

letters

15 wounded, one out of every 6 made a refugee?"⁴ The horrifying extent of the destruction of Indochina would seem to indicate that attempts to "influence" the Pentagon from "inside" were ineffective. Acknowledging this, why did not those who claim that they were against the war resign from Jason? Or why did they not follow Daniel Ellsberg's example and make public the "Jason Papers?" The attitude of those Jason members who, as one of them put it, believe that they have "helped to strengthen the voice of sanity inside the American government" is reminiscent of a standard *a posteriori* argument put forward by people who have collaborated with an oppressive regime in order "to save what little could be saved"; for instance, after World War II, some French collaborators of the Nazis tried to justify themselves by stressing that they had helped save some Jews.

Far from influencing Pentagon policy makers, Jason physicists have, consciously or not, been used by them; they have put their competence at the service of a policy that, in order to maintain the US domination over Third World countries has gone, in South East Asia, as far as a war of genocide. Some groups of scientists (among them, in the US, Science for Vietnam, SESPA, MAG, NARMIC, etc.) make another choice: they work against the "military-industrial-complex" from "outside."

References

1. "Pentagon Papers," Gravel Edition, Vol. IV, page 122.
2. Ref 1, page 115.
3. "International Herald Tribune," 5 September 1972.
4. E. W. P. Pfeiffer, press conference in Paris, June 1972.

MARCELLO CINI
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JASON MEMBERS COMMENT: The letter of Marcello Cini and others is a more reasoned criticism of Jason activities than we have recently seen, and deserves a reasoned answer. I speak only for myself and not for any other Jason members. My name came into public view on a nonsecret list of titles of documents, where I appeared as one of the authors of a paper entitled "Use of

Tactical Nuclear Weapons in South-East Asia," or words to that effect. It is true that I helped write this paper under Jason auspices, and it is possible that it may have had some slight influence upon US policy in Vietnam. The question is whether I am to feel ashamed or proud of what I have done. I am glad to state publicly that I am proud of it. If my work had no effect on government policy, I can have done no great harm. If my work had some effect, I can be proud to have helped to avert a human tragedy far greater even than the one we have witnessed.

FREEMAN J. DYSON
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I do not understand how the authors of the letter above can possibly know my views on the relationship of a scientist to his government, the Vietnam conflict, SALT, or anything else, because colleagues of yours demanded of me that I denounce the US and its policy as well as my supposed participation *before* being permitted to lecture. Furthermore, not only were my offers to arrange a discussion of the above issues following my scheduled physics lectures flatly rejected by my confronters, but they insisted that I accept their political inquisition and *give responses that would satisfy them as a precondition* to lecturing. I refused and was therefore not permitted to lecture.

In general I am quite willing to discuss freely my views on the existence of Jason and the relationship between a scientist and his government and society—and I have done so on a number of occasions. In fact, shortly after the disruptions mentioned above, I participated in a general discussion of these issues at CERN at which time I advanced *none* of the three arguments in defense of Jason that were stated in the letter above.

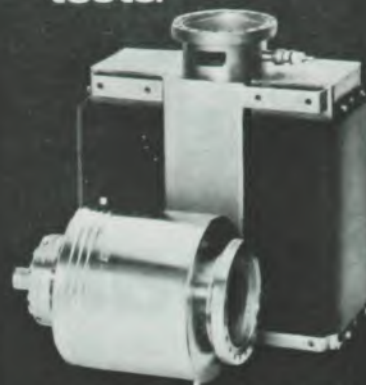
I consider attempts by small groups to demand political and moral purification as conditions for scientific dialogue to be dangerous precedents and not mere "harassments" as defended and rationalized in the letter above.

SIDNEY D. DRELL
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Developing countries

Michael Moravcsik has got to the root cause of the plight of physics (and physicists) in the developing countries by pointing out the lack of adequately trained manpower and its scientific isolation from the rest of the world (September, page 40). His suggestions, if implemented, would go a long way towards alleviating these problems. The suggestion which, as Mor-

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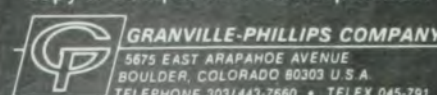


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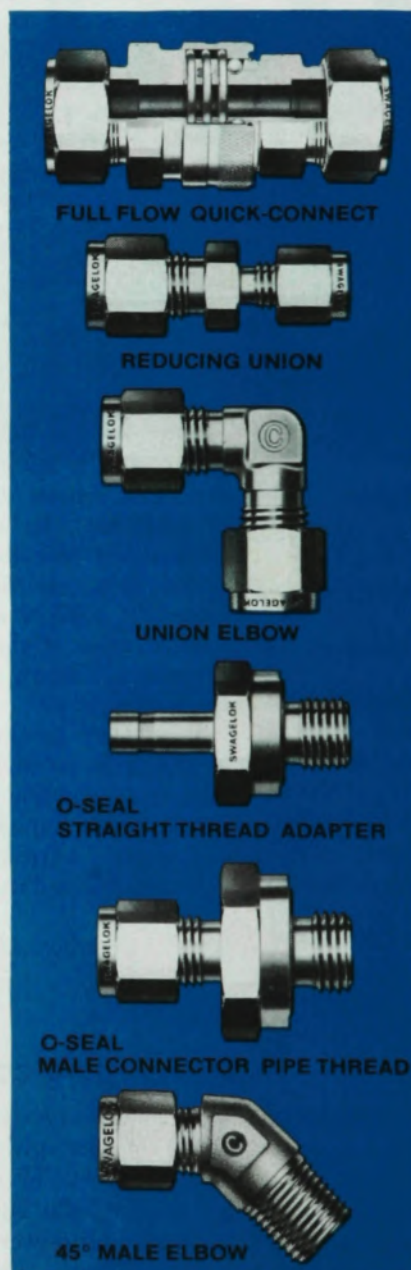
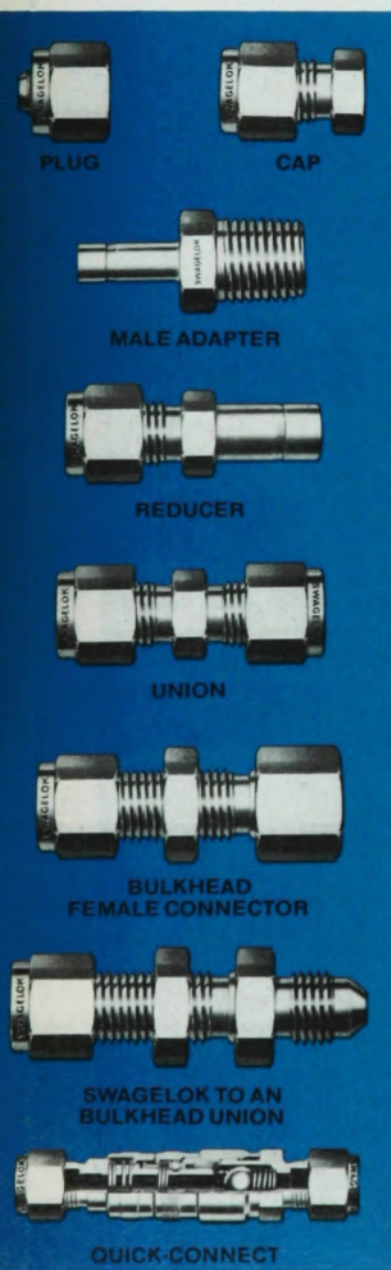
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avcsik pointed out, does not even require funds, and which will be most helpful to students from developing countries, is the opportunity for such students to learn about the running of a typical department and its auxiliary services such as the library, workshop, etc. Needless to say, the problems mentioned and the suggestions offered are also relevant to other scientific and nonscientific fields.

A year and a half of experience on the part of the present writer in a leading research institution and a university in his country, after graduate studies in US, has confirmed the fact that unemployment and underemployment, which Moravcsik only parenthetically mentions, are equally, if not more, serious problems handicapping the physicists in the developing countries. The unemployment he does mention apparently refers to the unemployment of graduates from the local universities, which indeed is there. However, many PhD's are also finding it hard to get jobs in spite of the fact that they are badly needed in the institutions, which are either understaffed or staffed with inadequately trained personnel. Most of the scientists trained abroad are sponsored by the institutions where they are employed, and the few individuals who go abroad on their own for higher studies find it hard to get jobs on their return. This factor is probably responsible not only for the underutilization of the numerous training opportunities abroad but also the unemployment of some of the highly trained personnel.

Unfortunately the problem does not end here. The talent of many competent highly trained young people already working in various research and educational institutions remains underutilized for several reasons. The often-mentioned bureaucracy and socioeconomic conditions prevailing in the developing countries are only part of the reasons responsible for the state of affairs. What seems to be also lacking is motivation and a sense of commitment to face these odds and to lay the foundations of conditions and traditions conducive to scientific research. What is, therefore, also needed is a thorough understanding of these and other problems.

ABDULLAH SADIQ

Pinstech

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Michael Moravcsik discusses some interesting problems; unfortunately, some of his suggestions seem very un-

likely to be helpful. As a former Peace Corps volunteer [teaching chemistry at Middle East Technical University (METU), Ankara, 1964-66], my own experience leads me to some rather different conclusions.

METU had visiting faculty from a number of programs besides the Peace Corps—UNESCO, Ford Foundation, and so on. It usually took a year or more for the visitors to become sufficiently oriented to do really useful work. It was rare that a visitor was as useful as a Turkish faculty member. Even those who remained for two or three years usually did little that related directly to problems of importance for the Turkish economy. The Peace Corps science-teaching program at METU was terminated, justifiably I believe, with the second group.

The exchange program between METU and Yale that Moravcsik mentions was, as of the time I was at METU, undoubtedly of considerable benefit to the theoretical physicists who took part; however, its only effect on the rest of the faculty seemed to be to lower morale among those unable to take part.

Moravcsik recognizes the importance of applied science and the necessity for local personnel to carry out the main task of development. This requires not only that visiting personnel not pull personnel of the host country away from appropriate tasks; it also requires that appreciable material resources be made available. Present programs fail both ways. While programs sometimes do produce qualified local personnel, they usually divert people from work concerned with economic development. More seriously, material resources tend, now as in 1966, to be woefully inadequate. My limited direct experience with US AID suggested that it could not have been less interested in providing help for technical development; furthermore, the problem is general as total (worldwide) US AID for scientific development was microscopic (under \$10 million per year if I remember correctly).

Finally, Moravcsik quotes Maurice Bazin, writing in *Science for the People* (May 1972), as follows: "Science development is an imperialistic scheme to keep poor countries enslaved." I have been unable to find this quote in Bazin's article. In fact, it is not even a fair paraphrase, since Bazin essentially argues that science development, as it is presently being carried out, is helpful to the corporations of the capitalist countries and harmful to the people of the developing countries; therefore, the direction of scientific development ought to be different. On the whole, Bazin's article seemed to me more rea-

continued on page 77

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sonable than did Moravcsik's.

MICHAEL E. GREEN
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THE AUTHOR COMMENTS: I appreciate Abdullah Sadiq's perceptive comments, particularly in as much as they point at some of the problems that I did not have an opportunity to discuss in my article. Indeed, unemployment of well-trained scientists in some of the less developed countries exists in spite of the extreme need for such people in the development of the country. The reasons are complex, including the handicap of a sizeable body of miseducated people who are functionally inoperative but who occupy many of the positions for scientists (the "deadwood problem"), the unwillingness of some governments to earmark the requisite amount of the money for science and science education, the cumbersome beurocracy in many countries, as well as the lack of participation on the part of scientists in decisions pertaining to science policy. It is for this reason that I emphasized the necessity of training students from the less developed countries not only in technical science, but also in how to create opportunities for doing science. Incidentally, these shortcomings would be particularly conspicuous to Sadiq in Pakistan, a country whose "scientific size" is particularly small compared to its "economic size." [For a quantitative discussion of this point, see the article of the Yale historian of science Derek de Solla Price, "Measuring the Size of Science," *Proceeding of the Israel Academy of Science and Humanities* 4, 98 (1969).]

In connection with underemployment, Sadiq mentioned the lack of motivation and lack of commitment that sometimes prevails among some scientists in the less developed countries. Indeed, this problem of morale is perhaps the most crucial single ingredient in any development problem, as I have emphasized in other articles. (See for example "The Transmission of a Scientific Civilization," in *Science and Public Affairs*, to be published in the winter of 1973.) It is for this reason that, fundamentally, science development is a *par excellence* indigenous task. Outsiders can and must help considerably, but the crucial element is the local scientific community, and it is their expertise, skill, and devotion that ultimately determines the outcome. This is particularly true when it comes to evolving the appropriate socio-economic conditions conducive for science and technology. For a particularly eloquent discussion of

this point, see Jorge Sabato's article in the UNESCO journal *Impact Of Science on Society* 20, 183 (1970).

It was also a pleasure to receive Michael Green's letter, which raises some other important points I did not have space to discuss in the original article.

One such point, which appears in Green's letter in several contexts, is the extent to which all scientific activities in a less developed country should be tied to immediate economic goals. Green (in agreement with US AID) takes the short-term view and hence feels that activities by Peace Corps instructors, which aim at the overall strengthening of the scientific structure of the country and hence are long-range projects, are wasted. I feel rather differently, and am convinced that one of the main reasons why international scientific assistance has not been as successful as it could have is because it tried to build "useful" applied projects on an indigenous scientific base that was weak, fragmented, and perfunctory. This has been a topic of frequent debate in science circles for many years. In any case, it is important to emphasize that the cost of strengthening the scientific infrastructure is usually much less than the financing of applied-science projects, and hence sufficient funds can be set aside for the former without significantly detracting from the latter.

The other important point Green discusses is the question of equipment versus manpower development. Green complains of a *lack* of equipment in Turkey. Coincidentally, at the same time when Green's letter reached me, I received a letter from another American scientist with personal experience in Turkey, who, among others, complained of the *surfeit* of equipment there that stands idle because the local scientific community is not sufficiently developed to use it. This second type of complaint is, in fact, the more common one. It would seem that institutions in less developed countries often request, and scientific assistance agencies too readily grant, expensive research equipment, which is easy to donate and showy to own. It is thus quite difficult to strike an optimal middle ground, especially since many other considerations, such as the desirability of requiring matching contributions from local resources, the availability of repair facilities, and so on, must also be taken into account. There is no pat formula for how to proceed, and previous experience is perhaps the best guide.

This leads me to comment on US AID, which Green rather categorically castigates in his letter. As to Green's statement that "(AID) could not (be) less interested in providing help for technical development," that is clearly



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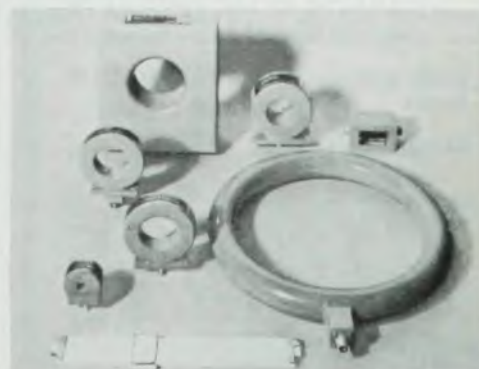
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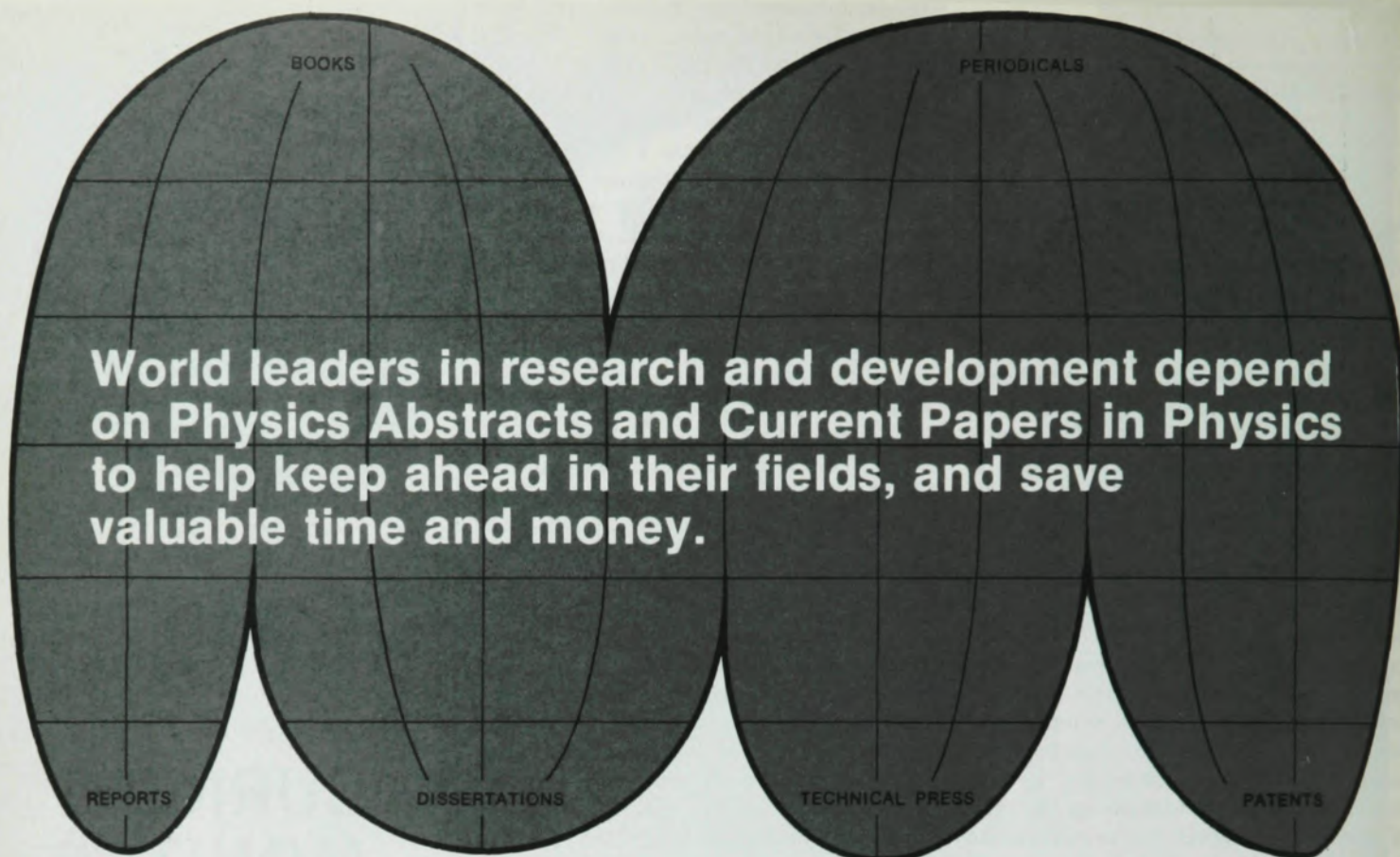
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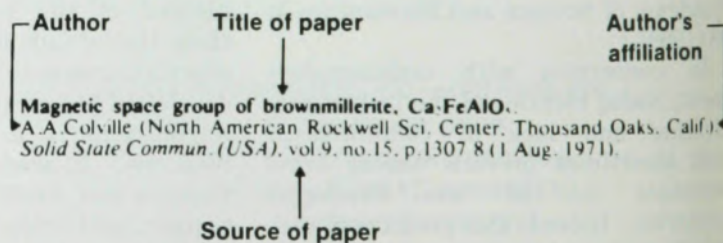
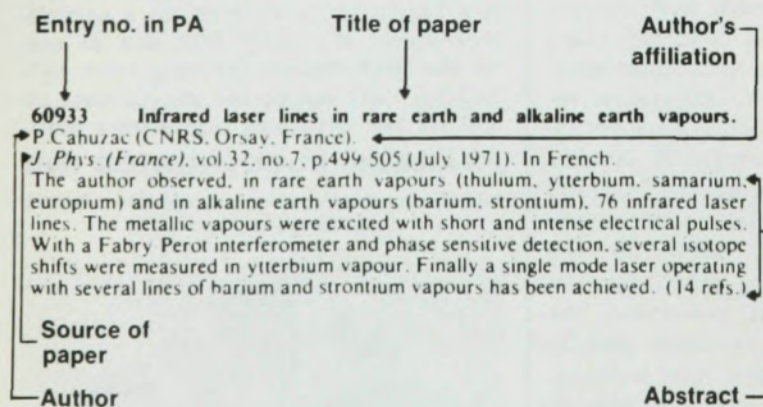
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contradicted by AID's record, open to anybody who wishes to make a study of it. My own impression (integrated over various areas of the world) is that AID's record is not at all a bad one, though, in my opinion, it has certain characteristics that I consider unfortunate. The two most striking of these is AID's almost exclusive concern with short-term projects (defined as programs showing conspicuous results within about five years), and AID's very marked preference to deal with large projects at the neglect of small and perhaps more experimental programs. I believe, in agreement with the Peterson report¹ on international assistance, that these shortcomings could be greatly remedied² by the creation of the independent International Development Institute. A proposal to this effect was submitted by the President to Congress over two years ago,³ and has been languishing there ever since.

I do agree with Green, by the way, that the total amount of international assistance offered by the United States is much too small, a sin the US shares with all other more advanced countries in the world, regardless of race, religion, color or politics. This was mentioned in my original article.

Finally, let me comment on Green's discussion of Maurice Bazin's article. Indeed, the sentence at the end of which reference was given to the Bazin article is not a direct quote from Bazin. In my original manuscript submitted to *PHYSICS TODAY*, there were, in fact, no quotation marks around that sentence. They were added in the editorial office, and I missed catching them when the proofs reached me. Since an author is responsible for his article, however, I want to apologize for this slip, and state explicitly that the sentence does not appear in that form in the Bazin article.

The particular sentence is, however, (contrary to Green's feeling), a reasonable paraphrase of Bazin's point of view, as I ascertained not only from the article but also from private correspondence with Bazin. I am strengthened in this belief by the fact that neither Green nor Bazin suggest an alternative, specific, program for science development. This, in fact, is my main worry about comments like those of Bazin or Green: They are completely negativistic in tone, and as such it is difficult to see how they can be construed as a contribution to the development of science in less developed countries. Science development is not a science, and hardly even an art yet. Experience in it is limited, and therefore views might diverge as to what the best road to salvation may be. The aim,

therefore, is to involve as many people as possible, with as divergent views as possible, each having an opportunity to work on the implementation of his particular approach, but none simply obstructing other people's efforts. It was with this in mind that I wrote the original article. Its two aims were (a) to offer some examples for efforts which, in my opinion, would be useful steps independently of what particular view of science development you take, but, (b) in case you disagree with my particular suggestions, to induce you to get personally involved yourself and devise and implement your own ideas and programs for science development.

References

1. "US Foreign Assistance in the 1970's: A New Approach" (Report To The President From The Task Force On International Development, March 4, 1970. US Government Printing Office, 1970-0-402-378).
2. M. J. Moravcsik, *Scientific and Technical Assistance in the Seventies* (to be published; preprints available on request).
3. "Foreign Assistance for the Seventies," President Nixon's Message to the Congress, September 15, 1970. Obtain from the Agency for International Development, Washington, D. C. 20533.

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University of Oregon
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More Gibbs

That the desire to memorialize Gibbs antedates that of H. Cassell and W. Giauque and others (October, page 67, and J. Chem. Phys. 42, 3, 1965) is suggested by the following definition of the "Gibbs" from Jerrard & McNeill's "Dictionary of Scientific Units" (Chapman & Hall London, 1963):

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A unit of adsorption suggested by Dean¹³ in 1951. A surface concentration of 10^{-12} mole cm^{-2} is equal to one Gibbs. The name commemorates J. Willard Gibbs (1839-1903), famous for his work on the phase rule.

¹³ Dean, R. B., J. Phys. Coll. Chem. (LSA) 55, 611 (1951).

This little dictionary probably ought always to be consulted before laying a name on something. Besides, it contains a certain amount of dry commentary that makes it interesting and amusing to read for its own sake.

W. W. ENNIS

Bell Labs
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