

Seven out of ten drink it

Seven of every ten people in the United States live in places of 2,500 or more population; three-fourths of the people live on two percent of the nation's land surface. If present trends continue, 80 percent to 90 percent of the U.S. population will be living in urban areas by the year 2000.

This enormous concentration of people obviously creates problems, not the least of which is water supply. Very little scientific information is available, however, on how best to supply urban water needs.

In July 1969, the Secretary of the Interior instructed the Office of Water Resources Research (OWRR) to develop a national program of research in improving urban water resources management. This and similar actions culminated last year in a national conference on urban water research, sponsored by OWRR. Recommendations from the 60 experts who attended the three-day conference led to development of a National Urban Water Resources Research Program, published last week.

Technology for collection, storage, transportation, and distribution of water and for waste treatment is still far from adequate to cope with urban water problems, according to the report. Research into supplying adequate amounts of water would take two directions—increasing the actual available supply and decreasing the demand.

Recycling, development of toilets that use less water for flushing, and adjustment of industrial processes to use less water would in effect decrease the amount of water needed by an urban area.

Research in desalination, studies of precipitation-runoff patterns with an eye to capturing and retaining the water and development of techniques to recharge ground water, such as by spreading runoff water over permeable soils, are some of the ways the report suggests to increase the supply of water available to a community.

Other areas needing much research, says the report, are drainage and waste disposal. Most of what is known about drainage was learned in rural areas and thus has limited applicability to urban water problems. "Waste treatment methods generally employed have not advanced very much in more than a generation." Industry constantly creates new wastes, requiring new treatment methods. Research should be directed both at reducing the amounts of waste materials produced and at producing residues that are more easily treated.

The report also recommends study of how computer technology and sys-

tems analysis can be used for gathering and storage of data and in simulation of problem situations that arise in connection with urban water supply.

On another level, research is needed into the environmental and ecological elements of the urban water problem. By definition, an urban area disturbs the natural environment and alters the natural balances among life systems. The report suggests research in urban hydrology, the extent to which man-made water bodies resemble natural bodies in their effects on the ecology, the relationship of water quality to the uses to which it is put, and the impact of various kinds of pollutants, structures and activities on the inhabitants of lakes, streams and estuaries.

The nonhuman elements in these processes can be measured and analyzed, but man himself "adds an overpowering variable to any ecological equations that cataloguers and analysts may seek to develop," the report says. Studies of human motivations, attitudes, values, preferences and patterns of behavior with respect to water use are thus vital to any attempt to plan for future water use.

The final part of the proposed research program is concerned with implementation of knowledge from the technological and environmental investigations. It is important, the report

HARDENING OF THE ARTERIES

Now the villain is protein

It was just beginning to seem easy to avoid hardening of the arteries, a condition which can lead to heart attacks and strokes. All one had to do was to avoid cholesteric foods: fat cuts of meat, shellfish, organ meats, butter, egg yolk and baked goods, according to the Inter-Society Commission for Heart Disease Resources in New York City (SN: 12/19/70, p. 46). Now a University of Virginia chemical engineer, Dr. John Gainer, and graduate student Guy Chisholm, have come up with evidence that cholesterol is not the only compound implicated in atherosclerosis; they find that protein is also a villain.

The way polymers behave in solution got the two chemists thinking about whether protein might be implicated in hardening of the arteries. For years people in the chemical industry had noticed that addition of polymers to a solution changes the rates at which gases diffuse through it. Then, reading that Danish researchers had induced atherosclerosis in rabbits by placing them in an oxygen-deficient (hypoxic) atmosphere, Dr. Gainer and Chisholm wondered whether protein (a polymer) might cause oxygen to diffuse slower in blood, reducing oxygen transport to

says, to determine what forms of organization are most effective for the development and operation of an urban supply system. Some activities may best be undertaken by private institutions. Large factories having large volumes of wastes may be better equipped to operate treatment facilities than the communities in which they are located, for example. The willingness of the public to vote bond issues for water improvements should be explored. Other areas requiring study are financing construction and operation of facilities; how, when and where decisions are made; and administrative organization.

The report recognizes that urban water problems must compete for public attention with many other issues, but asserts that they have particular urgency. Changes that can have serious effects, such as filling in a creek or building a reservoir are pursued on the basis of present knowledge. It is essential therefore, that the state of this knowledge be advanced as rapidly as possible. "Many of the decisions on water facilities and processes have profound or even irreversible consequences. Once the regimen of a lake or stream has been changed, the community and the nation may have to live with the result for a very long time, if not forever." □



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Chisholm, Gainer: Tissue scanning.