

powerful Senate Appropriations Committee, Allen Ellender of Louisiana, had suggested that science would compete more favorably for public support if it contributed more effectively to international cooperation with the Soviet Union. Likewise, Senator Fong, a friend of science and another member of the Appropriations Committee, is understandably interested in future development of scientific exchange with China. Basic sciences, like astronomy and high-energy physics, are particularly relevant to international exchange, since these fields at least do not have to worry about classified material.

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THE EDITOR COMMENTS: For a different view of the budget see our news story on page 69.

Minority groups

I am working on a project to publish a directory listing the scientists and the technically trained professionals representative of the Spanish surnamed and the American Indian communities. This project is a personal attempt to assist in the development of opportunities for scientific and technical training for members of these minority groups. Often programs designed to offer such training have been ineffective, or have not been implemented because the professionals needed to relate to such programs were not identified and could not be consulted. The problem has arisen in both government and industrial efforts. Hopefully the directory planned will help remove this obstacle.

I have solicited information from approximately 800 individuals, who were identified by analysis of membership listings of societies or associations of which I am a member. However, to make this effort more complete, I ask that anyone not yet contacted, who feels he should be included in the directory, should write me.

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Superconductors

The article by Bernd Matthias on "The search for high-temperature superconductors" (August 1971, page 23) unfortunately gives a rather parochial view of the field. The latter part of the article, which attempts to deal with the more challenging questions of higher-temperature superconductivity, is particularly

disappointing. This results from a number of imprecise statements, omissions and trivial errors, some of which we wish to point out here.

First, following a reference to my work on the possibility of superconductivity occurring in organic structures, he states that instead of becoming superconductors, "the compounds" become ferroelectric semiconductors and backs this up by quoting the work of L. I. Buravov *et al.*¹ While the compounds studied by Buravov bear a superficial resemblance to those required by our theory, this is not sufficient. A careful study of the theory would show that there are precise criteria that must be satisfied before one could hope to test the basic concept. The problem of synthesizing the compounds that we believe are needed is comparable in degree of difficulty to the total synthesis of a complex natural product. This study is opening up new areas of organic and metal-organic chemistry, and while progress has been good, it would be naive to expect a solution to so difficult a problem in only a few man-years. In addition, many theoretical questions remain to be answered, and some of these answers depend upon material parameters that are not yet available. In view of these problems, some of which are analogous to the prediction of the classic crystal phases, it is curious that Matthias should so uncritically consider the example above as a proof of the stability of the ferroelectric phase relative to the superconducting phase.

Secondly, through a serious omission Matthias gives a misleading impression of W. L. McMillan's² beautiful work on the theoretical reasons for an upper limit on T_c . After criticizing earlier those who are unwilling to deal with instabilities in superconductivity, Matthias quotes McMillan's figure of 40K for the predicted maximum T_c for V_3Si -like compounds. Unfortunately, however, he failed to note that McMillan very clearly states that this figure is based on the assumption that in this structure the phonon frequency can be decreased indefinitely. In fact, McMillan goes on to say: "Of course, this is not the case. We are likely to drive some phonon mode unstable, so the metal prefers a different crystal lattice. . . . This would set an upper limit on the coupling constant that one could obtain experimentally and provide a stronger upper bound on T_c ." These instabilities are, of course, well known and have been extensively studied by all serious contributors to this field.

Thirdly, Matthias appears to believe that the exciton theory of a possible high-temperature superconductor has been disproved theoretically by the work of J. P. Hurault.³ This conclusion is the result of a rather trivial error in Hurault's paper, which has been pointed out

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