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ABSTRACT

The study of environmental matters on a global scale provides a series of unique problems and priorities in order to accomplish genuine innovation and social change. There is a need to conceptualize and understand the differential boundaries between natural and social systems. Three types of problems to be dealt with range from cultural perceptions of nature, to attempts to regulate and manipulate the environment, to questions about the receptivity of various groups to new technologies. Habits of thought need to be challenged in the area of how to interpret change. Many research questions must look into the future for long term changes and solutions encompassing a century or more, rather than limited time-frames of years and decades. This more evolutionary time-frame requires new and different concepts and units of analysis. For example, when climate is examined in a longer-term perspective major changes are found within the last 1000 years along with important variations within centuries. In addition, today's science and technology must not be recognized as universal, neutral, and value free but as a product of western culture. Some priorities for future environmental studies include the conscious attempt to place research in a larger overall time span and to become sensitive to the various cultural interpretations of science and technology. (DE)

ENVIRONMENTAL STUDIES: SOME PROBLEMS AND PRIORITIES

by
Kenneth A. Dahlberg

The study of environmental matters on a global scale has a number of attractions; it blends well with some of our cultural predilections towards "thinking big" as well as with some of our scientific ones towards thinking universally. There is also the excitement of watching and participating in the unfolding of new intellectual, professional, and political enterprises. And as with any new enterprise, there are genuine prospects for important changes as well as the risk of serious miscalculation or misconception as new combinations of men and women seek to examine new problems or to look at old problems in new ways. Barabara Ward, in her speech at the Stockholm Conference, remarked upon both the profound re-thinking she observed going on throughout society and upon the tendency for "new" facts--such as the vulnerability of the oceans--to so rapidly penetrate the human consciousness as to become truisms.[1] However, as the Stockholm Conference and subsequent developments have shown, it is one thing to gain international recognition for an idea such as the vulnerability of the oceans and quite another to gain agreement on what should be done when and where and by whom (and at what cost) to avoid irreparably damaging them.

Such mixtures of old and new can be seen as a result of the usual tensions between innovation and habit that accompany any major social change. In environmental studies, as in other fields, we must be very careful that our innovations do not turn out to be superficial or simply new variations of old habits of thought. One of the virtues of multidisciplinary work is that it may finally force one to recognize certain underlying habits of thought, certain assumptions, which when recognized provide the opportunity for genuine

innovation. Caution is therefore in order in dealing with "new" concepts. A recent example can be seen in the calls for global and holistic views of the earth--views which often suggest that since the earth is ultimately one ecosystem, political and social systems should follow suit.[2] While such views are appealing, when one examines things more closely, one finds that even in the physical world there are a myriad of interacting subsystems which go into making up the global ecosystem. Similarly, the political and social world can perhaps best be seen as analogous to those intricately carved ivory spheres from the Orient that nest one within the other. Seen from 10 meters they look like a solid ball; examined closely, one sees the interrelated separateness of the spheres as well as their individual filagree.

The critical theoretical problem in dealing with the relationship of wholes to their parts is that of the boundaries between them, particulary the question of the degree to which they are <u>differential boundaries</u>. While there is some concern in theoretical ecology in identifying systems and sub-systems and in tracing out their broad interactions, it is only in case studies that the variability of boundaries between them is thoroughly discussed in terms of rates of energy flow, threshold levels, etc. Equally, in international relations theory, macro-approaches have tended to postulate various systems and sub-systems and then focus on one or the other. Rarely is there any explicit formulation of the concept of differential boundaries and it is again only in case studies that one really gets at them. Examples range from tariffs and quotas in the economic realm, to visas and immigration laws in regard to people, to censorship, jamming, and cultural exchanges in the realm of ideas. Lack of sophistication in this area can have policy costs. For example, it would appear that the Arabs gained a great policy advantage recently through their awareness of political/economic/technological interconnections of international

oil, whereas many Western policy planners looked only at the economic dimension and placed too much reliance on a free trade model where price is seen as the major factor influencing rates of flow between sub-systems.

Beyond the recognition that there are differential boundaries of great complexity within natural and social systems lies a more fundamental challenge facing those interested in environmental studies: the need to try to understand and conceptualize the differential boundaries between natural and social systems. The types of problems to be dealt with here would range from cultural perceptions of nature and the environment, to attempts to regulate and manipulate the environment (both engineering and agriculture have tended to be viewed largely as uni-directional processes where man is the master), to questions about the receptivity of various groups to new technologies.[3]

Another area where habits of thought need to be challenged can be found in our tendency to understand the past, present, and future in quite similar terms. While we recognize that changes in distance give us quite different perspectives of the same object (for example, the ivory sphere), there has been very little discussion of the changes required in the units of analysis that we use as we shift from one time frame to another. Part of the fuzziness one finds in this area results from the tendency of social scientists to use only those units of analysis associated with what I call the policy time-frame (covering a period of up to ten years). While a number of research questions and units of analysis have been developed which are generally appropriate to this time-frame, difficulties arise when these questions and units are projected back into the past or into the future to try to consider longer-term changes. In examining changes over a period of approximately a century (what may be called the developmental time-frame), it should be clear that rather different

research questions and units of analysis are required. That this is not clear can be seen in the "misunderstandings" between conventional and Marxist economists which are in good part due to the different time-frames and units of analysis that each of them uses.

An evolutionary time-frame (covering a period of several centuries) requires yet again different basic questions and units of analysis. Just as different scale maps have different capabilities and limitations, each time scale has certain trade-offs between comprehensiveness and detail. The main point here is not to try to explore the many fascinating implications of using different time scales and trying to discuss the appropriate questions and units of analysis for each, but to suggest that we all tend to be very sloppy in moving back and forth between time-frames without consciously making adjustments or even asking what the appropriate phenomena to be studied at each level are.[4]

Once one begins to work with the idea that different time frames require different units of analysis and concepts, it becomes clear that phenomena which may be considered constant for purposes of analysis in the policy time-frame are often quite variable or discontinuous if they are looked at in terms of the developmental or evolutionary time-frames. For example, most historians and futurologists tend to assume a constancy of climate and project current climatic conditions forwards or backwards. However, when one looks at climate in a longer-term perspective, one finds that there have been major changes within the last 1000 years and that there are important variations even within the centuries.[5] One finds an equal variability among all of the basic elements of agriculture over the last millenium, including variations in the distribution of vegetation and soils. Also, there have been major man-induced

changes in crop seeds, domesticated animals, etc. At the other end of the time scale, the work of biologists on circadian (daily) rhythms and on biological time clocks has shown that the capacities and sensitivities of animals vary tremendously over the day. For example, one half of a litter of rats given a heavy dose of X-rays at their daily biological peak point did not die for 120 days; the other half, given the same dose at their daily biological low point, died in ten days! Similarly, it has been found that certain pests can be killed with half the dose of pesticides at their most inactive biological period as compared to their most active period. Among men, the statistics on accidents are significantly higher among those who periodically work the night shift than for those on the day shift. Again, the point here is that our current theories and methodologies tend to encourage over-universalization--which in this case involves assuming constancy where significant variation exists. What is needed is to look more carefully at the habits of thought that lead to this as well as at their intellectual and practical costs.

We need to beware of over-universalization in regard to science itself. The historic growth of science and technology has been in the West, and much of modern science is intimately linked with highly sophisticated technologies produced by elaborate industrial establishments. What this suggests is that a part of what is usually called science is in fact cultural and historical baggage.[6] The risks of simply assuming that the whole package of science/folk science is neutral, value-free, and universal can be seen especially in agriculture. In both the attempts at colonial agriculture in the 19th century, and in the current attempts to "transfer" the green revolution around the world, the cultural parts of the package become painfully obvious in the form of unanticipated results. Unfortunately, rather than seeking out the cultural (and ecological) incompatibilities, the usual reaction is

to blame outside factors--insufficient administrative back-up, political interference, the "irrationality" of peasants, etc. The suggestion here is not that there are no universal aspects of science, but that modern science is an admixture of universal and Western elements. And of course it is only by more carefully examining the historical and sociological evolution of science itself and comparing its development in the West with how other cultures conceive of nature and science that one can gain a better estimate of which elements of "science" are universal and which are culturally relative.

The various theoretical considerations discussed above suggest several priorities in developing research strategies for global environmental matters. First, there must be a conscious attempt to place research in a real space-time context. This means several things in my view. To go back to the analogy of the ivory spheres, it means that one must know which sphere he is talking about (that is, which level of analysis he is working at) as well as the relationship of that sphere to the other spheres. It means that one needs to have an awareness of the different qualities that are observable at different historical removes, i.e. one needs an awareness of how each of the time-frames bears on the topic under consideration. Also, since we necessarily utilize the conventions, institutions, and instruments of "science" and technology when examining the whole world, we need to have an awareness of the capabilities and limitations of each. In addition, we need to become sensitive to the various cultural distortions that are introduced when a mixture of science and Western folk science is unconsciouly transplanted to other cultural and technological soils.

This does not lead to a criticism of specialized studies per se. It rather suggests that specialized studies need to be developed and understood in terms of these larger contextual dimensions. It also means that we must

exercise caution in using existing studies which have not taken the above points into consideration. For example, works which assume a constancy of climate (whether they are historical or futuristic) need to be re-examined to see if that false assumption does violence to their explanations or predictions. An obvious difficulty immediately arises, particular in terms of historical studies: how do we know what the actual variations in climate were over a particular period? It is only recently that there has been much historical research aimed at answering this question. One can therefore say that to the degree that our understandings of current and projected environmental dilemmas are dependent upon accurate historical data regarding variations such as this one, we shall have to encourage new historical research and a rather wide-ranging re-interpretation of previously written histories. Such historical research, just like current research in environmental studies, will have to try to bridge the gaps there are between the natural and social sciences.[7]

The knowledge and communications gaps between the natural and social sciences--just like the "cultural" differences C.P. Snow described between the sciences and humanities--tend to be exacerbated by the institutional specialization of the academic and business worlds. In attempting to bridge some of these gaps, any environmental research group ought to be concerned with minimizing the problems of institutional specialization and arteriosclerosis. We might do well to examine the experience of other major attempts at multidisciplinary work in the past; for example, the various foreign area research institutes that were established in the 50's and 60's. While the risk of co-optation by government agencies is obvious, the risks of a folk science-based ethnocentrism and of progressive specialization are less obvious, more controversial, and more difficult to deal with organizationally.

Overall then, there are at least three qualities called for in global environmental studies: 1) independence, 2) adaptability and 3) the ability to place things in a multifaceted space-time context. We live in a time of change, a time when there is the possibility to re-think, re-work, innovate, and perhaps even create. The barriers to this are habits of thought, habits of culture, and habits of organization. While it is clear that man cannot live without habits, it is not clear that we can continue to live with our current ones. Given the role that scientists and intellectuals have had in building up our current repetoire of habits, it would appear incumbent upon us to attempt to demonstrate the new modes of thought, organization, and cultural awareness that are so needed.

NOTES

1. Barbara Ward, "Speech for Stockholm" in Maurice F. Strong (ed.), Who Speaks for Earth? New York: Norton, 1973, pp. 19-22.

2. A typical exposition of this view can be found in Lester R. Brown, World Without Borders, New York: Vintage Books, 1972.

3. Sensitivity to critical environmental changes would also fit in here. One wonders if the situation of Western societies is not analogous to that of the frog, which while it will immediately jump out of hot water if placed therein, will simply end up being cooked if placed in cold water which is gradually heated to boiling.

4. Such differences are more consistently recognized--if implicitly--in the life sciences. Evolutionary theory includes such units as species, habitat or climate change, and concepts such as adaptation. The theory of succession--dealing as it does with a shorter time span--tends to focus on different units and to be more geographically specific. As the time scale is further shortened, the units of analysis and the research questions asked change accordingly.

5. H.H. Lamb, Climate: Present, Past and Future, London: Methuen, 1972.

6. See Kenneth A. Dahlberg, "The Technological Ethic and the Spirit of International Relations," International Studies Quarterly, Vol. 17, No. 1 (March 1973), pp. 55-88.

7. For example, much of the work on the history of climatic changes involves such scientific dimensions as the study of tree rings, fosilized pollen, and glacial movements. These have to be combined with a sensitive study of conventional history plus agricultural history (itself a rather neglected field).

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