importance of advertising what was to come in a course so as to whet the student's appetite and "make the customer want to buy", of treating the demonstration experiment not just as a sideshow but of making sure that the student is sufficiently advised about an experiment so that he does not miss the point it aims to show.

Three great demonstrators were portrayed one after the other by those who had had acquaintance with them. Benjamin Snow, well known lecturer at the University of Wisconsin, was described by J. C. Blankenagel of the Wesleyan University department of German, who told of Snow's ability as a natural actor, teacher, and psychologist in the field of learning. With a flair for the dramatic, Snow organized his lectures with great care and introduced physical concepts slowly and clearly. He shared with his students his own deep appreciation for the beauty of the universe. Said one Alabaman, "When Benny Snow talks about an *erg*, I'd almost like to do a little bit of work myself!" Snow "lived for physics", and his students caught his enthusiasm.

The success of A. L. Foley as a lecturer was explored by L. I. Bockstahler of Northwestern University who tried to investigate what it is about a great teacher that endures "twenty years after". Bockstahler spoke of Foley's simplicity, clarity, and skill in conveying to students the reality of physical phenomena. Foley's experiments were carefully prepared and shown with skillful coordination of speech and manipulation. Much of his success depended upon his genuine enthusiasm and sound knowledge, his natural dignity and regard for his listeners, and his clear manner of keeping principles in sight.

The lectures of Professor Robert Pohl at Göttingen have long been renowned. E. W. Caspari of the Wesleyan department of biology, formerly a student at Göttingen, told of Pohl's lectures to three or four hundred students who crowded his lecture room at 7 o'clock in the morning. Pohl's apparatus was large, simple, and always worked. He used shadow projection freely and dispensed with the lecture table in favor of small tables on rollers. He kept constantly before the student the importance of the "system of reference" and used his experiments to introduce quantitative discussion of results, allowing the importance of an experiment to sink in by slow discussion. To him, analysis without experiment was "verdammte Kreidephysik".

At other sessions of the Wesleyan meeting, demonstration experiments were presented by K. S. Van Dyke of Wesleyan on piezoelectricity, by D. S. Ainslie of Toronto on induction phenomena, by C. L. Andrews of the New

York State Teachers College and W. M. Fairbank of Amherst, both of whom showed microwave experiments, by E. M. Rogers who showed several "experiments without words", and by H. P. Knauss of the University of Connecticut who demonstrated a fairly exact hydrodynamic analog of radioactive decay.

R. M. Sutton

THE SMALLER THE BETTER

POCKET-SIZE SOUND-LEVEL METER

A sound-level meter, flashlight size and weighing slightly over two pounds, has been announced by Hermon Hosmer Scott, Incorporated. It covers the range from 34 to 150 decibels above standard ASA weighting characteristics which duplicate the ear response at various loudness levels and is run on readily available batteries. At last there is an easy way of finding out whether one's neighbor is really playing his radio too loud or whether one is just jumpy.

FELLOWSHIPS

NEXT YEAR'S FULBRIGHT OPPORTUNITIES

Awards made under Public Law 584 of the 79th Congress, the Fulbright Act, which authorizes the Department of State to use certain foreign currencies and credits acquired through the sale of surplus property abroad for educational exchange programs with other nations, will permit more than one thousand United States citizens to undertake graduate study, teaching, or research abroad during the 1951–52 academic year. Opportunities will also be available for a comparable number of foreign nationals to come to the United States. Countries included in next year's Fulbright Program are Belgium (and Luxembourg), Burma, France, Greece, Italy, the Netherlands, New Zealand, Norway, the Philippines, the United Kingdom and British Colonial Dependencies, Australia, Egypt, Iran, and Turkey.

Those applying as visiting lecturers must have had teaching experience in an institution of higher learning, while those applying as advanced research scholars must have the doctoral degree or equivalent recognized standing in a profession. Lecturing and research applications must be submitted by October 1, 1950; forms may be obtained by writing to the Conference Board of Associated Research Councils, Committee on International Exchange of Persons, 2101 Constitution Avenue, Washington 25, D. C.

Those wishing to teach in national secondary schools abroad should apply to the Office of Education, Federal Security Agency, Washington 25, D. C., while applications for teaching in American secondary schools abroad should be sent to the American Schools Service, American Council on Education, 744 Jackson Place, N.W., Washington 6, D. C. The closing date for these two categories is October 15.

Students applying for graduate study abroad who are enrolled in American colleges or universities should get in touch with their local Fulbright Program Student Advisors. Others should apply to The Institute of International Education, 2 West 45th Street, New York 19, N. Y. The closing date for graduate study applications is October 31, 1950.

KIMBERLY-CLARK CORPORATION FELLOWSHIPS

Grants for research fellowships at the University of Wisconsin, Massachusetts Institute of Technology, Notre Dame, and Purdue have been renewed by the Kimberly-Clark Corporation of Neenah, Wisconsin. In addition, it has been announced, the University of Minnesota has been included in the program for the present year. The fellowships are intended to implement graduate studies of subjects of interest to the pulp and paper industry, including work in physics.

EDITORS OF PHYSICAL REVIEW

GROUP PHOTO WANTED

Several snapshots were taken of all editors of *The Physical Review* who had assembled at Ithaca for the first summer meeting of the American Physical Society in about 1930. The group included E. L. Nichols, Gordon S. Fulcher, Ernest Merritt, and John Tate. Would anyone with a copy in his possession be kind enough to lend it to the Institute? It will be properly cared for and then returned. Please address Henry A. Barton, American Institute of Physics, 57 East 55 Street, New York 22, N. Y.

TATE FELLOWSHIP FUND

CONTRIBUTIONS WELCOMED

Word has been received that a John T. Tate Fellowship Fund has been created at the University of Minnesota and that a fellowship committee, including friends of Dr. Tate from the University and about the country, has been appointed. Details will be announced later, but in the meantime contributions are being received from Dr. Tate's many friends. Those who wish to be included should make their checks payable to the University of Minnesota and send them to Dean T. C. Blegen, Graduate School, University of Minnesota, Minneapolis 14, Minnesota.

WHAT DO YOU DO?

INFORMATION ON LABS NEEDED

The American Institute of Physics frequently receives requests for advice on what laboratories might be approached on some particular research or development problem. It is difficult to give these callers a wide choice because the information on hand is so scanty.

An attempt is therefore being made to set up a roster of research and development laboratories which take work on assignment. The information desired is the name, address, size of laboratory, geographical area served, types of problems handled, fields covered, minimum fees, and any other information relevant to a general inquiry file of this sort.

It will be appreciated if those who have this information will kindly send it to Laboratory Information Serv-