Letters

NAWAPA

Let me respond to your editorial (8 Jan., p. 113) on the $100-billion-plus North American Water and Power Alliance by agreeing that it would be large and that it is imaginative, but only within engineering limits. Four sorts of criticisms may be voiced.

1) It would destroy a great deal of the low-altitude wildlands of Alaska and Canada and a large fraction of the vestiges of such wildlands in the western states. No one, thus far, has undertaken to compare our need for these wildlands a century hence with our need for NAWAPA's boons, and no one on earth is either competent or in a position to do so objectively.

2) As premises, NAWAPA takes forecasts and definitions of use which are self-fulfilling, subjective, and self-serving. Burton and Kates, in a review [*Economic Geography* **40**, 82 (1964)] of three books published by Resources for the Future (RFF), have said:

> Demand for [water] . . . is not to be interpreted in conventional economic terms. . . . Water "demand" for the base year 1960 is really an estimate of the amount of water actually supplied. Similarly, projected "demand" for the year 1980 is really that amount of water expected to be supplied. . . . [The RFF authors] are caught in the prison of their own assumptions . . . [namely] that things will change but only in the way and at the speed that they are now changing. . . . The danger which we foresee is that projections may become self-fulfilling prophecies.

3) The NAWAPA proposal is in no sense an optimum, because imagination in seeking alternatives has been limited to engineering alternatives. Imagination must not be limited to alternate conduits or tanks. It must also ask whether we should electrodialyze the Colorado River to reduce the surplus of water required for irrigation in order to carry salts out of the soil; whether we should distill treated sewage in order to escape the free energy of removal of salt; what the economies of scale in desalination are. And we must be just as sure about the economies of scale and the technology of desalination a century hence as we are about the technology of water storage and transportation. Imagination must also inquire into the nature of "use." By and large, water is used only to carry something and, excepting for the transport of nutrient in irrigated plants, to carry away something not wanted, including heat. Is our imagination really so narrow that we can envision no other way to serve these purposes?

4) The major problem is quite separate: Common practice among those concerned with resource development is to take population as an independent variable, and population projections as immutable, sacred. Discarded by the engineers are the host of "if's" either tacit or explicit in the demographers' projections. . . . In fact, we do not know what the future will bring. While a ten-year projection seems to leave little room for uncertainty, still the halving of Japan's birth rate between 1949 and 1957, the failure of the American birth rate to drop as Sweden's dropped following a post-World-War-II "bubble," the persistence of California's growth, each of these has shown that earlier projections were not prophetic. The hundred-year projection should have uncertainties at least as great as the tenth power of the uncertainties in the ten-year projection.

One point comes clearly out of this: If we must plan for the century ahead, we cannot regard population as the independent variable. Whether or not we wish to plan populations as well as the facilities to serve them, we cannot escape the proposition that virtually everything we undertake will in some obscure way affect population changes and, thereby, the facilities needed. Even if we can identify all the significant influences and ask our computers where we go, the answer that results will itself be a significant influence. And when we include it in the computation, will we have an iteration sequence that converges or diverges? For, whereas the short-range forecasts seem to have a self-fulfilling quality, in the long range they should be self-defeating, whether they forecast "Our Plundered Planet" or "Enough and to Spare." Certainly a society convinced by the pessimistic forecast will modify its course to avoid such a fate, and a society convinced of the other will probably expand until there is nothing to spare. How far ahead does "self-fulfilling" neutralize "self-defeating"?

NAWAPA is a program of bankruptcy. After the water "for as long as 100 years" supplied by this development has all been "used," what next? And if we find a way to wiggle out of the predicament of A.D. 2065, how about that of 2165? No problem of population growth stemming from a static pattern of family size and death rates can be solved either by emigration or by technology. It can only be solved by a changing pattern of family size or of death rates. Science, technology, emigration can only postpone the issue. If the time gained by postponement is not used to find a solution in smaller families, then the problem will only have been enlarged. At today's growth rates, in each 35 years the piper's bill is doubled. It would seem the part of providence to attack the issue now rather than when time has come to an end. It would seem the part of providence not to lull an audience by telling them they may go their way secure in the knowledge they will be cared for.

If we must build NAWAPA, let us wait until we know our doom is at hand, and when our last realizable ambition is to amaze future archeologists.

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Cancer Chemotherapy Program

The Wooldridge Report on the activities of the National Institutes of Health (see News and Comment, 26 March, p. 1556) has failed to direct attention to the most significant achievements of the Cancer Chemotherapy Program. Whereas most research is rapidly reported at scientific meetings or disseminated in the form of articles in the scientific journals, the vast data accumulated under contract research is much slower in rising to the surface.

The primary screening program dealt with 75,000 compounds. It was fairly easy to publish the negative data. Most of the positive data have not been published, as the development of these leads is still in progress. Interim re-