SCIENCE

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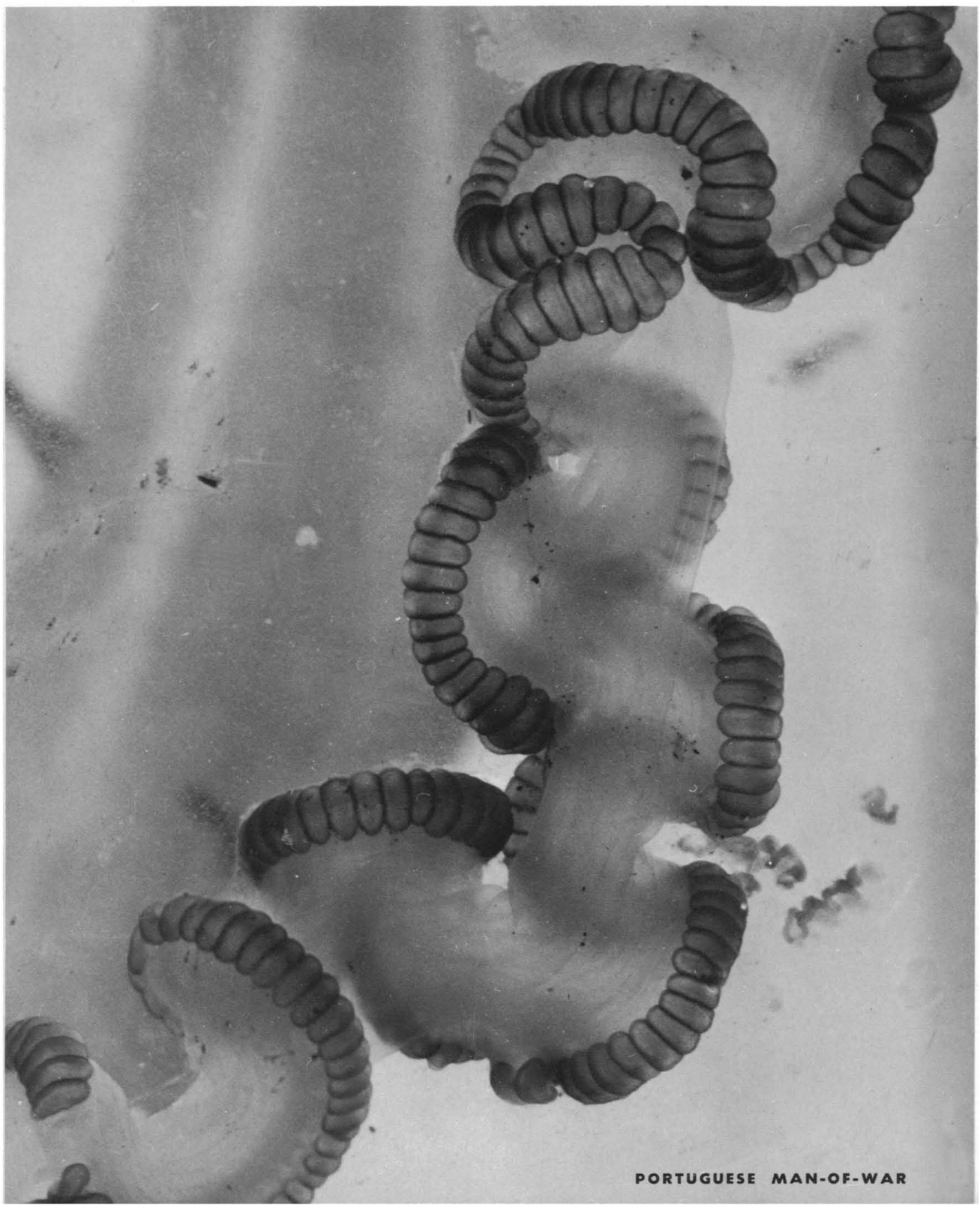
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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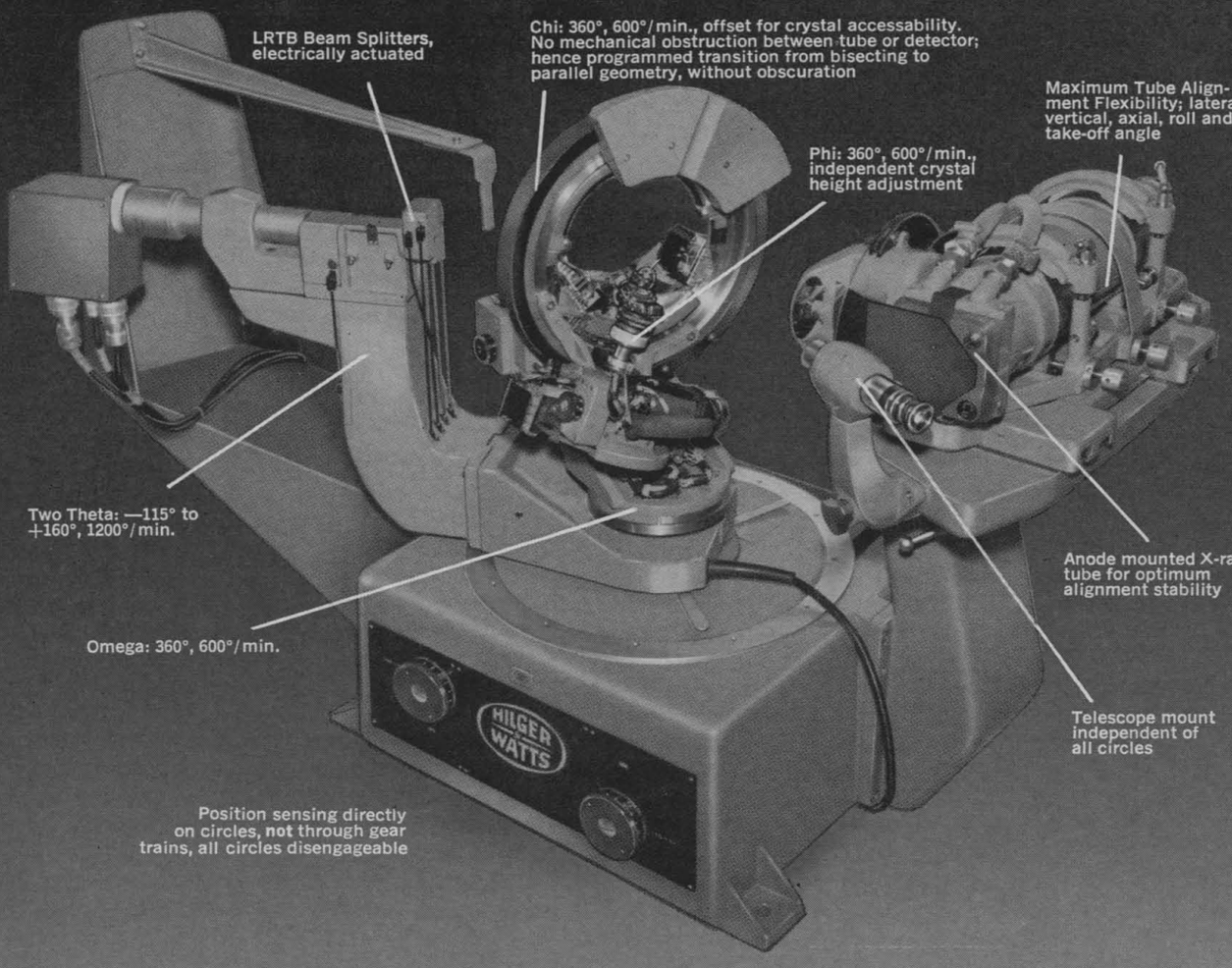

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COVER

Coiled fishing tentacle of the Portuguese man-of-war (*Physalia physalis* L.) contains the poisonous nematocyst capsules. During the capture of food the nematocyst thread everts and punctures the prey. Oozing from its wounds are many substances, including the tripeptide-reduced glutathione which initiates the feeding behavior of *Physalia*'s feeding polyps (gastrozooids). See page 434. [Fritz Goro, *Life*]

AAAS SYMPOSIUM VOLUMES

In Agriculture and Related Fields

AGRICULTURE AND THE QUALITY OF OUR ENVIRONMENT

Editor: N. C. Brady

476 pages, bibliography, author and subject indexes. 1967.
Price: $13.50. AAAS members' cash orders: $11.50.

Agriculture and the Quality of Our Environment addresses itself to this two-pronged problem: How does environmental quality affect agriculture and how does agriculture affect the quality of the environment?

This book provides a good summary and analysis of agriculture's stake in the quality of our environment. It also identifies the part which science must play to solve environmental pollution problems.

AGRICULTURAL SCIENCES FOR THE DEVELOPING NATIONS

Editor: A. H. Moseman

232 pp., 37 illus., bibliog., index, 1964.
Price $6.75. AAAS members' cash orders: $6.00.

The symposium was devoted to the role of agricultural science and technology in the acceleration of economic progress in newly developing nations. The twelve chapters of this volume comprise an informed summary of the problems and opportunities of technical, economic, and educational assistance in agriculture. The book will be helpful in furnishing some background experience for the use of agricultural planners in the newly emerging countries.

GROUND LEVEL CLIMATOLOGY

Editor: Robert H. Shaw

408 pp., 144 illus., bibliog., index, 1967.
Price: $12.50. AAAS members' cash orders: $10.50.

Ground Level Climatology consists of twenty papers dealing generally with the theme of weather and agriculture (including forestry) and specifically with the climate closely surrounding plants and animals—the microclimate. Investigators in the field of ground level climatology seek to understand the complex relationships between living organisms and their environment: the relation of climate to the distribution and abundance of plants and animals; the effects of weather modification on physical processes within the microclimate; and the effects of moisture, temperature, and energy balance on physiological functions.

GERM PLASM RESOURCES

Editor: Ralph E. Hodgson

394 pp., 59 illus., bibliog., index, 1961.
Price: $9.75. AAAS members' cash orders: $8.50.

The 25 papers treat the subject according to origin of germ plasm, developmental programs, new approaches to uses and perpetuation, and protection of plant and animal germ plasm.

Progress in improving the usefulness of the available germ plasm is measured. The need for additional germ plasm is pointed out, and problems relating to further development, preservation, and utilization of germ plasm to advance plant and animal production are indicated.

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1515 Massachusetts Avenue, NW, Washington, D. C. 20005

enough to allow efficient use of specialists. Therefore, for a period, there is going to be a great need for technical people who can readily shift from one specialized task to another until the marketplace or politics becomes sophisticated and established enough to influence and to justify the training of specialists. One needs only to look into the past of this country to verify this tenet. Specialization in science, engineering, and medicine took place here only after a period of generalized training in these fields. All in all, training of specialized technical persons in a developing country, especially at an early stage, can lead to a greater waste of trained manpower than would a broad education in fundamentals.

LOUIS LYKKEN
2932 Oxford Avenue,
Richmond, California 94806

Measuring Racial Differences

In connection with Clark's letter, "In defense of dissent" (5 July), a scientific investigation of possible racial differences in intelligence may be of interest, but I wonder if a truly scientific investigation is possible in present human society? Human beings cannot be gathered into isolated and well-defined categories, as can bacteria, insects, or other types of animals. Every man and woman is a product of the human community and is influenced by it, through education or lack of it, through the media of communication, as well as through encouragements and through threats. Intelligence is not a function of the isolated person, but is a combination of cooperations and antagonisms. Every respondent will bias his replies to investigations or questionnaires according to his conception of the use that he believes will be made of the results. Since problems of racial difference are being so hotly debated, the application of the term "scientific" to a study undertaken in the present epoch of history will be illusory. Such studies should wait until it has been possible for our society to achieve conditions for unbiased research and in which, perhaps, the questions can also be better formulated. Sometimes scientific techniques do well to step aside for a while and give way to discretion until newer insights have developed.

J. M. BURGERS
4622 Knox Road, Apartment 7,
College Park, Maryland 20740

Teaching: Who Is Being Rigid?

Albert Weiner suggests that engineers and scientists who are contemplating retirement might welcome the opportunity to teach science or math (Letters, 14 June). This letter, like many others, represents what I believe to be wishful thinking on the part of engineers and scientists. I never see letters like this from academicians. For example, I have personally found there is no university or state college in California interested in the services of an individual with a new Ph.D. in applied science and over 20 years of previous experience in engineering and scientific work. They "justify" this view with such comments as "too old," "no teaching experience," "insufficient publications," "too much management experience," "concern about rigidity."

I respectfully submit that anyone who can return to school after 20 years away and get a Ph.D., in competition with the outstanding young men currently enrolled in any good graduate school, cannot be rigid. However, the hardening of the arteries of the academic community is quite apparent and has convinced this writer that teaching is not the place to look for constructive creative work with leaders of the future.

EPHRAIM M. HOWARD
Apartment J-2,
2030 East Santa Clara Avenue,
Santa Ana, California 92705

Frederick II, Natural Scientist

In any list of royal personages (Figueira, Letters, 5 July) who have published scientific papers, surely the Holy Roman Emperor Frederick II of Hohenstaufen deserves mention. His *De arti venandi cum avibus* (1245) was one of the few contributions to true natural science between Aristotle and the Renaissance; the description of the uropygial or preen gland, for example, shows a clearer appreciation of its structure and function than some 20th-century work. Surely the grandson of Frederick Barbarossa should head the list of reigning monarchs with scientific publications, by virtue of seniority over Carlos I of Portugal and Hirohito of Japan.

DONALD P. DOOLITTLE
Agricultural Experiment Station,
Purdue University,
Lafayette, Indiana 47907

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Foreign Associates

When educated and talented people leave poor countries to go to rich ones there is ambivalence at both ends of the migration route. The receiving countries welcome gifted newcomers, but feel guilty about taking talent that can be ill-spared in a less fortunate country. The losing countries complain of the brain drain, but often continue conditions that encourage able men to emigrate.

The reasons for migration are many, and there is no single remedy for the complex of problems called the brain drain. It is, however, possible to identify the persons whose loss would be most damaging and to make it more attractive for them to remain.

If a developing country is to take reasonably full advantage of modern science and technology, it must have at least one research and teaching university of good quality in order to develop and hold the indigenous competence necessary to analyze the country's own problems, evaluate work done elsewhere, translate new findings into locally useful applications, counsel government leaders, and inspire and educate future scholars. The staff members best qualified to lead such an undertaking are, understandably, the ones best known and most likely to be offered positions elsewhere. They are also the ones most likely to be driven away from their own countries by intellectual loneliness unless they have an adequate number of stimulating colleagues and the facilities necessary to do the work of which they are capable.

Abdus Salam wrote in 1966 in *Minerva*: "Looking back on my own period of work in Lahore . . . I felt terribly isolated. If at that time someone had said to me, we shall give you the opportunity every year to travel to an active centre in Europe or the United States for three months of your vacation to work with your peers; would you then be happy to stay the remaining nine months at Lahore, I would have said yes. No one made the offer."

But now the offer can be made to a few scientists. The International Center for Theoretical Physics in Trieste, of which Dr. Salam is the director, has granted to 27 carefully selected physicists from developing countries the privilege of working at the Center for from 1 to 4 months a year with little more formality than a letter announcing the time of arrival. These Associates, of which the Center hopes eventually to have 50, are reimbursed for travel and maintenance costs from Center funds, but it is expected that their salaries will be continued by their own institutions. The Royal Society is establishing a similar scheme that will extend into fields other than theoretical physics. A recent seminar of the United Nations Advisory Committee on the Application of Science and Technology to Development proposed to the National Academy of Sciences and the Canadian National Research Council that the United States and Canada create from 200 to 300 similar associateships tenable in Canadian and American universities and research centers.

If the associates and the institutions are well matched, the arrangement will be advantageous to the host institutions, for, almost by definition, the associates will be those scientists from developing countries that institutions in other countries would most like to lure away.

The host institutions should benefit, but the primary purpose is to help the developing countries build up their own scientific resources to the point of not needing such special help. The richer countries will surely continue to assist the developing ones. Among possible forms of assistance this one appears to be a particularly attractive way—and an inexpensive one to boot—to help them retain one of their own greatest assets: able scientific leaders.—DAEL WOLFLE

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