

EDUCATION AND RESEARCH NEEDS IN HYDROLOGY

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The recently developed awareness by governmental and other authorities of impending need to increase useable water supplies in the United States and throughout the rest of the world has brought a surge of interest in the general field of hydrology. Whereas few departments of hydrology have existed before in institutes of higher learning, within the span of a few years, as a result of this surge, many universities and colleges have added educational programs that cover all aspects of natural water occurrence and availability. Right now there is a search for qualified teachers to staff new or expanding departments, particularly in the area of ground-water hydrology.

The institutes of higher education in New Mexico, in line with the national trend, are developing and expanding their efforts in this area. Using three of our major schools as examples, the University of New Mexico has made major strides in the study of economic and legal aspects of water supply, New Mexico State University has expanded rapidly in the study of water use in agriculture, and the well established Department of Ground-Water Hydrology at New Mexico Tech has significantly enlarged its activities in the study of scientific aspects of hydrology. (This is not to suggest that these institutes are restricting themselves to development only in these areas of special interest.) Thus, a student in New Mexico who is interested in preparing for a profession in any area of water supply can find a school which will provide him with excellent training.

The several individual and inter-university cooperative research projects in hydrology that are being pursued in New Mexico colleges and universities provide important information to State action agencies, such as the State Engineer Office and the Department of Development. Cultural development in New Mexico, as elsewhere, has shown the general state geographic areas where potable and non-potable water is found, and the areas where great or small quantities of water are available for development. It is now the task of both the research agencies and the action agencies to refine this general knowledge, to encourage optimum use of available water, and to discourage practices that will be detrimental to the state's "hydrologic health."

Thus, we wish to apportion water in the most beneficial manner, to administer water supplies most equitably, and to use water most efficiently. We wish to find and develop new water supplies where they exist, to improve

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the quality of water where economically feasible, and to find new and beneficial applications for water while at the same time protecting existing water rights. Finally, we wish to better understand the occurrences of water; that is, the relation between water and the environments in which it exists.

I want to emphasize the need for continuing fundamental research that is implicit in the last statement above, not because it is any more important than any of the others, but because this need can sometimes be overlooked in the press for rapid economic development of water supplies. A project which today may seem to provide merely for the satisfaction of intellectual curiosity, can tomorrow provide the required knowledge or insight for a new type of water development.

An example of fundamental research in one area of hydrology is a project in Estancia Valley, New Mexico being carried on by New Mexico Tech in cooperation with the New Mexico Water Resources Research Institute. Part of this study is concerned with the hydrologic and geologic history of the basin as a means of explaining the presence of highly mineralized shallow ground water. In this basin changing meteorological conditions in the geologic past have strongly influenced the evolution of the basin to its present hydrologic and geologic condition. To obtain information in this "hydrologic" study, we are collecting data on meteorology, geology, paleontology, limnology, and archeology.

What the study will produce immediately in the way of "useful" information, I can only speculate on at this point; except, I hasten to add, that the graduate students involved in the study will, I hope, develop a "feel" for basin hydrology, a mental picture of a water basin as a dynamic system, and a recognition of the manifold interrelationships that exist between water and its environments. And these after all are the things that we as students must hope to learn. This is the essence of the science of hydrology that must be comprehended before we can speculate on what effects man's beneficial use of water will be.