News and Comment

Alaska: First Phase of Post-Quake Reconstruction Ending; Long-Term Scientific Program Is Under Way

In a few weeks winter begins in the southern coastal area of Alaska hit hardest by the big earthquake of 27 March, and the first phase of reconstruction will end.

In a report titled, "Response to Disaster," the Federal Reconstruction and Development Planning Commission for Alaska says that essential public services will have been restored by the time the freeze begins. Top priority was given to repairing water, sewer, and power lines. Schools are open for classes, roads have been patched, and airfields have been put back into service. Port facilities, which are so essential to Alaskan life, and which sustained perhaps the heaviest general damage from the quake and accompanying tidal waves, have gotten at least makeshift repairs or replacements.

(The tempering influence of the sea keeps the climate reasonably moderate in the Anchorage region, compared with some other parts of Alaska; temperatures reach freezing on only a few days in October in most years. The construction season, fortunately, is therefore not very different from that of some other northerly states.)

Emphasis since the earthquake has understandably been on emergency repairs, but now the stress is shifting to economic and resources-development planning. And it appears that the Alaska commission, created by President Johnson immediately after the disaster to coordinate federal agency relief and reconstruction activities, and headed by Senator Clinton P. Anderson (D–N.M.), is very soon to be succeeded by another body formed to oversee long-term development.

In the conclusion of its report, which may be taken as its swan song, the commission says, "The character of this long-range development will be very different from the emergency reconstruction phase. The pace will, of necessity, decrease and the emphasis will shift from construction planning and scheduling to economic study analyses and recommendations.

"As a result, the Commission and the Bureau of the Budget have developed an organizational concept which fits the requirements of this phase. For example, the focal point of the Federal organization will shift from Washington to Alaska. The State role in the planning phase will be a very active one, and the State Commission may also wish to modify its structure. Both the State and Federal Governments will be concerned with planning for the entire state, not just the disaster area. This long-range planning should move forward at once, building upon the momentum developed in the course of reconstruction."

Damages over $300 Million

As the title implies, the commission's report provides a summary of relief and reconstruction activities by federal agencies, particularly by the 11 represented on the commission. The report notes that early estimates of damage of up to half a billion dollars were reduced to a considerably smaller but still very sizable total of $311 million. Damage to public property—federal, state, and local—amounted to an estimated $234 million, while damage to private property was estimated at $77 million. Total federal assistance to Alaska as a result of the earthquake will reach more than $325 million in grants and loans, according to the report, which includes in this total everything from disaster relief and an additional $23.5 million in "transition grants" for the state government to added highway funds, various loans and purchase of bonds, and money for restoration of federal facilities.

While most of the federal funds have gone into physical reconstruction, a scientific program has been an integral part of the first phase of the recovery effort. At the outset commission chairman Anderson called for a major investigation of the scientific and technical aspects of the earthquakes (*Science*, 1 May, p. 515). A scientific and technical task force was established within the commission and assigned not only to study geology and soil conditions in the earthquake area in order to advise the commission on the "physical parameters in Alaska which should be considered in connection with reconstruction," but also to help shape a long-range scientific effort.

As a result of field studies by scientists and engineers from both federal agencies and private firms working under contract, zoning and engineering criteria have been established on which federal aid can be based.

The design for the scientific study has not been completed, but the report of the scientific and engineering panel to the commission includes a series of recommendations for long-term scientific and engineering investigations, and the major points have been incorporated into the final recommendations of the commission itself.

The U.S. Geological Survey, which was one of the federal agencies most heavily engaged in the scientific and engineering follow-up to the earthquake, intends to continue and broaden its work. The task force report says that the Survey

> is actively planning a comprehensive report on geologic and hydrologic effects of the Alaskan earthquake. As now visualized it will contain chapters on damaged cities and transportation routes, as well as discussions of each of the geologic factors such as regional uplifts and [subsidence] that influence damages throughout the state. Exploratory steps are being taken by the Survey to include contributions of data from other agencies in the proposed report, so that it will constitute a complete story of all earth-science engineering facets of the earthquake.

Also expected to play major roles in the proposed scientific study are the Office of Science and Technology and the National Academy of Sciences. A few days after the earthquake, President Johnson directed Donald F. Hornig, his science adviser and director of the OST, to provide technical assistance to the commission and to coordinate the efforts of the federal agencies doing scientific work in Alaska in the aftermath of the quake.

In his letter to Hornig, the President wrote, "In defining the scientific and technical questions involved and the related informational requirements for collection and assessment we hope that you will be able to enlist the aid of the National Academy of Sciences."

Last spring, NAS President Frederick Seitz appointed a 12-man committee headed by Konrad B. Krauskopf of Stanford. The committee has met twice, once in Alaska. An engineering panel was created by the committee and has been involved in the first-phase work on soil analysis and in advising on construction regulations.

Questions of financing remain to be settled, but the committee hopes to perform two main functions. First, it is already acting on Hornig's request that it review the efforts of both government agencies and private organizations with a view to advising on how gaps in scientific and engineering work may be filled. Second, the committee is interested in compiling a comprehensive report, requiring 2 or 3 years' work, which would cover not only geology and seismology but results of the quake which could be assessed through the life and behavioral sciences. This report would deal in detail with the response to the earthquake of the earth itself, of man-made structures, and of living things.

A Great Opportunity

The Alaska earthquake, as one scientist put it, was a "great catastrophe" but also a "great geophysical opportunity." In the words of the task force report, the earthquake provides "a unique opportunity to obtain and make widely known reliable scientific data concerning the cause and effect of seismic disturbances."

Knowledge gained could be applied in minimizing damage from future earthquakes and, hopefully, in developing means of predicting them.

The commission in its report recommended several specific measures to reduce destruction and loss of life—establishment of a seismic wave warning system in Alaska, improvement of seismic equipment, identification of hazardous areas, and promulgation of more effective building codes to be more rigorously enforced.

Revealingly, however, the lead recommendation of the commission was to "conduct additional research on earthquake prediction techniques and on the propagation of seismic sea waves."

Achievement of accurate prediction techniques is obviously highly desirable, but hopes for development of such techniques appear to be higher among nonscientists than among researchers in the field.

Until recently, theories of earthquake prediction were a hardly reputable subject among theoretical seismologists. Hypotheses had been put forward, for example, that disturbances in magnetic fields or ground tilting presaged earthquakes, but these were not substantiated to the satisfaction of geophysicists at large.

In the last few years, however, several things have happened to lend greater respectability to the subject. In Japan, where earthquakes are a familiar and often devastating feature of life, scientists decided that they owed it to their country to make a serious, organized effort in the field of earthquake prediction. No claims have been made, but an earthquake research group which included world famous seismologists has closely examined the field and identified areas where work would be justified and should be supported.

In the United States, the government's Project Vela, aimed at improving means for detecting nuclear testing, has contributed to the flourishing growth of geophysics in recent years. The sizable sums of federal money spent on Vela attracted sophisticated instrument designers to the field, and the flow of research contracts to the universities produced coveys of graduate students in seismology.

Scientists have also been acquiring significant knowledge of the way rocks fail, and new long-distance survey devices have provided detailed data on tens of thousands of earthquakes.

A Major Effort?

A major effort on earthquake-prediction research would require expenditure of substantial sums, compared to the almost negligible funds now being spent. The burden of deciding whether a bigger effort now is justified seems to lie primarily with an OST panel on earthquake prediction which was formed after the Alaska quake. The panel, composed of some of the most highly respected men in the field, has been meeting in the passionately anonymous style normal at this stage for OST and the President's Science Advisory Committee panels. Within a few months the panel is expected to come up with a recommendation on whether, in view of the state of the art, more money and talent can profitably be employed in research on earthquake prediction.—JOHN WALSH

Science in the Suburbs: Private Research Unit Discovers Flaws in Dependence on the Local Community

The Waldemar Medical Research Foundation, a small cancer research facility located on Long Island, New York, has spent the summer responding to articles in the Long Island daily newspaper *Newsday* that charged Waldemar with misuse and mismanagement of publicly donated funds. The repitition of charges (*Newsday* printed over 25 articles in 2 months) has produced a review of Waldemar's administrative records by the Nassau County district attorney and has caused the withdrawal of community support from an institution that was unusually close to the local population. Ordinarily such a situation would go unmarked by the wider scientific community, for neither the paper nor the foundation is well-known, and the conflict between them has overtones of a localized guerrilla battle for the support and affection of the Long Island natives. Though the details are primarily local, however, the Waldemar story illustrates some of the obstacles to closer ties between "science" and "society" that exist even when representatives of both groups have earnestly tried to communicate; it underscores the vulnerability of private research laboratories that lack affiliation with a large university or other institution; and, finally, it raises certain questions about the best method of providing support for science. While the argument about the desirability of extensive federal support continues, the summer experience at Waldemar suggests that federal support is probably to be preferred to certain of the alternatives.

To understand the extent of Waldemar's difficulties, it is necessary to understand the rather special ways in which the institution functioned in the community. Waldemar was founded in 1947 by Norman Molomut, then a bacteriologist at Columbia University's College of Physicians and Surgeons, where he had received a Ph.D. in 1939. Molomut's efforts to establish his own laboratory grew not only out of a personal wish to be his own master but also out of a conviction that the practice of science ought to have closer and more spontaneous ties with the community than was possible in more formal situations. Waldemar, named for an early donor, was thus to conduct social as well as scientific experiments.

At first the bills were paid mainly