17 September 1982, Volume 217, Number 4565 **SCIENCE**

Differing Values in Academia and Industry

Many universities are examining searchingly their relations with industry. The basic reason is financial. The academic community is nervous about federal funding of research. Some universities report that they have retained a satisfactory level of support, but half or more have not. Apprehension about federal support has been coupled with other financial problems of the universities brought on by recession and inflation.

In this environment it has become fashionable to look to industry as a possible source of funds. Already a number of universities have entered into contracts involving substantial sums, and additional arrangements will doubtless follow. In general, industry has not been devoting a sufficient sum to basic research within its own laboratories or elsewhere. It was treated to a lesson when a large number of companies were caught flat-footed by academic developments in molecular biology. Other sectors of industry have become concerned about future supplies of personnel trained in computer-related fields.

Despite an apparent basis for close cooperation between academia and industry, the likely outcome is far from a cure-all for the financial ills of the universities. The money spent by industry at universities is unlikely to top 10 percent of the federal funds they now receive. Close cooperation between universities and industry could lead to harmful tensions induced by competing value systems. Universities already have their share of such differences. The humanists look down on the engineers and vice versa; the various science departments usually have little interaction. However, the faculty share common goals in the pursuit of knowledge and in fostering the education of the young. Most of the faculty place these goals above that of attaining personal wealth.

The value system and the mode of conducting research and development in industry are quite different from those of academia. To survive, a company must make a profit. It must evolve with the changing times. And it must be well managed, with a clearly defined chain of command. The bankruptcy courts are very busy these days. Only the strong and nimble remain viable.

In industry, the pressure of the bottom line inevitably dictates policies with respect to R & D. The goal is not pursuit of knowledge; it is the attaining of proprietary advantage. Accordingly, research results obtained at industrial laboratories often go unpublished or are released slowly in the patent literature. In the university, fast publication of scientific findings is eagerly sought. Much of the activity in industry is conducted by interdisciplinary teams whose members are arbitrarily assigned to tasks. Projects may be suddenly terminated. Only a favored few in the typical industrial laboratory have the privilege of personally choosing a research area and sticking with it through discouraging phases of effort. This frenetic tempo is incompatible with the tempo of graduate training in the natural sciences. In their thesis research, it is essential that students pursue a line of inquiry patiently and in depth.

These examples of differing values and procedures make it obvious that close collaboration between academia and industry is likely to create new problems and tensions. That is not to say that cooperation is undesirable. One time-tested method of cooperation is that of consultation, preferably conducted off-campus. Professors spend at most an average of a day a week at this. They bring their expertise to industry and in turn learn of new developments and new job opportunities for their students.

However, some of the new arrangements between universities and industry come close to inserting an industrial enclave into the campus. It would be unfortunate if such examples were carelessly multiplied. Rather, emphasis should be placed on avoiding relationships that might damage the universities and their ability to carry out well their essential functions of undergraduate and graduate education.—PHILIP H. ABELSON