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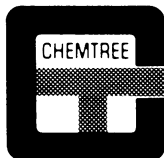


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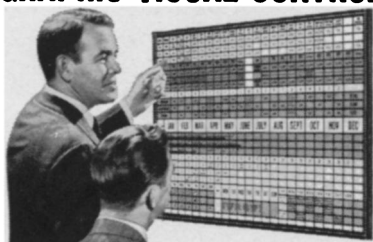
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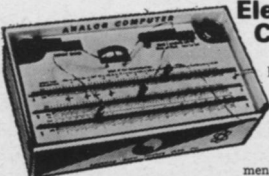
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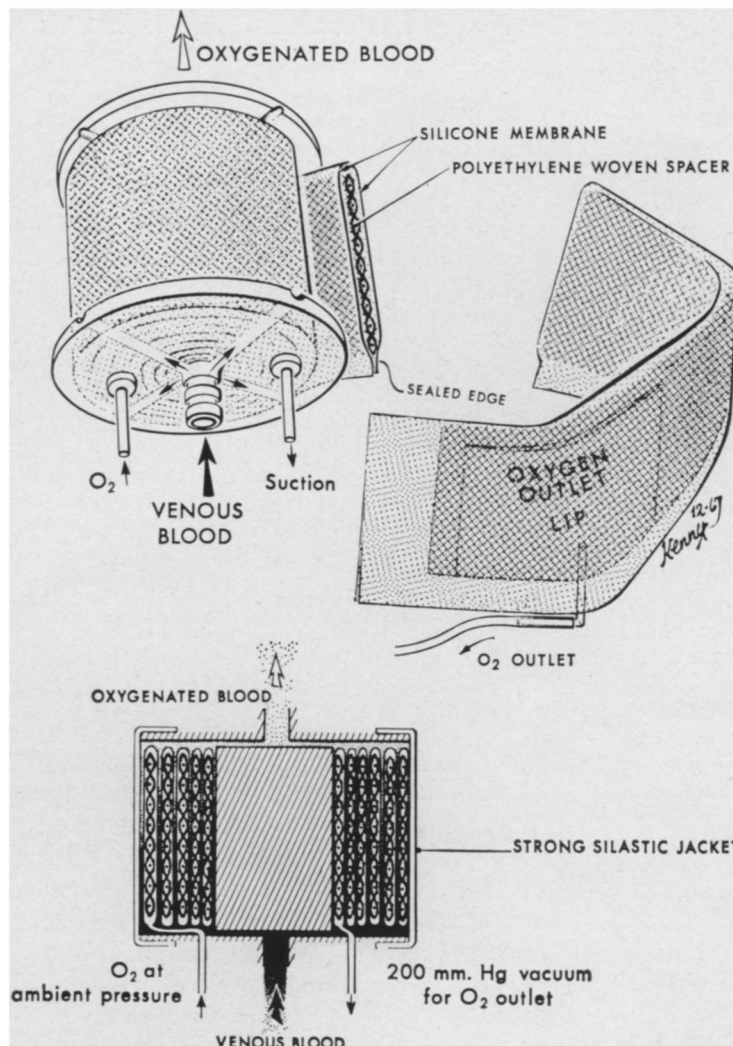
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Each year hyaline membrane disease, a breathing problem, afflicts some 25,000 newborn babies, mostly premature ones. One of every 15 babies is born prematurely; the greater the prematurity the greater the danger that the tiny lungs will not inflate properly.

Soon to be tried out on babies with the respiratory disease is a new artificial lung developed at the National Heart Institute, Bethesda, Md. Its first human use will be at Children's Hospital in Washington, D.C., following successful experiments with newborn lambs in several laboratories.

Through use of the new device collaborating scientists in the Boston City Hospital, the University of Chicago Medical School and Johns Hopkins University School of Medicine have maintained adequate blood oxygen levels in lambs from one to eight days old dur-

ing continuous periods of up to four days.

The experimental work was done on young lambs because they weigh about the same as newborn infants.

The lambs were subjected to a seven-percent oxygen supply for brief periods, during which the artificial lungs supplied the lack. Normally, oxygen makes up about 20 percent of the atmosphere.

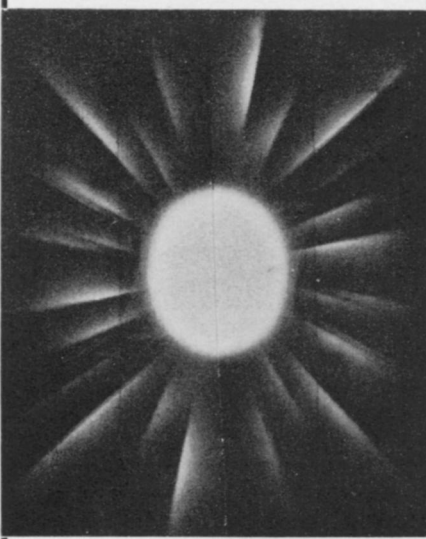
Up to now, artificial lungs have been used for no more than 12 hours on newborn laboratory animals. Even in that time they caused severe damage to lungs, blood cells and blood proteins, and formed clots and air bubbles in the blood.

The new model is powered by suction: oxygen is pulled through the lung by intermittent application of a slight vacuum to the oxygen outlet port.

The researchers say that the new lung



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owes most of its safety advantages as well as its high efficiency to this gentle, cyclic application of negative pressure. It prevents oxygen bubbles from entering the blood even if pinhole leaks occur in the plastic membranes separating the blood from the oxygen. Also, it gives a pulsating motion to the membrane, increasing the blood's oxygenation by moving the stagnant layer of oxygen-saturated blood near the membrane.

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The lung can oxygenate up to 450 cubic centimeters, nearly a pint, of blood per minute.

ASTROPHYSICS

NSF takes up the slack

Despite abandonment by the Navy, research in laboratory astrophysics at California Institute of Technology will continue under a grant of \$800,000 from the National Science Foundation.

The studies, which have been under the direction of Prof. William A. Fowler and the late Prof. C. C. Lauritsen, use laboratory methods such as energetic particles from accelerators to mimic conditions supposed to exist on the sun or other stars.

Results of such experiments give astronomers an idea of what to look for as evidence that theoretical processes are actually going on. Feedback from what astronomers actually do see then modifies the theories and the laboratory work based on them.

Some of the questions under investigation are the nature of the processes that generate the energy radiated by stars, the manner and the order in which nuclear reactions in stars form the various chemical elements, and the way in which stars, galaxies and the solar system evolved from some primordial state of the universe.

The Caltech work has been supported by the Office of Naval Research for the last 20 years, and its budget has grown from \$100,000 a year to the current figure.

In a few years they hope to find support for a \$10 million cyclotron as well.

The Navy gave up support in accord with a Defense Department policy of withdrawal from nondefense research that was announced when this year's budget was submitted to Congress. At the time it was predicted (SN: 2/10, p. 136) that the National Science Foundation would step in and carry some projects dropped by Defense.

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