News of Science

Second United Nations International Conference on the Peaceful Uses of Atomic Energy

During the first 13 days of this month scientists from 69 nations met in convention in Geneva, Switzerland, to discuss the peaceful uses of atomic energy. The conference, called the largest assemblage of natural scientists ever convened, followed by 3 years the first such international meeting, which also met in Geneva. Behind both meetings is the historic speech given 8 December 1953 by President Eisenhower. Speaking before the General Assembly of the United Nations, the President pledged the government of the United States to find ways by which "the miraculous inventiveness of man shall not be dedicated to his death but consecrated to his life." The member nations of the U.N., acting in concert, translated this resolve into a continuing international program.

Scope

The formal program of the convention called for 12 general sessions, 6 evening lectures, and 85 seminar-like small meetings. The seminar schedule, which included 16 free periods to be used as the participants saw fit, was arranged on a five-part, or series, structure. Major aspects of atomic energy discussed in the series were (i) physics, (ii) reactors, (iii) chemistry, (iv) isotopes and biology, and (v) raw materials, metallurgy, and reactor technology.

A comparison of the 1955 and 1958 conventions reflects the growth of the atomic energy field. Although there were three fewer nations in attendance at the later meeting, the number of individuals present jumped from 2900 to more than 6300. The number of technical papers submitted is more than two times greater than the 1955 figure, with the result that there will probably be 34 volumes in the published proceedings.

Results

The major results of the conference, which was designed to facilitate the exchange of information between scientists working in the field of atomic energy, follow.

Fission. Fission power plants have already turned out hundreds of millions of kilowatt-hours of usable electricity. By 1970 nuclear stations will have at least 15 million kilowatts of electrical capacity—some 50 times as much as at present. The cost of nuclear power is expected to fall "well below" that of conventional power by the late 1960's in the United Kingdom, and nuclear power will be competitive with conventional power in other countries between 1963 and 1973.

Fusion. Papers indicate that "remarkable progress" is being made on a very broad front in the problem of fusion power. However, speakers estimated that it would take 10 years to reach the "break-even" point in experimental devices (the point at which the energy turned out equals the energy fed in), plus an additional period to develop machinery on an industrial scale.

Propulsion. A "hopeful" outlook for nuclear-propelled ships was indicated by reports on the U.S.S.R.'s icebreaker *Lenin,* launched last year, and the United States' merchant ship *Savannah,* now under construction. Commercial nuclear aircraft propulsion seems much further away, but experiments with small nuclear systems potentially useful in aircraft were described.

Isotopes. Radioactive isotopes were reported serving around the world as new tools in medicine, agriculture, industry, and basic sciences. Their use was reported to be saving industry $400 million a year in the United States and 1000 million rubles a year in the Soviet Union. In medicine, the use of isotopes for diagnosis and treatment was described as "one of the brightest and most exciting developments of modern science."

Hazards. Study of some of the hazards associated with the atomic age revealed that nuclear power reactors had been performing safely, with few disturbances and no danger to personnel, and that it was possible to "see daylight" in the problem of safe disposal of radioactive wastes.

Legal problems. New international agreements will be needed to deal with problems raised by patent laws, prospecting, international collaboration, mobile reactors, the disposal of wastes in the oceans, and possible damage beyond national boundaries as a result of reactor incidents.

Exhibition

In conjunction with the conference, a 20-nation exhibition of the peaceful uses of atomic energy ran concurrently on the grounds of Palais des Nations. In a temporary building erected between the Palais and Lake Geneva many aspects of current work in atomic energy were demonstrated. An operating nuclear reactor, laboratory devices, flow charts, uranium-prospecting vehicles, and a traveling laboratory were among the exhibits.

The United States offered the largest display and had four major sections dealing with basic sciences, life sciences, fission reactors, and fusion research. The exhibition, which was open to both the conferees and the public, drew an attendance of 100,000 persons during the 15 days it was open. It closed Monday, 15 September.

Removal of Secrecy

Most auspicious circumstances surrounded the opening of the convention. Just prior to the first of the month announcement was made that the United States, Great Britain, and the U.S.S.R. had removed all security restrictions on their thermonuclear research.

The action, widely applauded by the conference participants, set the tone of the international meeting. The American scientist who said, "This is pure joy to be able to talk freely," spoke for most participants. Many examples were found in which work done in secrecy in one country was confirmed by work done in another. One case, announcement of proof that pi mesons degenerate into electrons, a matter that had been under study for 23 years, moved one scientist to dance a jig in the corridor of the Palais.

Future Meetings

As at the first conference in 1955, the participants at the Second International Conference on the Peaceful Uses of Atomic Energy considered the possibility of future meetings. Among participants and observers the conviction seemed widespread that the rapid growth of the atomic energy field had resulted in the conferences becoming unwieldy and impractical. Despite the elaborate organizational structure, many scientists found themselves unable to keep up with the flow of information that came out of the numerous sessions. Further, they found that there was inadequate time for informal meetings among the men working in various nations on similar problems.

A commonly expressed view was that future conferences should be held at more frequent intervals and on more spe-

cialized topics. Despite these views, the U.S. delegation suggested a third meeting in 1961. The matter can be expected to be a topic of discussion during the General Assembly session on the United Nations which is currently convened in New York.

Publication of Proceedings of the United Nations Conference on Peaceful Uses of Atomic Energy

The U.N. has announced the scheduled publication of the various reports and statements made at the conference.

The proceedings of the conference will constitute the means by which the information will be made available throughout the world. The only complete edition, which will be in English will consist of the following:

1) Material relating to the objectives and operation of the conference.

2) The record of all sessions. There was a series of plenary meetings and five concurrent sessions, when approximately 600 selected papers were orally presented and discussed.

3) The complete text of all papers submitted to the conference (approximately 2200).

4) A detailed index volume (subject, numerical, and author.) This is an important and useful addition to the published proceedings.

Two new subjects discussed at this conference were "controlled fusion" and the use of nuclear power for purposes other than the generation of electricity, as, for example, its application to marine propulsion. Further details on these topics are available from U.N. information sources.

While the Proceedings of this conference will be of direct value primarily to the scientist, their importance reaches far beyond the purely scientific interest. Papers on finance, banking, health safety, education, and many other aspects of this question will be of special interest to all whose lives and interests involve atomic energy in its broadest sense.

The complete English edition is expected to consist of 34 volumes. They will be produced by letterpress with an 8½-by-11-inch page size; the volumes will probably average 500 pages each and will have a distinctive cover design and dust jacket.

The first volumes will be available in December 1958, and the last volumes are expected off the presses by July 1959. To insure maximum speed in publication, the work of printing has been assigned to printers in several countries in Europe and North America.

Copies of each volume will be mailed to subscribers as soon as they become available.

The average retail price of the English edition of the proceedings will approximate U.S. $15 per volume, or the equivalent in other national currencies; the regular price for the full set will therefore approximate $510.

In a special prepublication offer the United Nations and local bookstores will now accept orders for the complete English edition of 34 volumes at the special price of $435. For this prepublication price, all orders must be received by the United Nations prior to 30 November 1958. In addition to the very substantial economy achieved, prepublication orders will be given priority.

Two payment methods are available.

1) Full payment may be made of the total prepublication price for the complete English edition of $435 or its equivalent in other currencies; for fully prepaid orders no postage will be charged.

2) Those who prefer longer term payment arrangements are required to deposit 10 percent of the prepublication price ($44 or the equivalent in other currencies). Thereafter, monthly invoices covering the full price of volumes sent during the month must be paid as they are received, until the full prepublication price has been paid; the balance of volumes remaining will then be sent.

Readers who do not wish to subscribe to the full series may record their particular field of interest on the order cards provided by the U.N.; for volumes which fall within the particular subject indicated, further particulars will be sent as soon as they are available. The special prepublication terms are available only to subscribers to the complete series.

Abridged editions in French and Spanish will be published by the United Nations. They will consist mainly of the papers presented orally (approximately 600), the papers submitted in the language of the edition, and a selection of other papers. Each of these editions is expected to comprise 15 volumes, and a prepublication price of $190 is available until 30 November 1958.

Heisenberg Theory

The mathematical formulation of a "uniform field theory" developed by German physicist and Nobel Prize winner Werner Heisenberg was criticized recently at a meeting in Geneva of about 200 physicists from the East and West. Wolfgang Pauli of Switzerland voiced doubts about the accuracy of the mathematical computations on which the theory was based. He said that although this must not necessarily prejudice the conclusions drawn by Heisenberg, the theory nevertheless lacks power of proof. Marvin Goldberger of Princeton University commented that "The idea of the theory is highly admirable, but my personal feeling—and that of many other physicists here—is that the mathematical methods used by Heisenberg to arrive at specific numeral predictions must be regarded as being doubtful."

Support for Academic Freedom Work

The American Association of University Professors has announced receipt of a grant from the Jerome Levy Foundation of "no less than $5000 a year," for a 5-year period, the money to go into the association's Academic Freedom Fund. A chief use of the grant will be to give temporary aid to the professor who is discharged or suspended without pay in apparently clear violation of principles of academic freedom, and who is particularly handicapped in making his defense because he lacks money to live on. In addition, the fund will be used at colleges or universities where a general crisis threatens the academic freedom of a whole institution, and where faculty members rising to meet that threat need financial support.

In a statement to the press, William P. Fidler, AAUP general secretary, pointed out that defense of academic freedom is basically the safeguarding of professors in the performance of their work. He recognized that the objective and dispassionate nature of teaching and research will sometimes be misunderstood by an excited public opinion, and that in its extreme form—when the excitement is about evolution, loyalty oaths, or racial segregation, for example—public opinion can become a tyranny. It is then time, Fidler said, to turn to the AAUP's 1915 Declaration of Principles, which describes the nature and function of a university:

"It should be an intellectual experiment station, where new ideas may germinate and where their fruit, though still distasteful to the community as a whole, may be allowed to ripen until finally, perchance, it may become a part of the accepted intellectual food of the nation or of the world. Not less is it a distinctive duty of the university to be the conservator of all genuine elements of value in the past thought and life of mankind which are not in the fashion of the moment. . . . One of its most characteristic functions in a democratic society is to help make public opinion more self-critical and more circumspect, to