

ANATOMY

Find Vital Brain Centers

Discovery of the location of the centers controlling breathing and blood circulation may save the lives of patients stricken with bulbar polio.

► **DISCOVERY** of the two most vital centers of the brain controlling breathing and blood circulation was announced by Dr. A. B. Baker, University of Minnesota Medical School, at the First International Poliomyelitis Conference in New York.

They are bits of tissue each no bigger than a grape seed. They are located in the part of the brain called the medulla, or bulb, which connects the spinal cord with the brain. The bulb itself is only the size of a man's thumbnail, extending an inch and a half back into the brain.

The breathing and blood circulation centers are each really twins. That is, there is a left and a right breathing center and a left and a right circulation center. The twins of each set work together. Having two of each is a natural safety provision, like having two lungs and two kidneys. A person might get along with only one of the breathing center twins, but if both are destroyed by the polio virus or an injury, death follows.

Discovery of the exact location of these breathing and circulation centers was made during the infantile paralysis epidemic in Minnesota in 1946. Doctors had known before that injury to the bulb at the base of the brain might kill by stopping either the heart or breathing.

They knew this was the cause of death in polio when the virus invaded the bulb of the brain, in cases of bulbar polio. But when doctors at the University of Minnesota hospital saw 183 bulbar polio patients within three months, they were able for the first time to sort out the patients by symptoms.

Some, they saw, had trouble only with breathing. They had this trouble even though their breathing muscles in the chest were not paralyzed. Others had fast heart beat, and the blood pressure went way too high or way too low. Still others had trouble swallowing and talking. Obviously, different centers in the brain had been affected.

Actual location of the centers was made by examining 5,000 thinner-than-paper slices of the bulbs of brains of patients who died of bulbar polio. In every case of death from breathing trouble, the damage was in the same tiny area in the bulb. In every case of death from heart and circulation trouble, the damage was in another tiny area, but the same area in each of these circulation cases, too.

Polio patients stricken with bulbar polio this year, as many have been already in North Carolina, will have a better chance of survival, thanks to these discoveries. No

more than ten out of every hundred bulbar patients should die, Dr. Baker estimates. Most of these would be the ones whose blood circulation centers have been damaged by the virus. The ones with damage

CHEMISTRY

Halt Spread of Infection

► **DISCOVERY** of a blood chemical barometer of polio infection was announced by Drs. David Glick and Frank Gollan of the University of Minnesota Medical School at the First International Poliomyelitis Conference in New York.

The chemical is called anti-hyaluronidase. It acts to stop hyaluronidase, which is a spreading agent contained in bacteria, viruses, snake venom and bee sting venom. The spreading chemical, hyaluronidase, speeds the spread of infection through the

to the breathing centers can be kept alive in most cases by oxygen and other treatment during the acute stage.

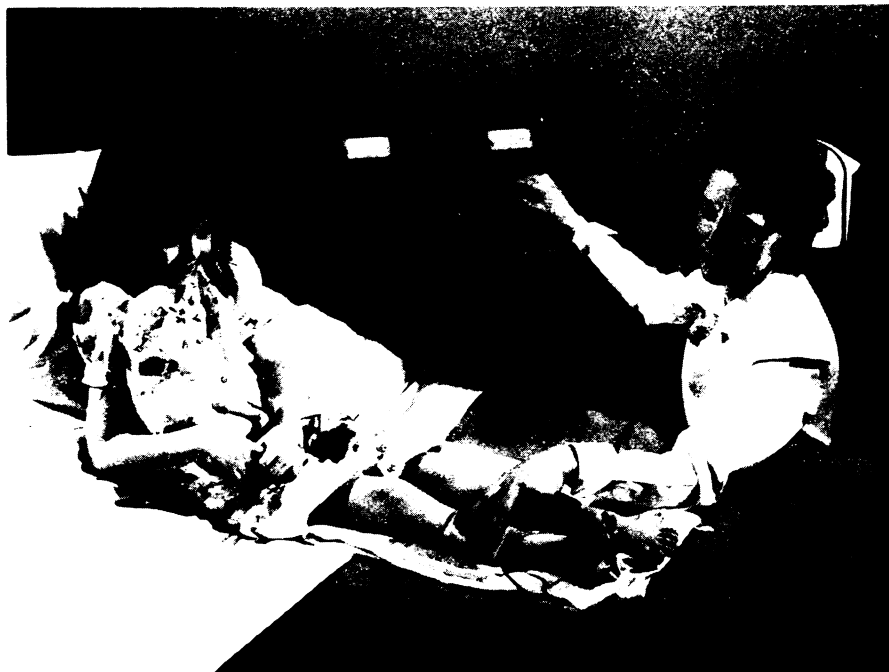
For the patients with damage to the circulation centers no treatment has yet been discovered. The next step by Dr. Baker and associates will be to attempt to produce exactly the same damage to exactly the same tiny spot in the brains of laboratory animals. Then they can try various treatments to find one that will save the victims. When this is accomplished it will be another step in the fight against infantile paralysis.

Science News Letter, July 24, 1948

body by dissolving the cement-like chemical that holds tissue cells together. In studies of animals and 27 human polio patients, the Minnesota scientists found the amount of the anti-spreading chemical increased in direct proportion to the infection.

The anti-spreading chemical, the scientists believe, might be used to determine the acuteness of infection in a polio case and to confirm the diagnosis in suspected cases.

They are trying now to isolate the anti-hyaluronidase so that it might be given to



MUSCLE-STIMULATING DEVICE—Paralyzed muscles of a little girl are artificially exercised by this new device called a variable frequency wave generator. Developed jointly by the General Electric Research Laboratory and the G-E X-Ray Corp., the machine uses electric current to contract and relax paralyzed muscles to prevent them from wasting away through disuse. It was demonstrated for the first time at the First International Polio Conference in New York.

patients to halt the spread of infection through their bodies. Attempts are also being made to find a drug or chemical that would stimulate the body to produce more

anti-hyaluronidase itself. Discovery of such a chemical might give a kind of vaccination method for protection against polio.

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PHYSIOLOGY

Gage Muscles by Sound

A new machine called an electromyograph, reveals the state of health of muscles by allowing the doctor to hear the sound they make when they contract.

► DOCTORS can now tell by the sound a muscle makes when it contracts whether it is paralyzed, getting better or normal.

If it clicks, the muscle is in bad shape. If it makes a deep-toned "glup-glup," it is healthy. Sounds in between the click and the glup tell when the nerve of a polio patient is regenerating and the muscle coming back to normal functioning.

The machine that lets the muscle tell its story in sound as well as on a silent screen was developed at Northwestern University's Department of Nervous and Mental Diseases. It was shown at the First International Poliomyelitis Conference in New York by Dr. L. J. Pollock, head of the department, and Dr. Alex J. Arieff.

Called an electromyograph, the machine is similar to the electrocardiograph which picks up electric potentials from the heart and the electroencephalograph which picks up potentials from the brain, popularly called brain waves.

Tiny needle electrodes are stuck into the muscle to be tested and the machine turned on. The doctor then can both see and hear what the muscle is doing as it contracts. In cases of paralyzed muscle, an electric stimulator to the nerve is used. This is just placed on the skin surface over the muscle being tested. The stimulator tells whether

the nerve fibers have come down to the muscle. The machine used without the stimulator tells whether the impulses are getting to the muscles.

The machine is being used for diagnosis in war veterans and other patients with peripheral nerve injuries as well as for polio victims.

Science News Letter, July 24, 1948

Muscle-Testing Machine

► A MACHINE that takes the guesswork out of muscle testing and gives a big boost to the polio patient's spirits with its record in pounds of his improvement was shown at the same meeting.

The machine was devised by Dr. Willis C. Beasley of the U. S. Public Health Service.

With this machine doctors and physical therapists can for the first time get an accurate measure, in pounds, of the strength of even the weakest muscles. Heretofore strength of weak muscles has been gaged by the examiner who reports muscles as being "poor," "fair," or "good." The reports are based on the examiner's estimates from experience with how much strength he must exert to counteract the force of the muscle being tested.

Now the examiner can make the test in

the same way, but a small gage strapped on the examiner's hand is connected by means of an electronic device with the machine that gives the measurement in pounds.

Muscles so weak they can exert pressure of only one-tenth of a pound can be tested as well as strong muscles capable of exerting 300 to 400 pounds of pressure.

Patients, especially children working to strengthen weakened muscles, are greatly encouraged by hearing reports given in figures rather than in vague terms. A child, Dr. Beasley explained, is stimulated to compete when he finds a muscle that rated six pounds has gone up to eight or ten. Whereas a difference from "poor" to "fair minus," for example, would not be so encouraging.

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