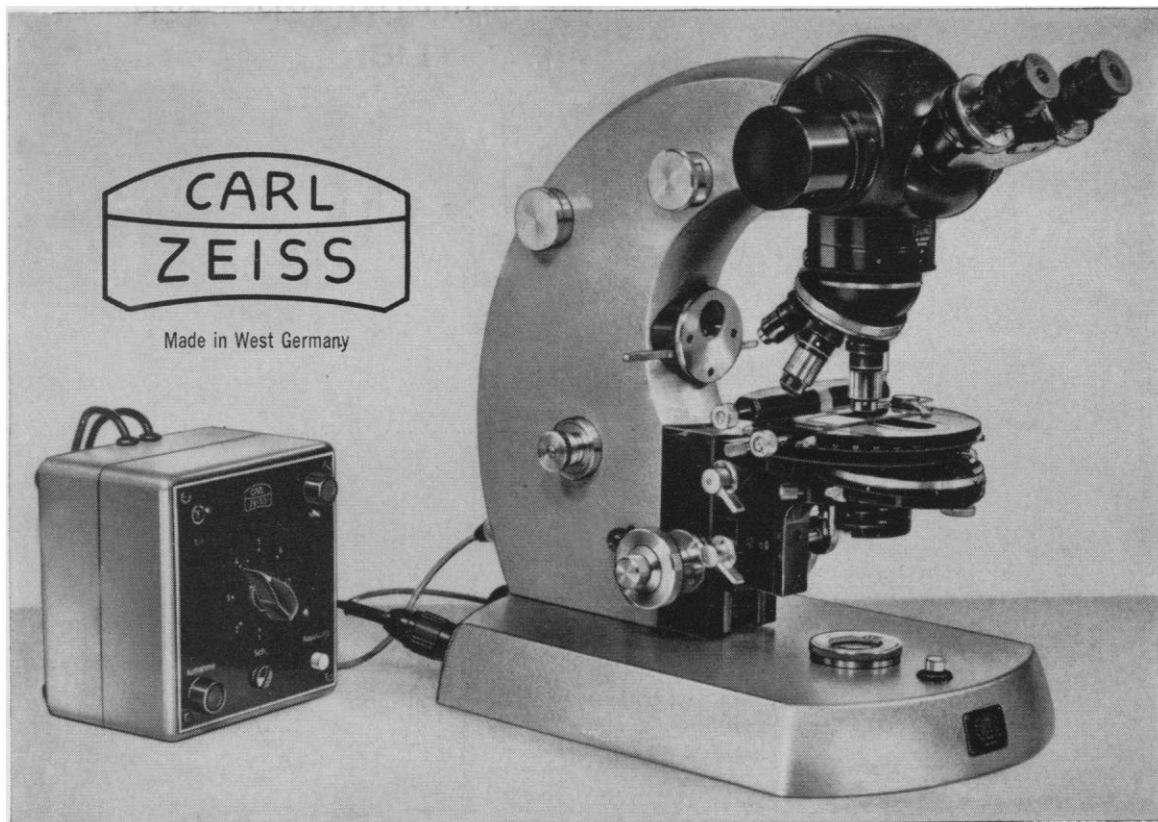


SCIENCE

5 June 1959

Volume 129, Number 3362

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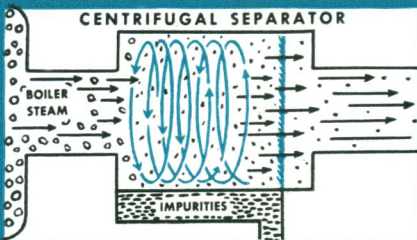
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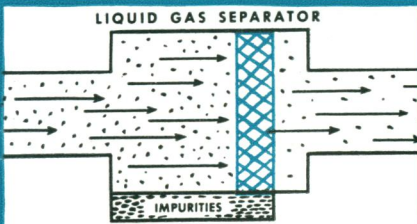
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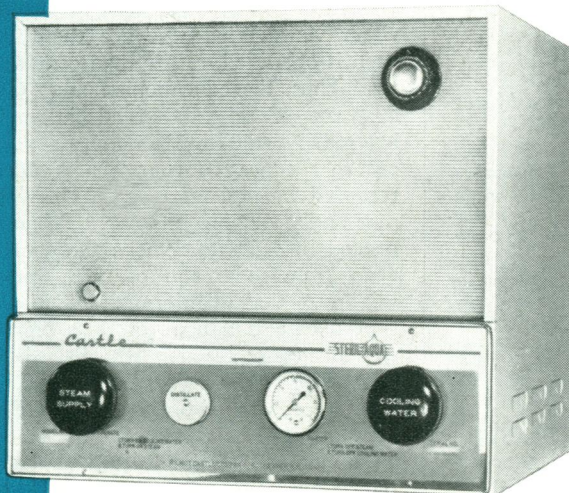
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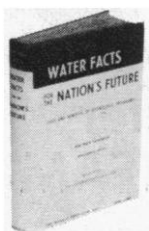
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Letters

Education of Science Teachers

The recent exchange of letters on the education of science teachers [*Science* 129, 744 (1959)] has shown clearly that a major point of disagreement between educationists and their opponents concerns the utility of education courses. On the one hand, the educationists assert that teaching is a profession which requires special, professional training; on the other hand, many people feel that anyone who knows his subject well can teach it satisfactorily. In practical terms, the question is: Can a college graduate teach as well, in his major subject, as a graduate with the corresponding degree in education? And, more generally, what mixture of education courses and "content" courses will produce the best teacher?

Both sides have produced arguments to support their views, but there has been very little objective evidence to support either view. What evidence there has been is one-sided, rather than comparative. Thus, the educationists ask, "Can 50 years of research in education be ignored?" while their opponents point out that education courses are widely regarded by undergraduates as easy to pass and negligible in content. What is needed in order to remove the controversy from the realm of mere verbal sniping to that of informed and intelligent debate is a body of facts on the effectiveness of teachers who have been trained in different ways.

A direct way of obtaining this information would be to compare the scores, on a nationally administered series of tests, of two groups of students: those whose teachers majored in education and those whose teachers majored in the subject concerned, without taking any education courses. Such tests already exist, and teachers of the second type are already at work with temporary accreditation in many places. Thus it might be possible to obtain the desired information from statistics or other information which already exists; on the other hand, it might be necessary to set up an extensive experiment, selecting teachers and students with appropriate backgrounds in order to free the comparison from systematic effects which might distort results obtained from the existing data. (For example, if poor students tend to take education courses because they are "easy to pass," this must be allowed for in comparing the intrinsic utility of education courses with that of "content" courses for training of teachers; but if we are interested in the relative effectiveness of education and "subject-matter" graduates as teachers, then such effects should be ignored.)

Until some such study is made, I do not see how the present controversy can be anything more than a difference of opinion which, for lack of evidence, cannot be resolved.

ANDREW T. YOUNG

11 Buena Vista Park,
Cambridge, Massachusetts

Luminous Wrist Watches

Joyet [*Bull. acad. suisse sci. méd.* 14, 367 (1958)] reports that the average man's luminous wrist watch contains 0.36 μ c of radium and the average woman's watch, 0.13 μ c, both being of the type in which the entire dial is painted. A man wearing such a watch 24 hours a day receives a gonadal dose of about 21.8 mr/yr, and a woman receives about 12.7 mr/yr, as measured by Joyet.

A sample of 224 persons (a group of Government employees in New York City in all of the occupation categories and levels represented) was investigated. Questions were asked and observations were made as to type of watch and wearing habits, with the results given in Table 1.

When Joyet's results were combined with the results for this sample of New Yorkers, it was found that the average gonadal exposure of the 224 persons is calculated to be 3.83 mr per year per person. The fact that very few, if any, persons in the age group up to age 30 or 35 wear watches for the first 10 or so years of life should not be ignored. This would tend to reduce the figure 3.83 to about 2.5 mr/yr. This reduction might be offset slightly by the fact that, of the luminous watches worn, a larger fraction is worn by younger than by older adults. This was a general observation, and findings were not tabulated.

If we assume, then, that the average annual dose is about 3 mr from birth to age 35, the 35-year dose will be about 0.1 r, as compared with the estimate by Laughlin and Pullman of 0.03 r (range 0 to 0.3 r) given in the National Acad-

Table 1. Data on the wearing of luminous watches from a survey of 224 Government employees in New York City.

Item	Men	Women
Total number questioned	148	76
Number wearing watches of all types	114	57
Number wearing luminous dial watches:		
Less than 10 hr/day	0	0
10-19 hr/day	34	2
19-24 hr/day	16*	0

* Only one watch found with luminous points (Joyet's category P).

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emy of Sciences report of 1956. This amounts to about 3 percent of natural background radiation and only about 1.5 percent of the total radiation dose derived from background plus medical and dental exposure to the gonads, as currently estimated.

HANSON BLATZ

City of New York Department of
Health, New York

Ruth Benedict

Julian Steward, in his long and pre-vaillingly generous review [*Science* 129, 322 (1959)] of *An Anthropologist at Work, Writings of Ruth Benedict*, raises three issues which seem to call for clarification. He interprets my discussion of Ruth Benedict as a "figure of transition" as referring to her role in linking together the Boas period of anthropology and one small segment of contemporary culture and personality research known as "national character." I did not use the term in any such parochial sense, but rather in reference to the whole intellectual climate of opinion of the second quarter of the twentieth century.

Steward asks why I did not mention the Kardiner-Linton seminar held at Columbia University in the late 1930's. At the time that Abram Kardiner independently began to apply psychoanalytic theory to the study of culture, the major theoretical lines for the study of personality and culture (as in John Dollard's *Criteria for the Life History*) had already been worked out by Roheim, Sachs, Fromm, Erikson, Frank, Dollard, Sapir, Gorer, and myself, and Ruth Benedict was already familiar with them. Kardiner's one new contribution—his theory of primary and secondary institutions—neither she nor I found useful. Although it is uncertain to what extent Ralph Linton mediated the existing literature to Kardiner, I have always regarded Kardiner's work as an example of historical parallelism.

On the third point, the extent to which Steward feels that the Columbia University department of anthropology was, during his membership in the department, a continuation of the Boas tradition, Steward himself is surely the best authority.

MARGARET MEAD

American Museum of Natural History,
New York

Winchester's Genetics

In a review of A. M. Winchester's book, *Genetics* [*Science* 129, 91 (1959)], the reviewer dismissed the book as one that he could not recommend for use by

students of the subject. He commented that the book was apparently written for college students with little formal education, and he seemed to imply that there was something wrong with such a text being anthropocentrically oriented. Since the book was published by a distinguished publishing house, and the series in which it appears is edited by a geneticist who was also then a member of the Editorial Board of *Science*, it seemed to me that something must be awry somewhere. I therefore sent for a copy of Winchester's book, and having read it I have now satisfied myself where things went awry. They went awry with the reviewer. He committed the cardinal sin of reviewing, namely, reviewing a book at a level for which it was not written and at which it was never intended to be read. The author quite clearly sets out the classes of readers for whom the book is intended: the nonspecialist student in genetics, the student of psychology, sociology, or medical science, and those wishing to take the course as an elective or as a part of a general education program.

As one who has had to learn his genetics from books, and who has read a representative number of them over the course of the years, I should like to protest the reviewer's unfair dismissal of this book, and to go on record as saying that Winchester's book is, in my opinion, a book eminently well suited to meet the requirements of a first and perhaps only course in genetics for the student who is not specializing in the subject. The text is clearly and soundly written, the illustrations, tables, and figures are clear and quite generally most interesting in themselves, and the problems are most helpfully constructed. The orientation toward man makes the book unusually interesting.

ASHLEY MONTAGU

321 Cherry Hill Road,
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While it is true that Winchester's book is meant to appeal to students of varied backgrounds, it is apparently meant for biology students as well. This point, however, is really quite unimportant, for the real issue is whether any textbook that treats its subject in a trivial and superficial manner should be used in any course in our universities.

Montagu is entitled to his opinion of the book, but his obvious appeal to the authority of a member of the Editorial Board of *Science* is unworthy of serious comment. I am sorry, however, that I have piqued the sensibilities of an anthropologist by complaining about the excessive anthropocentric orientation of a textbook of genetics.

S. R. GROSS

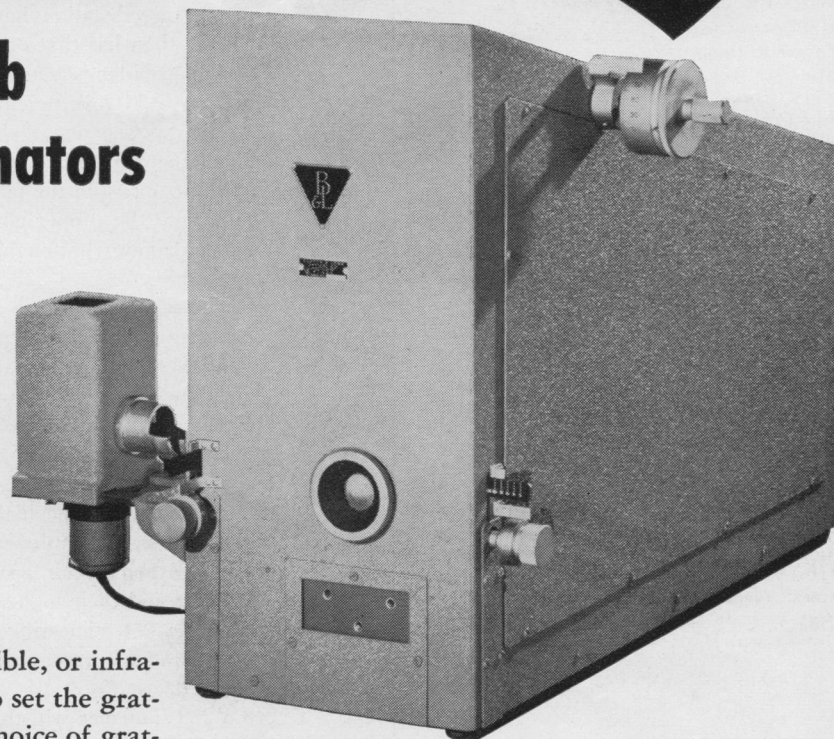
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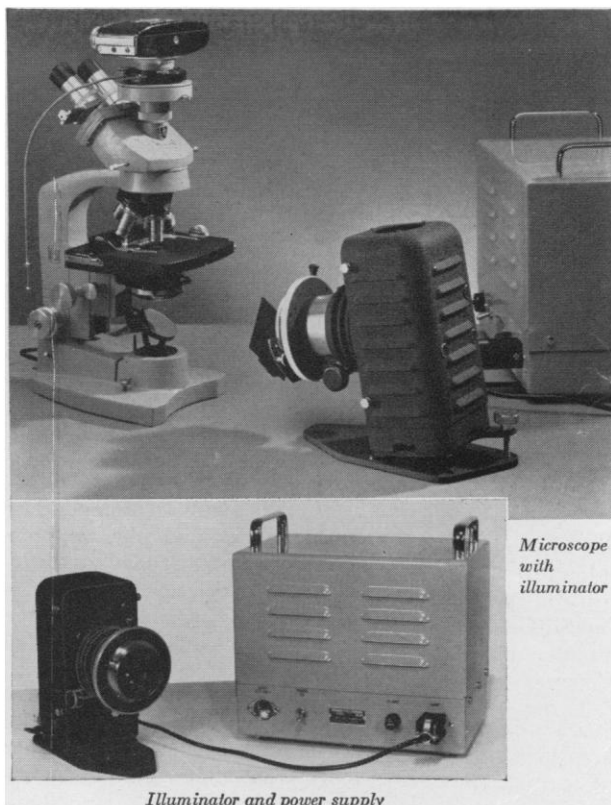
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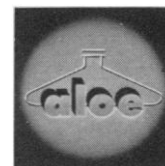
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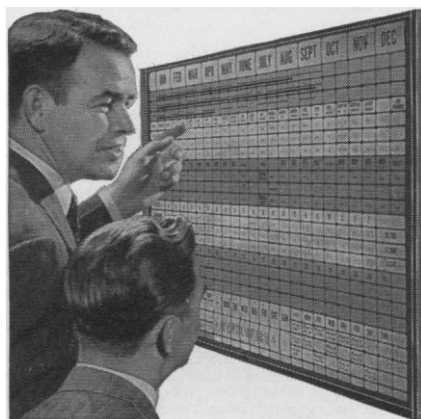
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W. C. STRONACH

American College of Radiology,
Chicago, Illinois

International Botanical Congress

The ninth International Botanical Congress will be held in Montreal, 19-29 August, at the University of Montreal, McGill University, and Sir George Williams College. The first session of the International Botanical Congress took place in Brussels in 1864. It has been held only once before on this continent, in the United States. This will be the first time it has been held in Canada. About 6000 delegates from 72 countries are expected to attend.

The program of the scientific sessions will be conducted in 16 sections and will deal with all aspects of botany in its broadest sense, including plant production, breeding, and protection, and their implications for agriculture and forestry. Some 400 scientists, representing all sections of the program, have been invited to present papers, participate in symposia, and deliver public lectures. About 2000 contributed or voluntary papers will also be given.

An extensive series of field trips constitute an important part of the congress. Seventeen pre-congress field trips and seven post-congress field trips have been organized, covering the period 20 July to 14 September. These trips will take foreign scientists to all parts of Canada, from coast to coast, and to the subarctic. Probably about 2000 delegates will participate.

During the period of the meetings in Montreal, commercial firms will be given the opportunity of exhibiting in the winter stadium of McGill University, where nearly 90 booths will be provided. Canadian government departments and research institutions will have displays at various places on the campuses.

The estimated cost for organization, publications, and so forth will be about \$225,000. Of this sum about \$75,000 will be obtained from government sources (\$50,000 has already been provided by the federal government), \$75,000 will be secured from the delegates, and it is hoped that \$75,000 will be forthcoming from Canadian industrial interests.

Free Radical Stabilization

The fourth International Symposium on Free Radical Stabilization will be held at the National Bureau of Standards, 31 August to 2 September. Emphasis will be placed on the properties of solids containing trapped radicals and on the chemical and physical interactions involving trapped radicals at low temperatures.

Activities tentatively scheduled for the first day of the symposium include a discussion of the organization and aims of the NBS free-radicals program, a session on low-temperature chemistry, and a banquet in the evening. On the following day, the discussions will be concerned with methods of production of trapped radicals and physical properties of radical-trapping solids and with the identity and concentration of trapped radicals. The evening activities will include a round-table discussion of future trends in free-radical stabilization. The final session of the symposium, on the interaction of free radicals with solids, will be held the morning of 2 September. That afternoon, tours of the laboratories of the bureau's Free Radicals Program will be conducted.

In addition to the conducted tours, informal visits to the free radicals laboratories may be arranged for the two days immediately following the symposium. These visits should be planned in advance by writing the National Bureau of Standards.

Although the program of presented papers is for the most part already complete, time has been set aside in the various discussion periods for brief reports. These short communications will be listed in the program but need not be submitted in manuscript form. Notification of the nature of a proposed communication should be made *before 1 August*.

The NBS has arranged for accommodations at Dunbarton College, which is located within a few minutes' walking distance of the NBS. Dormitory facilities at \$5 (single) or \$3.50 (double or multiple) per night are available from 30 August to 5 September. Further information can be obtained by writing Dr. A. M. Bass, National Bureau of Standards, Washington 25, D.C.

Reactor Technology

Oak Ridge National Laboratory has announced that the third Conference on Analytical Chemistry in Nuclear Reactor Technology will be held at Gatlinburg, Tenn., on 26-28 October. The general theme of this conference, "Analysis of Reactor Materials Following the Operation of Nuclear Reactors," complements prior meetings, which dealt

with (i) advances in the chemical analysis of important reactor materials, and (ii) the role of analytical chemistry in the startup and operation of nuclear reactors.

The subjects which will be emphasized at this conference are chemical analysis as related to the estimation of corrosion and erosion rates; reprocessing of fuels and blanket materials; and the analytical chemistry of fission product mixtures, of plutonium, and of the transplutonic elements.

The contribution of papers pertaining to these or closely related subjects is solicited. Presentations on new developments or improvements in methods of chemical analysis, including advances in instrumentation, are especially invited, although review papers and those involving pertinent theoretical discussions may well prove to be of equal interest and should be submitted for consideration.

To facilitate the completion and distribution of the program well in advance of the conference, speakers are requested to submit abstracts of about 500 words *not later than 1 August* and to indicate the time required for their presentation, not to exceed 30 minutes. The proceedings of the conference will be published.

All communications about the conference, including the submission of manuscripts and abstracts, should be directed to: C. D. Susano, Oak Ridge National Laboratory, P. O. Box Y, Oak Ridge, Tenn. Inquiries with respect to accommodations, or requests for reservations, should be addressed to: Mr. Tom Woods, Manager, Mountain View Hotel, Gatlinburg, Tenn.

Forthcoming Events

July

1-3. Hydraulics, annual conf., Fort Collins, Colo. (W. H. Wisely, American Soc. of Civil Engineers, 33 W. 39 St., New York 18.)

1-4. British Tuberculosis Assoc., annual (closed), Cambridge, England. (BTA, 59, Portland Pl., London, W.1, England.)

1-5. International Radio and Electronics Conv., Cambridge, England. (British Institution of Radio Engineers, 9, Bedford Sq., London, W.C.1, England.)

2. Radiation and Ageing, Ciba Foundation 3rd annual lecture on ageing, London, England. (G. E. W. Wolstenholme, Ciba Foundation, 41 Portland Pl., London, W.1, England.)

3-5. International Union of the Medical Press, 4th cong., Cologne, Germany. (Dr. Stockhausen, Secretary of Bundesärztekammer, Cologne.)

4-9. American Soc. of X-ray Technicians, Denver, Colo. (Miss G. J. Eilert, 16 14 St., Fond du Lac, Wis.)

6. Shortening of Lifespan of Mammals Following Irradiation, research forum, London, England. (G. E. W. Wolstenholme, Ciba Foundation, 41 Portland Pl., London, W.1, England.)

5 JUNE 1959

RADIOACTIVITY AT WORK...#2

Our business is radioactivity—applying it, measuring it, protecting against it

This is the second in a series of reports devoted to NSEC's work with the exciting new tool, radioactivity. Its uses appear endless, not only in the nuclear industry, but also in the fields of chemicals, petroleum, pharmaceuticals, medicine, steel and coal. Applied radioactivity helps us examine product and process improvements, indicates ways to reduce costs, and probes for answers to complex research problems. With radioisotopes and radioactivity, we seek solutions by methods never before practical or economically feasible.

One of our project descriptions may apply directly to a problem you are facing, or point up a general application in your field. Take advantage of NSEC's specialized skills and equipment. See how safely and profitably the phenomena of radioactivity can be put to work for you.

ACTIVATION ANALYSIS

Where a high degree of quality control is desired, activation analysis offers a sensitivity far exceeding conventional quantitative analysis. Elements in quantities as minute as one part per billion can be identified and measured. Activation analysis is important in manufacturing, and in research projects requiring rigid standards of purity. It is especially useful in the processing of rare or expensive materials since, in most cases, only a fraction of a gram of material is required.

In activation analysis, exposure of the test sample to a stream of neutrons creates radioisotopes with distinct radiation characteristics. Even minute quantities of trace elements are made sufficiently radioactive that sensitive counting equipment can measure them. Activation analysis may be performed for as many trace elements as desired in a single small sample.

NSEC offers activation analysis as a commercial service. We can handle complete testing and analysis or can assist in establishing a standardized procedure for production line use. Ask Dr. Paul Kruger, Manager of our Chemistry Department, about this service.

RADIOTRACERS IN BIOMEDICAL RESEARCH

Radiotracing is proving extremely valuable in medical and pharmacological research. Radioactive tracers in infinitesimal amounts are used to follow the course of a substance through a living organism. With tracers, research scientists discover where the substance goes, how long it takes to get there, and what happens when it arrives.

Recently, NSEC completed a study determining the behavior of a radioactive enzyme for a drug manufacturer. Information was needed regarding the speed with which the product was absorbed and how it was distributed in the body. The experiments provided valuable data for the manufacturer. Extended animal tracer experiments are now

in progress and human studies are about to be undertaken.

Information about the method and radioisotope selected will soon appear in a scientific journal. For additional information on this and similar tracer studies, just write us. Our report on services for study of the reticulo-endothelial system is also available.

PROJECT SUNSHINE

When an atomic bomb test is made anywhere on earth, radioactivity is scattered into the air and carried about by wind currents. These "hot" atoms fall with precipitation and settle on animals, vegetation, soil, and water. This fallout contains the dangerous radioactive nuclide, strontium-90, and it is desirable to maintain constant knowledge of the amount.

To monitor this fission fallout, the Atomic Energy Commission set up "Project Sunshine." NSEC has been active in the program since 1955, analyzing samples received from all over the world. NSEC recently has been awarded two additional major contracts to measure fallout in Pittsburgh rainfall and in particulate material in the air.

Close to half the fallout measurements, and most of the particulate material analyses in this country are being conducted by NSEC.

NSEC is one of very few private firms with the necessary low-level counting equipment to perform such vital work. This, and similar apparatus designed and built by our staff, is used to conduct research that leads to a better life for us all. Would you like to discuss the ways it might assist you?

FISSION PRODUCT BEHAVIOR IN A REACTOR SLURRY

In a proposed nuclear power reactor, the fuel used is a slurry of uranium oxide and thorium oxide particles. NSEC made a preliminary study of the probable distribution of fission products within the reactor, to aid in the design of the fuel-decontamination processes. High pressure, high temperature studies were made in an autoclave using reactor-irradiated slurries, as well as synthetic mixtures of fission products.

NSEC has conducted hundreds of radiochemical analyses of experimental nuclear fuel elements, reactor coolant water and other reactor components. NSEC also assists in determining fuel burn-up efficiency, and the rate of gain for breeder reactors. We are taking part in the development of nuclear power plants for aircraft, and are advising many firms which are fabricating fuel elements for various reactors.

If your work involves nuclear reactors or components, call us at HOMestead 2-4000 in Pittsburgh. We'll work with you from the preliminary environmental radioactivity survey through the disposal or use of the radioactive waste.

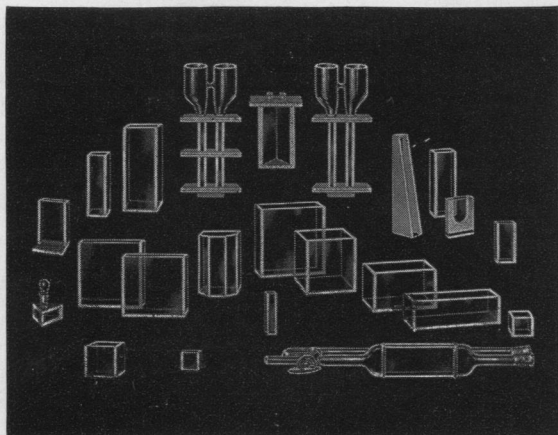
For more detailed information on our studies and services, just call or write. Proposals and quotations on your specific needs will be made without cost or obligation. And if you would like to keep informed of the latest developments in this constantly changing field, just write on your letterhead and ask us to put you on the mailing list for our monthly publication, "Radioactivity at Work."

Our expanding business requires additional qualified technical personnel. Interested? Submit resume to Personnel Manager.

Nuclear Science and Engineering Corporation

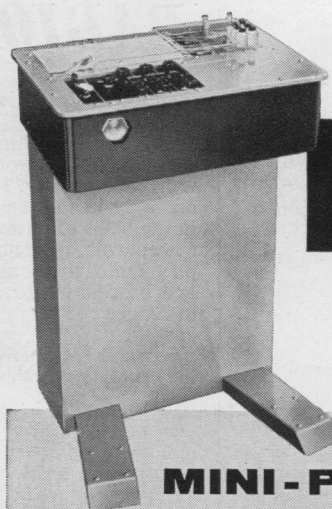
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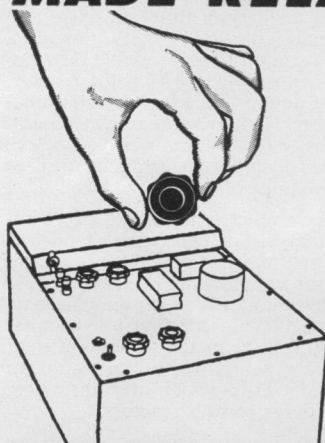
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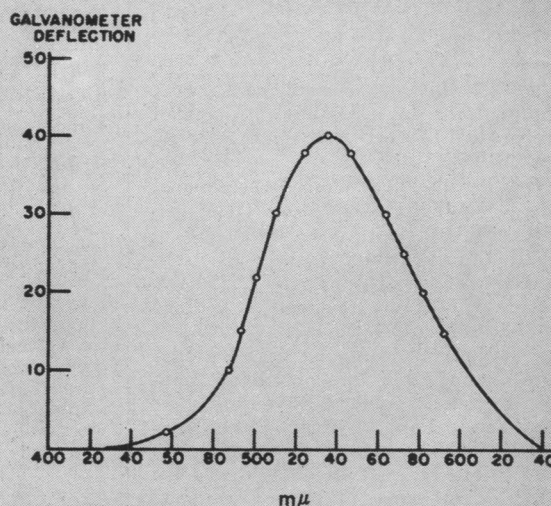
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