pumping and containing equipment that water does. The remaining three projects are a process heat reactor, an advanced boiling-water prototype, and a small power plant.

Congressional Response

Chairman McCone described this program as "aggressive, forward looking, and one that will get results." But before he had completed his testimony a number of committee members, including Senator Gore (D-Tenn.) and Representative Holifield (D-Calif.) began criticizing the program as "timid" and "wholly inadequate." This occasioned the first open break between McCone and the committee. A relationship which Anderson had called "very good" at the opening of the hearings deteriorated rapidly as McCone lashed back at his critics for over-hasty deprecation of his program. The exchange, which reminded many observers of the acrimony that characterized the commission-Congress relationship when Lewis Strauss was chairman of the AEC, was not taken to be a serious threat to cooperation between the two groups but just a break in the surface harmony. The fact is that the commission and the committee are in fundamental agreement on basic issues. A major aim is competitive nuclear power for some areas of the United States within 10 years. Another is power for certain European nations within 5 years.

A Question of Leadership

One issue which troubled the committee members was concerned with the commission's exact role in advancing atomic power in the United States. Chairman Anderson said he was disappointed that the commission now regarded the construction of experimental prototypes as the domain of industry. The commission now takes the responsibility for planning prototype development, but in Anderson's opinion it should also continue to build them, as it did in its earlier years. The current policy, as put forth by Chairman McCone, is to invite proposals from industry to build prototype reactors of specified types. If no satisfactory proposals are received, the commission then goes ahead and builds the reactors on its own sites. As an inducement to industry, the AEC has proposed to Congress the concept of construction grants. Under this plan, which has the approval of the Bureau of the Budget, up to 50 percent of reactor-construction costs incurred by industry could be covered by a grant.

A Question of Degree

Although the AEC and the Joint Atomic Energy Committee have no fundamental issues dividing them, questions that are primarily ones of approach remain. The major problems seem to be two: degree of leadership that the commission should exercise and size of the country's atomic power program. The commission, presumably reflecting the Administration's tight budget policy, has indicated that it prefers to give industry every opportunity to exercise some degree of leadership and, at the same time, share some of the financial burden. It would also limit development to the more promising programs. The committee, concerned less with money than with the United States Government's domestic and foreign leadership in atomic energy, is calling for a more positive governmental role and a larger program. Moves made to date, including the restoration of a canceled public power project by the AEC, indicate that, despite that initial flare-up, there is a willingness to reconcile the two differing views on leadership and size.

Desert Agriculture in Israel

A study is under way in Israel to determine whether or not it is possible to farm the Central Negev Highlands with the exclusive use of rain and floodwater, as did the ancient peoples. Michael Evenari, botanist and vice president of the Hebrew University in Jerusalem, and his wife have been living this winter in a 2000-year-old farmstead at the site of the former Nabatean city of Subeita in the Negev desert.

The farm—five terraced acres with a network of channels, spillways, and regulators—has been reconstructed, and the well-preserved five-room farmhouse has been repaired. The couple expects to stay in residence for at least 2 years, the minimum time required for crop study.

Historical Background

Extensive remains of ancient habitation and agriculture are found in the Negev desert, which covers 60 percent of the total area of Israel. Flood irrigation, ancient terracing, stone clearing, and all other phases of irrigation work were carried out with outstanding technical skill by the ancient civilizations. Archeologists have studied the general form of the civilizations that were connected with these agricultural projects, but very little, if any, field and research work has been done to understand the basic features of these agricultural systems. Even less is known about the irrigation methods, crops, and agricultural practices that enabled these farming communities to flourish in the desert.

Most of this ancient desert agriculture is concentrated in the Central Negev Highlands, which lie at an elevation of 1200 to 3000 feet above sea level and consist of rugged rocky hillsides, cut by narrow wadies leading to broad flood plains. The typical loess soil of the area forms a shallow cover on the hillsides, while in the wadi bottoms and flood plains it reaches a depth of several meters. The annual winter rainfall is sporadic and seems to fluctuate widely, with a mean between 70 to 120 mm per year (3 to 5 inches). Very little climatological data are available for the region.

The ruins of at least five large cities have been found in the area—Abda, Subeita, Auja, Kurnub, and Halutza. These cities had a total estimated population of 80,000 to 100,000 inhabitants at the peak of their development. Most of them were originally founded by the Nabateans (200 B.C. to A.D. 100) and were later expanded and developed at the time of the Byzantine Empire (A.D 300 to 700). In the vicinity of these towns, well-developed agricultural projects have been identified that date back to the same periods. Some of these projects are relatively small in size—farm units of 1 to 4 acres—while others cover from 100 to 300 acres.

Ancient Desert Agriculture

Agriculture was developed only in the depressions, wadies, and flood plains, where loess accumulated. The slopes of the hillsides served only as water collectors for providing irrigation water and also for extensive grazing. The fields in the wadi bottoms and flood plains were always terraced with strong, well-built stone walls to stabilize them and enable the runoff water to penetrate into the soil.

Only the runoff water from the hillsides was used for irrigation. This runoff is caused by even a very light rainfall, since the loess, when moistened, forms on its surface a thin crust that is almost impervious to water. This crust insures a high rate of runoff from the slopes. On the terraced fields the same crust is formed, but the leveled fields and the stone walls prevent the water from running off and it slowly penetrates into the soil.

The runoff from the hillside slopes, which was the only water source, was artificially increased by stone-clearing and exposing the soil surface directly to the action of the rain. The runoff water was directed into the fields by exploiting the natural water courses where they were impermeable. However, in those areas where the water courses were composed of permeable fissured rock or gravel, the runoff water was led to the fields through artificial conduits.

Large tracts of land in the flood plains lying adjacent to the main wadies were irrigated by means of diversion works and canals. The canals were often

a few kilometers long and several meters deep.

Preliminary investigation indicates that in all the fields the irrigation systems were so planned as to insure a complete control and distribution of the water by means of spillways, canals, drop structures, division boxes, and so forth. All these structures were built of stone. There was a depth of irrigation that would wet between 2 and 4 meters of soil. For loess, this irrigation is sufficient for the annual requirements of cultivated orchards or general field crops.

The pilot-plant farm is the culmination of years of Negev research by Evenari and his associates, South African-born Leslie Shennon, a water engineer; Naphtali Tadmore, an agriculturist; Y. Aharoni, an archeologist; and Tossi Feldman, an amateur archeologist from a nearby kibbutz, who reconstructed the farm. The research is supported by the Ford Foundation.

Evenari's preliminary findings will be reported to farmers, agriculturists, and scientists from every part of the world at the International Farmers Convention that will take place in Israel, 29 March to 12 April.

Geneva Test-Ban Negotiations

The executive committee of the Federation of American Scientists, a nationwide organization of more than 2200 scientists and engineers, has released a statement on the current nuclear test-ban negotiations at Geneva that includes the following comments.

"The present Geneva negotiations seem to be reaching a stalemate. . . . If the arms race continues, the certain spreading of nuclear weapons to more and more nations will almost surely lead to nuclear war of utter destruction.

"We should like to comment on several points of difficulty in the present negotiations.

"(1) We regret the impression given by news reports that data from the new underground explosions invalidates the inspection system worked out by the Geneva Conference of Experts last summer. Quoting from a U.S. State Department release of January 24: 'These data did not invalidate the system agreed upon at Geneva last summer.' Recently released testimony before the Senate Subcommittee on Disarmament makes it clear that the same detection capability envisioned by the Experts' Conference can be obtained with the original number of stations proposed, with some improvements in the techniques used.

"It is very unfortunate that the new seismic data were released, before thorough evaluation of the positive as well as negative aspects, in such a way as to emphasize the negative aspects of the data. The manner and form of this release was such as to give rise to misleading reports which placed undue emphasis on the negative aspects of the new data. It is understandable that in these circumstances suspicion might well arise as to the motives behind such release.

"We wish to point out that the capability and reliability of the monitoring system can be significantly improved by making use of 'calibration' explosions, both chemical and nuclear. Consequently it would be desirable that there be provision for calibration explosions in the first agreement.

"(2) The Russian insistence on veto rights over the composition and operation of the inspection teams and the technical staff which will man the stations is a clear obstacle to success of the talks. To maintain this demand certainly means blocking any hope of agreement.

"Russian insistence that monitoring stations in each country be operated only by nationals of that country is also a fundamental block to success of the talks.

"If the Russian suspicion that the detection system would be used by the West as the basis for a widespread spying system is real, other means must be found of safeguarding against espionage; this problem must not be allowed to block a nuclear policing agreement altogether.

"(3) There is a stated American desire to exclude peaceful explosions from the ban. There is in fact an American program, called Project Plowshare, which is meant to develop peaceful applications of nuclear explosions. The carrying through of the peaceful tests program is certainly less important now than is the chance of agreement on a workable test ban and its policing. If exemption of peaceful explosions from the test ban threatens the success of an agreement, Plowshare should not be insisted on. It is really extraneous to the basic issue of arriving at a better chance of peace.

"In particular, the scheduled nuclear explosions this summer under Project Plowshare could very well lead to unrestricted resumption of Russian weapons tests. No gain from Plowshare would compensate for this unfortunate result."

Tropical Medicine Survey

The National Academy of Sciences–National Research Council has announced a major survey of needs in the field of tropical medicine. The work will be directed by Willard H. Wright, recently retired chief of the Laboratory of Tropical Diseases, National Institutes of Health. Wright, who holds doctorates in veterinary medicine and in medical parasitology, was a member of the NIH staff for 22 years. He is a past president of the American Society of Parasitologists, president-elect of the American Society of Tropical Medicine and Hygiene, and has served in many capacities in the World Health Organization, for which he has just completed an assignment in the Middle East.

Advocated for several years by the American Society of Tropical Medicine and Hygiene, the survey was proposed by the Department of Defense on recommendation of the Armed Forces Epidemiological Board. Support has now been assured by the National Institutes of Health, the Department of the Army, and the Rockefeller Foundation.

As presently conceived, the investigation will cover infectious and parasitic diseases, veterinary medicine, and environmental hygiene. It will include surveys of disease problems in tropical and subtropical areas of significant importance to public health and to agricultural and industrial development; of funds expended for medical care and disease control; of financial support for research in medical and hygienic problems of the tropics; of fellowship opportunities, teaching programs, and training facilities; of career opportunities and incentives; of the impact of travel and migrations on tropical disease problems; of the importance of tropical medicine to the economy of the United States; and of projected manpower needs in terms of domestic and overseas requirements. The data assembled will be used to assess the need for domestic, foreign, and international measures to deal with the problems defined in the survey.

French Geological Information Service

The monthly publication of some 3000 to 5000 technical papers dealing with the earth sciences poses a problem of major magnitude in documentation and classification. The Service d'Information Géologique (S.I.G.) of the Bureau de Recherches Géologiques, Géophysiques et Minières (B.R.G.G.M.) is attempting to cope with this problem by means of a classified card index, duplicated for sale to interested persons or institutions. The index provides ready reference by means of letters and numbers, to 1200 subjects, the main headings being mineralogy, petrography, stratigraphy, tectonics, geophysics, general and dynamical geology, applied geology, history and activities of geology, regional geology, general paleontology, biology, botany, and zoology, prehistory and problematica.

Full information, descriptive data, and samples of work may be obtained from J. Roger, B.R.G.G.M., 74 Rue de la Fédération, Paris 15, France.