

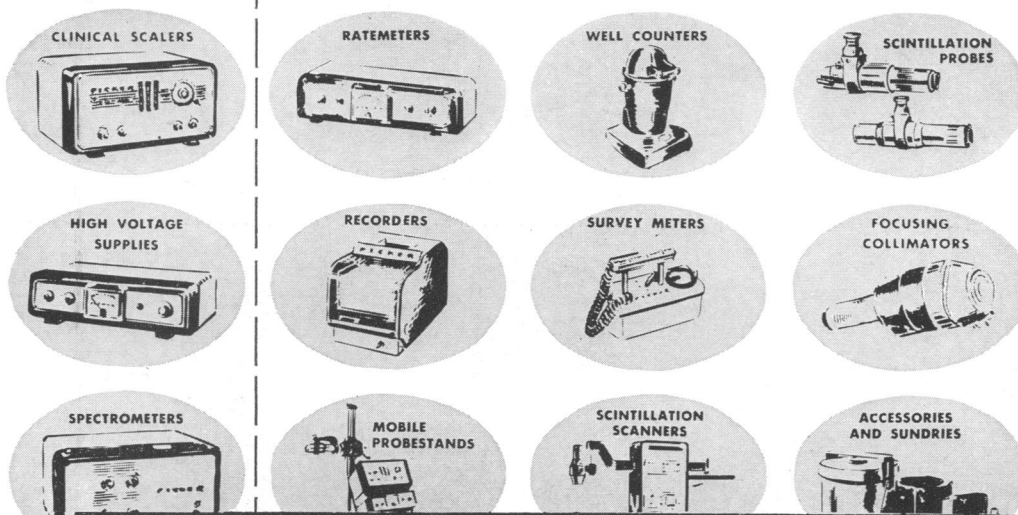
SCIENCE

10 April 1959

Volume 129, Number 3354

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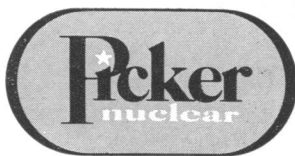
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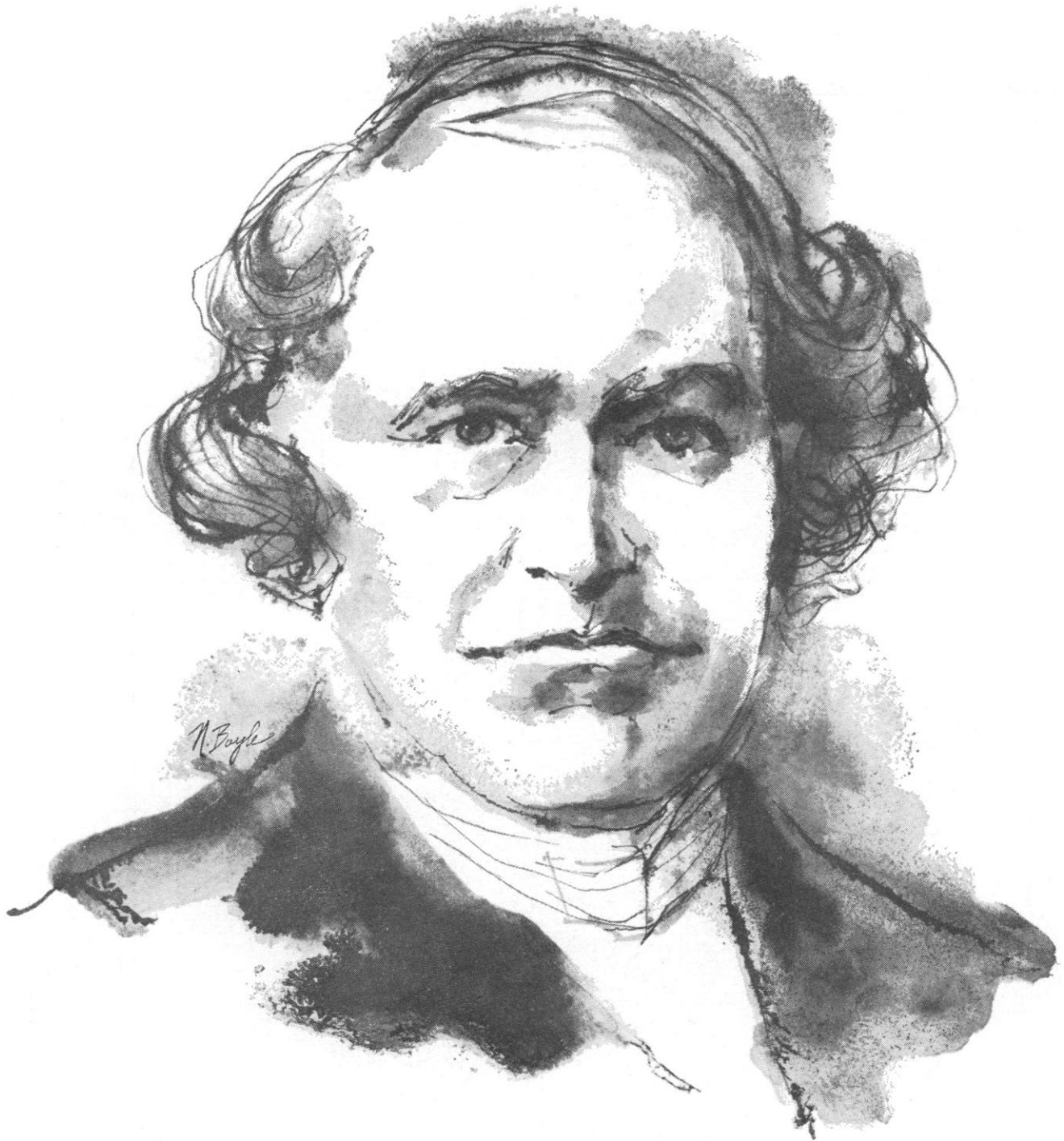
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William Whewell...on mind and matter

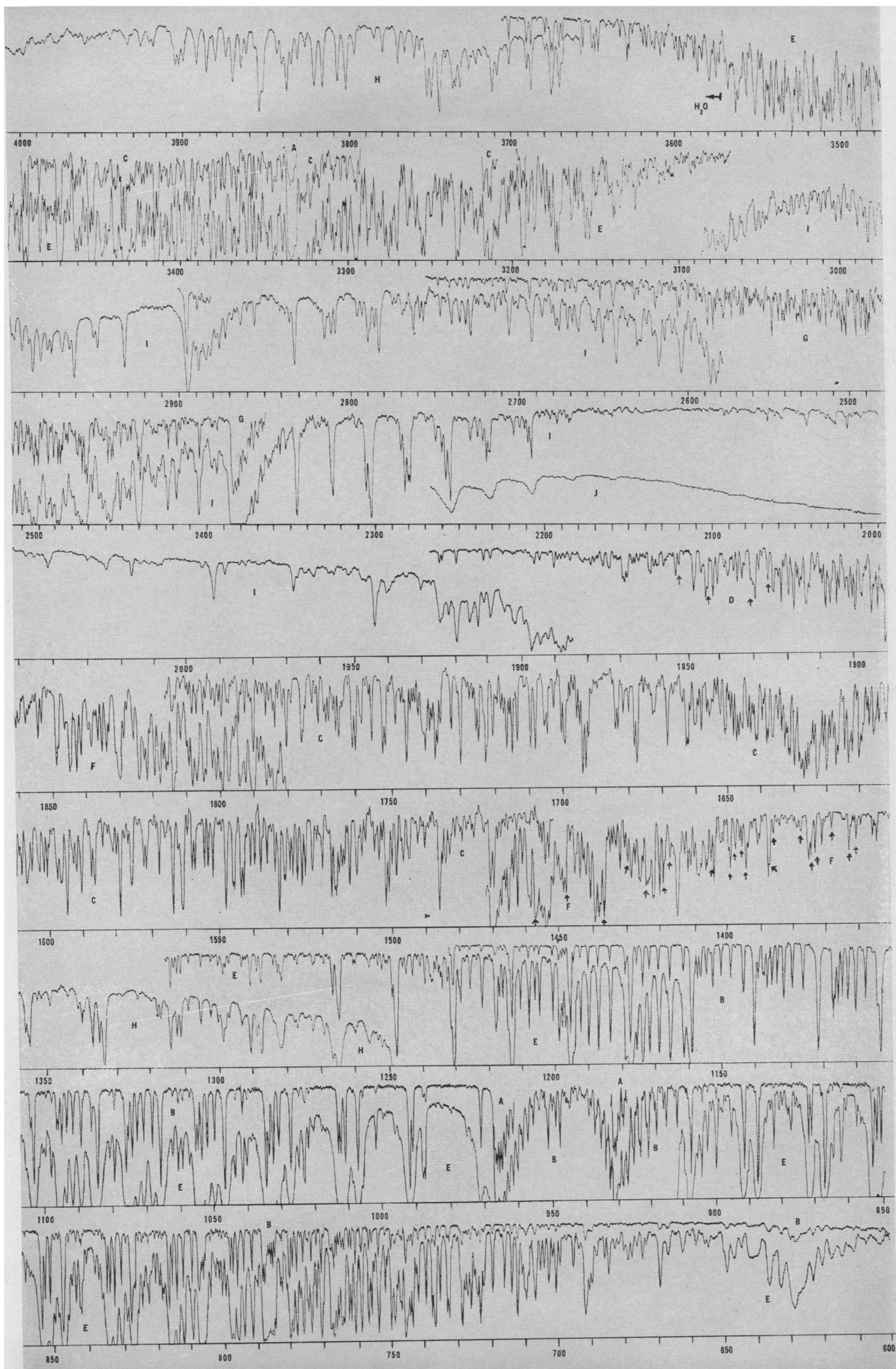
"...these metaphysical discussions are not to be put in opposition to the study of facts; but are to be stimulated, nourished and directed by a constant recourse to experiment and observation. The cultivation of ideas is to be conducted as having for its object the connexion of facts; never to be pursued as a mere exercise of the subtlety of the mind, striving to build up a world of its own, and neglecting that which exists about us. For although man

may in this way please himself, and admire the creations of his own brain, he can never, by this course, hit upon the real scheme of nature. With his ideas unfolded by education, sharpened by controversy, rectified by metaphysics, he may *understand* the natural world, but he cannot *invent* it. At every step, he must try the value of the advances he has made in thought by applying his thoughts to things."

—*Philosophy of the Inductive Sciences*, 1847

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D	7.5 mm	8.2 M
E	75.0 mm	2.8 M
F	75.0 mm	4.6 M
G	75.0 mm	8.2 M
H	750.0 mm	2.8 M
I	750.0 mm	8.2 M
J	110.0 psi	2.8 M

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Letters

Experimenter and Subject

The article by James G. Holland [*Science* 128, 61 (1958)] on experiments on human vigilance arouses in me certain immediate and delayed reactions based on long experience as a chemical engineer dealing with observation of experimental phenomena. The author's observation that an empirical examination of the data per se must come first, without too early a development of theories, is most pertinent; such an approach is the basis of good experimental work. I do feel, however, concern over seeing data presented and not correlated (though perhaps the author has attempted correlations, with little success). Examples of such data are the length of the period following detection in which no observing responses are emitted as a function of the fixed-interval length; the slope of the response curve as a function of time of exposure to the type of interval, and so on. The data on the behavior of two different subjects, given in the same graph (in Fig. 7), together with the more elegant and meaningful treatment in Fig. 9 of a group of high-response versus a group of low-response subjects, certainly suggests the need for a reexamination of earlier work in terms of subject ability.

In raising these and other questions I realize that the immediate response will be that this is "outside one's field," an area in which one has "no competence," and so on. This brings to mind the general separateness of the specialties, deplored by some and rigidly maintained by most. A pertinent remark is that of a physicist who criticized a piece of chemical research and was told off for getting out of his field of competence. The physicist replied, "I may not be a chemist, but I know poor research when I see it." This is not to imply, I hasten to add, that the subject research, or all other research in that field, is poor research work, but rather that there is a common basis of examination characteristic of good research men confronted by data from any field. A virtue of *Science* is its presentation of fairly raw data with sufficient description of the experimental conditions to enable one to begin to assess the experiment as an experiment, without regard to the background literature. To paraphrase what Holland notes, one can criticize and correlate data without a theoretical basis pertinent to the literature and without development of theoretical concepts relating to other work.

To return to the experiment at hand, it would appear pertinent to consider the ability of the subject at the job in ques-

tion and his demonstrated skill for the work. Thus, taste tests must utilize subjects with taste-discrimination, if sensitivity is required. Pertinent in this case is the response of subjects with radar search experience on live targets, as compared with subjects new to this type of operation.

A related question is the inherent or partially developed ability to correlate experiences, such as is found in a trained investigator studying an apparatus, who must develop suitable controls to make it operate properly. Similarly, a nonprofessional operator of a distillation tower or a furnace or other device will often develop an unusual ability to relate cause and effect in controlling the operation. Is this learning, or is it a demonstration of ability to think deductively about one's relation to the environment? How often did Newton observe the fall of an apple before wondering about it?—if we may believe the simple story of our childhood. In a sense, the described experiment is a contest between the experimenter and the subject, and perhaps it should be examined in that light.

JAMES H. WIEGAND
Sacramento, California

European Degrees

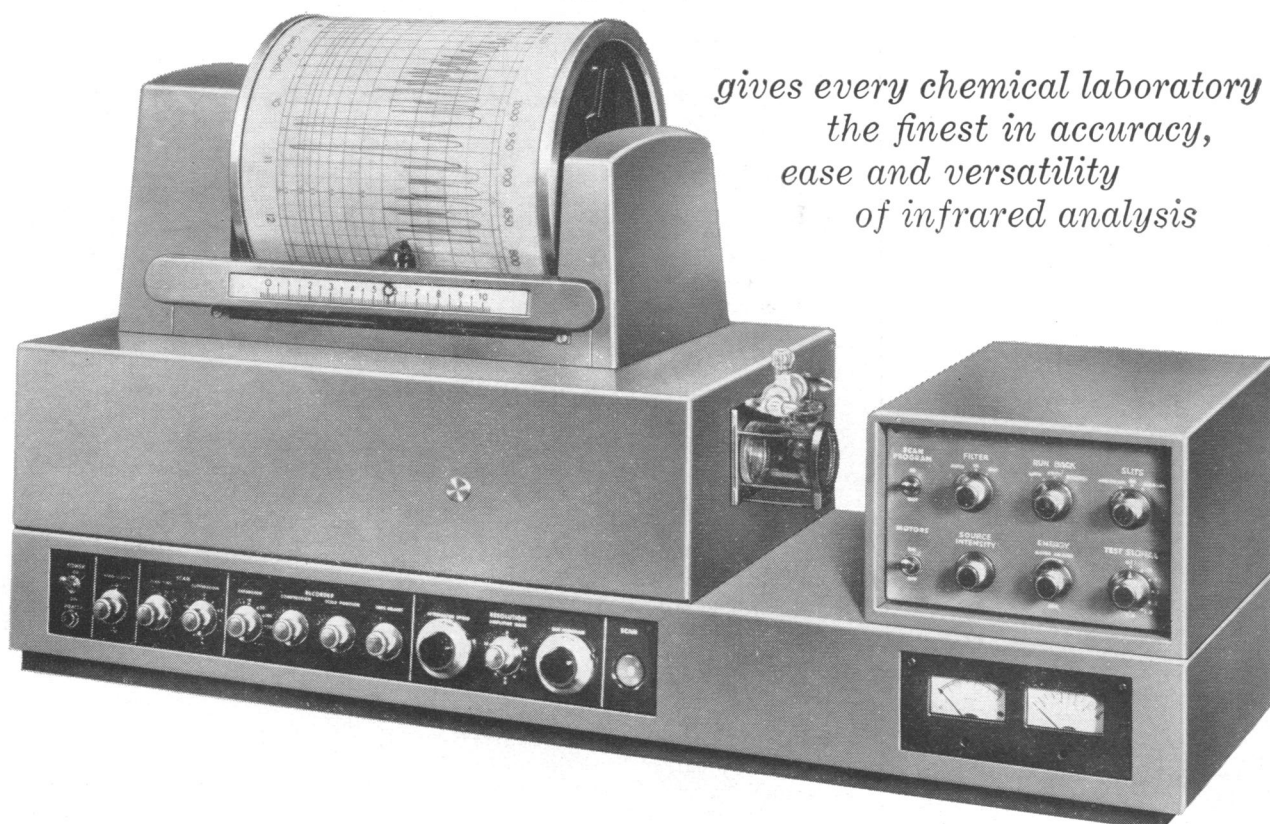
The article "Basic research in Europe" [*Science* 128, 227 (1958)] by D. M. Gates, is most interesting—but I can't agree with his "translation" of European degrees [for example (page 228) *licentiat* as "poor Ph.D."]. It's true, it's most difficult to find the American equivalent for earned European degrees; I know it from personal experience. I hold the degree of "Dipl. Ing., Dr. techn."—that is, "Diplom-Ingenieur, Doktor der Technischen Wissenschaften," generally abbreviated "Dr. Ing." (set before one's name)—but no United States authority could give me a dependable answer to the question of how to "translate" these degrees. I'm using "D.Sc. (Tech.)"; others call themselves Ph.D.'s. The "Dipl. Ing." (in chemistry) is sometimes "translated" as Ch.E. or M. Eng.

I believe it would be desirable for some authority—federal or organizational—to standardize the "translation" of foreign degrees, and for the holders of honorary degrees to indicate them by setting an "h.c." (*honoris causa*) after the "Dr." or "D.Sc.," as is customary in (Central) Europe.

Couldn't the AAAS, together with the American Institute of Chemists, the American Chemical Society, and others, initiate steps to end the confusion?

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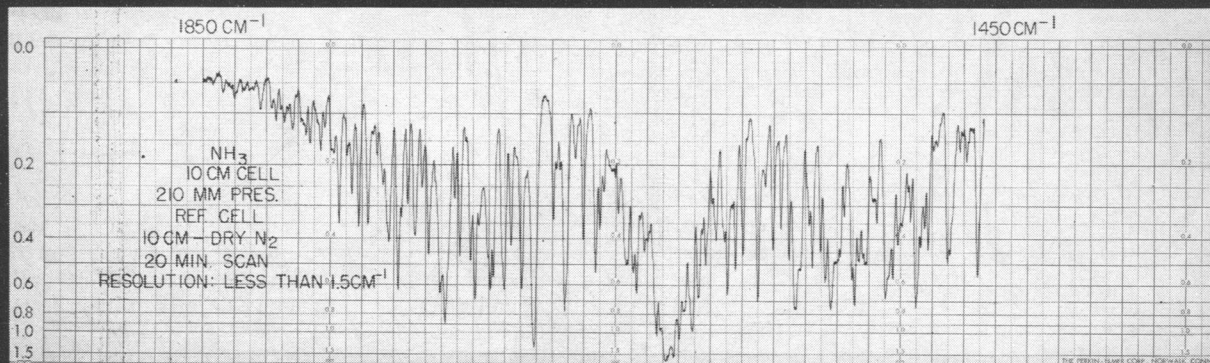
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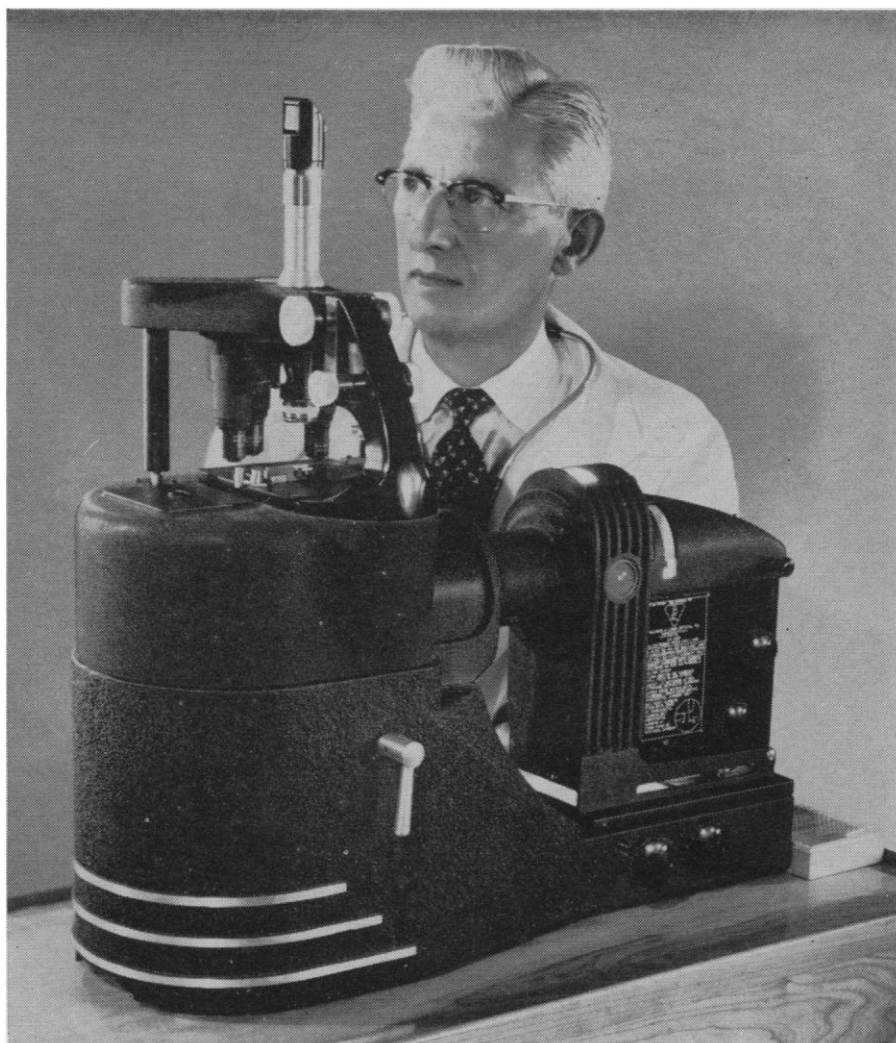


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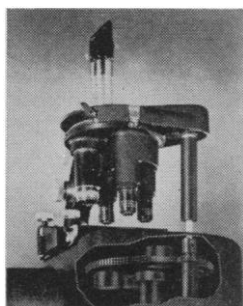
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Meetings

Seaweed Symposium

The third international seaweed symposium was held in Galway, Eire, on 13 to 19 Aug. 1958. It differed from its predecessors in that four formal lectures were delivered by invited speakers and in that an exhibition of commercial seaweed products was organized. Previous symposia were held in Edinburgh (in 1952) and in Trondheim (in 1955).

The participants, who came from 22

countries, numbered 207. The symposium was opened officially by Sean Lemass, Minister for Industry and Commerce. All scientific sessions were held at University College, Galway. In addition there were excursions into the surrounding country, either to collect algae or to visit the seaweed factories at Kilkeerlin and Ballyconneely.

The symposium was organized under the auspices of a small international advisory committee through the Irish National Committee, but most of the work was done by a local committee in Galway with T. Dillon as chairman and C.

O'hEocha as secretary. The program was divided into three sections: botany, chemistry, and applied industry, with a special session on intertidal ecology. Special lectures were given by R. D. Preston (England), on "Biochemical and biophysical aspects of some seaweeds"; by E. L. Hirst (Scotland), on "Seaweed mucilages"; and by H. M. Ulrich (Austria), on "Alginate esters and altered alginate fibers." A. Walford (United States) delivered a public lecture on "The sea as a potential source of food."

Some 20 communications of original work were made to the chemistry section. Wickberg (Sweden) reported the isolation of O- α -D-galactopyranosyl-glyceritol, O- α -D-galactopyranosyl-(1-6)-O- β -D-galactopyranosyl(1-1)-D-glyceritol, mytilitol, and 2-L-amino-3-hydroxy-1-propanesulfonic acid and an N-substituted taurine from various red seaweeds. The presence of unidentified phenolic compounds in *Ascophyllum nodosum* has been detected by Haug and Larsen (Norway). These workers also determined that the seasonal variation of nicotinamide in some of the Fucaceae is between 15 and 35 micrograms per gram of dry matter, in autumn and spring, respectively. Turvey and Rees (Wales) described the major water-soluble polysaccharides of *Porphyra* as floridean starch and a galactan sulfate, containing galactose, methyl galactose, and anhydrogalactose. O'Donnell and Percival (Scotland) reviewed the polysaccharides in green seaweeds and described especially a heteroglycan sulfate from *Spongamorphia* which contained glucose, xylose, rhamnose, and glucuronic acid. The hydrolysis of the sulfate ester linkage in fucoidin, chondroitin sulfate, and keratosulfate by an esterase in *Patella vulgata* was reported by Lloyd and Lloyd (Wales). A preliminary description of the polysaccharide sulfate from *Furcellaria* was given by Clancy, Walsh, O'Colla and Dillon (Eire). Young and Smith (Nova Scotia) reported analyses of the free amino acids, peptides, and proteins of *Chondrus* in which some peptides contained citrulline and ornithine and in which about 50 percent of the protein was present in an insoluble form, the distribution of amino acids being very similar to that of other algal proteins.

About ten papers on the utilization of marine algae were read. A critical appraisal of laminarin sulfate as a blood anticoagulant was given by Burt (Scotland); she stressed the fact that this ester is of lower potency and of much greater toxicity than heparin, on prolonged administration to rabbits and dogs. Seaweed meal can be fed to chickens, hens, and sheep without detrimental effects, according to Jensen (Norway), and with beneficial effects when it constitutes 5 to 7 percent of the basal ration, according to Höie and Sannan (Norway).

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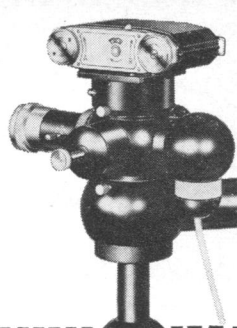
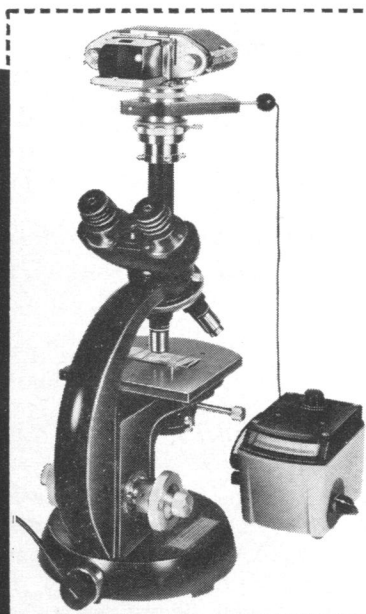
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AAAS Symposium Volume No. 48

Published July 1957

Edited by Albert Tyler, California Institute of Technology
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Charles B. Metz, The Florida State University

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A symposium on "Formation and Early Development of the Embryo", held 27 December, 1955, at the Second Atlanta Meeting of the AAAS, served as the basis for this volume. Emphasis was placed on the problems of early development and of the initiation of development. The investigations presented in the various communications cover both descriptive and experimental work on the biological and chemical levels. Apart from their intrinsic interest and the measure of progress that they provide, the specific discoveries and analyses presented serve to exemplify various approaches toward the understanding of the manner in which sperm and egg contrive to produce a new individual.

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About 27 papers were read in the botany section. From experimental work Jacobs (United States) reported that the controlling factors in wall formation and regeneration in *Caulerpa prolifera* must be in the cytoplasm close to the cell wall, rather than in the streaming cytoplasm. Segi (Japan) discussed the commercial cultivation of *Monostroma* in Japan.

Boalch (England) described changes in the proportions of prostrate and erect systems in pure cultures of *Ectocarpus confervoides*, and changes in shape and size of cell, which resulted from changes in salinity, illumination, and temperature. The study throws some doubt on the reliability of current taxonomic criteria. Dixon (England) discussed confusion in the taxonomy of *Pterocladia pinnata* caused by morphological variation as a result of differing ecological factors. Müller-Stoll (Germany) reported on the ecology, internal anatomy, and biochemistry of *Fucus vesiculosus* in the western Baltic. In deeper waters this species grows to a length of 7 meters and lives 7 years or more. Powell (Scotland) discussed his proposal to reduce the 15 or more species of *Fucus* now listed to about five.

Baardseth (Norway) described a method of physode estimation and reported that the percentage of physode volume varied with the species and, in *Ascomyllum*, was related to salinity.

Haxo and Neushal (United States) have studied the growth and differentiation of young specimens of *Macrocystis pyrifera* and described an ingenious apparatus for growing and observing these plants at depths of 30 to 100 feet. This technique permits analysis of the effects of various environmental factors. Fogg (England) reviewed the technology of mass culture of microscopic marine algae but concluded that harvesting difficulties make such culture commercially uneconomic at present. Von Stosch (Germany) compared the leucosin of diatoms and chrysomonads with laminarin and adduced evidence for their close relationship.

Kanwisher (United States) described a new method of determining the photosynthetic and respiratory capacity of several intertidal algae. He reported that freezing and drying on the shore have similar effects in depressing respiration. Provasoli (United States) has observed the response of *Ulva lactuca* to various hormones added to bacteria-free cultures. His study suggests strongly that the level of auxin and gibberellin controls speed of growth and size of crop in the coastal zone.

Allen (United States) has induced several fresh-water, nitrogen-fixing species of blue-green algae to become adapted to marine conditions. Growth was somewhat retarded, but their ca-

capacity to fix nitrogen under these conditions was studied.

Grenager (Norway) described a method of predicting the distribution of *Laminaria digitata* and *Ascophyllum nodosum* in unknown areas by study of charts only. A forecast was checked later by a field survey and found to deviate by only a few percent for each species.

The abstracts of most communications and of two of the formal lectures have been printed in a small volume of 92 pages, which may be purchased from Dr. C. O'hEocha, University College, Galway, Eire. No further printing of the proceedings is anticipated. The next symposium will be held in Paris in 1961, under the chairmanship of A. D. de Virville.

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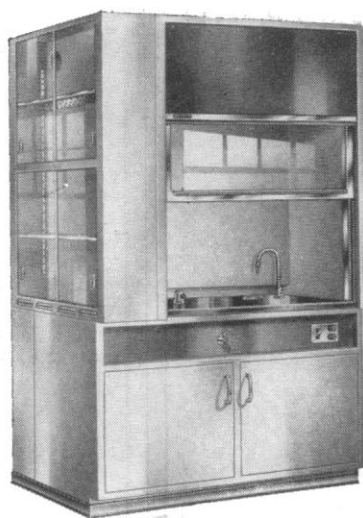
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Halifax, Nova Scotia*

Youth Conference on the Atom

A national Youth Conference on the Atom, the first meeting of high-school science students and teachers for discussion of the peaceful uses of nuclear energy, will be held at the Claridge Hotel in Atlantic City, N.J., 30 April-1 May. The attendance of approximately 500 junior and senior high-school science students and teachers at the conference will be sponsored by 60 or more electric utility companies throughout the country. Organizations cooperating in the conference include the AAAS, Atomic Industrial Forum, Future Scientists of America Foundation, National Science Foundation, National Science Teachers Association, and Science Clubs of America.

John A. McCone, chairman of the Atomic Energy Commission, will deliver an address on 30 April. Other speakers will be Norman C. Hilberry, director of the Argonne National Laboratory; Charles E. Robbins, executive manager of the Atomic Industrial Forum, who will tell the young scientists about industrial uses of the atom; Cyril Comar, director of the Laboratory of Radiation Biology at Cornell University, who will describe the use of the atom in agriculture; and John Laughlin, chief of the division of physics at the Sloan-Kettering Institute for Cancer Research, who will speak on the uses of the atom in medicine.

Forecasts of the atom and the world of tomorrow will be presented by Francis K. McCune, vice president of the General Electric Company, and Charles H. Weaver, vice president of the Westinghouse Electric Corporation, who are in charge of atomic activities at their respective companies. Ben D. Wood, director of the Bureau of Collegiate Educa-



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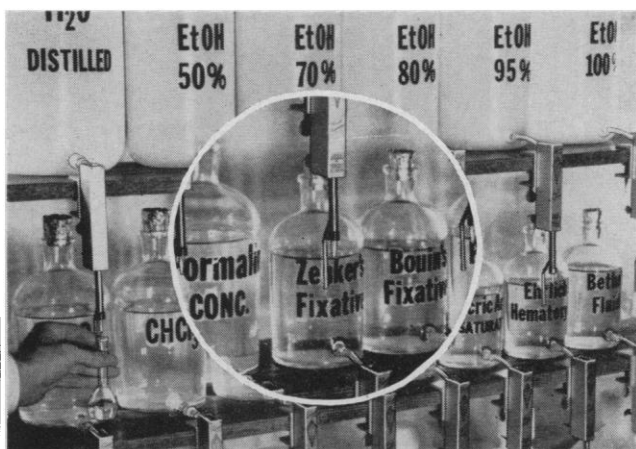
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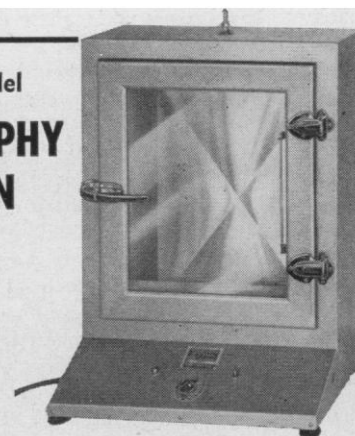


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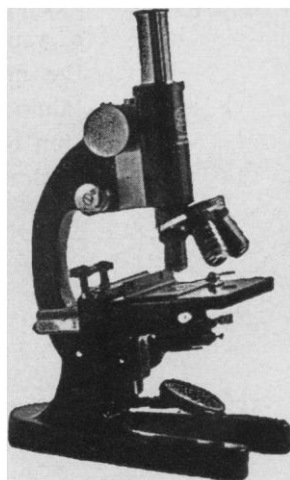
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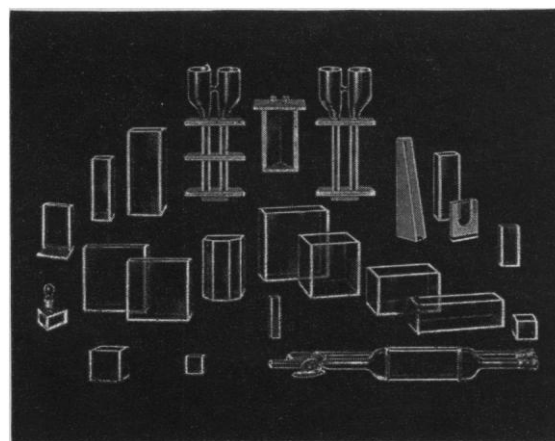


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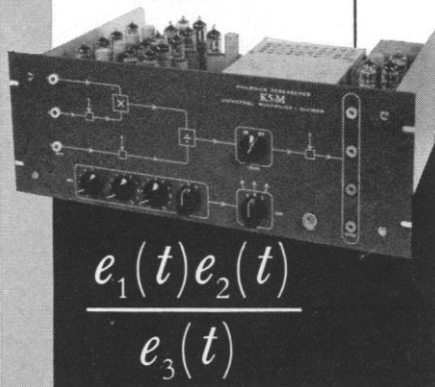
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tional Research at Columbia University, is serving as educational consultant to the conference.

The program for the Youth Conference is being arranged by the Electric Companies Public Information Program. For information, write to Bozell and Jacobs, Inc., 2 W. 45 St., New York 36, N.Y.

Operational Research

The second International Conference on Operational Research, organized by the International Federation of Operational Research Societies, will be held in Aix-en-Provence, France, 5-10 September 1960. The program committee would welcome suggestions for papers (or groups of papers) to be presented at the conference. Suggestions should be sent to the Secretary of IFORS, 11 Park Lane, London W.1, England, *before 1 May 1959*, with a copy to the secretary of the Operational Research Society of the country of origin. Manuscripts will be required by *1 December 1959* in order that preprints can be made available before the conference.

The International Federation came into existence in January this year, having as its objects "the development of operational research as a unified science and its advancement in all nations of the world." The first international conference on the subject was held at Oxford in 1957.

Prague Antibiotics Conference

A symposium on antibiotics with international participation will take place in Prague, Czechoslovakia, 17-23 May. The proceedings will be divided into three sections: (i) problems of the biosynthesis of antibiotics, (ii) the scientific pathophysiological basis of antibiotic therapy, and (iii) the problems of fermentation technology and nonmedical use of antibiotics.

Further information will be furnished upon request by the secretary of the symposium, Dr. M. Heřmanský, Antibiotics Research Institute, Roztoky near Prague, Czechoslovakia.

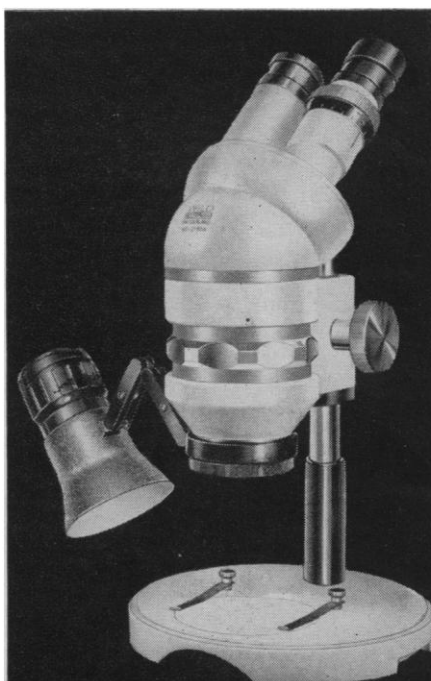
Forthcoming Events

May

10-15. Society of American Bacteriologists, St. Louis, Mo. (E. M. Foster, Univ. of Wisconsin, Madison 6.)

10-14. American Soc. of Maxillofacial Surgeons, Chicago, Ill. (O. H. Stuteville, 700 N. Michigan, Chicago 11.)

11-12. Practical Problems of Coordinating and Integrating All Services Related to the Treatment, Training and Management of the Mentally Retarded,



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