

Letters

The Poor Are Getting Richer

I should like to comment on the article by Eric Hutchinson, "Politics in higher education" (27 Nov. 1964, p. 1139), from the point of view of a member of one of those smaller institutions which are supposed to be rapidly degenerating. [Hutchinson wrote that as a result of government support of university research, through which "The rich get richer and the poor get poorer, . . . the poor institution gets poorer and poorer in the quality of its faculty."] I believe the effects of research grants on the small colleges and universities are not as bad as he implied. A survey of electrical engineering departments, particularly in the West and Midwest, will show that almost without exception the faculties are considerably stronger than at any time in their previous history. Certainly there has been an improvement in the diversity and quantity of educational background of the faculty members. In addition, a considerably larger fraction of them are engaged in research than would be possible without government funds.

At the University of Colorado almost all the faculty members with appropriate qualifications have been able to obtain support for their research needs (that is not to say that we have been able to obtain all the funding we should like to have). Research grants have made it possible for a fair number of men to work at institutions where as little as 10 or 15 years ago research activity was practically impossible because of heavy teaching loads and lack of funds. There is certainly a danger that the rich get richer and the poor poorer; however, I think an examination of the current situation will show that although the rich have been getting richer, the poor have also been getting richer, and possibly at a greater rate. Again speaking from experience at the University of Colorado over the last 2 years, we are currently in a position to draw staff with better backgrounds and from a wider variety of institutions and indus-

try than at any time in our previous history. This seems to be true at most of the universities in the Rocky Mountain and midwestern regions, and along with this there is a rapid increase in the graduate enrollment. Similarly, I believe you will find that the contributions of new and important ideas from these universities to the national scientific community are increasing.

The "emergence of a small number of super-universities of extraordinary prestige" which Hutchinson foresees need not be at the expense of the other schools. There are more first-class staff members than can be accommodated on a few campuses, and, if the granting agencies will continue to recognize talent where it is, the smaller institutions will continue to improve in quality. Additionally, members of the faculties at the most prestigious universities must be careful not to inflate their own importance in the same way that those of us in the less well-known schools are likely to exaggerate our contributions, for, as in the past, the best-known schools will continue to have a great deal to say about how our country's educational and scientific programs develop.

FRANK S. BARNES

*Department of Electrical Engineering,
University of Colorado, Boulder*

Science Self-Generated

I wish to examine critically some remarks of V. R. Potter ("Society and science," 20 Nov. 1964, p. 1018) concerning the historical roots of the "upsurge in molecular biology." According to Potter, the freeing of funds from the polio program, owing to the development of a killed-virus vaccine, as well as a coincidental increase in the support of cancer research has "permitted and encouraged the expansion of . . . research with no particular disease in mind or research that is directed toward understanding the nature of life processes in general. . . . What has emerged is the new science

of molecular biology. . . ." The tenor of these remarks is that the upsurge in molecular biology was a direct consequence of the fortuitous availability of research capacity and of funds that had been raised to support "a great humanitarian effort to increase the well-being of mankind." In the light of these remarks, molecular biology takes on the character of a somewhat prodigious child of medical research.

Such a pragmatic view is not unusual in this technological society and era but misleads with respect to both the actual history and the inherent developmental tendencies of the sciences, in this particular instance, of molecular biology. Proof that DNA is the physical carrier of heredity goes back to 1944 (O. T. Avery, C. M. MacLeod, M. M. McCarty, *J. Exptl. Med.* **79**, 137). The term molecular biology was introduced independently in 1952 by P. Weiss and W. T. Astbury (P. Weiss, personal communication). The DNA model with its genetic implications, according to Potter the "icon" of molecular biologists, was unveiled in 1953 (J. D. Watson and F. H. C. Crick, *Nature* **171**, 737, 964), and the existence of a genetic code was first proposed by G. Gamow in 1954 (*Nature* **173**, 318). None of these germinal accomplishments can be related to a sudden influx of funds from seemingly completed or intellectually unfocused medical-development programs. Not without humor, Potter has pointed out that "molecular biologists have a religion all of their own." I do not believe, however, that he would be prepared to accept the premise that the upsurge of religions results from the availability of funds for the erection of cathedrals or the remuneration of clergymen.

The central issue is raised by the mutually opposing views of scientific research as a promoted and utilitarian activity or as an autonomous development of cognition of the laws of nature. The contemporary scene is populated by promoters of research, a fact which may not be unrelated to the "unbalanced growth" of research expenditures as compared to the growth rate of the scientific community or the scientific literature [D. J. de Solla Price, *Little Science, Big Science* (Columbia Univ. Press, New York, 1963), pp. 92 ff.]. It is especially true that the medical Establishment in the U.S. is functioning as one of the large promoters of the life sciences; so did agriculture several decades ago, and so