

NATURAL RESOURCES

New Technique Promises Fresh Water From Sea

► **LARGE-SCALE** production of fresh water from the ocean may become feasible as a result of a radical technique proposed by Dr. Louis A. Bromley, University of California chemical engineer.

The technique, which is still on paper, might come within striking distance of yielding water at a price of 30 cents per 1,000 gallons, the "ideal" generally sought by experts in the field. At the present time, the cheapest mass distillation is done at Aruba, in the Caribbean, for about \$1.75 per 1,000 gallons.

Dr. Bromley's "multiple effect centrifugal evaporator" would consist of a tier of whirling trays. Salt water would be distributed along the trays mounted on a rotor. Steam, introduced in a segment below the trays, would whirl them and at the same time vaporize the sea water.

The water vapor would condense as fresh water on the tray next above, flowing off into a trap. The salt left on each tray would also be removed.

The proposed method combines two techniques already proposed or under development: a rotary method and the use of multiple stationary trays. Rotation spreads more thinly both the sea water on top of each tray and the condensing fresh water on the underside, and this permits the use of more trays for a given quantity of heat.

Dr. Bromley says both the compact equipment and the lowered fuel consumption would be expected to reduce costs over present methods.

A single unit, as now conceived, would be 10 feet in diameter and about 12 feet high, each unit having half a dozen stacks of 20 to 50 trays. It would produce between 100,000 and 200,000 gallons per day of demineralized water. A battery of the units producing 10,000,000 gallons of water per day would produce water at a cost of from 25 to 50 cents per 1,000 gallons, Dr. Bromley estimates.

It would take about six years to develop the method.

Science News Letter, March 15, 1958

GENERAL SCIENCE

Britain Starts Library Of Russian Science Facts

► **A SPECIAL UNIT** of the British Department of Scientific and Industrial Research has begun a national lending service of Russian scientific literature.

It is already dealing with approximately 100 requests a week from research and industrial organizations. The scheme is part of the plan to improve the present inadequate methods of disseminating the results of scientific research.

Long-term proposals include building a National Lending Library of Science and Technology in the north of England and building a National Reference Library of Science and Invention.

It is estimated there are at least 1,000

Russian current scientific and technical periodicals. Excluding school textbooks, the Russians are producing about 18,000 titles a year in science and technology. This almost equals British output of titles of all types.

As a first step the new lending library unit of the Department of Scientific and Industrial Research is regularly collecting about 250 periodicals from Russia. It is claimed that it already possesses the largest collection of current Russian material in West Europe.

One difficulty is that much of the Russian literature is not sold and can be obtained only on exchange. Dr. D. J. Urquhart, who is in charge of the unit, is ready to exchange with Russian organizations or to take over exchange offers which British organizations do not want to develop with Russia.

The Government's advisers are also considering measures to improve the arrangements for abstracting and translating Russian technical literature. Only about two percent of Britain's working scientists can read Russian.

Russian language courses may be increased. Proposals are also likely to be made to develop a scheme of cooperative collection and translation by Western European countries of Russian publications.

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GEOPHYSICS

Atmosphere Found Denser Than Thought

► **THE EARTH'S** atmosphere at 240 miles is 40 times more dense than was previously estimated, calculations based on changes in the orbit of the first Russian sputnik have shown.

Even at this density the atmosphere there is still closer to a vacuum than obtainable in any earth laboratory. The matter present, however, is sufficient to reduce by a factor of 40 the previously expected lifetime of any satellite making its closest approach to earth at 240 miles.

This would mean a lifetime of 38 days, not four years, for the proposed Navy-launched Vanguard satellite, which will weigh about 21 pounds with a diameter of about 20 inches, if it circled the earth at distances from 240 to 600 miles into the atmosphere.

Analysis of radio tracking data from the officially named Satellite 1957 alpha two gave the new figures for atmospheric density. Drs. R. Jastrow and I. Harris of the U. S. Naval Research Laboratory, Washington, report their calculations in *Science* (Feb. 28).

Density determinations at such high altitudes are found from the rate by which the satellite's time for one complete trip around the earth changes, other orbital constants and the "ballistic drag parameter," which depends on the mass and area.

There is believed to be about a ten-thousandths of a billionth of a gram of matter in each cubic centimeter of space at 240 miles.

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IN SCIEN

HORTICULTURE

Four All-America Mums Named for First Time

► **NOW CHRYSANTHEMUM** lovers can have the best of these showy, colorful fall flowers. Four mums have been named the first All-America Mum Selections winners and plants will be available this spring.

Ranging in color from deep red through rose and yellow through bronze, these mums represent the finest, widely adapted and "most meritorious" varieties from among three years of entries. Ruby King takes the prize among the red cushion mums; Burning Bronze, bearing two-and-one-half inch double blooms, is a second winner, while rose-petalled Showpiece and golden Emperor share the honors among the large flowered decoratives.

All-America Mum Selections, a non-profit educational institution, conducts trials for testing and screening new varieties of mums. It does no breeding or plant selling. Like its associated organization All-America Selections, it provides a way for evaluating and testing promising new plants.

There are two All-America Selections winners among flowers this year: Maytime, a large flowered ruffled grandiflora bedding petunia in a new color, salmon pink, and a new Petite type of double French marigolds. Four colors, lemon yellow, gold, orange, and a bicolor of maroon red and gold, are represented in this new class of very dwarf, very early marigolds.

Winners among the vegetables are a colorful red lettuce, a white-seeded greenpod snapbean, an exceptionally heavy bearing wax snapbean, a new variety of long-standing mustard greens, and a beet with "globular roots of richest blood-red interior."

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AGRICULTURE

Improved Weed Killer Controls Johnson Grass

► **JOHNSON GRASS**, a serious weed pest in 38 states, can be effectively controlled through the use of sodium dalapon, scientists reported to the Weed Society of America meeting in Memphis, Tenn.

The results of four years' cooperation between U. S. Department of Agriculture and state scientists indicate that the herbicide can largely replace costly methods of control such as taking land out of crop production, Ellis W. Hauser, USDA weed specialist, and Jack T. Thompson, Georgia Agricultural Experiment Station, said.

Although it is considered a weed in cultivated fields, and it grows wherever cotton is produced, Johnson grass is an important forage resource and is used for hay and pasture in some areas.

Science News Letter, March 15, 1958

CE FIELDS

PHARMACOLOGY

Drug Combination May Reduce Electroshock Aid

► A NEW DRUG combination has shown promise in the treatment of depression and has replaced the electroshock treatment in some cases.

Dr. Leo Alexander of the Boston State Hospital reports in the *Journal of the American Medical Association* (March 1) that the drug combination, meprobamate (Miltown) and benactyzine hydrochloride (Deprol), made the use of electroshock unnecessary in more than one-half of the 35 patients to whom the combination was given.

The recovery rate was described as "highly promising." It was "definitely" above the spontaneous recovery rate expected during the first year of illness, and only slightly below that obtained with electroshock.

To be effective against depression, a drug must reduce excitability without too much depressive action, and at the same time strengthen a person's "ego boundaries" by reducing psychic pain, fear, and resultant avoidance responses engendered by stress.

While no single drug fulfills both requirements, meprobamate fulfills the first and benactyzine hydrochloride the second.

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MEDICINE

Soot-Lung Cancer Relationship Discovered

► HOW a carcinogenic or cancer-causing substance in soot, 3,4-benzopyrene, can cause lung cancer has been found.

Plasma protein, found in abundance in the lungs, is able to dissolve the 3,4-benzopyrene out of the soot and "free it to be acted upon by tissue to form cancer," says Dr. Hans L. Falk, pathologist at the University of Southern California School of Medicine.

Dr. Falk and his associates have drawn this picture of their soot-lung cancer relationship:

The inhaled soot particles are broken down into their component parts. The 3,4-benzopyrene is dissolved out of the particles by plasma protein. In this free state it is susceptible to action by tissue resulting in cancerous growth.

Previously, it was not known how the body could grasp this cancer-causing agent that is locked in the soot particles floating over most U. S. cities.

Dr. Falk worked with Adele Miller, also at the University, and Dr. Paul Kotin of Los Angeles County General Hospital. The biological activity of the soot, after it enters the respiratory tract, is definitely favorable to lung cancer, they report in *Science* (Feb. 28).

Renewed interest in the cancer-causing properties of soot, they said, followed the

observation that the risk of development of lung cancer is greater among urban residents than rural.

Previously, 3,4-benzopyrene had been found in ashes of cigarette paper. It has also been shown that 3,4-benzopyrene can cause cancer, depending upon the amount inhaled. Dr. Falk and his colleagues tackled and solved the problem of how and what the body used to dissolve the soot once it had entered the lungs.

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EDUCATION

College Faculty Member Salary Averages \$6,120

► THE SALARY paid college faculty members will average \$6,120 this year.

This "shamefully low figure" is reported by the Office of Education, Department of Health, Education and Welfare. A new study on higher education shows that average faculty salaries in public colleges and universities range from \$5,110 for instructors to \$8,530 for full professors.

In private institutions, the average salary is \$4,230 for instructor and \$7,360 for full professors.

Concerning the report, HEW Secretary Marion B. Folsom said that college teachers train most of the future leaders in all walks of life.

"They must receive greater rewards if we are to attract and hold those with the best qualifications for teaching the young men and women of this country," he said.

Nearly 1,150 colleges and universities, having more than 80% of all higher education enrollment, participated in the study, which was designed to provide basic information to assist college administrators.

A 102-page report of the study, "Higher Education Planning and Management Data, 1957-58," was prepared by W. Robert Bokelman of the Office of Education.

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EDUCATION

One-Fourth of Freshmen Drop Out of College

► KEEPING students in college seems to be as much of a problem as getting them to go to college.

A U. S. Office of Education study shows that about one out of four students who enter college drops out before the end of the freshman year. This is as many as the students who quit in the following three years combined.

Particularly alarming is the fact that one-fifth of all the students who drop out permanently were in the top 20% of their high-school graduating class.

Out of every ten students who begin college, only six finish.

This is a "distressing waste of talent," Commissioner of Education Lawrence G. Derthick said, pointing out that the number of 18-year-olds in our present population is very low and these are our potential leaders.

The study was prepared by Robert E. Ifert of the Office of Education staff.

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ENGINEERING

Direct Telephone Dialing To Europe Expected

► IT MAY be possible to place a telephone call to Europe just by dialing the number directly on your own phone in the next five to ten years.

The nation-wide dial toll system is being made flexible enough for ultimate interconnection with European systems through the transatlantic submarine cable, O. F. Wallman, American Telephone and Telegraph Company, New York, reported to the American Institute of Electrical Engineers meeting in New York. It will also be possible to serve Hawaii through the transpacific cable, and telephones in Canada as well.

About half of the 300 automatic machine switching centers planned to serve 62,000,000 U. S. phones have been installed. The remainder will be in operation within the next five to ten years, Mr. Wallman said. He implied that the exact time when direct dialing to European numbers will be possible depends on switching progress there.

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ENGINEERING

Develop Accurate "Space Speedometer"

► AN ULTRA-SENSITIVE "space speedometer" for measuring accelerations in any direction in space has been developed by the Sperry Gyroscope Company, Lake Success, N. Y.

When used with gyroscopes to feed signals to a miniature computer, the device gives a very accurate, jam-proof guidance system for aircraft, missiles and atomic submarines.

Dr. W. L. Barrow, research vice-president of Sperry, said the sensitive accelerometer can detect the slight gravity force produced by an angular deflection as small as a ten-thousandth of a single one-minute space on a wrist watch. The device is now being produced for the Navy and Air Force.

Three small, self-contained metal cylinders form the accelerometer. Smallest is the floating sensor, the acceleration-sensitive element. This is immersed in a silicone fluid inside the next larger cylinder, which in turn is supported by bearings within the outer shell.

The smallest cylinder, within the silicone fluid, would rise to the surface except that the middle cylinder is made to spin by a small motor that rotates the fluid, causing the inner sensor to center itself exactly.

Because the sensor is supported only by the spinning liquid, static friction is eliminated and the slightest acceleration along its longitudinal axis moves the sensor along this axis. The tiny distance moved can be measured precisely by electronic methods.

Thermostatic controls in the outer shell hold the temperature within the unit to within one degree Fahrenheit even when the surrounding temperature swings as much as 80 degrees.

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