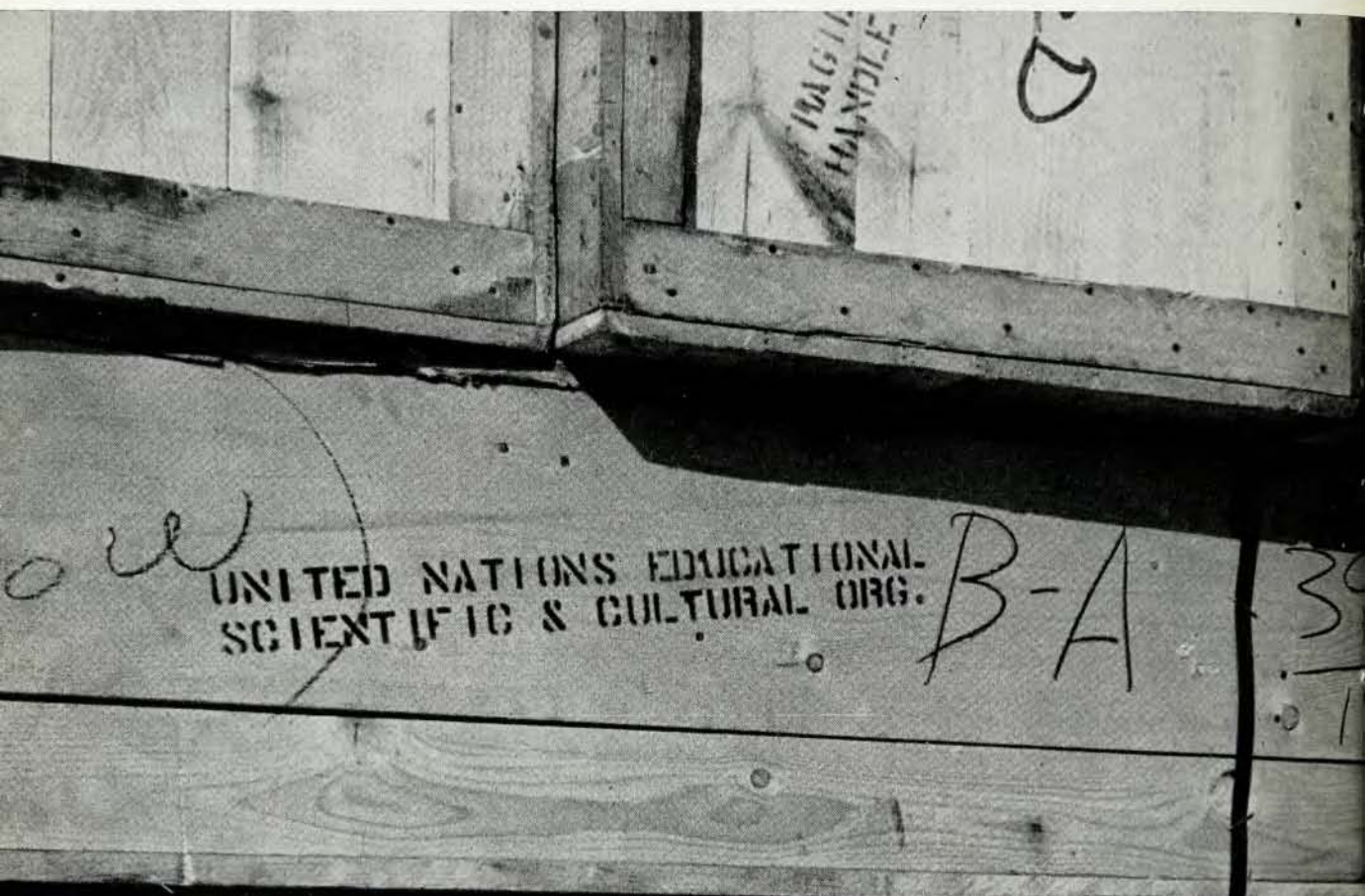


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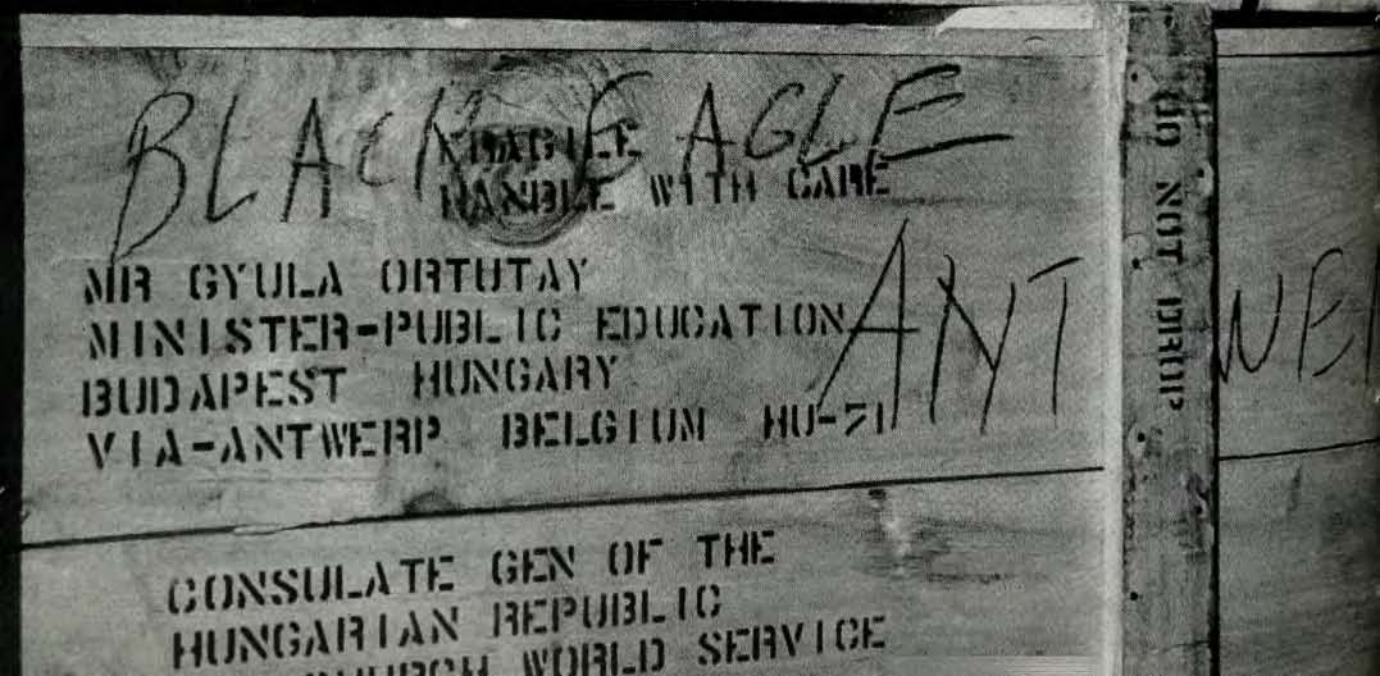
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UNESCO

A WORK IN PROGRESS

What should physicists know about Unesco and how can they contribute individually toward world peace by participation in some phase of Unesco's work? The chairman of the National Research Council's Committee on Unesco recounts Unesco's accomplishments and aims in science matters.

by *Bart J. Bok*

The United Nations Educational, Scientific, and Cultural Organization is concerned with something very intangible—the minds of men. Unesco's purpose is to create through education, science, and culture a climate favorable to world peace. It is *not* a little mental Security Council that comes running with a first aid kit to patch up each threat to the peace. It is the organization that looks into the basic causes for war and suggests remedies for their removal. It is Unesco's function to encourage and support (the latter of course within the narrow limitations of its budget) activities that contribute effectively toward the creation of good relations between peoples.

Point Four

In its early days Unesco operated with relatively little reference to the United Nations, but during the past year a much closer collaboration with UN and the small specialized agencies has come about. The most exciting development of all has come as a consequence of President Truman's famous "Point Four" proposal and the President's proposal is al-

ready affecting Unesco's program in the sciences. It is also heartening to note that much of Unesco's past work in the sciences had been carried on in the spirit of the President's proposal long before it was made!

In his inaugural address on January 20, 1949 President Truman presented a four point program through which the United States should make available American scientific and technical knowledge to underdeveloped areas of the world. In the first of these four points the President called for continuing unfaltering support of the United Nations and related agencies, in the second for a continuance of the program for world economic recovery, and in the third for a strengthening of freedom-loving nations against the dangers of aggression. He then continued with his fourth point, which reads as follows:

"We must embark on a bold new program for

Continued on page 28

Holland born and educated, astronomer *Bart J. Bok* has been at Harvard since 1929, where he is a professor and associate director of the Harvard College Observatory. He and his wife, who is also an astronomer, are joint authors of a book, "The Milky Way." Dr. Bok became interested in United Nations affairs during the latter part of the war and helped put the "s" in Unesco.

UNESCO *Continued from page 17*

making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas. . . . Our aim should be to help the free peoples of the world, through their own efforts, to produce more food, more clothing, more materials for housing, and more mechanical power to lighten their burdens.

"We invite other countries to pool their technological resources in this undertaking. Their contributions will be warmly welcomed. This should be a cooperative enterprise in which all nations work together through the United Nations and its specialized agencies wherever practicable. It must be a world-wide effort for the achievement of peace, plenty, and freedom.

"With the cooperation of business, private capital, agriculture, and labor in this country this program can greatly increase the industrial activity in other nations and can raise substantially their standards of living."

The President's proposal was followed by a resolution adopted by the Economic and Social Council of the UN in which the member governments were asked to "promote by all appropriate means the expansion of international exchange of technical knowledge, especially through the United Nations and its Specialized Agencies," and in which the Secretary General of the UN was requested to prepare "a comprehensive plan for an expanded cooperative program of technical assistance for economic development through the United Nations and its Specialized Agencies." Extensive preliminary work on this technical assistance program is now under way with Unesco participating to the fullest in the planning.

Achievements: Field Offices

It is a very happy circumstance that much of Unesco's program to date is in effect a technical assistance program. This applies not only to the sciences, but also to Unesco's work in education, travel fellowships, and mass communications. As far as the sciences are concerned, it is generally recognized that the field science cooperation offices are of great importance to this program; the experience gained through them may serve as a guide for the establishing of additional offices in this and other fields. A scientific apparatus information service and the

scientific literature service, also established by Unesco, can become especially useful for underdeveloped areas. The Hylean-Amazon Institute, established by Unesco in Brazil, represents a pilot project for the UN in illustrating how one may proceed in the creation of other international institutes as a part of the technical assistance program. The UN is profiting by the spade work of Unesco.

Unesco is not supposed to be a high-level agency. The Institut de Cooperation Intellectuel of the old League of Nations was in essence an organization primarily useful to scientists at or near the top of the ladder. Unesco aims instead at becoming the instrument through which "peoples will speak to peoples."

First under the direction of the British biologist, Joseph Needham, and for the past year under the French physicist, Pierre Auger, the Department of Natural Sciences of Unesco at the Paris headquarters has done a first-rate job of planning, organization, and execution.

Probably the greatest single achievement of the natural sciences department was the establishment (under great difficulties, and largely through the unrelenting efforts of Needham) of four field science cooperation offices. The general idea behind this plan was that Unesco should assist in the development of the scientifically backward regions by assisting the scientists of the area in their work and making it possible for them to have full access to information available in more favored countries. It thus became Unesco's task to establish listening posts far from the centers traditionally associated with the advance of science. Four field offices were established—at Rio de Janeiro, Cairo, Nanking, and New Delhi. These have developed in totally different ways, very much according to the special needs of each area.

The Rio de Janeiro office, transferred to Montevideo in the fall of 1948, has been principally active in the establishment of the International Institute of the Hylean-Amazon. This task has now been accomplished and the Institute is on its own, with Unesco standing by to assist and advise it, but with the management actually in the hands of a board appointed by the eight cooperating nations. The transfer of the office from Rio de Janeiro to Montevideo was made following a recommendation from a Unesco-sponsored Latin American conference on the development of science.

The Middle East Office at Cairo has already done quite a lot of good work in the area which it serves. It has furnished replies to an imposing list of questions asked by scientists of the region and it is encouraging the formation of local scientific societies to facilitate the exchange of information in the area; the Cairo office was of great assistance in fighting a cholera epidemic.

The East Asia office at Nanking (with a branch at Shanghai) has had the responsibility of allocating and distributing two million dollars worth of educational and engineering equipment originally purchased by Unrra. The future program of this office is understandably in doubt at the present time; it has been transferred to the Philippines.

The fourth office, that of South Asia, was established at New Delhi in April, 1948. It already has supplied technical information in the fields of engineering, agriculture, and medicine requested by scientists in the large area it serves. The work of the various field science cooperation offices is coordinated through a headquarters unit at Paris.

Achievements: Grants-in-Aid

The second major phase of Unesco's activities in the sciences is through an extensive program of grants-in-aid. In this phase of Unesco's program, the organization depends wholly on existing international scientific organizations, whose work it supports through a judiciously executed system of grants-in-aid. Thus far the International Council of Scientific Unions has been the principal beneficiary of this program. The International Astronomical Union, the International Union of Pure and Applied Physics, the Union of Chemistry, and many other unions and commissions of the International Council of Scientific Unions have all received grants to support certain phases of their work. These have been largely in the form of travel grants and grants for administrative purposes and publication; it can truthfully be said that the post-war revival of international contacts in the sciences has been aided tremendously by the support received from Unesco.

It is the intention of Unesco to sponsor in the next few years a number of high level technical symposia. One of the first of these is a symposium organized jointly by the astronomers and the hydrodynamicists on the hydrodynamics of the mo-

tions of masses of gas in interstellar space. A group of not more than twenty or twenty-five specialists will meet in Paris for a week during the second half of August to discuss these problems.

In its program of grants-in-aid the principal function of Unesco is again to initiate and to stimulate, rather than to operate indefinitely. In keeping with this plan, Unesco is now branching out into the areas of medical sciences (in cooperation with the World Health Organization), the agricultural sciences (in cooperation with the Food and Agriculture Organization), and at present especially in the field of engineering sciences.

Achievements: The Science Program

The third major phase of Unesco's activity is a group of programs directed and largely executed from Unesco headquarters in Paris. Notable achievements have already been made in the fields of scientific abstracting and scientific reconstruction. In the abstracting field, Unesco's efforts have already resulted in cutting down costs and eliminating unnecessary duplication of effort in biology and medicine. An interim coordinating committee on medi-



*French Embassy Int. Div.
Unesco House, formerly the Hotel Majestic, Paris.*

cal and biological abstracting has been at work for more than a year and met again in June. The biological-medical effort is in the nature of a pilot project; an international conference on science abstracting which was to have met in late June will consider the problems in other sciences as well.

We in the United States have generally not been sufficiently aware of the fine work by Unesco in scientific reconstruction. Even before the organization had officially been born, Unesco distributed fifty workshop outfits to its war-devastated member nations. To insure sound requests from scientists of the war-devastated countries, a scientific apparatus information section was established and, to supplement this, Unesco provided the funds for a science credits scheme to enable the war-devastated countries to purchase the specific items of equipment that were most needed. In 1948 alone Unesco's budget for scientific reconstruction ran over \$300,000, not counting the funds supplied by sources outside of Unesco; the work is continuing this year.

The headquarters unit in Paris is responsible for planning and executing a number of special projects. During the first two years the preparatory work for the International Institute of the Hylean-Amazon required much of the staff's time and a preliminary inquiry was made into the possible establishment of other international institutes under UN auspices. The staff in Paris did the necessary preparatory work for launching the International Union for the Protection of Nature, which officially came into being at the conference held at Fontainebleau in October 1948.

Unesco's work on the popularization and the social implications of science has thus far been largely exploratory. But the natural sciences department can point to a series of broadcasts which it sponsored, to a popular science exhibition that has been shown widely in the Near East and in Europe, and to the publication of a book with suggestions for science teachers in war-devastated countries.

Much of the work of the natural sciences department in Paris is done in close collaboration with the other departments. This, for example, is the case with respect to popularized discussions of the social implications of science where much of the planning is done jointly with the mass media group and the social studies department. Another example is that of fellowships: those financed by Unesco as

well as those sponsored by the organization. Under Unesco's program of reconstruction fellowships there is the category of "science and social development," the candidates for which are processed by the department for the exchange of persons, with the advice and assistance of the natural sciences department.

Current Aims

The present program in the natural sciences contains four other distinct items in which Unesco and the UN are collaborating closely.

Between August 17th and September 6th of this year the Economic and Social Council of the UN is calling a UN Scientific Conference for the Conservation and Utilization of Resources (UNSCCUR), which is to be held at Lake Success, New York. This conference aims to promote the exchange of technical information at the expert level, and Unesco has participated, especially in planning the sessions dealing with technical education. Furthermore Unesco has arranged, in collaboration with the International Union for the Protection of Nature, to hold concurrently with the UN conference a technical conference on the protection of nature, which is scheduled to meet between August 22 and September 1.

Secondly, for the past two years the Economic and Social Council has been studying the creation of possible UN research laboratories. Unesco is participating actively in this study. In the preparation of its report to the UN, Unesco headquarters in Paris has asked for and received assistance from many scientists in the United States and abroad. Of special interest to physicists, mathematicians, and astronomers will be the information that an international computation center ranks high on the priority list.

Thirdly, and in connection with its program for the popularization and social implications of science, Unesco has prepared a series of pamphlets on the general topic "Food and People." These pamphlets are to form the basis for world-wide discussions on this very vital subject, which are being initiated by Unesco in collaboration with the Food and Agriculture Organization.

In the fourth place Unesco is taking a lead in the movement to make the human rights declaration, one of the great documents of the UN, known

to people everywhere, and to secure popular support for its general adoption. A group of pamphlets dealing with various articles of the declaration is now in preparation, one of which is entitled "Freedom of Science."

The You in Unesco

Unesco is supposed to be the instrument through which "peoples must learn to speak to peoples," and opportunities for individual participation in its work are varied and worthwhile. Local and regional Unesco councils are springing up all over the country. Kansas and Colorado led the way and Southern California, San Francisco, Cleveland, New England, and many other areas are following. Every one of these councils operates in a way especially adapted to the conditions of the area which it serves, but in all of them there is a great need for participation in council activities by scientists as individuals and also by organized groups of scientists.

Among these activities is the simple human gesture of hospitality to others. Almost every university and industrial community has a good many visitors from abroad. One can make these visitors feel at home and help them get to know what America is really like. A most rewarding effort would be to raise a fund for bringing a foreign visitor to one's community or, instead, to give someone in the community the opportunity to live and

study abroad for an extended period. The booklet "One Road to Peace" gives many suggestions with regard to concrete activities in the area of human relations.

There is still the greatest need for public participation in the reconstruction work of Unesco. Unesco has prepared a series of very informative booklets, several of them dealing specifically with scientific needs (see list at the end of the article). In addition there is the fine new program just undertaken by CARE; in collaboration with the Library of Congress CARE has initiated a program under which packages of books may be shipped abroad.

The scientists in the community have a special responsibility in acquainting civic organizations with the program of Unesco since their friends and neighbors will have to depend largely on them for information regarding the implications of Unesco's program in the natural sciences. A community group which desires to devote a number of meetings to a discussion of "Food and People" can hardly do so without active participation by one or more scientists. Four years ago the physicists of the country undertook a most remarkable assignment in mass education on the implications of nuclear research. The techniques learned during the exciting days of atomic propaganda must now be applied in the spreading of information regarding the scientific aspects of the program of Unesco and the UN.

In closing: scientists have a special responsibility with regard to the declaration of human rights. If the document is to be fully understood and appreciated, the nonscientists must be able to learn why the need for freedom is so basic to science that, without this freedom, science cannot flourish. As citizens and as scientists it is also our duty to be in the front line for the defense of freedom in all its aspects.

Dr. Bok has prepared a list of references and addresses for those who are interested in further and continuing information on Unesco. They are given below:

The U. S. National Commission on Unesco publishes monthly THE NATIONAL COMMISSION NEWS, subscription price \$1.00 annually from the Superintendent of Documents, Washington 25, D. C. All general requests for UNESCO LITERATURE published in this country should be addressed to the Unesco Relations Staff, Department of



State, Washington 25, D. C.

The Columbia University Press, New York 27, N. Y. is the general distributing agency for UNESCO LITERATURE PUBLISHED FROM PARIS. One should write to this address for subscriptions to the monthly UNESCO COURIER, subscription price \$1.00 annually.

The National Research Council's Committee on Unesco issues mimeographed bulletins at irregular intervals, SCIENCE IN UNESCO. Copies of these bulletins and other Unesco material can be obtained free of charge by writing to the Committee at 2101 Constitution Avenue, Washington 25, D. C.

Published articles include: Bart J. Bok, UNESCO AND THE PHYSICAL SCIENCES, *Bulletin of the Atomic Scientists*, 4, 343, 1948; Bart J. Bok, SCIENCE AND THE MAINTENANCE OF PEACE, *Science*, 109, 137, 1949; FOOD AND PEOPLE, a reprint by Science Service of Washington, D. C. of two articles, one by Aldous Huxley, the other by Sir John Russell, single copy 10¢, 15 for \$1.00, 100 for \$5.00; W. A. Noyes, Jr., REPORT ON THE THIRD UNESCO CONFERENCE AT BEIRUT, *Chemical and Engineering News*, 27, 974, 1949.

Excellent suggestions for local activities are contained in a group of pamphlets, issued by Unesco and obtainable from Unesco Relations Staff, Department of State, Washington 25, D. C. and from the New York office of Unesco, 405 East 42nd Street, New York 17, N. Y. The titles of these pamphlets are: IT'S YOURS FOR THE GIVING, UNIVERSITIES IN NEED, SCIENCE LABORATORIES IN NEED, SCIENCE MUSEUMS IN NEED, LIBRARIES IN NEED, and ART MUSEUMS IN NEED.

For information regarding the CARE book program write to: CARE Educational Unit, 50 Broad Street, New York 4, N. Y.

On fellowships, Unesco has published STUDY ABROAD, an international handbook of fellowships, scholarships, and educational exchange (Vol. 1, 1948), \$1.00 at the Columbia University Press.

For information regarding FULBRIGHT GRANTS (available only in the foreign currencies of the countries involved) write to: the conference board of the Associated Research Councils (2101 Constitution Avenue, Washington 25, D. C.) for cases involving professors, research scholars, and specialists; or write to the Institute of International Education (2 West 45 Street, New York 19, N. Y.) in the case of a graduate student desiring to study abroad or wanting to visit here from abroad.

The Institute of International Education has published a booklet ONE ROAD TO PEACE dealing with the whole subject of international exchange of people.

The National Research Council Committee on Unesco calls on individuals and groups for help in its work and is always prepared to receive suggestions. It may be reached at 2101 Constitution Avenue, Washington 25, D. C.



Cosmic Rays and the Sun

If cosmic rays are assumed to fill interstellar space, the total energy involved (being, in fact, comparable with that of starlight) is too great to be readily explainable. Each particle carries several million times more energy than an atom in even the hottest stellar interiors, so that it must acquire this energy from a highly cooperative and therefore infrequent process, rather than in a single elementary act, as does a quantum of radiation from a star's surface; or else elementary processes (atom annihilations) of hitherto unknown violence must be postulated. Recently, Fermi has proposed a cooperative mechanism, involving interstellar magnetic fields, that would seem to be enormously more efficient than any before proposed. But the recently discovered presence of composite particles (atomic nuclei) in cosmic rays causes difficulties: on the one hand, the composite particles would surely be torn apart by violent elementary processes; on the other hand they carry high charges and would lose energy rapidly, during long journeys, by ionizing the atoms of the interstellar gas through which they pass.

The authors of this paper propose that cosmic rays may originate in or near the sun—a companion paper by Alfvén, *Physical Review*, June 1, 1949, indicates a possible mechanism—and are then confined to the solar system by extensive magnetic fields therein. It is shown that a field strength of the order of 10^{-5} gauss would be required, and that the particles would circulate in complicated orbits for thousands of years, thereby becoming isotropic in direction, before being intercepted by the earth or other objects. There should then be no residual anisotropy due to the motion of the solar system as a whole relative to the galaxy—this is subject to experimental verification—and the necessity for an incredibly prolific mechanism to fill all space with cosmic rays is avoided.

R.D.R.

On the Origin of Cosmic Rays. By R. D. Richtmyer and E. Teller. *Phys. Rev.* 75: 1729, June 1, 1949.

The Mesotron Mass

The mesotron as normally found in nature has an energy of about one billion electron volts and a half life for disintegration of a few microseconds. The mass of this elusive particle is measured by observing its momentum from the curvature of the tracks it makes in a cloud chamber in a powerful magnetic field, and its range by the number of one-fourth inch lead plates it passes through in a subsequent journey into another cloud chamber, below the magnet. The observations show an ap-