This work has led to the setting up of pilot plants for brackish water conversion in the U.S. Several have capacities for production of up to 10,000 gallons daily and 50,000-gallon plants using the Loeb-Sourirajan type membrane are being built.

Dr. Sourirajan foresees a wide variety of uses for the process, notably desalination, water pollution control, water renovation, water purification, waste reclamation, concentration of acqueous sugar solutions and separation of liquid hydrocarbon mixtures.

While he feels Canada may not have any pressing need for desalinating plants, it does have pressing water pollution problems, notably with the Great Lakes and rivers that flow through metropolitan areas. And he feels that it is here that the reverse osmosis process will eventually have one of its greatest impacts.

HARD WATER APPLICATIONS

Dr. Sourirajan, working with A. R. Hauck of the City of Ottawa Pollution Control Centre, recently completed a study of the performance of several typical Loeb-Sourirajan-type membranes for the treatment of hard waters, polluted waters and sewage waters.

The treatment of hard waters is of special concern to municipal and industrial water users. Hard water requires much soap before a lather is formed. It also deposits sludge or incrustations on surfaces with which it comes in contact and in vessels and boilers in which it is heated.

The responsible substances are calcium and magnesium ions and to a lesser extent (because of their normally smaller concentrations), those of iron, manganese, strontium and aluminum.

For waters containing 300 to 800 parts per million of these substances, it was shown possible to obtain waters containing two parts per million or less.

This, says Dr. Sourirajan, indicates that his membranes can be successfully used for the treatment of industrial and natural hard waters to give product waters of acceptable quality for domestic use as well as for high pressure boiler systems.

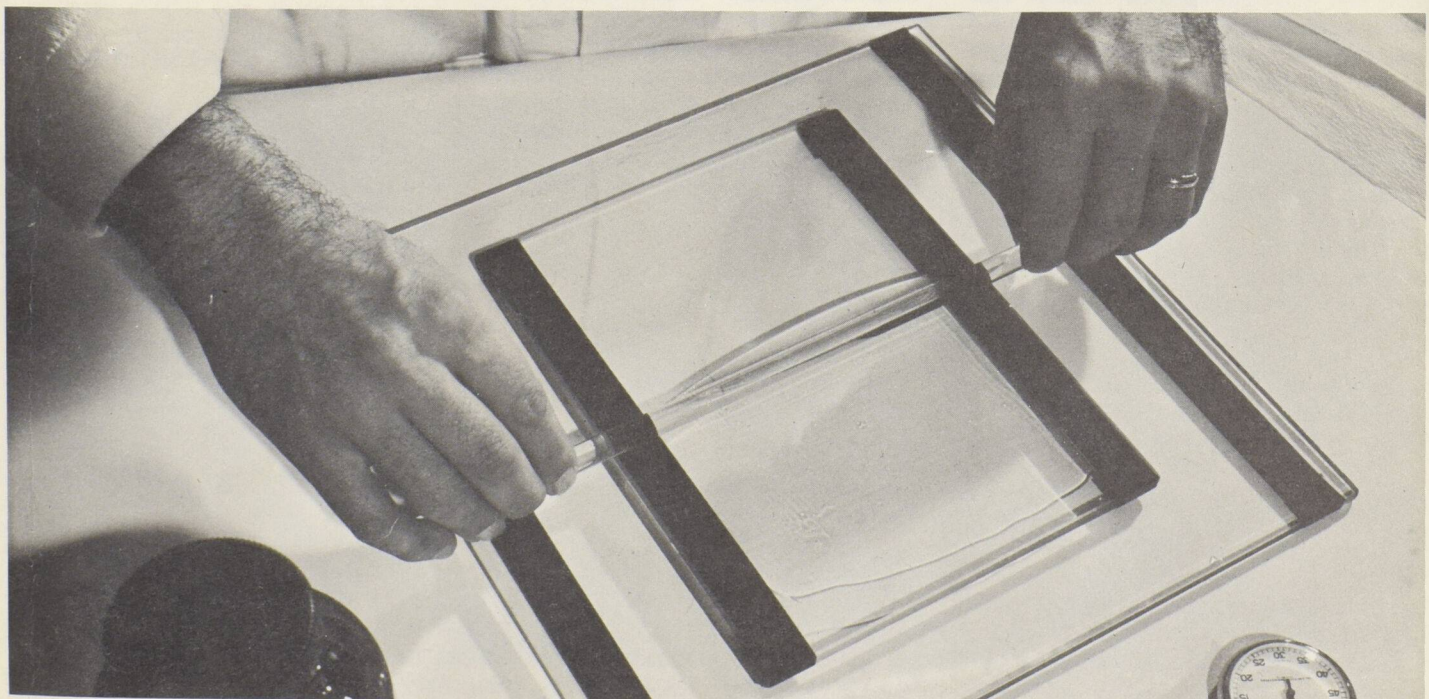
In municipal and industrial water supplies, the presence of excessive amounts of nitrates, borates, fluorides, chlorides, phosphates, alkyl benzene sulfonates and ammonium ions are usually regarded as pollutants.

The pretreatment of water for the removal of excesses of such pollutants may be necessary in many water supply systems. Dr. Sourirajan says that, by the appropriate choice of the porosity of the membrane, practically any degree of solute separation can be obtained. He believes the data compiled in the work with the reverse osmosis process are significant enough for consideration of the process for practical industrial applications.

Experiments with samples of raw sewage water, obtained from the city of Ottawa's primary sewage treatment plant, indicated that reverse osmosis was capable of offering an effective and economical means of upgrading sewage water to a quality suitable for almost all water uses.

Present primary and secondary sewage treatment facilities have as their objective the removal of organic material and suspended solids. These treatments are not designed to remove nitrates, phosphates or the non-biodegradable surface active agents (e.g. detergents). The removal of the latter would be the objective of tertiary sewage treatment facilities not in extensive use today.

Dr. Sourirajan says reverse osmosis can effectively take the place of tertiary and in some cases, of tertiary and secondary treatment facilities.



The porous cellulose acetate membranes used in the reverse osmosis are manufactured in Dr. Sourirajan's laboratory.

Membrane poreuse d'acétate de cellulose pour l'osmose inversée. Les membranes sont fabriquées au laboratoire de M. Sourirajan.