

The following account of the Visiting Scientists Program in Physics was written by the head of the recently established Education Department of the American Institute of Physics. At the informal gathering shown at right, P. Kusch of Columbia University, one of the visiting physicists, chats with a group of Dartmouth College students in the home of Leonard M. Rieser, Jr., head of Dartmouth's Physics Department.

Photo by Hanson Carroll



The Visiting Scientists Program in Physics

By W. C. Kelly

ACADEMIC year 1957-58 was the first year of the visiting physicists program. Seventy-five prominent physicists packed their bags and, putting aside research and administration for a few days, set out on visits to colleges to talk about physics. Another twenty-eight visited high schools for a day. The activities during the visits left no doubt that physicists have a common interest in educational problems and that progress in solving the problems requires cooperation of the kind that made the visits possible.

Physics departments that carry on extensive research programs are used to a succession of visitors who bring reports of new developments in physics. Because of geographical isolation or heavy teaching schedules that preclude research activities, many of the smaller colleges are not on the routes ordinarily covered by traveling physicists and miss the stimulation of visits. To remedy this situation the American Association of Physics Teachers and the American Institute of Physics made a joint proposal to the National Science Foundation for a program of visits to colleges. The major objectives of the program were: (1) to stimulate interest in physics among undergraduates in colleges and universities through visits by leaders in physics research, (2) to provide opportunities for physics staff members of the visited institutions to discuss their research and teaching problems with the visiting physicists, and (3) to acquaint other members of the academic community and the public with recent developments in physics. Visits to high schools were also to be a part of the program. However, since the number of schools offering a physics course was greater by several orders of magnitude than the number of colleges with majors in physics, visits to a small number of high schools were to be organized experimentally to determine the most

successful approaches to a later expanded program in the schools. Except for a brief section near the end of this article, the details of the high-school program will be left for a later report.

Organization

FUNDS were granted by the National Science Foundation, and the program was set into motion in the spring of 1957. The AAPT Committee¹ on the Visiting Scientists Program in Physics and the American Institute of Physics jointly determined policies; the arrangements for the visits were made by the American Institute of Physics.

The first of the facts of life that impressed itself upon the organizers of this program was that although many distinguished physicists had consented to make visits, their many responsibilities would not permit absences for more than two visits of two or three days each. We would not be able to arrange itineraries in which a few physicists would each visit perhaps ten colleges. Instead, around fifty or sixty physicists would be needed for visits to about a hundred colleges. The second problem was that it would be difficult to allow the participating colleges and universities free choice of visitor. Some of the visitors would be oversubscribed, and others who could do an excellent job would be overlooked. We decided not to publish a list of available visitors but to ask each participating institution to tell us what it hoped to accomplish during the visit and to let us recommend a visitor. The visited institutions would entertain the visitors and contribute a small sum

¹ Members of the Committee are J. W. Buchta, University of Minnesota, chairman; L. D. Huff, Clemson College; C. J. Overbeck, Northwestern University; H. K. Schilling, Pennsylvania State University; R. J. Stephenson, College of Wooster; and F. Verbrugge, University of Minnesota.

toward travel expenses. Honoraria and travel expenses of the visitors would be paid from the granted funds. On this basis, one hundred and fifty-two colleges and universities asked to participate. One hundred and eight could be accommodated within the 1957-58 program. Many of the others we hope will take part in the current academic year.

Matching institutions to visitors on the basis of stated preferences seemed to work well. Most of our suggestions were accepted both by the institutions and the visiting physicists. In a few instances, we were asked to make changes and this was done without great trouble. At the end of the year, seventy-five physicists had visited one hundred and eight colleges and universities in forty states, Alaska, and the District of Columbia. The names of the visitors and the visited institutions are given in Tables I and II.

Activities

EACH college and its visitor together worked out a program for the visit. Although the programs varied greatly in details, certain activities were prominent in all, according to letters from the visitors and the colleges. Lectures were given on a great variety of topics: recent research by the visitor, reviews of progress in various areas of physics, the role of science in our society, the philosophy and the history of physics, and careers in physics, to name a few categories. They were delivered in lecture rooms, chapels, town halls, and public libraries. Physics students and physics staff members predominated in the audiences, but the visitors were encouraged to find general interest among the faculty and students of the visited institutions and of nearby institutions and among the town people. One physics department head was accused by his opposite number in the history department of not properly advertising the presence of the visiting physicist; the historians recognized the visitor as *their* colleague because of his work in the history of science. Many of the visitors also took over physics classes at the request of the instructors. In the aggregate, these classes, if they could have been continued through the academic year, would have constituted a kind of super-curriculum in physics, covering almost every field of physics and taught by research leaders in those fields.

There was much emphasis upon informal activities in which undergraduate students could take part. The visitors found the physics majors in many institutions avid for information about what physicists do, how one gets into graduate work in physics, and what physicists think about current political problems. Bull sessions in dormitories and fraternity houses went on for hours. Some colleges put offices at the disposal of the visitors so that students and staff members could drop in for a chat. The visitors had little time for meditation, according to reports.

The physics staff at each visited institution had its innings too. The visitors spent a considerable amount of time consulting with the college physicists about problems covering the gamut in research, teaching, and administration. Some of the visitors helped, for example, with the selection of equipment needed to initiate small research programs. Advice such as "You can easily build this piece; write to me for a circuit diagram." or "This is good basic equipment; buy it." is invaluable to a person who wants to spend his small research grant well and who is confronted by stacks of commercial catalogs. Some of the institutions were planning new degree programs or revision of old ones and asked the visitors for their criticisms. Finding new staff members and holding present ones was the administrative problem most frequently brought up by physics departments. It is worthy of note that many of the visiting physicists were invited by college presidents and deans to discuss not only the problems of physics departments but general educational problems as well. What went on in these conferences is not a matter of record, but there are indications that the visitors spent their time well.

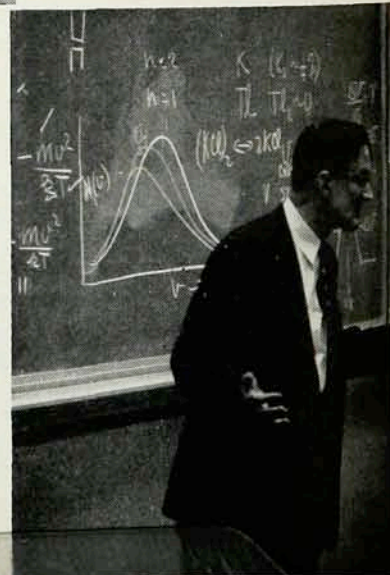


First order of business after visiting scientist arrives on campus is to map out final details of full schedule. When Kusch reached Dartmouth he had coffee with Department Chairman Rieser and discussed plans for three-day visit.



Later . . . he dined with members of the physics department . . . gave a colloquium lecture . . . talked shop with physics students.

Photos by Hanson Carroll



The public relations of physics and physicists received a boost from the visits. Advance information about the visitors, supplied by the Public Relations Department of the American Institute of Physics, alerted local editors to the visits. The ensuing newspaper articles and interviews conducted on radio and television programs presented the views of the visiting physicists on a variety of subjects of public interest. The tone of these reports was prevailingly sympathetic toward physics, and the favorable publicity did not diminish the prestige of the visited physics departments.

What the Visits Accomplished in Colleges

LETTERS from the colleges, written after the departure of the visitors, were almost uniformly favorable toward the program, even enthusiastic. After discounting the polite phrases, one gets the impression that the colleges were genuinely impressed by the willingness of these prominent physicists to interrupt busy schedules to spend several days on isolated campuses and that almost all of the colleges used this opportunity well. The students found themselves chatting with men who were making scientific history, the college physicists discovered that research leaders who had hitherto often been remote were their colleagues after all, and the college administrators were pleased at the recognition being given their institutions and ready to listen to the recommendations of the distinguished visitors.

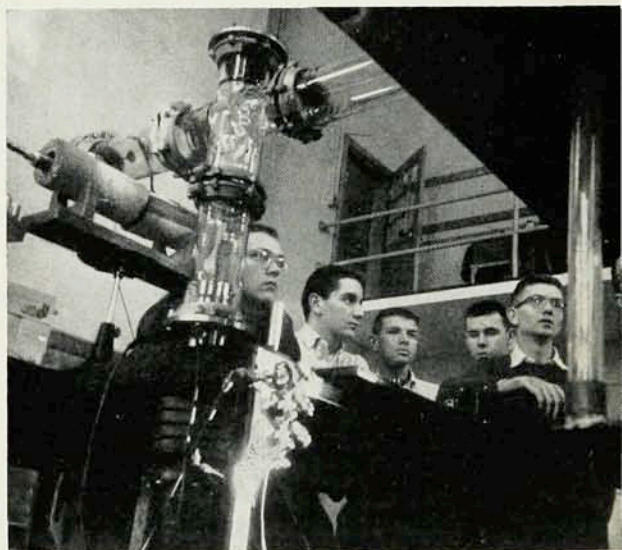
What the visitors did best, of course, was to bring the colleges for a brief time into the currents of contemporary physics research. This is not to say that college physics departments as a group are not interested in the latest developments or well informed about them. Indeed, a number of the staff members of the colleges impressed their visitors a great deal by the way they had been able to keep up in physics. But the visitors helped to bring *V*-particles and parity to life for the students and undoubtedly convinced some of them that basic research is exciting. The visitors also, as mentioned above, discussed with the college physicists research in progress or contemplated at the visited institutions. The encouragement afforded by this kind of attention was extremely valuable. The expert advice offered by the visitors even extended to reading portions of manuscripts and to writing lengthy letters, full of supplementary information about research projects and curricula, after the visitors had returned to their homes.

The colleges were pleased at the way the visitors entered into campus life, recognized the importance of the work of small departments, and tactfully offered what advice they could. Some were concerned at the

beginning of the program as to whether these physicists, whose work was often far removed from undergraduate teaching, would "fit in". They need not have worried; the visitors fitted in very well indeed.

What the Visitors Found

THE visitors had much to say when they got back. The reports varied considerably, of course, but a number of themes kept recurring. One of these was a concern about the tendency of the colleges to concentrate upon undergraduate teaching to the exclusion of research by the physics staff. Many of the visitors reported that the colleges they visited were doing a good classroom job of teaching physics, but the absence of research or other scholarly activities in physics in these same institutions seemed a serious gap in the total educational program. The visitors understood the reasons for this lack of research, knowing the relatively heavy teaching loads of college faculties and the lack of college research funds, but they wondered why something could not be done about it and had many suggestions. Another serious problem that the visitors encountered was the increasing difficulty that colleges have in adding physicists to their staffs or holding the ones they have. Many colleges are unable to attract young PhD's in physics in spite of fairly good salary scales. The reason often is that opportunities are lacking for the prospective staff member to continue his research at the college so he goes elsewhere. Whatever the reason, the effect of this shortage of physicists on college campuses is to overload the ones who are there to the point where their teaching is becoming a burden to them instead of remaining the pleasant and stimulating activity which



Participants in the Visiting Scientists Program in Physics got together on May 1, during the American Physical Society's spring meeting in Washington, D. C., to discuss program. J. W. Buchta of the University of Minnesota (standing near window) presided. Speaking (at right) is Marcel Schein of the University of Chicago.

Photo by Hank Walker, courtesy Life



attracted them to college life in the first place.² The visitors also commented on the scarcity of modern physics equipment in some departments, on the lack of building space to carry on the necessary activities of the departments, on the lack of books and periodicals in some of the libraries they visited, and on the need for revision of parts of the undergraduate curriculum, usually the introductory physics course. These comments were made in a constructive fashion, not in a spirit of carping criticism, and were usually accompanied by good suggestions to the visited institution as to what could be done to improve things.

It would give an incorrect impression to mention only the difficulties facing the colleges. The visiting physicists also saw much that they approved wholeheartedly. They were heartened by the response of the students, who were eager to talk about physics, about graduate work and jobs in physics, and about the Physicist, World Peace, and the Cosmos. One visitor reported that a class he taught had boned up by reading his articles in the physics journals. Another captured the confidence of the nonphysics students so well that they kept bringing him their poems and paintings. The visitors also got acquainted with college physicists who were doing a top-notch job of teaching and who still managed to keep up with recent developments in physics, often by carrying on a modest research project. Some of these college physicists could be formidable men in a colloquium, the visitors found, and the students showed by their preparation and their keen interest in physics that they had received excellent instruction.

In summary, the visitors' letters indicate that there is good teaching being done in many of the visited colleges, but the growing manpower shortage threatens even the best-established institutions and has already seriously reduced the quality of work in physics at some institutions. Furthermore, the questions of how much physics research should be done and what kinds deserve serious consideration by the colleges.

There was a personal side to the visits. If anyone thinks them two-day or three-day holidays for the visitors, he is greatly mistaken. The visitors worked from arrival to departure on full schedules, a few of which—in spite of frequent admonitions about a leisurely

time table—were drawn up by the institutions to fill each shining hour and some that were not shining. One visitor gave ten lectures, each requiring preparation, in addition to numerous other activities during three days. Needless to say, overloading will be avoided in the continuation of the program in 1958–59. There were social activities during the visits—dinners, receptions, and excursions through the countryside. One visiting physicist attended a basketball game; another upheld the honor of East Coast physics by playing on a faculty soft-ball team. Diets ranged from a Rocky Mountain dinner of elk meat (enjoyed) to one lacking meat, coffee, pepper, and tobacco (tolerated.)

Visits to High Schools

THE high-school program of visits was an experimental one designed to explore various ways of getting physicists and high-school teachers and students together. A number of interesting pilot projects were developed by the visiting physicists listed in Table III: visits to every senior high school in a large metropolitan area, visits to small rural schools, a mammoth demonstration lecture for over six thousand high-school students, conferences with school board members, demonstration lectures given at school assemblies, and career day programs in addition to informal conversation with students and teachers. About forty schools took part. The visits were found valuable by the participating schools and the visitors and will furnish a basis for an expanded program of visits to schools in 1958–59.

The Visiting Scientists Program for 1957–58 has passed into history, but its effects on education in physics remain and will increase with time. The effect of lectures is admittedly temporary, but there are more permanent effects. One of these is the realization that cooperation among physicists at large institutions and small is fruitful and indeed essential for the solution of educational problems. Other effects will result from the many suggestions for the improvement of physics teaching that have come from the first-hand contacts of research leaders in physics with the problems of the colleges. The suggestions are numerous enough and comprehensive enough to keep groups working on these problems supplied with ideas for a long time. Physicists owe thanks both to their visiting colleagues for unselfish services to the profession and to their colleagues in the visited colleges who used those services well.

² See also *Report on a Study of the Supply of Physics Teachers in US Colleges and Universities Offering a Major in Physics*, American Institute of Physics, 335 East 45 Street, New York 17, N.Y.

Table I. Visitors to Colleges and Universities

Paul C. Aebersold, Atomic Energy Commission	Philip Morrison, Cornell University
L. Thomas Aldrich, Carnegie Institution of Washington	Philip M. Morse, Massachusetts Institute of Technology
Samuel K. Allison, University of Chicago	Erwin W. Müller, Pennsylvania State University
Daniel Alpert, University of Illinois	H. V. Neher, California Institute of Technology
Luis W. Alvarez, University of California	John H. Neiler, Oak Ridge National Laboratory
Peter G. Bergmann, Syracuse University	George E. Pake, Stanford University
Hans A. Bethe, Cornell University	Wolfgang K. H. Panofsky, Stanford University
Francis Bitter, Massachusetts Institute of Technology	John R. Platt, University of Chicago
Walker Bleakney, Princeton University	R. D. Present, University of Tennessee
Robert C. Block, Oak Ridge National Laboratory	E. R. Rae, Columbia University
Lyle B. Borst, New York University	R. Ronald Rau, Brookhaven National Laboratory
Walter H. Brattain, Bell Telephone Laboratories	George T. Reynolds, Princeton University
Sanborn C. Brown, Massachusetts Institute of Technology	H. T. Richards, University of Wisconsin
Keith A. Brueckner, University of Pennsylvania	Glenn M. Roe, General Electric Company
J. W. Buchta, University of Minnesota	Louis Rosen, Los Alamos Scientific Laboratory
David O. Caldwell, Massachusetts Institute of Technology	Vance L. Sailor, Brookhaven National Laboratory
Warren B. Cheston, University of Minnesota	E. E. Salpeter, Cornell University
Robert F. Christy, California Institute of Technology	John A. Sauer, Pennsylvania State University
Robert S. Cohen, Boston University	Marcel Schein, University of Chicago
V. W. Cohen, Brookhaven National Laboratory	Leonard I. Schiff, Stanford University
Clyde L. Cowan, Jr., George Washington University	Harold K. Schilling, Pennsylvania State University
Lawrence Cranberg, Los Alamos Scientific Laboratory	R. S. Shankland, Case Institute of Technology
E. Creutz, General Atomic	C. W. Sherwin, University of Illinois
Martin Deutsch, Massachusetts Institute of Technology	William Shockley, Shockley Semiconductor Laboratory
Max Dresden, Johns Hopkins University	R. Smoluchowski, Carnegie Institute of Technology
Joseph L. Fowler, Oak Ridge National Laboratory	Robert L. Sproull, Cornell University
William A. Fowler, California Institute of Technology	M. W. P. Strandberg, Massachusetts Institute of Technology
Ronald Geballe, University of Washington	Richard F. Taschek, Los Alamos Scientific Laboratory
Kenneth Greisen, Cornell University	John S. Toll, University of Maryland
Robert Hofstadter, Stanford University	Charles H. Townes, Columbia University
Donald W. Kerst, General Atomic	G. H. Wannier, Bell Telephone Laboratories
Polykarp Kusch, Columbia University	W. W. Watson, Yale University
Leon M. Lederman, Columbia University	John H. Williams, University of Minnesota
M. Stanley Livingston, Massachusetts Institute of Technology	Robert R. Wilson, Cornell University
E. J. Lofgren, University of California	M. E. Wyman, Los Alamos Scientific Laboratory
Robert E. Marshak, University of Rochester	C. N. Yang, Institute for Advanced Study
Louis R. Maxwell, US Naval Ordnance Laboratory	Mark W. Zemansky, The City College of New York
Walter C. Michels, Bryn Mawr College	

Table II. Visited Colleges and Universities

Agricultural & Technical College of North Carolina	Hope College	Salem College
Albion College	Juniata College	Southern Illinois University
Alfred University	Kansas State Teachers College	Southern Missionary College
Amherst College	Kent State University	Southwestern at Memphis
Antioch College	Kenyon College	Southwestern College
Arizona State College	Knox College	Spring Hill College
Augustana College (S. D.)	Le Moyne College	Tarkio College
Baldwin-Wallace College	Lewis & Clark College	Thiel College
Bates College	Linfield College	Trinity College
Beloit College	Loyola University (New Orleans)	Tuskegee Institute
Bowling Green State University	Macalester College	Union College
Brigham Young University	Mankato State College	University of Alaska
Butler University	Marquette University	University of Delaware
Carleton College	Miami University	University of Dubuque
Carson-Newman College	Monmouth College	University of Louisville
Case Institute of Technology	Montana State University	University of Minnesota at Duluth
Central College	Morehead State College	University of Nevada
The Citadel	Morehouse College	University of New Hampshire
Clark College	Nebraska Wesleyan University	University of Portland
Clarkson College of Technology	New Mexico College of Agriculture & Mechanic Arts	University of Redlands
Clemson Agricultural College	New Mexico Institute of Mining & Technology	University of South Carolina
College of Puget Sound	New York State Teachers College (Albany)	University of Vermont
Concordia College	Northwest Nazarene College	University of Wichita
Cornell College	Oberlin College	University of Wyoming
Dartmouth College	Ohio University	Utah State University
DePauw University	Oklahoma Baptist University	Vassar College
Eastern Illinois University	Oregon State College	Virginia Military Institute
Eastern Michigan College	Prairie View A & M College	Virginia Polytechnic Institute
Findlay College	The Principia	Wabash College
Geneva College	Reed College	Washington & Jefferson College
Gettysburg College	St. Ambrose College	Western Illinois University
Gonzaga University	St. John's University	West Virginia University
Hanover College	St. Lawrence University	Whitman College
Heidelberg College	St. Mary's College	William Jewell College
Hiram College	St. Olaf College	Wilson College
Hollins College		Wittenberg College
		Worcester Polytechnic Institute

Table III. Visitors to High Schools

J. T. Arnold, Oregon State College	Robert L. Mooney, Georgetown University
Martin J. Arvin, Southern Illinois University	Frank L. Moore, Jr., Clarkson College of Technology
Graydon D. Bell, Harvey Mudd College	Raymond L. Murray, North Carolina State College
V. L. Bollman, Occidental College	H. V. Neher, California Institute of Technology
Herman Branson, Howard University	Donald C. Peckham, St. Lawrence University
Francis T. Byrne, Catholic University of America	John L. Powell, University of Oregon
K. E. Davis, Reed College	Theodore S. Renzema, Clarkson College of Technology
Joseph R. Dillinger, University of Wisconsin	Alfred Romer, St. Lawrence University
John E. Edwards, Ohio University	S. Fred Singer, University of Maryland
Stanley Farr, West Virginia University	Irvin L. Sparks, Eastern Illinois University
Theodore W. Lashof, National Bureau of Standards	Keith R. Symon, University of Wisconsin
Howard H. Laster, University of Maryland	C. D. Thomas, West Virginia University
Glenn O. Lefler, Eastern Illinois University	Arthur Waltner, North Carolina State College
Donald C. Martin, Marshall College	W. Whaling, California Institute of Technology
Ralph J. Miller, Greenville College	