

CONSERVATION

World Water Decade Planned by UNESCO

➤ A FAR-REACHING program of international cooperation in hydrology which would lead to better conservation and use of water resources was approved by the 12th General Conference of UNESCO.

The 10-year program, to be known as the "International Hydrological Decade," will be launched at an international meeting of experts in 1963. A program will be drafted and submitted to an intergovernmental meeting of experts in 1964 so that the 10-year program can start in 1965. Interested agencies which will cooperate are the Food and Agricultural Organization, the World Meteorological Organization, the International Atomic Energy Agency, the International Council of Scientific Unions, the International Association of Scientific Hydrology, the International Union of Geodesy and Geophysics and the Union of International Engineering Associations.

UNESCO will help train hydrologists and promote basic studies by member states as well as the exchange of information on hydrology.

Hydrology is the science of the waters of the earth, their occurrence, circulation and distribution, their chemical and physical properties, and their interaction with their environment and with various forms of human activity. Hydrology encompasses the full range of water phenomena on and in the earth, including surface water, soil moisture, ground water, glaciers and icecaps, and atmospheric moisture.

The overall objective of the program is to improve man's ability to use and conserve water resources through international cooperation.

• Science News Letter, 82:384 December 15, 1962

FORESTRY

Blanket of Small Debris Spreads Forest Fire

➤ IF THE FLOORS of the nation's forests could be tidied with a giant vacuum cleaner, annual fire losses could be cut dramatically.

A two-year study by the Washington State University Division of Industrial Research shows that it is the blanket of small twigs and pine needles that spreads the 13,000 blazes that blacken and char nearly half a million acres of American forests every year.

"The fires simply will not burn," Dr. E. Roy Tinney, principal investigator, has found, without material a half-inch or less in diameter. In addition to twigs and needles, such materials include dried grass, leaves and lichens.

"Almost all fires in American forests start on the ground," said Dr. Tinney. "Even when lightning hits the top of a tree, the fire usually travels down the tree and then spreads along the ground." When a really big fire gets rolling, it consumes the tallest tree almost as fast as the smallest needle.

Until now, very little has been known of the mechanism of fire spread. The WSU research, backed by a \$52,000 grant from

the National Science Foundation, is part of a nationwide effort to discover the basic reasons for all fire occurrence and spread.

Initial efforts by the Division of Industrial Research were aimed at modeling forest fires. Several materials, varying in diameter from one-fourth inch to one inch and in length from one inch to a foot, were used as models of forest fuel. But the investigators were continually stymied by lack of information on the combustion processes in small solid fuels.

The investigation was then altered to solve the more basic problem, the lack of a reliable scientific description of the combustion process. Models of the forest fuel were made with small white fir dowels. Using them, measurements were made to compare with predicted values for thermal radiation, heat convection and burning rate. These factors are fed into a program for the International Business Machines Corporation 709 computer to obtain mathematical expressions for combustion of small forest fuels.

The Northern Forest Fire Laboratory, a research arm of the U.S. Forest Service at Missoula, Mont., cooperated in the research.

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RADIOLOGY

Radiation Before Surgery Advised for Cancer

➤ TREATMENT of early and middle stage cancer of the larynx, or vocal cords, by radiation was advised at the meeting of the Radiological Society of North America in Chicago. Surgery can still be used if radiation fails, but in a large number of cases the voice box can be saved.

Success with 89 percent of a group of 107 patients with early first stage cancer limited to one vocal cord was reported by Drs. C. C. Wang and Milford D. Schulz at the Massachusetts General Hospital, Boston.

They reported favorable results with 82 percent of 34 patients in the next stage. Nearly half of 78 patients responded to radiation although they had third stage cancers extending outside the immediate vocal cords. Even with widespread cancers and lymph node involvement, 13 percent of 57 patients were successfully treated.

All but 16 of the 276 patients given radiation therapy were men, mostly between 60 and 70 years old. External irritants, such as excessive smoking, alcoholic beverages and overuse of the voice during treatment were responsible for exaggerated radiation reactions of swelling and temporary voice loss in some patients, but super-voltage radiation produced fewer side effects than conventional X-ray. Results with the two-million-volt generator and cobalt-60 unit, used since 1952, were slightly but distinctly better than with the standard 200-kilovolt X-ray equipment.

Radiation "cure" rates are generally comparable with those of surgery, they explained, but if the disease cannot be controlled, total surgical removal can still be carried out. They noted that 12 of 14 patients who had operations after the failure of radiation were saved by the surgery.

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IN SCIENCE

CHEMISTRY

First Phosphorus Bonding To Only Two Other Atoms

➤ THE FIRST chemical bonding of phosphorus to only two other atoms was reported by Dr. Anton B. Burg, professor of chemistry at the University of Southern California, addressing the Robert A. Welch Foundation Conference on Inorganic Chemistry at Houston, Tex.

These developments are likely to lead to the invention of stronger, more heat-resistant plastics. Dr. Burg attached a fluorocarbon group to phosphorus and learned how to put the fluorocarbon-phosphorus units together to make rings of four or five phosphorus atoms, with no other kinds of atoms in the rings. Then by using another phosphorus compound he was able to break down the rings and get one phosphorus atom attached only to the fluorocarbon group and to the other phosphorus atom.

Bonding of phosphorus to three other atoms occurs in the phosphines, which are evil-smelling compounds that often can catch fire in air. Bonding phosphorus to four oxygen atoms is what happens in the phosphates and polyphosphates found in common household detergents and water softeners, and also in the biochemistry of muscles. With attachment to five atoms, phosphorus makes a very reactive chemical; and attachment to six others atoms is rare.

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TECHNOLOGY

Computer Programs Kept In Stock for Reuse

➤ COMPUTER PROGRAMS, the sets of instructions given to giant electronic brains telling them how to do all sorts of tasks for business, science, technology and other activities, have become a commodity that can be passed on from one organization to another.

A New York firm, Computer Usage Company, now develops computer programs for corporations and government agencies and then offers the same programs to others.

Both manufacturers of computers and programming competitors of CUC have a number of programs sitting idle that can be easily utilized by the average company or government agency with a problem similar to that of the original contractor for whom the program was designed.

Among the standard routines now available is an inventory control program for two discount store chains, a catalogue for the Department of Defense that could be used by private industry as well, and a neutron-logging program for a major oil company that tells how much extra oil a well contains.

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E FIELDS

ENTOMOLOGY

Bees Repelled by New Chemical Methods

► SCIENTISTS have smoked out a honey of a situation.

A beekeeper can remove honey from hives without a bee veil by making bees leave their hives obediently within two minutes using a new technique developed by Dr. Floyd E. Moeller, U.S. Department of Agriculture entomologist. He told the Entomological Society of America in Phoenix, Ariz., that he had developed two new bee-repellent methods. One, dilute acetic acid, used with the usual smoke, drives bees upward out of the hive. The second, propionic acid, sends the bees downward. The more volatile acetic acid repels the bees at lower temperatures.

The chemicals do not harm bees or humans and impart no taste or odor to the honey.

The methods were developed in cooperation with the Wisconsin Agricultural Experiment Station with the assistance of Dr. Alan A. Woodrow, U.S. Department of Agriculture entomologist at Tucson, Ariz.

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PSYCHOLOGY

Too Much Sleep Can Lower Efficiency

► SOME PEOPLE may do better work, or put up a better performance in sport, after spending a sleepless night than they do after sleeping soundly for eight or nine hours.

Dr. Donald E. Broadbent, director of the Applied Psychology Unit at Cambridge of the British Medical Research Council, said that a person puts up the best performance in a difficult task when the mind is aroused. But only when it is not stimulated so much that it becomes too tense.

Under some conditions, people become too aroused and overconcentrate on the job when they are fully alert, so that their efficiency falls. The effect of a sleepless night may prevent this, Dr. Broadbent has found.

Experiments have lasted more than four years, using young naval volunteers as "guinea pigs." Dr. Robert T. Wilkinson, one of Dr. Broadbent's assistants, kept these young men awake for one or two nights running and made them work under noisy conditions. His experiments revealed that, after a sleepless night, a noisy environment may be more conducive to work, because din helps to keep the mind alert.

The Cambridge experiments have also produced three other clear-cut findings:

1. Loss of sleep quickly affects the performance of a simple routine job, because a worker becomes bored more easily when

fatigued. But if a job is exacting, the effect of losing one night's sleep seems to be negligible.

2. Any slight reduction in efficiency, caused by lack of sleep, in an interesting job can easily be offset by offering extra incentives.

3. Any ill effects of several sleepless nights are quickly counteracted by one or two nights of normal sleep.

The main purpose of the experiments, which are continuing, is to discover how the switching of people to different shifts in plants affects their work.

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CHEMISTRY

Rodenticide Destroys Blood Clotting Vitamin

► CHEMISTS are cracking down on rat and mice pests.

A new rat-killer, Prolin, was announced to the Chemical Specialties Manufacturers Association in Washington by Dr. J. Abrams, Wisconsin Alumni Research Foundation, Madison, Wisconsin.

The rodenticide combines a special ingredient which destroys the clotting vitamin in the animal's bloodstream with warfarin, the most widely used anti-coagulant.

The new material destroys Vitamin K producing bacteria in the rat's digestive tract. Vitamin K acts as an agent in the system to effect blood clotting. This is the first anti-coagulant rodenticide which destroys an animal's Vitamin K supply.

Prolin is active against Norway rats, brown rats and house mice and is used on farms and in factories and houses. It causes death in one to five days by internal hemorrhage and is painless and tasteless. The rodenticide has a high safety factor because it is not toxic to humans unless consumed regularly over a period of time. Only "flagrant misuse" will cause death of pet dogs and cats.

Prolin will be available to consumers in the early part of 1963.

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TECHNOLOGY

Low Cost Rapid Transit Offered U.S. Cities

► WESTINGHOUSE is ready to install rapid transit systems in metropolitan areas that would provide service every two minutes day and night, run without human operators and collect fares automatically. The system would use lightweight electrically driven passenger vehicles, half as long as a streetcar, holding 20 passengers, operated singly during off-peak hours but in trains up to ten units during rush hours.

Primarily designed to operate on an overhead structure, it could also be at ground level or underground. Cost of the overhead installation would be \$2 million to \$3 million a mile for two lanes, about a sixth for subway systems.

Computers would dispatch and schedule the system, much as elevators are now controlled.

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GEOLOGY

Central Africa Arid During Last Ice Age

► CENTRAL AFRICA was exceptionally arid during the last Ice Age, Dr. Rhodes W. Fairbridge of Columbia University reported to the New York Academy of Sciences. The Nile almost dried up at this time. This differs from previous findings.

Dr. Fairbridge based his report on radio-carbon dating of clam and snail shells recovered from the silts of the Nile while on a field expedition organized jointly by Columbia's Departments of Geology and Anthropology to study portions of Nubia soon to be flooded by the Aswan Dam.

Heavy African rains began about 11,000 years ago, Dr. Fairbridge said, which created regular annual flooding by the Nile and paved the way for the Egyptian Golden Age.

"Since about 1000 years B.C., the tropical rains have gradually diminished. In spite of the predicted ups and downs in the future," Dr. Fairbridge said, "this suggests the drying tendency will continue in the subtropics. Temperate belts such as the Mediterranean coast of Africa, however, should get wetter and winters become colder, including those of New York."

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METALLURGY

New Steel Alloy to Allow Record Submarine Dives

► IF A NEW higher strength alloy steel lives up to expectations it will allow construction of submarines that can go to record depths.

The new alloy, called Maraging steel, was developed by the International Nickel Company, of which Dr. Robert J. Raudebaugh, New York, is product development supervisor. About 500 tons have already been produced for evaluation purposes.

Dr. Raudebaugh, who is president of the American Society for Metals, said that if usable as hull plates, the new steel will enable submarines to go to record depths, making detection more difficult, and it would also increase a submarine's resistance to underwater shocks from explosions.

The new alloy steel also could be used to great advantage in missile cases. It could be welded in the field without the quench and temper process required of conventional styles.

Maraging steel can withstand up to 300,000 pounds pressure per square inch without total heat treating, with only the weld needing to be treated, while conventional steel must undergo expensive and involved heat treating to withstand pressures of 175,000 to 200,000 pounds per square inch.

In addition to iron, the new alloy consists of 18 per cent to 25 per cent nickel with a fourth to a half per cent titanium as a hardening agent compared with other high strength steel formulas of chromium, nickel or molybdenum, two per cent to five per cent, with carbon three tenths to a half per cent as a hardening agent.

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