

AGRICULTURE

Study Salt Water Farming

DOUBLE THE agriculture potential of the earth with one single stroke—that is what salty water can do.

A whole new continent could be added to the world, Dr. Hugo Boyko of Israel told SCIENCE SERVICE. He presented a paper on a method of salt water irrigation to scientists attending the 9th International Botanical Congress in Montreal, Canada.

For many years now, Dr. Boyko said, an experimental garden has been flourishing in the desert, watered only with brackish water from a saline spring. The soil is 61% granite and limestone pebbles and rocks, with about 23% coarse sand. No fertilizer is applied, the Israeli researcher said, yet pomegranates, mulberry trees, sycamores and olive trees are thriving. Altogether there are some 180 species of trees, shrubs and other plants, selected for their drought-resistance and usually originating from arid and semi-arid Mediterranean regions.

These plants are living proof that desert soil and salt water can support an agriculture, Dr. Boyko explained. Farmers are used to associating salt or sea water with destruction of their crops. Also sandy or gravelly soil is usually thought of as not being farm land. The two "evils," salt water and so-called bad soil, can be combined to give millions of acres of land for agriculture.

There is a good reason for this: salt water percolates through the coarse soil so that the plant's roots do not stand in the salty water. Effectively, the plant has all

the benefit of the salt water without any of the harm.

Plants in the experimental garden were irrigated with water whose salt content ranged from 2,500 to 6,000 parts per million of salt per liter of water. The amount varied with the season, Dr. Boyko explained. This saltiness is enough to make a person sick if he were to drink it.

The only species that failed to survive under this irrigation were those with short root systems. The other plants were able to go three weeks, during an unusual drought, without irrigation. Actually, Dr. Boyko said, the plants needed less water than "you would suppose." Once a week was enough. Plants could also be irrigated with fresh water, following the salt water, without harm.

The salt does not accumulate since it passes down through the coarse soil. When it reaches bed rock, Dr. Boyko explained, the salt is carried out to the sea.

Shifting sand dunes can also support a crop. Barley, sugar beets, wheat, grass and Israeli esparto grass, which is used in paper making, can all be grown, Dr. Boyko said. These are all important economic crops. Water with a salt content higher than the Sahara's underground resources of brackish water was used for irrigation. It will thus be possible to "productivize" the arid and semi-arid lands throughout the world, Dr. Boyko said.

Science News Letter, September 5, 1959

ENGINEERING

Predict Use of H-Power

DIRECT conversion of controlled thermonuclear power to electricity is believed practical in the future, a scientist told a symposium on the dynamics of conducting gases.

Dr. Joseph L. Neuringer, of Republic Aviation Corporation's plasma propulsion project, Farmingdale, N. Y., said he had made a theoretical attack on the problem of extracting power from a gas contained by a magnetic field. He reported solutions for two special cases of the problem.

The conventional steam-turbine method of generating electricity is probably not the most practical and efficient way for using the energy liberated by controlled thermonuclear reactions, he said, since this involves moving parts of heavy, cumbersome machinery.

A method not involving moving parts is to generate the electricity by electromagnetic induction using the highly conducting gas of the thermonuclear reactions as the working fluid. This is the type of generator, he said, that may prove practical in the future. The symposium, which met at Evanston, Ill., was sponsored by the American Rocket Society and Northwestern University.

THE ABSENCE of smog in the populous, automobile-rich areas of the land will become a measure of man's skill and competence in solving the stability of chemical products, such as automotive fuels. Sir Hugh Taylor, Princeton chemist, now president of the Woodrow Wilson National Fellowship Foundation, told this to the gas dynamics symposium in Evanston, Ill., of the American Rocket Society and Northwestern University.

It used to be said that the civilization of a country could be measured by the amount of sulfuric acid produced, but Sir Hugh suggests that synthetic ammonia would now be a more appropriate measuring stick. An iron catalyst, a chemical that promotes chemical combination of the excessively inert mixtures of nitrogen and hydrogen, facilitates the synthesis of ammonia.

Potential energy barriers have become enmeshed in problems of national security, Sir Hugh explained, because it has been possible to solve the problem of stability in materials that were once considered highly susceptible to decomposition. Some of these materials are hydrogen peroxide, nitrogen tetroxide, ozone, and various atoms and free

radicals, in which the stability hinges on the potential energy barriers separating the reactants and products.

Hydrogen peroxide in concentrations greater than 90% is stored now in 25,000 gallon tanks and safely transported in 8,000 gallon tank cars, but this has required the most discriminating care in the selection of materials for containers, valves, lines and pumps.

Science News Letter, September 5, 1959

PSYCHOLOGY

Mice Bred in Psychology Laboratory Score Lower

MICE BRED and raised in the Behavior Laboratory at the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me., score lower on simple learning (conditioning) experiments than do a separated line of mice bred in the Main Laboratory of the institution.

The difference is due to heredity and not to the kind of care they receive or the psychological environment, Dr. Victor H. Denenberg, psychologist of Purdue University and the Jackson Memorial Laboratory, indicated in reporting the two mice substrains in *Science* (Aug. 21).

The hereditary source of the superiority of the Main Laboratory colony mice was established by moving mother mice to the psychology laboratory before the birth of the young and keeping the babies there until they were tested at 50 days of age.

These mice also did better on the simple learning tests than the Behavior Laboratory animals.

The two colonies of mice have been bred separately for 30 generations and during this time it is quite likely that a mutation took place which accounts for the differences observed.

These two psychologically different substrains should be useful for experiments on the genetics of behavior, Dr. Denenberg points out.

Science News Letter, September 5, 1959

TECHNOLOGY

Sapphires Brewed In "Pressure Cooker"

WHITE SAPPHIRES more nearly perfect than natural ones are being brewed in a "pressure cooker," at Bell Telephone Laboratories, Murray Hill, N. J.

To cook a batch of gems, some "seed" sapphires are heated under pressure in an autoclave with aluminum oxide and a solution of water and washing soda. The heat and high pressure dissolve the aluminum oxide and cause it to grow onto the seeds thus adding to their size.

Natural sapphires take thousands of years to grow, but these man-made gems are ready within a month, Bell scientists pointed out.

The gems, free of strain, have many industrial uses. Bell Laboratories are using the sapphires in research projects aimed at improving telephony and communications in general.

Science News Letter, September 5, 1959