

MEDICINE-TECHNOLOGY

Iron Lung Has Substitute

New electronic respirator, which may prove a boon to polio patients and poisoning victims, will get its first trial this summer.

► AN electronic substitute for an iron lung will get its first trials on polio patients this summer.

This new method of giving artificial respiration, which may also be used to save victims of barbiturate sleeping medicine poisoning and electric shock, was reported by Drs. James L. Whittenberger, Stanley J. Sarnoff and Miss Esther Hardenbergh, Harvard School of Public Health, at the First International Poliomyelitis Conference in New York.

First and only patient on whom the apparatus has been used so far was a woman with a "fast hiccup," technically termed diaphragmatic flutter. But the doctors do not know yet whether hiccup sufferers in general could be helped by the apparatus. It was tried on this patient because the surgeon was opening her chest anyway to cut the phrenic nerve to her diaphragm.

For polio patients and poisoning victims the doctor would make a small cut in the patient's neck and attach a silver electrode to the phrenic nerve at that point. The electrode leads to the electronic stimulator. As soon as this is turned on, the patient loses all desire to breathe and the machine takes over. The patient does not fight it as he often does the iron lung.

The electronic stimulator can be regulated so that slow, deep breathing with plentiful intake of air goes on automatically. The machine plus its batteries is small enough to be carried anywhere and can be used in an ambulance as well as in the hospital. Nursing care of polio patients will be much easier than when the patient is in an iron lung.

To make the electronic respirator more useful to poisoning and electric shock victims, the scientists hope to find a way of concentrating and focussing the current from the machine to the phrenic nerve so that it will not be necessary to make the cut in the neck and attach an electrode.

A new way of taking blood pressure which promises to help victims of "blue baby" and other heart and circulation defects has also been developed by Drs. Whittenberger and Sarnoff.

Instead of putting a cuff around your arm, doctors using this method will insert a small rubber tube into a vein in your arm and gently push it up into your heart and through the heart into the main artery leading to the lungs. As the doctor withdraws this tube the newly devised pressure-taking machine records the different blood pressures in the lung artery and the valves and auricles and ventricles of the heart.

Pressures in these different places may vary from two to 60. But the new machine shows the small ones just as clearly, accurately and quickly as the big ones. So the doctor can tell at once where and what kind of defect in blood circulation is present. Besides helping diagnose various ailments, the machine is expected to give entirely new knowledge of the blood vessels in the lungs.

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PLANT PHYSIOLOGY

Human Saliva Inhibits Germination of Seeds

► HUMAN SALIVA contains something that prevents some seeds from germinating and checks the growth of those that do sprout, experiments by Dr. Dvora Yardeni of the Hebrew University in Jerusalem have demonstrated. (*Science*, July 16).

Dr. Yardeni treated seed wheat with saliva collected from 33 persons of both

sexes and ranging in age from six to 68 years. Some of the treatments were at full strength, others with various dilutions.

Subsequent germination behavior showed a wide range in the inhibiting power of various samples, though there was no discernible correlation with either sex or age of the contributing individual. As a rule, undiluted saliva had greatest effect, but in a few cases greater inhibition of sprouting was obtained with a 50% dilution.

The inhibiting effect seemed to be principally on the radicle, or first small root; in many cases this failed to come out at all, though there were at least beginnings of shoot development.

Dr. Yardeni was prompted to undertake the experiments by two different groups of observations made by other workers: (1) that human saliva has a bacteriostatic effect, like that of penicillin; (2) that various antibiotic chemicals have a germination-inhibiting effect on seeds.

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PHYSIOLOGY

Diet of Milk Causes Liver Damage in Rabbits

► CIRRHOSIS—gin-drinker's liver to you—can result from an exclusive diet of milk. Rabbits and guinea pigs have shown that nearly perfect food to be not quite perfect; it lacks something that protects the



ELECTRONIC RESPIRATOR—This experimental model, which may prove to be an iron lung substitute, is demonstrated by Drs. James W. Whittenberger and Stanley J. Sarnoff of Harvard. When produced for general use, it will be only about half this size and have fewer dials and knobs. Dr. Whittenberger at left is holding the silver electrode that is attached to the patient's phrenic nerve through a small cut in the neck.

liver against tissue breakdown and the degenerative fibrous and fatty growth that constitute cirrhosis, and also something that promotes normal growth.

This dietary deficiency in milk was discussed by Edward J. Thacker of the staff of the U. S. Plant, Soil and Nutrition Laboratory, before the seventh annual meeting in Ithaca, N. Y., of the Laboratory's collaborators who work in state experiment stations and various federal departments.

Mr. Thacker has been keeping rabbits and guinea pigs on diets consisting of whole milk and skim milk powders, plus neces-

sary mineral elements. The animals fail to grow normally, and when they are autopsied, their livers prove to be badly damaged. Substituting dehydrated alfalfa for one-half the diet will prevent the development of cirrhosis. Less than that much alfalfa will enable the animals to grow, but then they will develop liver damage. It thus appears likely that the liver-protecting factor is distinct from the growth factor, but the case is not definitely proven. Thus far, neither factor has been isolated or identified.

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MEDICINE

Two-Front Attack Needed

Medical detectives must discover how the virus is spread and polio detectives must find the means to stop this virus criminal.

► MEDICAL DETECTIVE WORK along two fronts is needed for the conquest of infantile paralysis. This is clear from final reports made to the First International Poliomyelitis Conference in New York.

Scientists, thousands strong, are waging a good fight but no one really knows just how many polio viruses exist or what are the characteristics of each of the different strains of the polio virus family.

Within another six months research now under way may bring dramatic proof that some one avenue of germs is the prime means of the spread of the virus from one person to another. Is this avenue of infection an aerial route which the virus rides on the feet of flies? Or does the virus invade the fly's body as it does man's and travel in de luxe style with the fly furnishing food as well as transportation? Answers are coming to these questions, with their hint of a way to stop the spread of polio as yellow fever was stopped by discovery of the mosquito's part in its spread.

But if the answers are "noes," the polio detectives on another front may find the clues to stopping the virus criminal. A method for vaccinating against polio which is on a sounder basis than ever before was reported by Dr. Isabel Morgan of the Johns Hopkins School of Hygiene. Put the vaccine into the muscles, not just under the skin, and give such a big dose that the virus-fighting antibodies spill over from the blood to the central nervous system where the polio virus concentrates. This method will protect monkeys. Will it protect man?

The answers must come partly from the medical detectives who ferret out the secrets of what happens in the human body during the first hours of polio invasion. They must come partly from the polio detectives who trail and identify and characterize the various strains of polio viruses. This part of polio detective work is not as exciting

as it sounds. Dr. John R. Paul of Yale Medical School, one of the foremost polio detectives, calls it "dull" and "uninspiring." But, he said, "if we are to attempt to prepare specific vaccines which might be used to immunize man against this disease, we must clarify the strain situation."

Ferretting out the feeding habits of polio viruses is still another job for the medical detectives. Following this line, Dr. Raymond N. Bieter of the University of Minnesota has discovered chemicals which prevented paralysis or death in 90 out of every 100 mice. The polio virus, Dr. Bieter knew, has a special liking for nerve cells. Maybe, he reasoned, this is because the virus is hungry for some chemical in nerve cells. And if the virus enters the body through the throat and stomach and then goes to the nerves, why not, he wondered, feed it nerve cell chemicals while it is still in the stomach and stop it where it does no damage to human bodies?

It worked in mice. There is a hint that it is working in monkeys. If this proves true, the next step will be to try it in humans. But if it does not work in monkeys, the next step will be to try other chemicals the virus may be hungry for. Dr. Bieter is already on the trail of some of these. When he finds the right one we may have a chemical cure or preventive of polio.

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METEOROLOGY

Air Travel Made Safer by Central Weather Service

► A CENTRALIZED weather information bureau, now in full operation in Denver, is making a heavy contribution to both safety and comfort in airplane transportation. It is maintained by United Air Lines and is

located at Stapleton Airfield base.

With the aid of a huge weather wall map, meteorologists of the company review each morning the past weather conditions over the coast-to-coast and Hawaiian routes of the airline, study the present conditions, and make forecasts for the next 24 hours.

Meteorologists at other stations are consulted by telephone, and constant contact is maintained with the Denver U. S. Weather Bureau, whose chief meteorologist prepares special forecasts for the company. Airline weather forecasters along the system are aided in keeping posted on the nation's weather, minute by minute, by the company's 15,000 miles of private teletype lines and 7,600 miles of private telephone circuits. In addition to the centralized service, they keep in touch with the U. S. Weather Bureau and such Army, Air Force or Navy weather stations that may be in the vicinity.

By means of this central information center and the reports received by it the possibilities of conflicting predictions are ruled out. The information permits flight operators to cope with unusual weather problems, by rerouting planes around bad-weather regions or grounding them, and mile-by-mile information radioed to pilots warns them to prepare for, or dodge, bad weather ahead.

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CHEMISTRY

Ammonium Nitrate Safe When Properly Handled

► SAFETY in handling ammonium nitrate, the widely-used, white crystalline chemical compound that was behind the recent Texas City disaster, receives indirect consideration in a circular of the U. S. Bureau of Mines. Eighteen fires, serious explosions, and disasters involving ammonium nitrate have occurred since 1896.

The principal wartime use of ammonium nitrate was in explosives. Today's principal use is for fertilizer. Long used in limited quantities for this purpose, its use at the present time has greatly expanded. It can be employed with safety if proper precautions are taken.

The publication was prepared by G. S. Scott and R. L. Grant, chemists of the Pittsburgh office of the Bureau of Mines. Copies may be obtained free from that office. It deals with accidents and disasters, manufacture, preparation as a fertilizer, physical properties of pure ammonium nitrate, decomposition and oxidizing properties, spontaneous heating, and detonation.

The report includes a brief summary of published scientific information on ammonium nitrate and an up-to-date bibliography for reference. The publication states that while chemically pure ammonium nitrate does not decompose spontaneously at ordinary temperatures, it is an oxidizing