

Decline in crystallography

The guest comment on the international position of US physics by John Risley and Eugen Merzbacher in July (page 9) prompts me to draw attention to a similar decline in US crystallography as revealed by the publication of the fifth edition of the *World Directory of Crystallographers*, S. Abrahams, A. L. Bednowitz, eds, Polycrystal Book Service, Pittsburgh, Penn. (1977).

GUEST COMMENT

by
George A. Jeffrey

Crystallographers are defined, for the purpose of this publication, as those scientists whose interests relate closely enough to crystallography for them to join the appropriate national society, such as the American Crystallographic Association in the US. Since this society membership nearly always involves the payment of dues, it is reasonable to assume that these affiliations are not trivial. As judged by their employment addresses, the 7638 scientists in the 1977 World Directory are distributed amongst the sciences as follows: chemists, 35%; physicists, 18%; earth scientists, 15%; crystallographers, 14%; material scientists and metallurgists, 10%; biological and medical scientists, 8%. They therefore represent a cross section of the pure sciences, since their research is concerned mainly with the structure of matter and the consequences thereof; that is, they question why crystalline matter has certain desirable or undesirable properties, rather than how to make things having those properties.

By comparing the 1977 world list with the previous 1971 list, it is possible to observe the changes in the world distribution of crystallographers and in their interests. The total number of entries increased by a modest 9.6% in the intervening six years, but the most striking feature is the increases in certain Eastern European countries, as compared with a small decrease in the US. The changes for those countries having more than 200 crystallographers are as follows: German Democratic Republic, +88%; Poland,



Bulgaria, Czechoslovakia, +55%; USSR, +45%; Italy, +43%; France, +29%; Japan, +25%; India, +12%; German Federal Republic, 0; USA, -1%; Sweden, -10%; UK, -23%.

This suggests that the malaise in the international position of US science described in the letter by Risley and Merzbacher is not unique to atomic-collision physics, but applies across-the-board to

all aspects of physics-based sciences in the US. In parallel with this relative decline in population is a decline in the US contributions to *Acta Crystallographica*, which went from 40% in 1955 to 25% in 1975.

Another feature of interest in comparing the 1971 and 1977 world lists of crystallographers is the increase in participating nations from 57 to 71. Crystallography is one of the higher prestige sciences, if only because of the relatively large number of Nobel laureates arising out of work relating to the field. It is comparatively inexpensive and therefore attractive to the third-world countries; new names appear in the directory such as Indonesia, Iran, Ivory Coast, Saudi Arabia.

In view of the observations concerning participation in International Meetings, which prompted this letter, it is interesting to note the decrease in the number of US papers submitted for the Eleventh International Crystallography Congress in Warsaw this coming August to 88, as compared with previous overseas Congresses; 1975 in Amsterdam, 157; 1972 in Kyoto, 179; 1966 in Moscow, 127; 1963 in Rome, 190; 1960 in Cambridge, UK, 200.

GEORGE A. JEFFREY
University of Pittsburgh
(Co-Editor,
Acta Crystallographica)

7/18/78

Chinese participation

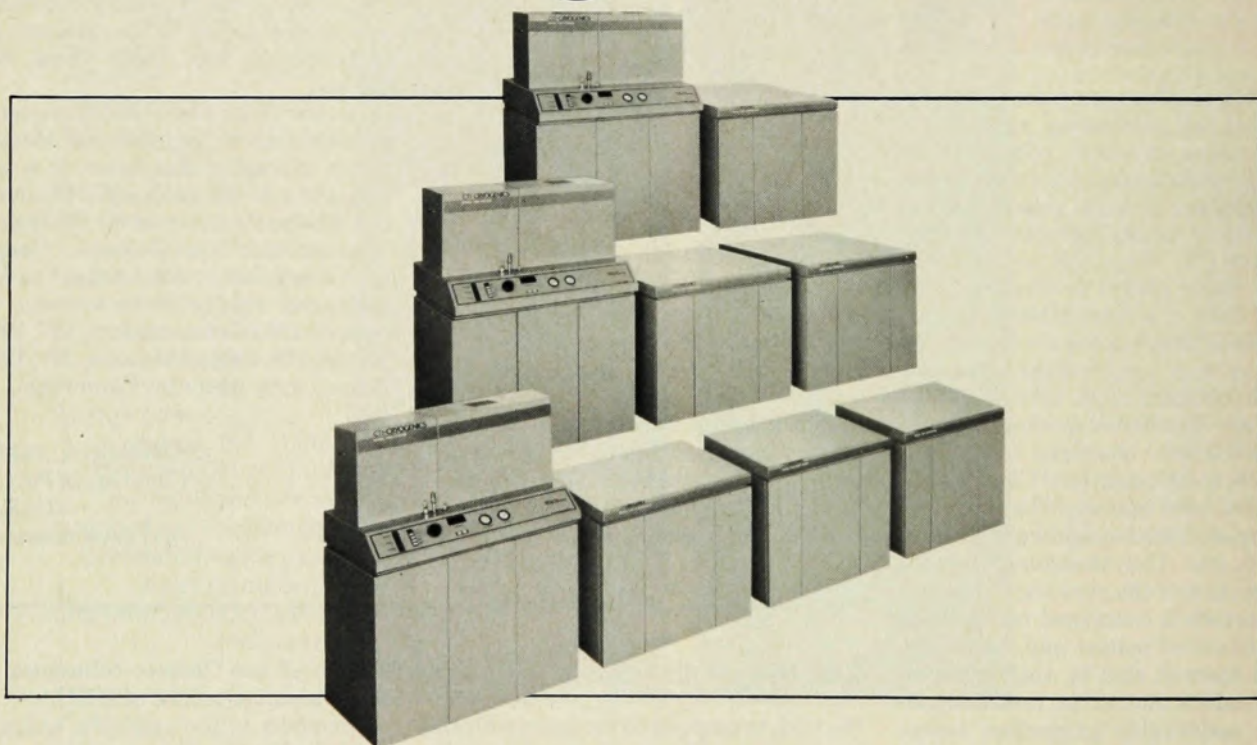
We wish to respond to the guest editorial by Harrison Brown in January (page 120).

First of all, we reaffirm our belief in the "right of the scientists of any country or territory to adhere to or to associate with international scientific activity without regard to race, religion or political philosophy" or "recognition of the government of the country or territory concerned," as proclaimed in the 8th General Assembly of the United Nations and quoted by Brown. It is precisely in accordance with this belief that we question the action by the International Council of Scientific Unions that results in the ex-

clusion of our Chinese colleagues from many member unions of ICSU.

Members in the scientific unions are almost always academies representing nations. Often the directors and administrators of these national academies are appointees of their respective governments. This is certainly true of the organization in Taipei known as the "Academia Sinica, Republic of China," which pretends to represent the scientific community of all of China. While Brown referred to the "Academy of Sciences in Taipei," which suggests regional rather than national representation, it is well known to him that there is no such organization in existence. The latter was a creation of ICSU over the protest of the

Research has a way of expanding. So do our new Series 1400 Helium Liquefiers and Refrigerators.



The new CTI-CRYOGENICS Series 1400 Helium Liquefiers and Refrigeration Systems provide high reliability, ease of operation, and flexibility in capacity. And with their modular design you can start with a relatively simple system and increase its capacity as your needs grow by adding components.

Series 1400 Systems are available for helium liquefaction from 5 to 40 liters per hour, or for closed-cycle refrigeration from 20

to 100 watts. Major Series 1400 components have been proven in over 125 field operating systems, so reliability is assured. For more expansive information on CTI-Cryogenics Series 1400 Helium Liquefiers and Refrigeration Systems write or call CTI-Cryogenics, Kelvin Park, Waltham, Massachusetts 02154 (617) 890-9400. Telex 92-3442.

CTI-CRYOGENICS
The pure performance company

HELIX
A Helix Company

letters

organization on which the pseudonym was bestowed.

The crucial point is, of course, that no scientist should be barred from international scientific activities. As we understand from conversations with our Chinese colleagues, in particular with officials of the Scientific and Technical Association of the People's Republic of China, China has no desire to exclude any scientist from ICSU activities. Since all Taiwanese are Chinese nationals (a fact emphasized by Taipei as well), they are naturally welcomed to participate in international activities when China becomes properly represented in the scientific unions. ICSU should actively encourage the scientists from Taiwan to join the Chinese delegations. Should the government in Taipei prevent them from doing so, ICSU may wish to actively make arrangements for them to participate as individuals. Have these avenues been explored?

We are not suggesting that any scientist be "divested." We are not placing any scientist "in disfavor." We are not discussing the "recognition of government." These emotion-laden words tend to misrepresent the facts and cloud the issue. As far as we know, contrary to Brown's expressed fears, no scientist has been barred from IUGS and IUGG activities. We feel that the condescending tone in which Brown condemned IUGS and IUGG and lectured the other scientific unions was uncalled for. Indeed, the actions of these two unions in granting China proper representation to uphold the principles of the universality of science and free circulation of scientists should be applauded and encouraged. It is fortunate that the issue has finally been brought out of committees and into the public domain. Members of the physics community are now given an opportunity to express their opinions and debate the merits in public.

S. S. CHERN

University of California, Berkeley

MARVIN L. GOLDBERGER

California Institute of Technology

C. K. JEN

The Johns Hopkins University

C. C. LIN

Massachusetts Institute of Technology

OLLI V. LONASMAA

Helsinki University of Technology

GORDON SHAW

University of California, Irvine

YUEN-RON SHEN

University of California, Berkeley

CHIA-WEI WOO

Northwestern University

CHEN-NING YANG

SUNY at Stony Brook

6/28/78

THE AUTHOR COMMENTS: The authors of the above letter, several of whom are

old friends, are to a certain extent uninformed about the philosophy of ICSU with respect to the China situation, which is identical with that expressed by the Board on International Organizations and Programs of the NAS.

Clearly we agree upon such important principles as "universality" and "free circulation of scientists." Beyond that there are important differences which must be appreciated if the full significance of Union actions with respect to the scientific communities of China and Taiwan are to be understood.

First of all, the "academies" or other adhering bodies to ICSU and the unions are not viewed as representing "nations" in the sense of national governments. They are viewed as representing "communities of scientists." Obviously these communities usually coincide with national communities, but this is not always so.

The principle of universality demands that all communities of scientists that so desire be represented in ICSU and the unions. There are in fact two major communities of Chinese scientists—one in the People's Republic of China and one on the island of Taiwan. No matter what one calls their organizations, no matter who we might say belongs under what governmental jurisdiction, the fact remains that there are *de facto* two separate communities, both of which are entitled to representation (again, as communities and not nations) for as long as they are separated.

There are no precise analogies to the present situation, but we must keep in mind that when the German scientific community was divided, both groups were given representation in spite of vigorous protests by some governments. This situation was repeated in Korea, and until recently there were two adhering bodies from Vietnam, one representing the scientists of the North and the other representing the scientists of the South.

The scientific leaders in the People's Republic of China have been told many times that appropriate organizations in China are enthusiastically welcome to join the ICSU family. The world scientific community is united in urging them to join. They choose not to do so however for as long as the scientific community of Taiwan is represented (usually by the Academia Sinica in Taipei).

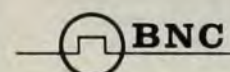
The writers of the letter state that the Academia Sinica "pretends to represent the scientific community of all of China." This is not correct. In 1973 when I was Vice President of ICSU I was asked by the ICSU officers to journey to Taiwan and clarify with officers of the Academia Sinica the entire question of representation. I returned with a written statement, which I delivered to the officers of ICSU and which states that the Academia Sinica represents only the scientists working on Taiwan and the associated islands—in

THE BNC PULSER FAMILY



NEW CATALOG AVAILABLE

Berkeley Nucleonics has a pulse generator for almost every job. Our pulsers cover a range from economical, general purpose models to programmable, precision ones. The pulsers are versatile and are used in many areas including design, performance testing, and calibration. Get our NEW SHORT FORM CATALOG and meet our family. Phone (415) 527-1121 or write to:



Berkeley Nucleonics Corp.

1198 Tenth St.
Berkeley, Ca. 94710

An astronomy text
that eclipses
all others—

Pasachoff ASTRONOMY: FROM THE EARTH TO THE UNIVERSE



OTHER GREAT ASTRONOMY TEXTS

Pasachoff: CONTEMPORARY ASTRONOMY

The original PASACHOFF. Integrates contemporary subjects, from the Viking space probe to the discovery of Uranus' rings (second and subsequent printings), all without mathematics. Text has chapter summaries, star maps, questions for each chapter and additional readings. A 32 page supplement updating the material to June 1978 is available, as are a *Teacher's Guide* and *Student Study Guide*. By Jay M. Pasachoff. 588 pp., 614 ill. (plus 24 pp. of 50 color plates). March 1977. \$18.98. Order #7101-2.

Pasachoff: ASTRONOMY NOW

The abbreviated PASACHOFF. This introductory text contains all the quality of the original, skillfully condensed for use specifically in one-quarter or one-semester courses. A *Teacher's Guide* and a *Student Study Guide* are available. By Jay M. Pasachoff. 400 pp. 415 ill. (plus 24 pp. of 50 color plates). Soft cover. January 1978. \$12.95. Order #7100-4.

Pasachoff & Kutner: UNIVERSITY ASTRONOMY

The expanded Pasachoff. This higher-level text includes additional physical arguments and some mathematics (algebra and trigonometry only) and is designed for one-year or one-term introductory courses. A *Teacher's Guide* is available. By Jay M. Pasachoff and Marc L. Kutner, Rensselaer Institute. 763 pp., 702 ill. (plus 24 pp. of 50 color plates). April 1978. \$18.95. Order #7099-7.

Smith & Jacobs: INTRODUCTORY ASTRONOMY AND ASTROPHYSICS

An introductory text for the serious physical science major. Ideal for either a complete year-long course or a concise one-semester exposure. Freshmen and sophomores with a solid grounding in high school geometry possess the mathematical maturity needed to understand this book. By Elske v. P. Smith, University of Maryland, and Kenneth C. Jacobs, University of Virginia. 564 pp. 284 ill. Hard Cover. July 1973. \$20.95. Order #8387-8.

Treat your students to a new, more traditionally oriented version of one of the most exciting astronomy texts on the market. A reorganization of the author's highly successful *ASTRONOMY NOW*, this version offers history and the solar system first, then continues outward through the universe. Additional history has been added, including more on ancient and Renaissance astronomy and astronomers. A new section on topics of modern archeoastronomical research, such as Stonehenge, Mayan astronomy and medicine wheels has been added. There is a new chapter on the earth as a planet, and additional material on the use of star charts and on observing the sky and its constellations. Some other material has been rearranged or subdivided to better aid both student and instructor, and recent updates (like the moon of Pluto and this year's spacecraft to Venus) have been included. And, of course, you'll also find all the features that have led to the success of earlier Pasachoff texts: full treatment of such contemporary topics as neutron stars, pulsars, black holes, quasars, x-ray astronomy, and life in the universe; beautiful illustrations in black-and-white and color (including 15 new color plates); glossary; additional readings; and star charts. The *Teacher's Guide* contains solutions and answers to the text's questions, tests with answers, labs, and suggestions for films, slides and experiments. Also useable with this text is the *Student Study Guide for ASTRONOMY NOW* (which now has a key to the new book). By Jay M. Pasachoff, Williams College/Hopkins Observatory, Williamstown, Mass. About 425 pp., 450 ill. (plus 32 pages of 65 color plates). Soft cover. Ready January 1979. About \$13.95. Order #7105-5.

A set of 40 Color Slides and a set of 100 black-and-white Overhead Projectuals keyed for use with all the Pasachoff texts are available. Check with publisher to find out if you qualify for the free offer on both projectuals and slides.

W. B. Saunders Co.

W. Washington Sq., Philadelphia, PA 19105
1 Goldthorne Ave., Toronto, Ontario M8Z 5T9

Prices are U.S. only and subject to change.

letters

other words those areas that are under "effective governmental jurisdiction." That statement was signed by Chien Shih-Liang, president of the Academia Sinica following lengthy discussions between the two of us and several highly placed government officials.

Many avenues have been explored that might get us off the horns of the present dilemma, including joint delegations (used successfully at one time during the German difficulties). ICSU and the unions (except for IAU) do not have individual memberships. Difficulties of financing major international collaborative programs make this approach most undesirable.

Speaking as an ICSU officer, I believe that the most palatable sequence of events would be for an organization such as the Academy of Sciences of the PRC to join ICSU and the unions, stressing that its membership is tentative until such time as there is an overall resolution of the geographical and political problems between the governments in Peking and Taipei.

Finally, it is most unfortunate that I find myself compelled to defend an important matter of principle under such trying circumstances. Those of your readers who know me realize that I started a major effort 15 years ago to re-establish contact with our scientific colleagues in the People's Republic of China. That effort was eventually successful. I hope that the present effort will also be successful, but not at the expense of giving up a principle that many of us believe is essential if there is ever to be a true world community of scientists.

HARRISON BROWN
The East-West Center
Honolulu, Hawaii

7/24/78

Inventor's horror story

I was much interested in Betsy Ancker-Johnson's editorial in April (page 96), and especially in the *imaginary* event with Samuel B. Morse.

Apparently Ancker-Johnson is unaware that the actual situation today is far worse than what she sees as a possibility, at least when it comes to defense-related inventions. I will relate my own experience:

In 1943, on my own initiative, and wholly at my own expense, I started development of an electronic fuel-control system for jet engines. By 1945, my development had proceeded far enough that the Air Force asked me to make a *gratis* demonstration of the control, on a jet engine (of course, in those days only the government had jet engines, and all my development was based on simulation and calculation). The demonstration was considered a great success, although they did not actually test fully one feature of

the control—its ability to protect from overtemperature. For this, we simulated an overtemperature condition, which the engineers found convincing.

I continued my developmental work, and a year later the Air Force asked to purchase one of my fuel-control systems, at a total price of \$10 000. I built one for them, which they had tested by an engine manufacturer. It was again found to operate relatively well, and the development proceeded.

Because of this one sale of a device I had developed at my own expense, the government held that they had a free license to use my invention. They purchased many millions of dollars worth of controls based on my invention from the major jet-engine manufacturer of the period (who had learned of the invention through my work with the Air Force), and have denied me any compensation for my invention, based solely on their having purchased and tested this one control! I have sought relief in vain through the Court of Claims for the last twenty years, and have been constantly turned down—all based on this one sale.

This may all sound like a distorted picture of what happened, from a disgruntled inventor. But everything stated above (except for the question of how my competitor learned of the invention, on which the court was silent) is to be found in the Court's own statement of the facts in the case (*Technical Development Corp and Franklin Offner v. The United States*, 202 Ct. Cl. 237). Nor was my development of the electronic control a minor advance. In a companion case, the US Tax Court, in *Offner Products v. The Renegotiation Board*, stated "It is clear that [Offner's] contribution to the defense effort was historic and immense. . . . It gave the US a decided edge over its international rivals. It saved the government millions of dollars in money and time."

So, Dr Ancker-Johnson, you don't have to look back in time to imaginary situations to find horror stories; nor do we only have to guard against new infringements on the rights of inventors: Things could hardly be worse than they are at present, at least for inventors who would contribute to the national defense. Since this experience, I have steered clear of defense-related projects as if from the plague—possibly to the country's detriment, but to my own peace of mind, at least.

FRANKLIN F. OFFNER
Northwestern University
Evanston, Illinois

5/15/78

THE AUTHOR COMMENTS: Franklin Offner's experience is not atypical; literally hundreds of small inventors have found to their chagrin that the government acquires property rights to inventions that are "first actually reduced to

WHEN HALF THE POWER



WILL DO THE WHOLE JOB!

If your application requires only moderate power, ENI's new Model A150 will do the job. All it takes is a laboratory signal generator and you've got a perfect match for RFI/EMI testing, NMR/ENDOR, RF transmission, ultrasonics and more.

Capable of supplying more than 150 watts of RF power into any load impedance, the A150 covers the frequency range of .3 to 35 MHz.

We could mention unconditional stability, instantaneous failsafe provisions and absolute protection from overloads and transients, but that's what you expect from any ENI power amplifier, and the A150 is no exception!

For additional specifications, a demonstration, or a copy of our new, full-line catalog, contact ENI, 3000 Winton Road South, Rochester, New York 14623. Call 716-473-6900 or Telex 97-8283 ENI ROC.

ENI

The World's Leader in Power Amplifiers

Circle No. 13 on Reader Service Card

PHYSICS TODAY / NOVEMBER 1978

13