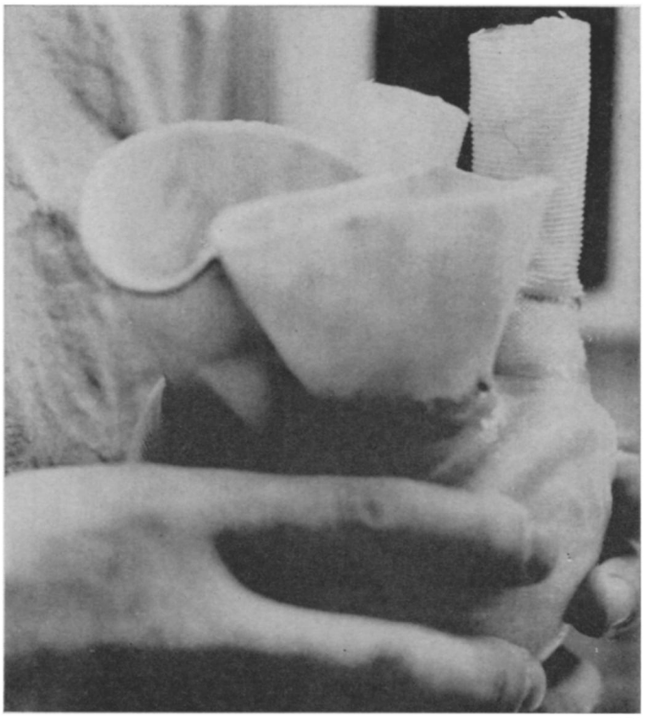
Implanting a stopgap heart

A mechanical substitute pumped until a transplant was found, but the success was a brief one



UPI

The stopgap heart in the inventor's hands.

A totally implantable artificial heart represents a panacea of sorts in treatment of cardiac patients. It would come in a variety of sizes to fit men, women and children, would, like a real heart, be gentle to delicate red blood cells, and would be powered from some tiny but efficient source within itself. It could also eliminate the scramble for a donor when a transplant is needed.

Though such a heart does not yet exist (SN: 10/19, p. 385)—scientists predict it will within five years—its forebear does. Last week it beat for 63 hours in the chest of a man from Skokie, Ill., until he received a new heart from a human donor.

In a desperate, last-ditch effort to save the life of 47-year-old Haskell Karp, a printing estimator whose own heart was damaged beyond repair, Dr. Denton Cooley implanted an eight-ounce heart of Dacron and silastic with an external power source, that had been available for patient use less than a week. Previously, it had been tested successfully in a half-dozen calves.

In other animal experiments, calves and dogs with totally implanted hearts have lived as long as 51 hours, and a booster heart used in tandem with the natural heart, has kept a dog alive for 19 months in Dr. Adrian Kantrowitz's laboratory at the Maimonides Medical Center in Brooklyn.

The artificial heart implanted by Cooley, which was developed by Dr. Domingo Liotta and which cost $5,000, was connected by tubes to a $20,000 power console the size of a spinet piano that regulates its beat. It was, explained Dr. Cooley of St. Luke's Episcopal Hospital in Houston, the only measure that could have prolonged Karp's life until a human transplant could be performed.

That occurred two and a half days later when Mrs. Barbara Ewan, dead of irreversible brain damage, was flown from Lawrence, Mass., to Houston. It was Dr. Cooley's nineteenth human heart transplant

But the success was only fleeting. Two days later, Karp died.

The death may have come from rejection of the human heart, but Karp also developed kidney and lung trouble, which could have come from the effect of the artificial heart.

Although the materials problem that plagues artificial heart developers is by no means solved, the Dacron-silastic combination heart Dr. Cooley used appears to be the most satisfactory to date. The heart, with an interior consistency of a cotton undershirt, caused some initial damage to Karp's red blood cells (red cells are likely to break or form clots whenever they come in contact with a surface other than the natural lining of human blood vessels) but after a time, his body became accustomed to its pumping motion. By the time of the human transplant, damage was "practically nonexistent," Dr. Cooley says. Conceivably, Karp could have been kept alive on the artificial organ for up to 10 days, but it was purely a stopgap measure at this stage of development.

Other available heart-assist devices would have been unable to keep him in shape for the hoped-for human transplant. Heart-lung machines, for example, used in surgery, generally take over the heart's pumping function safely only for a matter of hours, and the patient is unconscious during that time. And, totally implantable devices, such as Dr. Michael DeBakey's left ventricular bypass and Dr. Kantrowitz's booster heart, work in conjunction with, not in place of, the patient's own heart. In Karp's case, these would have proved inadequate.

The DeBakey bypass, a spherical plastic chamber the size of an apple, skirts the heart's left ventricle, through which blood is normally pumped, and offers a parallel route. It was developed by the Baylor University surgeon and Dr. Liotta.

The device engineered by Dr. Kantrowitz and his brother, Dr. Arthur Kantrowitz, is an assist pump installed across the arch of the aorta or great vessel. All blood then flows through it and through the natural heart.