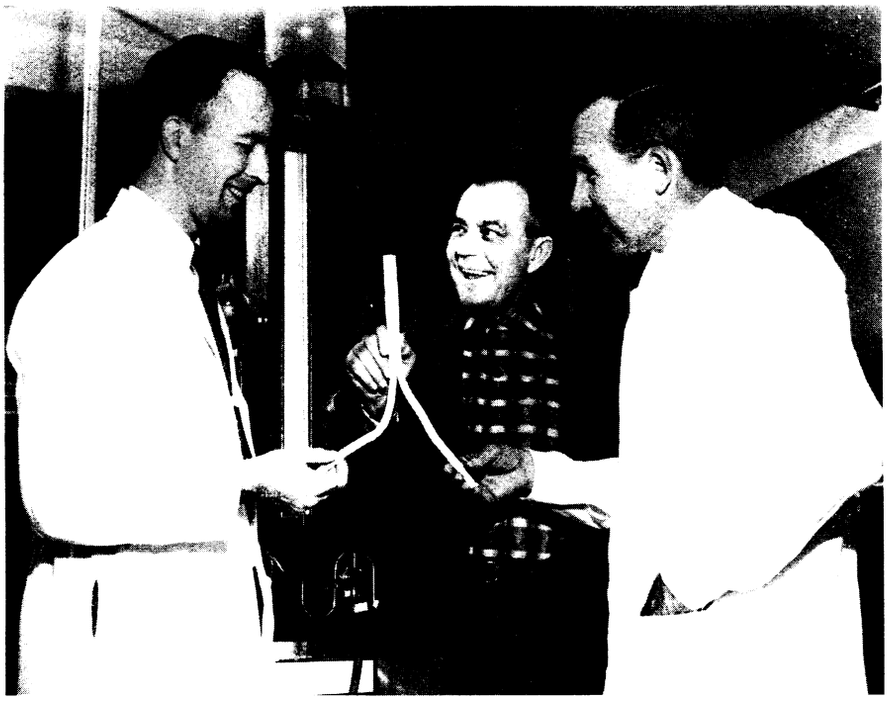

Y-SHAPED ARTERY—The nylon replacement artery proves a pleasant topic of conversation for Birmingham, Ala., steel worker Madison T. Gay (center) and the Y-graft's developers, Dr. W. Sterling Edwards (left) and Dr. James S. Tapp. Mr. Gay has one of the bifurcation grafts replacing the vital branching portion of his aorta where it divides to carry blood to his legs.

PHYSICS

"Brain" to Use Cryotron

See Front Cover

➤ THE FIRST giant "brain" using a revolutionary tiny device known as a cryotron instead of vacuum tubes or transistors is being built by scientists at Arthur D. Little, Inc., Cambridge, Mass.

The cryotron, shown on the cover of this week's SCIENCE NEWS LETTER and so small 100 will fit in a thimble, is a basically simple device that operates only at temperatures close to absolute zero, 459.7 degrees below zero Fahrenheit. It consists of a straight piece of wire about a tenth of an inch long wound with a control wire about the size of a human hair, and it will do the work of complex vacuum tubes (left) and expensive transistors (foreground) in some computers of the future.

At temperatures near absolute zero, many metals are superconducting, offering apparently no resistance to the passage of electrical current. The cryotron is man's first practical use of this property, discovered nearly 50 years ago but still not understood completely.

A superconducting metal's normal resistance will return, however, if sufficient magnetic field is applied. The electric current flowing in the control winding produces a magnetic field that destroys superconductivity in the straight wire.

The current in the control winding thus can cut off current in the straight wire, making an on-off electronic switch. Many cryotrons connected together are exactly the kind of switches needed for many computers.

One big advantage to using cryotrons for computers is the reduction in size. A large-scale one could be made to occupy one cubic foot compared to whole rooms for today's electronic computers. The refrigerating equipment needed to keep the cryotrons at liquid helium temperatures would cut down some on the space saved.

Dudley A. Buck, an instructor at Massachusetts Institute of Technology, started developing the cryotron three years ago. For this work he was awarded the 1957 Browder J. Thompson Memorial Prize of the Institute of Radio Engineers.

An important characteristic of cryotrons is their basic simplicity. Single wires with tiny coils wrapped around them can be made by automatic factories at great speed. Another advantage of the cryotron is its small power requirement. A disadvantage, however, is slow speed, expected to be overcome by future research.

Present cryotrons use wires of tantalum and niobium, two rare metals that are stronger than copper.

Science News Letter, February 16, 1957

MEDICINE

Nylon Artery Replaces Damaged Human Artery

➤ A NYLON artery, shaped like a "Y," is proving to be a life-prolonger, it has been reported.

The man-made artery is designed to replace tired, clogged or diseased arteries in the pelvic region. As a replacement for the human aorta, the man-made artery has already been used in more than 200 persons to keep the blood flowing from heart to legs.

Perfected by Dr. W. Sterling Edwards of the Alabama Medical College, Birmingham, Ala., and Dr. J. S. Tapp of Chemstrand Corporation in Decatur, Ala., the artery is an outgrowth of a nylon "no-kink artery" developed by Drs. Edwards and Tapp.

Called an "aortic bifurcation graft," the nylon artery opens new areas of surgery; permits rural clinics to stock replacement arteries, and can be used by military surgeons at the front.

Science News Letter, February 16, 1957

INVENTION

Proposes Mass-Produced Glass Atom Shelters

➤ PEOPLE who live in glass houses should have a better chance of staying alive during an atomic attack. Particularly if the glass house is buried in the front garden or the backyard.

A proposal to mass produce fiberglass civil defense shelters and the design for the shelters has been made in Washington by Willard Bascom of the National Research Council.

Mr. Bascom, who was formerly technical director of NRC's Advisory Committee on Civil Defense, thinks that a preformed fiberglass shell which can be buried adjacent to a house would provide American families with a cheap, comfortable lifesaver that would offer protection against blast, radioactivity and fires.

The shelter, which measures 12 feet and eight inches in length and is four and one-half feet in diameter, has walls one-quarter-inch thick. It is designed to be planted next to a house and opens both into the house basement and the yard outside.

A temporary home, as Mr. Bascom describes it, the fiberglass shelter sleeps four, has provision for food, water and blanket lockers and an air conditioning system provided by a hand-operated bellows used in German shelters during World War II.

Mr. Bascom points out that his proposal for glass houses underground to protect families during atomic war is not the only form of shelter or protection from enemy attack but that "its net advantages for most suburban dwellers are greater than those of any other protective system yet proposed."

During peacetime, Dr. Bascom adds, the shelter may find use as a playroom or darkroom.

Science News Letter, February 16, 1957