SURGERY

New Heart-Lung Machine Is Disposable, Part Nylon

➤ A DISPOSABLE heart-lung machine is now being used successfully in operating rooms in several medical centers in the United States.

The apparatus is called the Pulmo-Pak. It is made of nylon filters, compartments, and tubes which takes expert "care" of the patient's blood while it is circulating outside the body.

This machine, marketed by Abbott Laboratories of North Chicago, is now being used in cardiac "dry-field" operations and in still newer procedures involving local cancer treatment. The apparatus is presently available for clinical investigation only.

The device has proven beneficial in a method of cancer treatment known as perfusion. This method consists of "sealing off" the limbs, intestine, liver, pelvis and lungs from the systemic circulation. Then highly toxic drugs that kill cancers are pumped through the isolated portion of the body while the heart-lung machine takes on the responsibilities of handling the blood while it is circulating outside the patient's body.

In this manner, drugs that would normally be too powerful for the body, can be applied to specific organs in greater strength.

The machine is operated by a standard pump but has no moving parts, requires no complicated preparation beforehand, and is sterile and disposable.

Blood that enters the device receives oxygen and rids itself of carbon dioxide. A fine mesh removes excess oxygen and fibrin, the stringy substance in the blood. Then it passes into the body of the patient. Heparin is used as an anticoagulant. If it were not, blood clots quickly would form while the blood is outside the body.

At the end of the operation, the drug must be neutralized so that the blood will again coagulate normally.

Research on isolated perfusion surgery has been done at a number of medical centers, including Tulane University, the University of Minnesota, Massachusetts General Hospital in Boston, and Columbia-Presbyterian Hospital in New York City.

Science News Letter, May 16, 1959

BIOLOGY

Royal Jelly From Bees Prevents Tumors in Mice

➤ ROYAL JELLY, the mysterious food that the queen bee larvae eat, can completely suppress tumor development in mice.

It is also effective in preventing leukemia, three Canadian researchers report.

In what they describe as the "first unequivocal demonstration of an anti-tumor activity in royal jelly," the researchers say that mice receiving mixtures of royal jelly and leukemia cells survived while animals injected only with the leukemia cells died. The same results were obtained when ascitic tumor cells were used.

Further studies with whole royal jelly and its components indicate that this anti-tumor activity is found in the main fatty acid of royal jelly, 10-hydroxydecenoic acid.

Royal jelly gave no protection when administered after tumor implantation. Nor were the mice protected by separate doses of jelly and leukemic cells. Acidity, pH below 6, of the protecting mixture was essential for anti-leukemic action, the scientists report.

Thirty milligrams of fresh whole royal jelly or 1.5 milligrams of 10-hydroxydecenoic acid completely inhibited the development of transplantable leukemia in the mice. However, slightly more of the material was needed to prevent the development of ascitic tumors: 100 milligrams of fresh, whole royal jelly were required.

"The results have been confirmed repeatedly on nearly 1,000 mice during a two-year period, and show a striking effect: either all the mice die quickly or all survive," the scientists say. In two groups of mice receiving identical numbers of tumor cells, those given royal jelly remained alive and healthy for more than 12 months while the others died within 12 days.

Gordon F. Townsend, Ontario Agricultural College, Joseph F. Morgan, Department of National Health and Welfare, Ottawa, and Barbara Hazlett, University of Toronto, report the research in *Nature* (May 2).

Science News Letter, May 16, 1959

NUTRITION

Milk Does Not Supply Baby With Enough Iron

➤ MILK IS NOT the perfect food for babies.

Milk is a food that is very low in iron content, Dr. Edward H. Reisner, New York City specialist in blood abnormalities, reported to members of the Pennsylvania Academy of General Practice meeting in Bedford, Pa.

Milk is the major constituent of a baby's diet for the first six months of life. Therefore, the child must depend upon the supply of iron present in his body at birth. Yet, this is a period of very rapid growth in which the original supply becomes badly depleted, resulting in iron deficiency anemia, the specialist explained.

The anemia does not usually become apparent until the age of six months, and then not in every case. However, even apparently healthy infants of this age have significant depletion of their iron stores, he said.

Just early feeding of meat juices, eggs and vegetables will give the baby better supplies of iron, but by the time the deficiency is apparent, the absorption of iron through food is too slow. Dr. Reisner suggested administering iron to the child directly.

This can be done by mouth, but in prematures, the very young, and with babies with feedings problems, it is better to give the iron by injection. Of the several types available for injection, a complex of iron with dextran is the safest and easiest to administer, the doctor concluded.

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IN SCIENC

PUBLIC SAFETY

Special Group to Probe Radio Wave Safeguards

➤ POSSIBLE safety measures that should be taken to protect the human body against radio waves, particularly high-powered radar, are the object of a special study committee set up by the American Standards Association.

The committee will also try to pin down measures to prevent radio waves from triggering off untimely explosions of powder and flammable fluids.

Need for such safety measures is becoming more acute with growing use of high-powered "ham" sets, particularly in automobiles.

Operating a strong transmitter near the site of blasting might inadvertently set off the blast prematurely and kill or hurt many workmen. The radio waves could be picked up by wires running to the blast charge and deliver enough energy to explode the dynamite.

It is understood that the Voice of America is especially concerned with the possibility, admittedly a remote one, of accidentally blowing up a whole ammunition dump that may be near one of its powerful voices to Iron Curtain countries — particularly the floating voice aboard the converted U.S. Coast Guard cutter Courier.

The committee's purpose will be to find and develop safeguards akin to the familiar dangling chain which finally cut down fires on oil-carrying trucks by draining off static electricity.

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BOTANY

Root Growth Retarder Found in Vegetable Kale

➤ A MYSTERIOUS substance in kale apparently can keep some plants from germinating or can retard root growth.

The presence of a germination inhibitor in marrow stem kale was discovered when the problem of white clover seedlings' failure to germinate was studied.

When clover seeds were sown in the autumn following a summer crop of kale, the seeds might not germinate. If they did, A. G. Campbell of New Zealand's Department of Agriculture reports, the seedlings that emerged frequently died off in four to six weeks.

Laboratory studies indicate an inhibitor present in kale roots and, to a lesser amount, in kale leaves and stems permanently inhibits germination. Tests on ryegrass showed the substance drastically reduced root length.

A turnip plant and the weed spurrey may have the same effects, the scientist concludes in *Nature* (May 2).

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E FIELDS

ENGINEERING

Water Conversion Plant Is World's Largest

➤ THE WORLD'S largest single installation for converting sea water to fresh water has been constructed on the tiny semi-arid Dutch island of Balashi, Aruba. It is in the Caribbean off the Venezuelan coast.

The $11,000,000 plant is the first ever constructed that combines salt water distillation with the production of marketable surplus electricity.

Designed and built for the Aruban Government by the New York engineering firm of Singmaster & Breyer, Inc., the plant has a rated capacity of 2,700,000 U. S. gallons of distilled water per day. This is more than enough to supply all of the drinkable water needed by the island's 55,000 inhabitants.

Recent technological advances have been so rapid, said William H. Finkeldey, president of Singmaster & Breyer, that a large water-conversion, power-producing plant built today and incorporating accepted technical developments could produce fresh water from sea water for less than $1.00 per 1,000 gallons, assuming a credit from power sales.

At the new plant, production cost has been tentatively estimated as $1.75 per 1,000 gallons of fresh water. A lower figure is expected, however, when exact cost data reflecting power revenues become available. Distribution expenses would, of course, increase the price to the consumer.

Cost of water by any process cannot be predicted safely until the specific conditions for a proposed plant are known, Mr. Finkeldey said. Among these conditions are location, the price of fuel, the type of process selected, amortization of investment, and local markets for electricity.

Surplus water and power are important factors in this island's plans for economic growth. Both are essential to its multi-million dollar resort development.

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EDUCATION

Young Scientists Invited For Summer Training

➤ A SCIENCE training program for promising high school students will be inaugurated at the University of Maine this summer. Under a grant by the National Science Foundation this is one of a total of 112 such nationwide programs.

SCIENCE SERVICE has joined with the University of Maine in the selection of students who will attend the program at Orono, Aug. 3 to 28. Invitations to the University of Maine-SCIENCE SERVICE program have been issued to students who have placed in the top 25% of regional science fairs in the northeastern United States.

The program is designed to give extraordinary training and experience to about 100 high school students who possess unusually high aptitudes for work in science. Strong consideration will be given applicants' records in science fairs and in the annual Science Talent Search as well as course grades. All must be in their junior or senior year of secondary schools.

Travel expenses to a maximum of $120 for those chosen to attend will be paid. They will live in University dormitories without charge for room and board.

The program will not simply duplicate the work usually covered in high school or first year college courses. It is designed to broaden the student's background, to develop an appreciation of the interrelationships among sciences and to provide contact with research scientists.

Students will work in groups of about 25 according to the field of their major interest, biology, chemistry, mathematics, or physics.

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ENDOCRINOLOGY

Change of Thyroid Molecule Divides Effects

➤ SCIENTISTS have successfully juggled the basic molecule of the thyroid hormone so that it will do only the work desired, instead of producing a combination of good and bad effects.

The effects of the thyroid hormone in man now can be separated by changing the structure of the basic molecule, six investigators explained to scientists at the American Association of Physicians meeting in Atlantic City, N. J.

Now that the basic molecule can be changed, the effects of the hormone itself can be modified. For instance, thyroid hormone increases oxygen consumption by the body, lowers blood cholesterol and has a heat-producing effect. It also increases energy, mental alertness and appetite. Some of these effects are not needed in some patients, however. Others may even be dangerous.

For example, older patients frequently have a combination of low thyroid function and heart disease. If the usual thyroid hormone preparation is given to these patients, in addition to correcting the thyroid deficit, it raises oxygen consumption to a dangerous level in terms of heart condition.

If, however, a modified thyroid hormone is given, it produces all the needed effects without aggravating the heart condition.

It has also been possible to decrease the high levels of blood cholesterol characteristic of low thyroid function, and associated with atherosclerosis, without increasing oxygen consumption.

Studies of more than 60 different variations of the thyroid hormones were first run using laboratory animals. They produced a wide variety of biological effects, Drs. Rulon W. Rawson, William L. Money, Robert Kroc, Soichi Kumaoka, Richard S. Benua and Robert Leeper of the Sloan-Kettering Institute for Cancer Research and Memorial Center for Cancer and Allied Diseases, New York, reported.

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SURGERY

Small Hospitals Can Do "Open-Heart" Surgery

➤ OPEN-HEART operations can be performed in small community and city hospitals as well as in large medical centers.

Small hospitals can provide the necessary equipment, mainly a heart-lung machine, a trained surgeon and an interested and dedicated group of workers. Large medical centers are better able to provide the necessary physiological data. Since machinery for such data is expensive, the small hospitals need not provide this service, but could rely on the large centers for such information, four hospital staff members report in the *Journal of the American Medical Association* (May 2).

The open-heart operation does not need a vast assemblage of superscientists. Neither need there be a complex wilderness of gadgets surrounding the heart patient, say Drs. Alfred R. Henderson, Georges Oteifa and Robert R. Meijer and Harvey Black of Asbury Park, N. J. The men are affiliated with Fitkin Memorial Hospital, Neptune, N. J., Monmouth Medical Center, Long Branch, N. J., and Riverview Hospital, Red Bank, N. J.

There are at least 25,000 persons in the United States who annually are eligible for heart surgery. Many of these persons who otherwise could not receive treatment can be saved if heart surgery is available in small hospitals.

The four recommended that each member of an operating team be fully trained in his role in the operating room by repeated performance in the experimental laboratory. Repetition in the laboratory will make each individual procedure "as perfect and mechanistic as that of eating a meal."

The team should begin by performing the less difficult operations, such as those for the repair of holes in the heart walls. Gradually they may add the more difficult procedures, such as the "blue baby operation."

Science News Letter, May 16, 1959

EDUCATION

Quiet Movie Projectors Beat TV as Teachers

➤ QUIET MOVIE projectors are better training aids than closed-circuit television. Dr. F. J. McGrane of American Machine and Foundry Company and M. L. Baron of the U. S. Army Signal Equipment Support Agency at Fort Monmouth, N. J., reported on studies to the Society of Motion Picture and Television Engineers meeting in Miami Beach, Fla.

They said the difference might be due to TV's "small size of the screen (21-inch), lack of color, lack of a truly clear, bright, sharp picture and perhaps a 'conditioned reflex' involving previous use of television for 'entertainment' purposes rather than 'educational.'"

But TV ran neck-and-neck with noisy movie projectors as teachers in Army training.

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