TECHNOLOGY

New Computer Fastest

➤ THE FASTEST and most advanced computer system in operation anywhere, the UNIVAC LARC, is now working at the University of California's Lawrence Radiation Laboratory in Livermore, Calif.

The huge solid-state digital computer will be used in a variety of Atomic Energy Commission-supported research projects to solve problems of almost unbelievable complexity, problems that were unapproachable with existing computer systems.

Acquisition of the LARC will provide scientists with a valuable new tool in their attack upon problems in nuclear science and technology which are of vital importance to the nation's defense, Dr. Harold Brown, director, explained.

Many times faster than existing computer systems, the LARC was designed and built by Remington Rand UNIVAC with funds from the AEC. The Livermore laboratory is operated by the University of California for the AEC.

Almost all of the LARC's efforts will be devoted to nuclear weapons projects and fundamental studies of problems in nuclear physics of direct or potential application to the nation's weapons program.

Some of the areas to be studied with the LARC include the behavior of neutrons in nuclear explosives and reactors, the fundamental structure of the atomic nucleus, and the development of an accurate system of weather prediction.

In the latter project, the new computer will treat the earth's atmosphere as five separate layers while digesting data from weather stations throughout the country. From its computations the LARC will draw a weather map for each atmospheric layer. Such weather maps are expected to provide a degree of accuracy in weather prediction never before realized.

The LARC is capable of performing 250,000 additions or 125,000 multiplications per second. At this rate, it would take 40 men working with desk calculators for 100 years to equal the number of computations that the LARC can perform in one hour.

The system actually consists of two interconnected computers, one of which takes instructions from the other. The LARC contains some 80,000 transistors and 600 vacuum tubes in the computers and input-output devices. Its high-speed magnetic core memory will store up to 97,500 words (or 11-digit numbers), while an additional six million words may be stored on high-speed drums.

The computer is capable of acting upon 76 different types of instructions. Its mechanical printer will print 720 lines of results per minute. But for much faster operation, the LARC is equipped to display results on the face of a cathode ray tube. These results are automatically photographed for later development. The photographic process will record up to 9,600 lines of output per minute, and can also be used to draw graphs of results, plotting an average of 120,000 points per minute.

• Science News Letter, 78:246 October 15, 1960

VETERINARY MEDICINE

Window in Cow's Stomach

➤ A COW WITH A "WINDOW" in her stomach is giving an inside view of tranquilizing effects.

At the Second Demonstration Conference on Diseases of Farm Animals in Pennsylvania, Kennett Square, Pa., the window, prepared by minor surgery under anesthesia, was designed to give students and researchers a direct view of what drugs do to part of the digestive tract.

Noting that animals and humans alike have shared in the benefits of discoveries such as antibiotics, insecticides and tranquilizers, Dr. John E. Martin of the University of Pennsylvania School of Veterinary Medicine demonstrated how the cow's stomach quieted down after she took the antimotility drug isopropamide.

Also demonstrated at the conference were traps and baits for catching wild animals that may play a part in transmitting leptospirosis from farm to farm. This disease costs farmers about $200,000,000 yearly in animal loss.

It strikes many cattle, swine and horses and has varied clinical symptoms, including abortion, fever, drop in milk production, kidney and eye ailments. Leptospirosis can also be transmitted to household pets and to man. The research program at the New Bolton Center at Kennett Square includes a special laboratory, sponsored by the U. S. Department of Agriculture.

Mastitis research is being done on 30 young cows that will have their first calves and begin their milking life at the Center. A popular theory is that mastitis, a disease of the cow's mammary gland, is spread by poorly managed use of the milking machine. Dr. James M. Murphy of the School of Veterinary Medicine will try to find out how some cows resist infection.

• Science News Letter, 78:246 October 15, 1960

MEDICINE

Skin From Lost Limbs Preserved for Graft

➤ SKIN FROM LIMBS LOST in mining accidents has been successfully preserved by using fixed cold temperature procedures, Dr. Werner Budrass, senior physician at the Miners' Hospital in Bochum, Germany, reported to the first International Congress on Research in Burns at Bethesda, Md. He said the skin was later grafted to patients who retained it for as long as three months. The patients' own skin can heal while protected by the skin grafts.

Storage is safe for at least five years before use.

Dr. Budrass reported work with an investigation commission of the Mining Union, a government institution operating in France, Belgium, Luxembourg, the Netherlands, Italy and Germany. In an interview he said that his temperature procedure differs from any in the U. S.

"Because of the number of amputations necessary in coal mine accidents," he said, "we are able to obtain sufficient human skin for our needs." The skin is frozen relatively slowly at temperatures of minus 40 degrees centigrade, and after two days the temperature is kept at from minus one to minus three degrees so that protein decay does not take place.

Freeze drying, or lyophilization, can preserve the skin until needed. Storage containers are flushed with nitrogen several times before they are closed in vacuum to drive out as much as possible of the remaining oxygen.

Glass vessels are packed in padded tin cans for protection against the action of light, and the cans are stored at minus 18 degrees centigrade. This gives added protection during storage by reducing the posthumous changes of skin-protein and oxidation of fats, both of which depend largely on light and room temperature.

It is the temperature procedure, he believes, that makes both preservation of skin and homografts—grafting the skin of one person onto another person—so successful in European coal mining areas.

• Science News Letter, 78:246 October 15, 1960

MEDICINE

Prenatal X-ray Can Save Blood Problem Babies

➤ PREGNANT WOMEN whose blood is Rh negative were advised to have X-ray examinations during the last two months before confinement by Dr. Paul A. Bishop of Philadelphia, who spoke to the American Roentgen Ray Society meeting in Atlantic City.

The child born of an Rh negative mother and an Rh positive father may have fetal hydrops, a blood condition in severest form. It occurs once in 2,000 deliveries, and without replacment of blood by transfusion can be fatal.

The condition is no longer a hopeless one, Dr. Bishop said. Modern methods in the care of premature infants and the spectacular results of replacement transfusion techniques make early diagnosis of fetal hydrops of great practical importance. He illustrated with a case not suspected until X-ray diagnosis stimulated prompt action.

"Caesarian section followed by immediate and repeated replacement transfusions resulted in a vigorous baby that continues to thrive," Dr. Bishop said.

X-ray studies are advisable whenever there is a suspicion of an abnormal amount of fluid in the sac that holds the baby in the mother's uterus.

• Science News Letter, 78:246 October 15, 1960