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Science: Support, Excitement

When President Carter's science budget for fiscal year 1979 was announced, the scientific community was gratified with the proposed increases. Since then, however, there has been a long and difficult series of debates in Congress. In the aftermath of these debates it will not be possible to point to large dollar increases. In consequence, a letdown feeling is likely to affect members of the scientific community. The financial blow is likely to be compounded by a feeling that science is no longer unquestioningly accepted by our nonscientist peers. Two extremes of reaction are possible. One is self-pity and withdrawal, which is self-defeating. The other is Pollyannaism, which is stultifying. Instead, a realistic appraisal can be constructive and useful in furthering the field itself.

At the outset it can be flatly asserted that the support initially requested in the President's budget could have been used effectively. Indeed, even the agency requests might well have been used effectively. So unless it can be shown that the federal support that has been made available is too little to be of any use, it behooves us to apply the funds appropriated to the best effect and move on along the road to support for fiscal 1980.

There are two points that must be made with regard to the seemingly endless struggle to maintain public support of basic science. The first is the desirability of constantly maintaining a certain degree of tension in the allocation of public money. It can be argued that tension in itself is valuable to the field because it minimizes laxness.

The second point is that during the last 10 years of seemingly constant dimunution of support, science itself has flowered. It is appropriate to suggest that science is in a state of revolutionary advance. By this I do not mean great new societal advances, but rather scientific gains. And one can easily defend the proposition that an advance in the understanding of nature is the vital first step to the development of technology. Indeed, that has been true for many of the great inventions, such as McCormick's reaper.

Some examples illustrating the vigor of science may be given. The virtual proof of the concept of plate tectonics and sea-floor spreading certainly is a leading one. So is the enhanced insight that has been gained not only into the structure of large molecules but also into the dynamics of their association into binary spirals, clusters, and sheets. Impressive developments in picosecond spectroscopy make it possible to look at atom groupings in time intervals not previously considered when thinking in terms of stability, and thus the very concept of the molecule may require alteration. Developments in Raman and infrared laser spectroscopy provide a means of exploring the liquid phase that has never before been available, giving insights into particle dynamics that should greatly expand our understanding of critical phenomena and of ion mobility in solutions. And to these we may add microelectronics, computer applications, great new astronomy experiments, and so on.

Two general aspects deserve mention. The first is that outstanding instrumental gains lead the advances. In particular, incisive molecular sensors permit experimentation that unblocks long dormant theoretical paths—for instance, the Debye-Hückel-Onsager theory. The second general point is that the new insights have led to convergence within scientific disciplines as well as between them. In other words, the unity of natural science of a couple of centuries ago, which was lost in the specialization needed to understand the parts, may be more approachable again.

Look at the facts in your own area of interest and it is likely that the same statements can be made. If that is so, how can we say that science is eroding? Of course, we must not be complacent, and we must not destroy ourselves by self-inflicted wounds. Our pursuit of the nature of nature has never been more exciting.—NORMAN HACKERMAN, *President, Rice University, Houston, Texas 77001*