Implantable artificial lung

The development has been announced by Dr. Pierre Morin, director of the research department at Laval Hospital, Sainte-Foy, Quebec, of a unique prototype artificial lung, which it may be possible in the near future to substitute permanently for a natural lung. This artificial organ, the first to be designed for actual grafting to the human body, was demonstrated to researchers and doctors during the annual meeting in Quebec City in January of the Royal College of Physicians and Surgeons of Canada.

Assisted by a six-man research team from Laval University, Dr. Morin has been working in this area for about two years. The resulting artificial lung is to be tested over the next 18 months on sheep. Laboratory tests so far carried out have been conclusive, and all that remains is to carry out the animal experimentation that is necessary before the device is tested in a living human body. This final stage of the lung's development may take some time in order to allow for sufficient observation of its long-term behaviour.

Dr. Morin has admitted that the reaction of the human body to this new operation appears to be difficult to predict.

A man-made sponge

Contrary to what one might expect, the artificial lung is of relatively simple construction, containing no electronic or mechanical apparatus; it is, in fact, an artificial sponge – but a sponge with special properties. The cube-shaped object, measuring no more than one-and-a-half inches square, is capable of separating gases and blood, and also of determining exactly the required mixture of the two substances.

Dr. Pierre Morin

This "sponge" is woven out of a plastic material called "silastic", which consists of capillary tubes. Like the natural lung, silastic has the same properties as a sponge. When the project began, the researchers used other spongy materials, but the lack of ducts made it impossible for the lung to function. It was then that silastic was adopted.

The sponge is made up of superimposed layers of this elastic material, which, under the impulse of the ribs, will act like an accordion.

Adaptability

This artificial organ would be implanted in the rib-cage of a patient who has lost a lung – for example, a person suffering from an industrial respiratory disease such as silicosis or asbestosis, or one with pulmonary emphysema or chronic respiratory insufficiency.

It is still, however, too early to predict the date of the first implant of an artificial lung, Dr. Morin says. Aside from rejection of a foreign body, coagulation of blood inside the artificial lung is the most important problem to be resolved at this point. Basic research in the coming months will be primarily directed towards solving the coagulation problem.

Research on an organ to serve as an integrated artificial lung is at present being carried out by only two groups of researchers – one in the United States and the other at Laval Hospital. In time the two teams will pool the results of their discoveries and perfect an artificial lung that can be implanted in the human body.

Marriages in 1974

Preliminary figures show the number of marriages in Canada during 1974 totalled 198,824, a decline for the second successive year from an all-time high of 200,470 in 1972 and from 199,280 in 1973. The rate for 1,000 population declined slightly, to 8.9 in 1974 from 9.0 in 1973 and 9.2 in 1972. All provinces except Saskatchewan, and the Northwest Territories, registered declines in the rates of marriage in 1974 compared to 1973.

Researchers make gains with anti-cancer drugs

Researchers at Hamilton's McMaster University Medical Centre are developing new measuring techniques which will greatly assist more effective anti-cancer drug use.

Dr. Brian L. Hillcoat and Dr. Jack Rosenfeld are analyzing the effects and means of delivering drugs in the bloodstream to cancerous tissue. Their research is aimed at finding out how much of a drug enters the bloodstream, how long it stays there, and how much of a drug concentration in the blood is needed to affect the target tissue.

These questions require solutions to chemical problems and two researchers are developing analytical methods or "essays" capable of determining drugs in the blood at concentrations as low as one nanogram per milliletre – or one part per billion.

Detection of low drug levels is based on such techniques as gas chromatography, mass spectrometry, and electron-capture gas chromatography.

"Ten years ago, the instruments associated with these techniques were not available, and only recently have they become sufficiently rugged for use in routine analytical laboratories in the development of assays for many drugs," said Dr. Hillcoat.

Dr. Rosenfeld noted that some of the assays developed today were not sensitive enough and have required modification.

"This was the situation in the development of an assay for the anti-cancer drug 5-Fluorouracil, for which the assay had a sensitivity of only one part per million. Since physicians, however, at the Henderson Cancer Clinic were using a novel technique for administering the drug, an assay