

it cannot be photographed except with a large telescope. However, when two or three photographic plates are viewed in superposition, the thin line of the fourth ring can be clearly seen.

Printed reproduction of the "D" ring is extremely difficult. Feibelman therefore made tracings of the density of the photographic emulsion, and these clearly show the presence of matter in the plane of the other three rings but at a much greater distance from the planet.

## Water for Peace

Of all the water on earth, about 97 percent is in the oceans; only about one ten-thousandth of the total is available to man in streams and lakes.

Of his allotted ten-thousandth, man now controls only about 6.6 percent.

**Matching this available** water to rapidly growing numbers of people is the underlying theme of the International Conference on Water for Peace now in its second week in Washington, D.C.

The urgency of such an effort is underscored by a report prepared by the U.S. Interdepartmental Committee on Water for Peace. Nearly two-thirds of all the people living in the developing nations of the free world—about one billion people—get their water from unsanitary sources, the report notes. Water-borne disease kills up to 10 million, mostly infants, every year.

Yet, City Planner Constantinos Doxiadis observes, man can have all the water he needs, given time and the determination to bring pure water to everyone.

The most difficult problem to be faced is population growth, he advised delegates attending the conference's first plenary session.

**Nearly 5,000 delegates** from 90 nations and 19 international organizations were invited to the 10-day conference.

President Johnson announced in an opening address that the U.S. would establish a Water for Peace office in the State Department to coordinate this country's approach to international water programs.

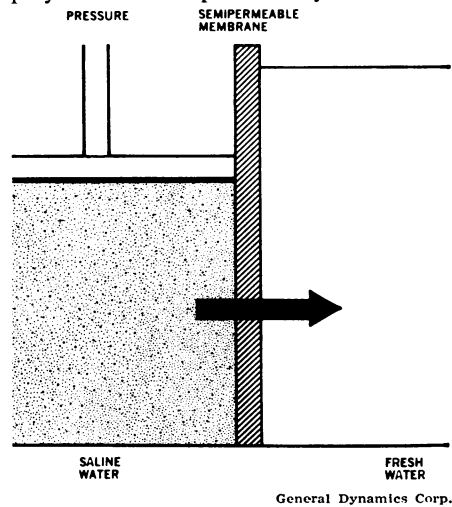
He also called for establishment of regional centers to promote research and the training of scientists and engineers. The first two centers, he suggested, should be in operation within two years.

The technology that finds, purifies and transports water was on display at the conference. Besides well-drilling equipment and pumping and treatment systems for municipal water supplies, a large number of firms displayed desalination processes.

To date, most desalination plants have been distillation units such as

the 150-million-gallon-a-day colossus to be built near Los Angeles. A bill authorizing \$57.2 million in Federal participation in its construction was signed into law by President Johnson, just in advance of the conference.

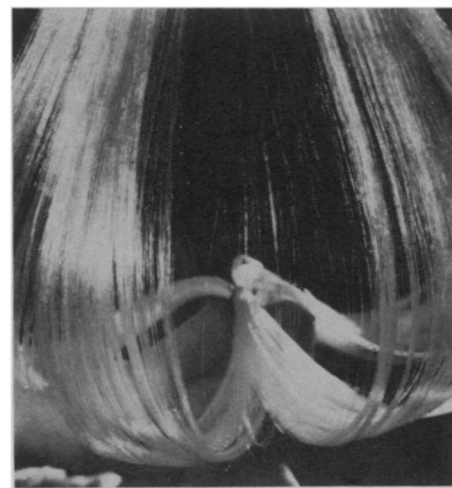
Units employing reverse osmosis, apparently one of the most promising second-generation processes, were displayed at the exposition by a number



The principle of reverse osmosis.

of major U.S. corporations including Westinghouse, Aerojet-General, American-Standard, General Dynamics and Du Pont.

An experimental variation on the reverse osmosis process was unveiled by Du Pont.



Du Pont's hollow polymer fibers.

Normally, reverse osmosis involves pumping salt water under considerable pressure against a membrane that will pass fresh water while excluding salt.

**In the Du Pont process**, trade named Permasep, the plastic membrane is spun into hollow fibers thinner than human hair. A production model desalinator envisioned by the company's engineers would have 20 million fibers in a one foot diameter sealed tube seven feet long.

## Water Funds Drop

All new U.S. support for the International Hydrological Decade, a major pillar of the Water for Peace program, has been dropped by the Senate in its version of the Interior Department appropriation bill.

The IHD, two years old this January 1, is a world-wide, 10-year program aimed at better development and use of the world's water resources. It was first proposed by the United States and is now sponsored by the United Nations Educational, Scientific and Cultural Organization.

The Senate cut the U.S. share in the IHD from \$2.168 million requested to last year's figure of \$168,000.

Earlier, the House had proposed to cut the requested \$2 million increase in support to \$500,000 (SN: 5/13), declaring that this is not the time for "a foreign aid program for water."

House and Senate conferees will now have to agree on the depth of the cut.

Much of the \$2 million increase was to have gone for exchange of scientists and students of hydrology with other participating nations, according to Dr. Raymond L. Nace, chairman of the U.S. National Committee for the IHD.

## NSF: Same Ceiling

The National Science Foundation—the only Federal agency charged solely with the support of research—is starting to walk stoop-shouldered after three years under a low budget ceiling of around \$500 million. This year is no exception.

The House of Representatives has trimmed \$31 million from the \$526 million authorization requested by the NSF; the amount still represents a \$15 million increase over the budgets of the previous two years.

**Most of the increase** will go for research in four areas of science: chemistry, social sciences, atmospheric sciences and oceanography. In particular, the House Appropriations Committee made a point of seeing that \$4 million requested for the National Sea Grant Colleges program was preserved intact.

A study by the National Academy of Sciences provided one reason for boosting the NSF's appropriation: the cost of chemical research, the Academy found, has been going up at a rate of more than 15 percent a year.

The NSF requested only \$25 million this year for its University Science Development Program, part of the national Centers of Excellence plan to bring almost-great universities up to the top rank. This is a \$10 million decrease from the \$35.6 million appropriation of last year. Under this pro-