in the fields of aerospace and oceanography will furnish a good foundation for development of the technology required to provide a good working environment for the operators of the rapid excavation systems of the future.

To sum up, we are confident that the resources are available to develop a rapid-excavation technology that will not only save the public money, but that will make available additional space that is vitally needed. The problems have been defined and, by using the systems approach to tackle all of them simultaneously, rapid progress can be made. An artist's conception of the future tunneling equipment and techniques is shown in figure 8. Note that all subsystems are compatible and continuous and can be controlled with minimum resources. The remotely-guided boring machine has a streamlined design. Both the temporary and permanent lining are being applied automatically and continuously. And the materials-handling concept not only provides for loading and transporting the broken rock continuously but also removes any dust generated and all of the water and gasses that may be encountered. This drawing illustrates the 15 year technological objective of Project Badger.

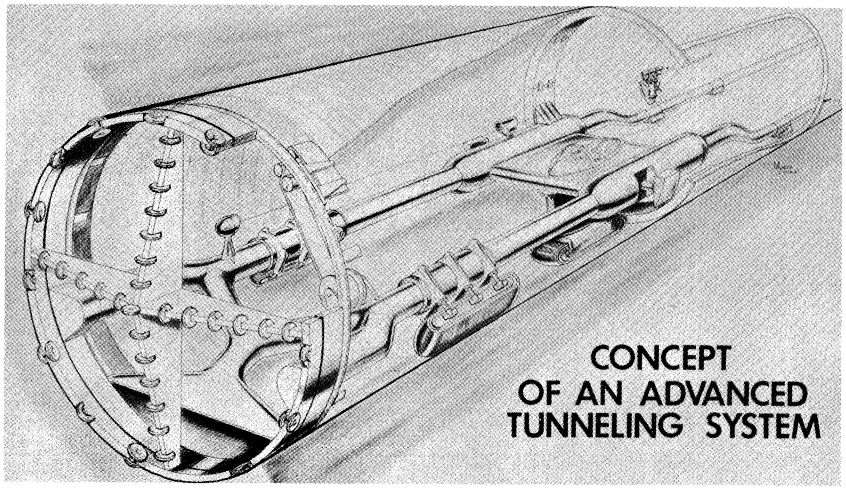

FIGURE 8

TUNA FORECASTING

The Bureau of Commercial Fisheries has very broad responsibilities, which cover all aspects of the fishing industry. We study the living resources in their natural environment to gather information necessary for conservation. We study the technology of fishing, fish preservation, and fish processing to reduce the cost of catching fish and to get them to the consumer in prime condition. To these ends we provide a variety of services to industry and the public.

It is not commonly recognized how large a scientific program the Bureau of Commercial Fisheries supports. We employ more oceanographers, limnologists, and marine biologists than any other agency, Federal, State, or private. Over 120 of these scientists hold a doctor's degree. We operate some 30 scientific laboratories on the ocean and the Great Lakes, and 12 research vessels longer than 100 feet. Many of our scientists and laboratories have worldwide reputations for their competence and special skills in radiobiology, shellfish farming, pesticides, air-sea interaction, plankton, and many other important fields of research.

In a short presentation it would be impossible to describe even the highlights of our scientific accomplishments and plans for the future. I do not intend to try. We have selected some aspects of tuna research, because the resource and its fisheries generally illustrate the problems and objectives of all fishery research.