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"Current Comments"

Identifying Paradigms in Science

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Unquestionably the work of Thomas S. Kuhn has become one of the most quoted in the literature of science history and policy studies.[1] Stephen Brush's provocative article in *Science* reminds us of this fact.[2] Brush also reminds us that "scientists are not supposed to be concerned about personal priority rights in a discovery," citing Robert Merton's work on scientists' behavior patterns.[3]

I have often wondered about this squeamishness among scientists to avoid any appearance that they should seem to covet honor. Indeed, I have the impression that older scientists assume this posture more often than younger ones--perhaps because they can now afford the luxury of playing at being above and far from the madding crowd.

But I also suspect that some 'older' scientists may sometimes, nevertheless, resent that they must share the glories of recognition with younger men who, without their guidance and sometimes direct assistance, might have achieved less. But that is the price one pays in becoming a scientific entrepreneur. In order to enlarge any activity, you have to share the glories and the profits--whatever the form they take. So much of human conflict arises in the resolution of just rewards for all concerned.

I suppose our Chinese counterparts today might argue that the Western ethos betrays a highly egocentric ambitiousness. This is probably a distorted view of American life, where in fact the vast majority of people must seek satisfaction in a collective pride.

One reason that America is hurting so badly today is that Watergate and all it implies has destroyed for millions that collective pride which sustains them through life's travails. A few really fantastic scientific breakthroughs by American scientists could fill the enormous vacuum created by the Nixonian debacle. If our political representatives in the Congress would recognize this, I am confident they would pour out largesse for science without demanding 'hard facts' to justify support of research. What a lift to American research would result if 1974 or 1975 could produce a vaccine against syphilis, a landing on Mars, or a cure for multiple sclerosis or schizophrenia! Probably a breakthrough in treatment or eradication of schistosomiasis would do more for American foreign policy objectives than either the peregrinations of Henry Kissinger or the millions we have poured down the military drains of developing countries.

I thought of all this in connection with ISI® 's work on co-citation analysis.[4] Identifying where the action was and is, that is, identifying the paradigms in science, may better help us focus our attention on the task of ordering our

priorities. Using various techniques of citation analysis, we have found a number of 'new' specialties that did not show up in 1972, but emerged in 1973 in clusters of highly cited papers. Some examples are: parathyroid hormone in clinical research; vibrational relaxation studies using lasers; lymphocyte reactivity and transformation in cancer patients. I do not mean this suggestion to imply that we prefer support of mission-oriented research at the expense of basic research. But once we have defined new areas of emerging research, those in a granting capacity can provide extra temporary support, but not at the expense of broad-based support of all basic research.

Maybe a regular critical examination of what we've got will enable us to select one or two projects each year that the public can really understand and that contribute to national pride. Perhaps this kind of 'nationalism' will be deplored by internationalists, but somehow I feel that the world might one day forgive our trespasses in Vietnam if we were to direct even a fraction of the energy and resources wasted there to pride-producing scientific breakthroughs. As in other areas, nationalism in science can act as a spur to creative competition.[5]

Nixon may have made his worst mistake in fiscally disabling the scientific community. Scientists may not be a political force, or, as yet may not have established the political lobby they need.[6-8] But, unlike most politici ans, scientists have much greater potential for the real accomplishments of which we can all be proud. The extent of this potential is beautifully outlined in a recent article by Lewis Thomas.[9]

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3. Merton, R.K. Behavior pattern of scientists. *Amer. Sci.* 57(1):1-23, 1969.
4. Garfield, E. ISI is studying the structure of science through citation analysis. *Current Contents®* No. 7, 13 February 1974, p. 5-10.
5. Grinnell, G.J. Nationalism in science: how it sometimes can be a positive influence. *Science Forum* 6(4):6-8, 1973.
6. Garfield, E. Biomedical and health care systems research should be financed from social security and health insurance funds; a permanent lobby could swing it. *Current Contents* No. 3, 16 January 1974, p. 5-7.
7. ----------. We need a lobby for basic research: here's how it might be done. *CC®* No. 11, 14 March 1973, p. 5-7.
8. ----------. Copyright and research funding have some interesting points in common. *CC* No. 9, 27 February 1974, p. 5-7.
9. Thomas, L. Commentary: the future impact of science and technology on medicine. *BioScience* 24(2):99-105, 1974.