

# The Story of the AMERICAN INSTITUTE OF PHYSICS

By *H. A. Barton*

**S**INCE its founding in 1931, the American Institute of Physics has devoted its attention to the development of physics as a field of human activity and to the economy of publishing the physics journals. In both respects there was a crisis in 1929. The Institute was founded to meet the crisis and has played a leading role in solving the problems confronting the physics field to the present time.

The Institute's attention to publishing problems has developed additional income from sources other than dues and has evolved more efficient methods of producing and distributing large amounts of technical text in the form of printed journals. The net result is that the "per-word" price to members has generally gone down. The great growth in demand for publishing space has been met in spite of increased printing and other costs. The Institute has thus helped meet the crisis in research communication.

The crisis as regards the development of physics was one of great opportunities suddenly to be embraced. It was becoming clear that the fields of optics and acoustics would require greater emphasis and that many who were not members of the American Physical Society would become actively involved in their development. Societies had already been formed in these fields. There was also need for special attention to the teaching activities of physicists and account had to be taken of the general industrial need of physicists, not fully appreciated in 1929. There was urgent need for a plan under which physicists could fully embrace the growing special and general opportunities of physics. There had to be both special societies and a coordinating arrangement to preserve the community of physics.

Today, by contrast, the Member Societies have, in the Institute, a well established professionally-staffed instrument to achieve their collective purposes. They

*H. A. Barton* has been Director of the American Institute of Physics since the time of its founding.

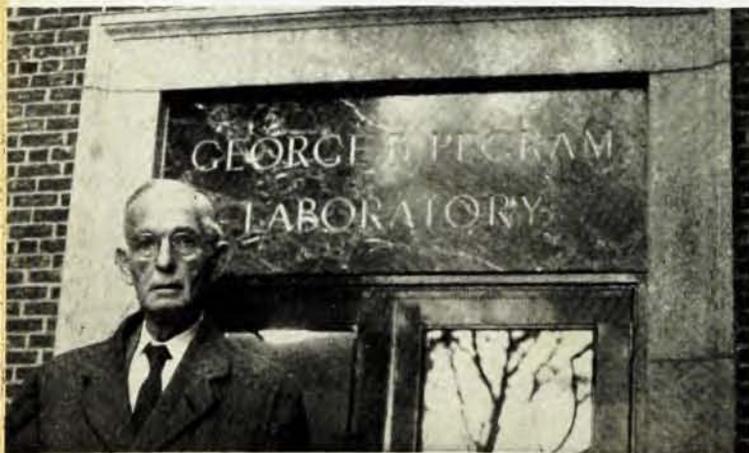
have developed the prestige of physicists in industry, they have greatly increased financial resources for publication, and they now take a leading part in national affairs which concern the advancement of science. They have maintained integrity as a group with common interests and are striving to minimize division into fields between which there exist no boundaries in nature.

**T**HE story of the AIP properly begins a couple of years before it was founded. A Physical Society "Committee on Applied Physics" sought means to reverse the dispersal of physicists. In 1930, after unpromising avenues of action had been explored, a federation of societies was conceived of and the name "Institute of Physics" first appears in a report of the Committee dated December 1930. The report was signed by Paul D. Foote (Chairman), L. A. Jones, A. W. Hull, H. E. Ives, L. O. Grondahl, K. T. Compton, G. B. Pegram, and Henry Gale. It is significant that, although the Committee was impressed by the strength and accomplishments of such great societies as the American Chemical Society and the several engineering societies, it was decided in the end that the then existing societies in physics should not be asked to relinquish their autonomy.

K. T. Compton and G. B. Pegram thereafter took the leadership in planning an organization and securing finances. The Physical Society, Optical Society, and Acoustical Society formed a joint committee which met at Columbia University on February 27, 1931. Acting on recommendations adopted at this committee meeting, these Societies very quickly agreed to establish the American Institute of Physics, named three men each to its Governing Board and invited the Society of Rheology to join. When the American Association of Physics Teachers was founded later, it promptly requested and was gladly given (January 27, 1932) equal status in the Institute.

All of the present Member Societies except the AAPT were officially represented at the first Governing Board meeting held at the Cosmos Club, Washington, on May 3, 1931. This is regarded as the founding date of the Institute. K. T. Compton was elected Chairman and G. B. Pegram, Secretary. The Board authorized various actions as a result of which, at the next (September 10,

*G. B. Pegram, Vice President Emeritus of Columbia University, was largely responsible for founding, and writing the By-Laws, of the AIP. Its first Secretary, he later became Treasurer, and he has served on the Governing Board for 24 years.*



1931) meeting, the Chairman announced that the Chemical Foundation would defray the expenses of the Institute for at least the first year and introduced the writer, then an Assistant Professor at Cornell, as head of the prospective staff. J. T. Tate, Editor of *The Physical Review*, was named Adviser on Publications.

An office was opened at 654 Madison Avenue, New York City, in a room of the Chemical Foundation on October 1, 1931, and a large dinner for the Press was held some weeks later to launch the AIP in the public eye. At another meeting of the Board, November 21, 1931, W. W. Buffum of the Chemical Foundation was elected Treasurer. This meeting also proposed publication plans, which the Member Societies subsequently adopted, whereby their journals came to be published through a central "editorial mechanics" office at the Institute, uniform size and format for these journals were adopted, and the Institute was empowered to select a single printer for the job. It was also decided that the plan of requesting authors' institutions to honor a "per-page publication charge", already in operation by *The Physical Review*, should be extended to cover submitted articles in all of the journals.

The year 1932 was mainly spent in carrying out these steps, the assembling of the journals beginning with *The Physical Review* and *Reviews of Modern Physics*. Miss Madeline M. Mitchell, who had assisted Dr. Tate, came with these journals and was appointed Publications Manager of the Institute. A larger office for the Institute was established at 11 East 38th Street, the Chemical Foundation assuming the cost of furnishing and also all transfer costs falling on the journals as well as the other expenses of the Institute.

A constitution was recommended and later adopted by the Societies, and the Institute was incorporated under filing date of June 1, 1932, as a nonprofit "membership corporation", under the laws of the State of New York.

The Constitution states that the objectives of the AIP are "the advancement and diffusion of knowledge of the science of physics and its application to human welfare" and goes on to say that "to this end it is part of the purpose of this corporation to undertake, among other measures, the publication of scientific journals

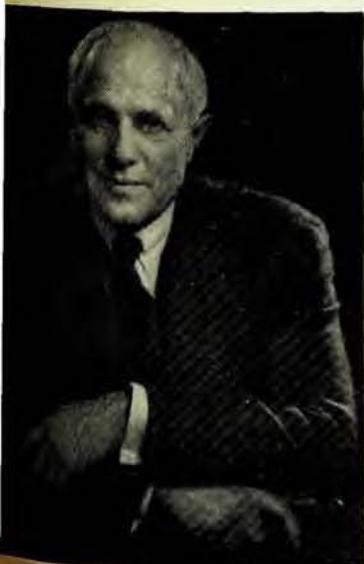
devoted wholly or mainly to physics and related sciences; to serve the public by making available to journals, newspapers, and other channels of public information reliable communications as to physics and its progress; to cooperate with local, national, and international organizations devoted to physics; to promote unity and effectiveness of effort among all those who are devoting themselves to physics by research, by application of its principles, by teaching or by study; and to foster the relations of the science of physics to other sciences and to the arts and industries".

The breadth of this charter given by the Societies to the AIP is significant for it indicates clearly that the latter was not to be a mere joint publishing department, but was also to be the joint instrument of the Societies for the gaining of any of their collective ends in which success would be furthered by combining their strength. This was clearly not a static assignment, but one in which enterprise was demanded. The Institute has realized that unity can only be maintained if the growing opportunities and responsibilities presented to physicists as a group are matched with a growth of effort to meet them. Clearly, if the physicists' own organization did not tackle the jobs to be done, organizations in bordering fields or newly founded organizations would undertake to do so and, as a result, the interests and loyalties of physicists would again begin to disperse. The reason for establishing the Institute would thereby be negated.

The incorporation papers had to be signed by "individual members", but these all promptly resigned, leaving only the Societies as Members by entities in the AIP. Provision had to be made for electing a Governing Board of representatives of the Member Societies. Technicalities of the law led to the holding each February of a meeting of proxies from each Society who collectively perform the act of electing the individuals nominated by the Societies. The Governing Board, so comprised, democratically and completely controls the policies and operations of the Institute.

ANYONE who reviews all the steps which led to the establishment of the Institute, the coordination of the journals in format and procedures, the establishment of the central publishing office and the writing and confirmation of the AIP Constitution, must be impressed by the speed with which the Societies and their officers and editors acted. Nothing could emphasize more eloquently the underlying agreement and the spirit of cooperation which existed.

In 1932 the Association of Scientific Apparatus Makers, which had earlier assisted the Optical Society in founding *The Review of Scientific Instruments*, informed OSA and AIP representatives that under the depression conditions then prevailing, they could no longer guarantee support of the *Review*. The time had come for the *RSI* to stand on its own feet. It was decided that it should be taken over by the AIP, that all advertising then in physics journals should be concentrated in it and that the *RSI*, augmented by a



*K. T. Compton, late Chairman of the Corporation of the Massachusetts Institute of Technology. His leadership drew the Founder Societies together to form the AIP. As first Chairman of the Governing Board he brought the infant organization to healthy maturity.*

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section entitled "News and Views", should be sent gratis to all members of the Member Societies. It was hoped that the increased circulation would make the medium more attractive to advertisers and so bring in revenue on its own merits. It did so, but the distribution cost proved so high that general free circulation was abandoned at the end of 1934. The *Review* has subsequently become profitable and its advertising section enjoys the increasing patronage of apparatus makers and other industries. It is interesting that the need for a "house organ" for physics was felt so early and so strongly.

It became clear that the AIP could not expect further general support from the Chemical Foundation after 1932 except in connection with the *Journal of Chemical Physics*, which was started by the Institute, under the editorship of Harold C. Urey in 1933. Consequently, in arranging agreements covering publication, at cost, of the journals of the Member Societies, it was also arranged that an amount equal to 15% of each journal's cost would be contributed annually by the respective Society to support the general non-publishing activities of the AIP. Miscellaneous contributions from other sources were received from time to time, and in 1934 a campaign for industrial Associates was launched. There are now 79 Associates paying \$250 each as annual dues. This income is divided between direct support of the physics journals and general support of the objectives of the AIP.

With the publishing program fully established, more attention could be given to promoting "physics in industry", so a conference of industrial research directors was called on December 14, 1934. This led to the appointment of a continuing Advisory Council on Applied Physics which met several times. Recommendations of this group were successful in producing a much more open attitude on the part of industries toward the employment of physicists and a greater willingness of physicists to take jobs outside the academic environment.

The most memorable results of the advice of this Council were the Joint Meeting on Applied Physics, in which all of the Member Societies joined on the occasion of the AIP's Fifth Anniversary, and the conversion of the old APS journal *Physics* into the present *AIP Journal of Applied Physics*. The meeting took place in New York October 29-31, 1936, and included an AAPT Symposium on Training Physicists for Industry as well as a number of symposia on physics in several branches of industry. The first issue of the new journal was that of January 1937. For several years thereafter the AIP organized or backed special symposia including one on "Physics in Metals" at Cambridge, "Physics in the Textile Field" at Charlottesville, "Physics in the Automotive Industry" at Ann Arbor, "Biophysics" at Philadelphia, and "Temperature, Its Measurement and Control in Science and Industry" at New York.

The Institute had run at a deficit for a while, but gradually increasing income and a temporary cut-back

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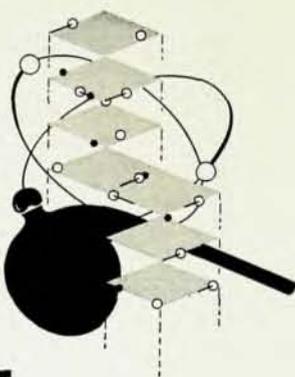
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in activities worked it off. The Societies changed their basis of support from a percentage of publishing costs to a percentage of income they got from dues. This was a sounder system because it was related to ability to pay and it gave the AIP an incentive to help membership in the physics organization grow. It still prevails although the AIP has been enabled by the development of other sources of income to reduce the percentage from 15 to 10.

**W**HEN World War II loomed up, the AIP was well established. The journals were mainly self-supporting, physics had been pretty well sold to industry, and it was possible to cope with the complications arising from war conditions. The Director spent half his time in Washington mainly on manpower and Selective Service problems. He established the Office of Scientific Personnel of the National Research Council which is now directed by M. H. Trytten. In the AIP office voluntary censorship of certain papers was furthered and later the whole routine of involuntary censorship was complied with. Priorities in the supply of printing, engraving, and paper stocks had to be obtained because of the importance of physics. Calls for cooperation were many and varied from the Office of Research and Development and other agencies.

The efforts of the AIP staff to represent physics in the war situation were greatly aided and backed by an influential War Policy Committee appointed for that purpose. The Committee issued statements urging the study of physics, the training of teachers, and the use of occupational draft deferments to further the technological war effort. Much of the Committee's effectiveness, however, was in direct recommendations to high officials and boards in the War Manpower Commission, the War and Navy Departments, and the War Production Board. As a result of these, the over-all contribution of physicists in those times of great emergency and confusion was much greater than it might otherwise have been.

In the midst of this activity, an opportunity presented itself to buy, at a very reasonable price, a building for the Institute's offices at 57 East 55 Street. An appeal to the membership was made for funds (\$75 000) with which to make the purchase. The resulting contributions, together with some extra support from the Member Societies as entities, provided more than enough money for the purchase, the renovations needed, and the expense of moving! This endorsement of the importance of unity, this expression of confidence in the functioning of the AIP greatly enhanced the strength and influence of the Institute and the morale of the staff. Some donations from corporations provided the needed furnishings. The building has been a growing asset, absorbing until now the growing activities of the AIP with little increase in what has been an exceedingly moderate space-cost from the beginning.

The theory of organization represented by the Institute underwent scrutiny in 1941, many holding that it

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really would be better if we had one big society in physics like the American Chemical Society in chemistry. A kind of "town meeting" was held in which such views were expressed. Nevertheless, no such change was proposed by the AIP nor favored by the Member Societies. It is notable, on the contrary, that adherents of several other fields of science were so much impressed by the AIP and its activities on behalf of physics that they were moved to set up somewhat similar organizations. Several delegations of By-Law framers sought information in our office. There now exist "Institutes" in biology, geology, psychology, and statistics. While the need for coherent action in their fields was the primary force leading to these, the AIP helped to point up such needs and pioneered a method of satisfying them.

Partly to meet the arguments of those who advocated "a more perfect union", the Member Societies in 1948 ratified changes in the AIP constitution whereby (a) members of the Societies are automatically members of the Institute, (b) a grade of Associate Member was inaugurated for some whose interest is not deep enough so that membership in a Society would attract them, and (c) three at-large members were added to the Governing Board, these to be selected by popular ballot. In order to make this a real rather than a paper reorganization, it was decided to establish a journal going to all members as soon as possible.

This last was, of course, easier said than done. It will be recalled that it had been tried earlier with *The Review of Scientific Instruments*, the result being financially disastrous. Nevertheless the need for a medium of communication between all physicists was so insistently urged that the AIP felt impelled to make another try. Several designs for the journal were proposed, one calling for a periodical to bring physics to the people outside the field. This was not vigorously attempted because *Science Illustrated* and then *Scientific American* took on this task. The present *Physics Today* began to evolve.

*Physics Today* went through too much money at first so, for two years, group and individual subscription plans were tried to support it. Finally it was concluded that its reason for existence essentially required circulation to all members and that a sustained effort over a period of years should be made to establish its value to physics and reduce its net cost to an acceptable figure. It has been pointed out that profitable journals like *Nature* and *Electronics* went many years before achieving self support, but were still considered valuable by their publishers. So *Physics Today*, if regarded as an opportunity for expression and communication, rather than as a technical archive or a text book, can go far to crystallize the purposes of physicists and facilitate their achievement. The net cost of *Physics Today* to the Institute is now decreasing steadily.

THE American Institute of Physics as a publishing house is best known through the regular journals of the Member Societies (*The Physical Review*, *Re-*



**Dr. James M. Lafferty**, Ph.D. (E.E.), University of Michigan (1946), joined the General Electric Research Laboratory in 1942. His work has included development of electrometer tubes, microwave reflex oscillators, and color-television picture tubes. During World War II Dr. Lafferty received a Naval Ordnance Development Award for contributions to the first VT proximity fuse.

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views of *Modern Physics*, *Journal of the Optical Society of America*, *The Journal of the Acoustical Society of America*, and *American Journal of Physics*) and its own journals (*The Review of Scientific Instruments*, *Journal of Applied Physics*, *The Journal of Chemical Physics*, and *Physics Today*). These journals published 17 050 pages in 1954, and the AIP also got out 480 pages of meeting programs. For these journals alone, the circulation and accounting departments handled in 1954 no less than 63 421 member and non-member subscriptions, a large fraction of which were foreign in origin. These departments also handled 13 573 individual transactions involving page charges, reprint orders, and back number sales.

These activities, however, do not constitute the whole publishing experience of the Institute. The journals of the Institute for Aeronautical Sciences were given editorial service in their early years. Help was given in planning *Acta Crystallographica*. The initial business management of *Acta Metallurgica* has been handled by the Institute. In 1955 *Noise Control* was established by the Acoustical Society. At this writing, the first issue of *Soviet Physics-JETP* has just appeared. This last, underwritten by a grant of the National Science Foundation, is to be a periodical translation of the research reports contained in the Russian *Journal of Experimental and Theoretical Physics*. About a year from now the AIP *Handbook of Physics*, edited by a committee of the Institute, will appear as a valuable data reference book—to be published by the McGraw-Hill Book Company.

A notable development of the past decade has been the demand from the Member Societies for increased services other than publishing. These include collection of dues, maintenance of lists, mailing of notices, and other clerical functions required by the several secretaries and treasurers. Central handling of such business minimized duplication of effort. It is a fact also that maturing societies cannot command forever the kind of enthusiastic, time-consuming, voluntary services that commonly help get them started. Clerical functions have to be handed to a paid staff, and this is where the Institute office has served as a welcome recourse.

The Institute is also occasionally asked to staff committees and other projects, especially where a grant has to be kept account of and disbursements made and where clerical services must be arranged for. A recent example has been the AAPT-AIP study of the "Role of Physics in Engineering Education" under a grant of the National Science Foundation. Other recent examples include cosponsorship of a Symposium on Temperature with the National Bureau of Standards and the Office of Ordnance Research and assistance in arranging publication of a Symposium on Photoconductivity sponsored by the University of Pennsylvania, the Radio Corporation of America, and the Office of Naval Research. Another type of central service maintained by the Institute for the Societies is legal counsel which is retained by the AIP on a continuing basis. This has proved to be an important asset.

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There are many other nonpublishing activities. They include the Placement Service, which last January listed more than 486 jobs, as contrasted with 234 registrants. Then there is the Physics Register which is being completed and maintained under contract with the National Science Foundation as a part of the National Register of Scientific and Technical Personnel established by act of Congress. There is also participation in the Scientific Manpower Commission and continuing cooperation with the National Research Council and the International Union of Pure and Applied Physics. A present activity is an attempt to find enlarged working space for the AIP, for although the staff has only increased in proportion to the tasks undertaken, the latter have expanded along with physics activity in general.

Public information activities have declined in recent years for several reasons and it is intended to build these up as rapidly as means and personnel can be provided. In the long run, physics, in common with any other human activity, depends upon public confidence and support. This implies that the integrity, loyalty, and humanity of physicists must be established strongly in the public mind. It must be made clear that physicists are motivated by an objective desire to learn the truth about nature and to apply what they learn to the good of mankind. Their contribution to labor-saving devices, communication, transportation, and other things of everyday life should be pointed out. The powerful tools they have given to the medical profession should be stressed. The *constructive* results of their efforts should continually be emphasized. The Institute is naturally expected to look after public relations and is currently increasing its attention to this activity. A related purpose will be the encouragement of well-qualified young men and women to consider careers in physics and accompanying efforts to help improve the early teaching of the subject. It is also hoped to expand the system of AIP Student Sections and to render the Sections more help and guidance than in the past.

Today, some 16 000 or more individuals belong to the Member Societies and the Institute. About 41.5% of these are associated with educational institutions, 40.5% are engaged in industry, 15.0% are working for the government, and the rest are in other categories. Their functions include teaching, research, development, administration, consulting, and others. They specialize more or less in a wide range of physics subdivisions, many of which border on related fields of science and technology. While there is no such thing as a "typical physicist" there is a kinship, born of professional training and maturing in a manner of thought, that has the recognition of physicists of all disciplines. They have in the Institute the mechanism to function as a community. To make the most of it they have only, in their individual acts and expressions, to maintain the spirit of unity and the enthusiasm for the calling of physics in all its breadth that originally made possible the creation of the American Institute of Physics.

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