

figure is over 30 percent.

The movement to bring more science and technology to bear on Israel's problems of domestic development is led in part by Eliezer Tal, science adviser to the Prime Minister and director of Israel's National Council for Research and Development. But the current President of Israel, Ephraim Katzir, himself a biophysicist and formerly a professor at the Weizmann Institute, echoed Tal's views when he told a group of American and Euro-

pean science writers visiting with him at his official residence in Jerusalem in December: "It is nice to have intellectuals if they are not spoiled intellectuals—if they are willing to contribute to the building of a new society."

Joel Schechter, an applied scientist and director of the research and development authority of the Ben-Gurion University of the Negev, states the situation a little more bluntly: "There is a huge academic bureaucracy that

enjoys tremendous prestige in this country. It has tremendous influence on the government and it frowns on applied work. We are trying to get people involved in society and not isolated in an ivory tower."

Israel obviously takes pride in considering itself an intellectual oasis in the Middle East. Now, however, it is insisting that that intellectual capacity be devoted to a greater extent to helping cope with the practical problems of Israel. □

Shall the Negev Bloom?

As one travels south from the populous Tel Aviv-Rehovot-Jerusalem cross section of central Israel, the land becomes visibly drier and more sparsely settled by the mile. Green crops of sugar beets, corn, wheat and vegetables gradually give way to cactus and hardy desert shrubs. The city of Beersheva receives only a third as much rainfall (rarely exceeding 8 inches a year) as Rehovot, 50 miles to the north. Just 6 miles farther south the rainfall drops to no more than 4 inches a year. From there on south, Israel is all desert, or as some prefer to call it (there being

no Hebrew word for desert), the wilderness.

About 50 percent of the land surface of Israel (not counting the Sinai and other post-1967 occupied territories) can be classified as true desert. The Negev, the vast southern portion of Israel, accounts for 60 percent of Israel's (pre-1967) land area but contains only 10 percent of the population.

Israel considers development and settlement of the Negev essential to its long-range survival, as the fertile areas to the north become increasingly crowded and industrialized. It maintains a broad program of desert research to aid in the attempt.

Such research is considered to have worldwide significance. One third of the earth's land surface is desert. The desert areas of the world are seen by many as the last major land mass offering hope for successful large-scale settlement and development.

Spearheading the effort to turn the Negev into a habitable and thriving region is the fledgling Ben Gurion University of the Negev. Located in Beersheva, a frontier development city on the northern edge of the desert, it has primary responsibility for the social, economic and scientific development of the Negev. To accomplish this task, it is forming special relationships with the land and people of the region. Its new center for health sciences, for instance, which began its first classes only two months ago, is more than a medical school. Its task is to join all health care services in the Negev into one system and then to operate that system. Its president is also chief health officer for the Negev. University officials are excited by this experiment merging medical education and regional health care. They believe it to be unprecedented in the world.

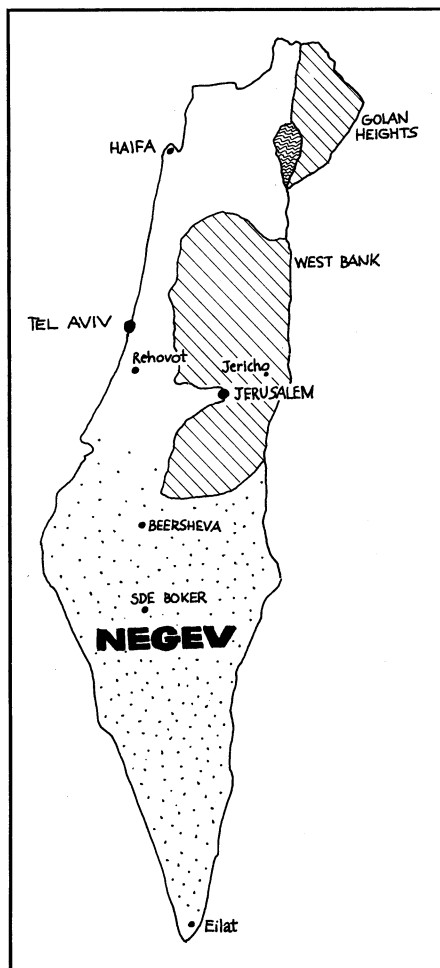
In 1973 the university established a research and development authority. It deliberately has a nonacademic, pro-industry orientation to help overcome the tendency in Israel to favor basic

over applied research. In addition to initiating R&D that is important to the Negev, it is also charged with encouraging industry, especially local industry, to develop and produce new products from the Negev.

One such product is a hard wax obtained from the jojoba, a desert shrub found naturally in northern Mexico and the southwestern United States (SN: 7/14/73, p. 26). Jojoba plants brought to Israel from the University of California at Davis agricultural laboratories have been found to grow better in Israel than in North America. Joel Schechter, director of the university's R&D authority, says the jojoba plants are currently yielding about 400 kilograms of wax per acre, a figure he expects can be doubled in the next five years. By then the project expects to be planting several thousands of acres of jojoba and harvesting enough wax for commercial operations. The wax, which according to Schechter no synthetic plastic can match, has applications in carbon paper, wax paper and waterproof coatings. It could be used to make bright-burning, smokeless, dripless candles, and it has potential medical uses in ointments and salves.

Another new project aims to develop an algae-growing industry, making use of two of the desert's abundant resources: sunlight and wind. Algae growing requires continual mixing of nutrient-rich water. At this early stage of research, the algae are grown in small tanks stirred by electrically driven paddlewheels. But Schechter envisions large basins in the ground, covered with plastic so the algae can be grown in winter as well as summer, the water stirred by paddles attached to windmills. The algae, which is 60 to 70 percent protein, would be used initially as feed for chicken and cattle. It could eventually become a protein resource for humans.

Overlooking a magnificent dry desert valley at the isolated outpost of Sde Boker, 30 miles south of Beersheva,



Science News

the new Desert Research Institute of the university carries out a far-ranging desert research program.

Ironic now in light of the controversial action by UNESCO in November excluding Israel from UNESCO's regional programs, the international significance of the desert research program had been officially recognized by UNESCO, and the institute had been offered by the Israeli government as Israel's contribution to the "International University" that

UNESCO is establishing.

The institute is conducting a comprehensive scientific survey of the Negev, collecting and compiling physical data on the desert. But beyond that it is studying the plant and animal life of the desert (including human physiology under desert stress), desert agriculture (both new methods and new plants), and assisting with the technological problems of settlement and industrial development.

Water is the most critical factor in the development of the Negev. Israel is one of the few nations of the world (some of the Sheikdoms of the Persian Gulf are the others) where almost the entire water potential is being put to use. More than 95 percent of available good quality water is in actual use, compared with less than 10 percent for Europe and the United States.

Thus there is great interest in the discovery that there are large amounts of water lying beneath the western Negev. Much of it is deep in an underground semi-artesian aquifer about 500 meters below the surface. It has a salinity of 2,500 parts per million. This is less than a tenth that of sea water but still too high for many crops, although sugar beets, wheat and sorghum are relatively salt-resistant and have shown no bad effects from such water.

Scientists at the desert research institute estimate that there is enough water accessible for pumping to add about 3 percent to Israel's water supply, which would be enough to support 50 new settlements in the Negev.

The underground water is about 100 degrees F. when it comes out of the ground. So institute scientists are experimenting with use of the water to heat the soil so vegetables like tomatoes, cucumbers and melons could be grown in the winter.

Institute scientists envision eventual widespread use in the Negev of the type of closed-system agriculture pioneered by the University of Arizona for use in desert regions. Areas are covered over by an inexpensive synthetic material that holds moisture inside and maintains a controlled environment.

Amos Richmond, director of the institute, envisions a day when extensive areas of the Negev will be covered with such closed-environment greenhouses, the warm semi-artesian water heating the soil to grow food for a thriving population of new desert dwellers. He even foresees a day 20 to 30 years from now when portions of the Negev can become a national park of Israel, with intermittent green valleys divided by barren areas, a place for rest and relaxation by Israelis and an attraction for tourists from other nations. He boldly talks of creating a safari park, introducing big game animals from Africa and attracting hunters from Europe and America.

Some Israelis scoff at Richmond's ideas, discounting them as the unpractical dream of a romantic visionary. Perhaps so. But one nevertheless has to admire the spirit and tenacity of those who take their calling from the still-to-be-realized prophecy of Isaiah: "... and the desert shall rejoice, and blossom as the rose."

—Kendrick Frazier

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