

velopment of science and of government science policy in Europe and Japan could sometimes note that a deliberate effort was undertaken by these countries to find areas of research which at the same time promised relatively quick results and were not the main tasks of large American research institutions. Such an attitude is only natural and not unwelcome because it enables a relatively smaller country to make essential contributions. If followed successfully—and especially in recent years some colleagues and institutions overseas have become quite expert in this—it has the side effect of pushing the data point in Cranberg's graph "Funding for R&D versus rate of economic growth for various countries during 1951-1960" even further to the right than shown in this somewhat ancient diagram. The less urgent but potentially more important task to support research that promises results only after a long period of time should not be devaluated.

A second problem with Cranberg's interpretation of the graph seems to be the silent assumption that R&D results are put into practice only in the country where such results have been obtained. There is some reason to believe that countries in the right half of the diagram were able to utilize R&D results (from, for example, the US) to improve their "product per man year" better than was American industry. There are several reasons for this belief: usually, people overseas are more aware of American progress in R&D than are Americans of overseas results; or, industrial structure overseas is sometimes more modern and more prone to utilize new results and innovations.

Finally, the graph depicts the situation in the decade when Japan and West Germany were still in their most ardent recovery period from the damages of World War II. Since the abscissa of the diagram shows the increase in percent, it is only to be expected that it is far larger in countries that had to restart at a very low level. That also applies to the USSR.

In conclusion, I do not subscribe to Cranberg's criticism of the US system of resource allocation. In the contrary, from my knowledge of other systems, I am inclined to give the US efficiency a rather high rating.

HANS DOLEZALEK

9/5/80

Alexandria, Virginia

THE AUTHOR COMMENTS: When Hans Dolezalek says "industrial structure overseas is sometimes more modern and more prone to utilize new results," he is sharing in a mounting concern about our international competitiveness, and challenging his complacent

conclusion about our present allocation of resources.

Surely it would help our steel industry, for example, if a few of our top-talented young scientists felt it was just as exciting to discover an important new steel alloy as to discover a new particle—as exciting to discover a better way to make steel as to discover a better way to make mesons.

And particle discoveries would not suffer at all if the present, very high-cost solo American effort in high-energy accelerator physics (HEAP) were reinforced and partially replaced by manpower and funds from Japan, China, Australia, Canada, Taiwan, Latin America and so on, in a new "HEAP-Pacific." HEAO and CERN are two useful models for the future of HEAP, when we look again at our resource allocations in science.

LAWRENCE CRANBERG

9/16/80

Austin, Texas

Help for Sakharov

The Olympic games are over; the hopes that Academician Andrey Sakharov might be allowed to leave his internal exile in Gorky and return to Moscow are over now too. Sakharov has been exiled for over nine months and has no contact with his scientific colleagues, is not allowed to take part in seminars or lectures, has no access to scientific information so crucial for his research. (Books and journals have to be brought to him by his relatives from Moscow, which usually takes weeks or months. Since January, his colleagues from the Lebedev Institute were allowed to visit him only three times!)

In spite of this, three scientific papers were accomplished by him in Gorky and English translations published at SLAC, Stanford University (Estimate of the Quark-Gluon Coupling Constant; Cosmological Models of the Universe with Rotation of Time's Arrow; Mass Formula for Mesons and Baryons).

I am convinced that it is time now for the world scientific community to escalate the efforts to help our distinguished Soviet colleague. From Sakharov's last communication it is obvious that he is mainly missing information about what is going on in physics.

It should be very easy for physicists to break down this information barrier. Let the theoretical institutes, laboratories and groups from all over the world begin sending Sakharov their preprints, lecture notes, reports. Send them by registered mail with the red "Avis de Reception" card to:

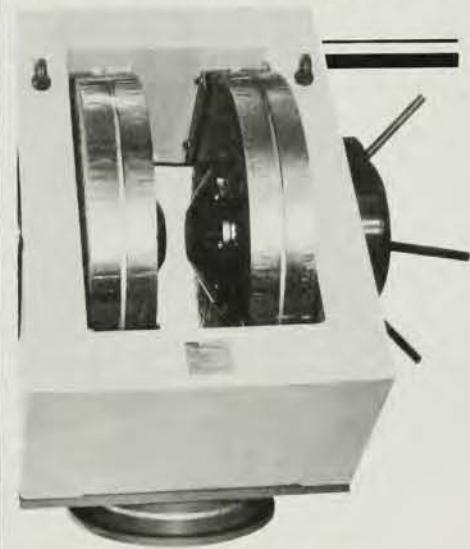
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letters

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Don't hesitate to ask your local post office to investigate if the red card is not returned to you with Andrey Sakharov's signature in about a month's time. Your local post office is obliged, according to international postal convention, to make the investigation and, if unable to provide proof that the mail was delivered, to pay you compensation.

There is no doubt that such worldwide action will not only provide Sakharov with necessary scientific information but will also represent considerable moral support for him. It will be important for Soviet authorities too: they will see that Andrey Sakharov's case is not at all forgotten by the world scientific community.

F. JANOUCH

Research Institute of Physics
Stockholm, Sweden

9/22/80

Diverting research funds

In all the discussion so far about the service charges levied by universities on research grants there has been no mention of another source of drain on grant monies, namely the use of these funds by the researchers themselves to augment their own salaries.

The principal justification for this would seem to be the claim that academic personnel are only employed for nine months of the year. In the case of tenured faculty this is creative semantics, akin to the creative accounting allegedly used by some universities in calculating their own share.

Another reason might be an attempt to adjust salaries that are perceived as too low with respect to some ideal (usually commercial!) professional standard. However this has got nothing whatsoever to do with the funding of research, whether true or not. Furthermore any comparison of commercial and faculty salaries usually omits the influence of tenure, which is a major benefit in an uncertain world. Is it possible that at least part of the difference is an attempt by the market to express the value of tenure in cash terms? To repeat: all this has nothing to do with the funding of research and should be kept wholly separate from it.

D. SHER

9/10/80

Cincinnati, Ohio

More from China

I am very impressed by Gloria Lubkin's article "Physics Today in China" (March 1980, page 32). She reviewed and pictured the complicated status of this field, which she witnessed during



Anechoic chamber at the University of Nanking, one of the world's largest.

her short stay of three weeks there, after ten years of disastrous effects from the Cultural Revolution. I am sorry that she was visiting our labs during power outages and guided by a dim flashlight so she could hardly see anything; as a result her personal security was not even guaranteed when she walked into an anechoic chamber without previous knowledge!

To make amends, here is a picture of the chamber. It is $11.4 \times 7.8 \times 6.7 \text{ m}^3$, completely isolated, and is one of the largest of its kind in the world; the cutoff frequency is less than 70 Hz. Its neighboring room, the reverberation chamber, has a rotating vane mounted horizontally. The chambers belong to the Acoustics Institute (affiliated with the department of physics)—a five-story building consisting essentially of four research directions: electroacoustics and acoustical signal processing, nonlinear acoustics, molecular and bioacoustics, surface-wave acoustics and quantum acoustics (including the study of various modes of sound propagation in superfluid helium in the Low Temperature Building some distance away). In these studies of sound propagation Isadore Rudnick of UCLA rendered us great help during his visit last November. The Institute is the oldest (founded in 1954) teaching and research institute in China and is in some way unique; it has about 50 faculty members and about 100 students to be trained in this specialty (both undergraduate and graduate).

The physics department possesses the special feature of including nuclear, microwave, solid state, acoustical physics, and so on, while in most other universities Lubkin visited these sub-

jects are divided into separate departments. If there is anything worthy of mention, it is having more freedom than ever before for each university and each department to decide what they think best for teaching and research. Personally I always stick to my point of view, that is, for undergraduates basic training is more important than any specialty; this is in agreement with almost all American physicists. It is also worth mentioning that the university is comparatively old (second to Peking only, I believe). Last May marked the university's 82nd birthday. (By a happy coincidence, this date coincided with a visit from John Bardeen. So we had a joint celebration!)

We are aware of the problems or rather anomalies, such as surprisingly large staff and so on. Things are in progress but in slow pace. When Gloria Lubkin comes back for another visit, we do hope she'll find physics tomorrow in better shape than today.

WEI RONG-JUE (Y. T. WEI)

University of Nanking
China

10/27/80

Applying for employment

A few years ago, when I was a hungry graduate student looking for a job, I had to fill out copious application forms. Some of these contained rather queer items. I am reproducing here my response to some of these would-be employers, which my successors in the fascinating field of job-hunting might find useful. Bear in mind, however, that, if my experience is any indication, it will not elicit a reply.

Dear Sir:

I am enclosing my completed application form for the one-year visiting assistant professorship advertised in PHYSICS TODAY. You will notice that my entry under "Number of pages published in refereed journals" is not a very large figure. Let me attach a few words of explanation to what might, at first sight, appear as rather meager output.

I publish in journals that cram a great deal of material in one page. If you compare *Journal of Mathematical Physics* pages to, say, *Annals of Physics* pages, you will see what a great difference there can be. I also keep my sentences short and concise, and do not include a lot of empty talk and speculation to lengthen the articles. As a result, my papers contain many more equations than those of other authors. Note also that the symbols I use tend to be more esoteric and complex than those found in other papers. For example, I make heavy use of curly Roman letters and Hebrew characters.