MEDICINE

Transplanted Hearts

Have been put in warm-blooded animals with no ill effects. Were planted onto the neck and put "in circuit" with the host's blood circulation system.

➤ SUCCESSFUL transplantation of hearts into warm-blooded animals, such as rabbits, cats and dogs, has been accomplished by Prof. Nikolai Sinitsin of the Gorky Medical Institute, Moscow.

The heart was transplanted onto the host animal's neck and put "in circuit" with the host's blood circulation system. No ill effects were observed. Prof. Sinitsin is now carrying out long-term experiments for the purpose of keeping animals with two hearts alive as long as possible. At the same time he and his associates are conducting experiments for transplanting hearts into the abdomen instead of the neck.

The work is expected to provide a valuable method for studying various problems of heart physiology and treatment of heart disease.

"The transplanted hearts retained their own individual rhythm which as a rule is slower than that of the host's heart," Prof. Sinitsin states in a report written for the Soviet Scientists' Anti-Fascist Committee.

Rabbits, cats and dogs easily withstood the transplantation operation with an "infinitesimal" loss of blood, Prof. Sinitsin reports. There was no visible effect on the work of their own hearts.

The operated animals did not show any shortness of breath, spasms or excessive excitation after the operation. They reacted normally to all external exciters, such as light, sound and pain.

The transplantation of hearts in warm-blooded animals followed earlier work in which Prof. Sinitsin succeeded in transplanting hearts in cold-blooded vertebrates. In these studies, the transplantation consisted in completely replacing a frog's heart with that of another frog. Some of these frogs lived more than six months with a borrowed heart and did not show any differences in behavior from normal frogs. In spring both males and females which had been operated on went through a normal nuptial period which ended with spawning.

"Microscopic examination of the blood vessels that had been sewn together showed that they had knitted completely and that the structure of the heart muscles was normal," Prof. Sinitsin says in describing the results with the frogs.

"When there are two hearts beating in the breast of one frog, they have entirely different relations to the animal's body. The host's own heart has both neural and humoral connections with his body through the blood while for the first 35 to 40 days the transplanted heart has only humoral, chemical connections. The nerves of the host then begin to grow onto the transplanted heart. It is also possible to study the action of a number of heart medicines on the organisms with two hearts.

"There is undoubted interest in the question of the length of time taken by a transplanted heart to take root in the host's organism, when the host's nerves grow onto it and what happens to nerve ganglions inside the heart.

"The success of these experiments on cold-blooded animals led me to repeat the experiments on rabbits, cats and dogs. As a preliminary measure we carefully developed methods of joining blood vessels of warm-blooded animals. The method we developed is exceedingly simple and rapid, taking 20 to 30 seconds to perform.

"For the first series of these experiments we developed methods of transplanting the heart onto necks of these animals. In this series of experiments the second heart had only its right half joined into the host's blood circulatory system. The left half of the heart was not 'in circuit'. This system we called the 'semi-clinical' method.

"Observations showed that the heart worked well and would live for a long time. The heart retained its own rhythm and had no adverse effect on the blood pressure of the host or his ability to perform work.

"For the second series of experiments after a long search for the correct method we transplanted hearts onto necks of hosts with both halves arterial and venous in circuit with the blood circulatory system. This gave us a complete second heart 'clinical transplantation' as we called it."

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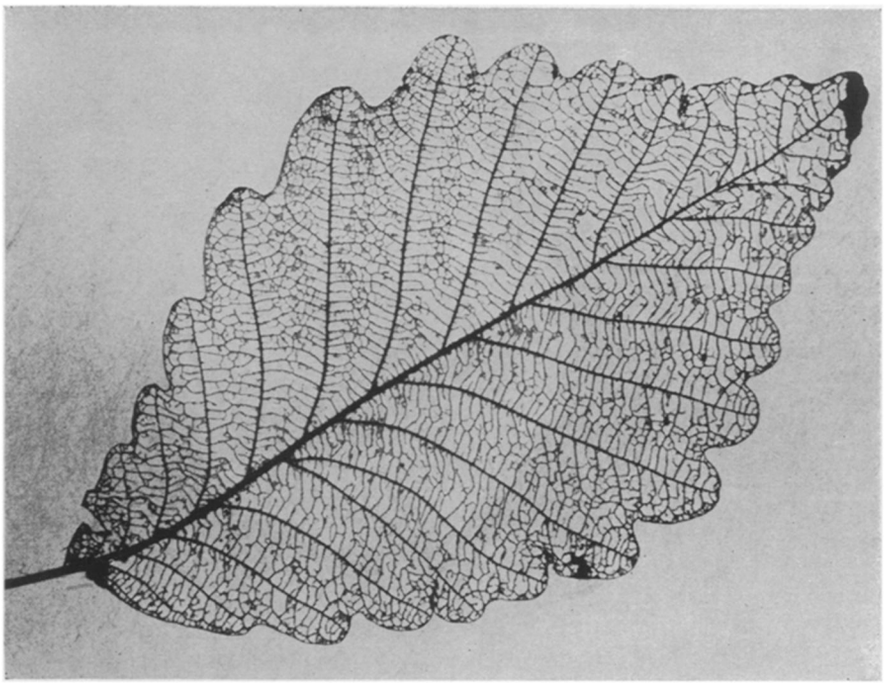

***LEAF SKELETON**—This is the skeleton of a chestnut oak leaf produced by the larval form of a saw-fly. When the larvae hatch out they feed on the pulp of the leaf, leaving the skeleton intact. Three leaves often attacked by this insect include the elm, poplar and chestnut oak. Photograph by George A. Smith, of Quarryville, Pa.*