TECHNOLOGY

# Saltwater Made Fresh

➤ BY A SIMPLE PROCESS of diffusion and a newly developed membrane, freshwater can be filtered from saltwater, and the remaining brine washed away.

The secret of this desalinization process is osmosis, a phenomenon whereby a special membrane, first of its kind, separates freshwater from pressurized salty ocean water. The freshwater, good for drinking, is collected in troughs.

This method is quite different from and costs only about half the traditional process of desalinization by heating water to steam and collecting the condensed freshwater as it cools.

The remarkable membrane that permits this process was developed and recently patented by research engineers Sidney Loeb and Srinivasa Sourirajan of the University of California's Saline Water Conversion Research Program at Los Angeles.

Sought for 50 years, this membrane is the first really successful material for work with solutions of salt in water. The porous membrane, made of modified cellulose acetate with aqueous magnesium perchlorate and acetone, could also be used in biomedical research for filtration of viruses, proteins and other such material.

By pumping pressurized seawater through one-quarter-inch Fiberglas tubing lined with the membrane, Dr. Glenn G. Havens, president of Havens Industries, San Diego, Calif., developed the desalting equipment with the aid of the San Diego Gas and Electric Company.

With a compact demonstration model, small enough to fit in a large closet, about 250 to 300 gallons of freshwater a day can drip through the tubing and be collected. About half the original water continues through the tubes with the remaining brine in order to maintain pumping pressure and to flush out the unwanted salt chemicals of the sea.

The seawater taken from San Diego Bay originally contains 35,000 parts per million of dissolved solids. After it has passed through the first stage of the process, the water contains about 2,000 parts per million. The water is then cycled through a second series of Fiberglas tubes where it is filtered to 200 parts per million, well below the 500 parts per million recommended by the U.S. Department of Health, Education and Welfare as a desirable maximum in municipal water.

The basic phenomenon of this process, osmosis, is as old as life. The cells that make up bodies of every living creature and plant on earth are filled with fluids that move in and out through the cell walls by diffusion.

Food and liquids used by the human body enter the blood stream by osmosis, and plants absorb food and moisture from the soil by osmosis.

In the new desalinization process, the semi-permeable membrane permits freshwater, but not saltwater, to pass through it. When pressure is applied to the flowing saltwater, this membrane can filter freshwater from seawater one hundred times faster than any other previous commercial films.

Because the system is so simple, Dr. Havens suggests that it could be used in emergency kits for life boats, in small ten-gallon-per-day home water conditioners, or in full-scale central plants for city use.

Dr. Havens estimates that less than 100,000 kilowatts of power would be necessary to produce the 100 million gallons of water used in the city of San Diego.

Calculated total costs of water converted by this method range from 25¢ to 52¢ per thousand gallons, in comparison to the cost of one dollar to obtain a thousand gallons by the traditional heating process.

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AGRICULTURE

## Oil and Rubber Spray Makes Deserts Bloom

➤ WINDBLOWN BARREN deserts and sand dunes can be tamed to produce grasses, peas and lettuce with a new British process of spraying the land with a layer of rubber and oil.

Obstinate sand dunes that had been shifted by the winds now carry a good growth of long-rooted grass, reported British scientists at the International Synthetic Rubber Company Ltd. in Southhampton, England.

Experiments during the past year have been carried out on arid lands in eastern England and on Scolt Head Island, off the British Norfolk coast.

The rubber film allows grass seeds to germinate and grow healthily to a point where the grasses can hold the sand in place, the scientists reported. Once a dense top growth can be built up, the sand is effectively protected from the wind. Seeds of peas, lettuce and onion have sprouted and have been growing satisfactorily through the film.

The spray, which is nine parts mineral oil and one part latex rubber, spreads a fine-mesh network over shifting desert sands and acts basically in three ways.

1. It protects the sandy surface from winds and holds the plants secure until the roots can get a good hold.

2. Rainfall is held near the surface and is not lost by drainage.

3. The film keeps the sand porous and prevents the soil from having a hard, flat surface which is impervious to grasses, water vapor and rain.

As the film is sprayed over the dune, it follows the natural contours of the sand and binds the sand grains into a skin. The mineral oils improve the life, water resistance and binding action of the rubber, the scientists pointed out.

Under good drying conditions, the film takes about four hours to solidify, but it reaches its full protective strength in about two or three days.

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