SURGERY

Hot Blade Seals Tissue

A new hot-blade scalpel now being developed may save as much as 85% of a surgeon's time during surgery by preventing hemorrhages—By Faye Marley

➤ A DRAMATIC NEW surgical instrument is being developed in New York and in San Francisco that will prevent bleeding by sealing tissues when they are cut. Called a "plasma arc scalpel," it will have gaseous heat equal to the heat and energy of the sun's surface.

Dr. Charles Sheer, physicist at Columbia's School of Engineering and Applied Science, told SCIENCE SERVICE that the first model of the new instrument has passed the drawing board stage and is being fabricated for its first testing on inorganic, or lifeless, models. It will be the length of a lead pencil and about one-half inch in diameter.

In California, Dr. Robert E. Shaw, a former Columbia University surgeon who founded the Biomedical Engineering Laboratory at the University's Electronics Research Laboratories in New York, and who worked out the idea of the new scalpel with Dr. Sheer, will collaborate on its later testing on separate animal organs such as the liver.

Perhaps a half dozen models will be required, Dr. Sheer said, before the instrument will be exactly right.

When living animals are tested with it to determine how well they will recover, the technical laboratories at the Institute of Medical Sciences at the Presbyterian Medical Center in San Francisco will perfect the scalpel for human use. A push button is expected to be placed on the tip of the instrument, which will be linked by a flexible cable to a cabinet near the operating table.

"It is too soon to know how long the research work will take," Dr. Sheer said. The two men are working under a joint grant of $379,450 from the John A. Hartford Foundation in New York. The grant is to be spread over three years.

Plasma arc systems are already in use commercially for cutting and welding thick steel plates at the rate of one inch a second. The plasma arc scalpel, which is now being developed for the first time as a possible tool for human surgery, is a further refinement of the commercially available system.

The joint medical-engineering program is directed toward harnessing the energy of the sun and the stars into a scalpel of ultra-high temperature responsible for its cutting power.

The great importance of the new instrument, Dr. Shaw pointed out, is the prospect that it will prevent bleeding.

As much as 85% of a surgeon's time during surgery may be spent controlling dangerous hemorrhage and natural bleeding. The new scalpel should increase the safety and time spent on operation, and may enable surgeons to extend their operations into such regions as the liver, where they have hesitated to work because of the danger of hemorrhage.

It is coincidental that bloodless surgery should be related to the plasma of physics and have nothing to do with the fluid portions of the blood called "blood plasma." Dr. Sheer stated that the plasma of the arc scalpel refers to a "fourth state" in which matter exists in the sun, stars and tails of comets.

The three states in which matter exists on earth—solids, liquids and gases—are actually rare in the universe. More than 99% of matter in the universe is in the form of plasma.

At the Plasma Engineering Laboratory at Columbia, Dr. Sheer has developed large plasma generators operating at 20,000 degrees Fahrenheit with an efficiency of 90%. These generators are capable of slicing through concrete and are as bright as the surface of the sun.

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SURGERY

Partial Thyroid Removal Helps Hyperthyroidism

➤ PARTIAL REMOVAL of the thyroid, the small, butterfly-shaped gland in the front of the neck, is preferred by many specialists over radioactive iodine and drug treatments for children when the disease called hyperthyroidism occurs. In this disease too much hormone is sent to the body cells, affecting them adversely.

A group of Los Angeles physicians call attention to the possible danger of treatment by iodine 131, which some doctors consider a definite contribution of the atomic age to medicine. Their findings are reported in the New England Journal of Medicine, 272:217, 1965.

At the Children's Hospital in Los Angeles, the use of radioactive iodine has now been largely discontinued because of the finding that it can cause cancerous as well as benign tumors in animals.

Comparison of 13 years of treatment includes 45 children from two years to 16 years of age at Children's Hospital in the period 1949 to 1962. During this time, 23 of the children were treated for overactive thyroids by administration of iodine 131. Although ten of the children became normal, five became hypothyroid, producing too little secretion. There were four recurrences, and one case of cancer of the thyroid gland occurred 20 months after a second course of treatment.

Fifteen children were treated with antithyroid drugs alone. Of this number, only four have normal thyroids as a result of treatment. Five eventually had to have surgery because of poor control or relapse.

Of 12 children who underwent surgery, six are definitely normal and three more are assumed to have normal thyroid function. No deaths occurred, but one is hypothyroid and two suffered relapses.

Forty of these 45 children showed extreme nervousness as a result of their overactive thyroids. Twenty-three had bulging eyeballs, a condition called exophthalmos that is seen in one type of goiter; 22 had mass or fullness of the neck; 19 had weight loss; 15 had heart palpitation, and 11 had tremors.

Drs. M. D. Kogut, S. A. Kaplan, P. J. Collipp, T. Tiamsic and D. Boyle, all of Children's Hospital, reported the study.

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BIOTECHNOLOGY

Rechargeable Pacemaker Steadies Heart Beat

➤ AN IRREGULAR HEART beat possibly may be steadied for as long as 30 years by a new battery-powered device inside a patient can be recharged from the outside.

This new cardiac pacemaker can be surgically placed under the skin of the stomach and can be recharged regularly from an outside power source by an electromagnetic induction technique. The technique saves the patient from further surgery, since the pacemaker's batteries run down in three or four years.

The rechargeable pacemaker is being developed by surgeons at the City of Hope Medical Center, Duarte, in collaboration with research engineers of Hycon Manufacturing Corporation, Monrovia, Calif.

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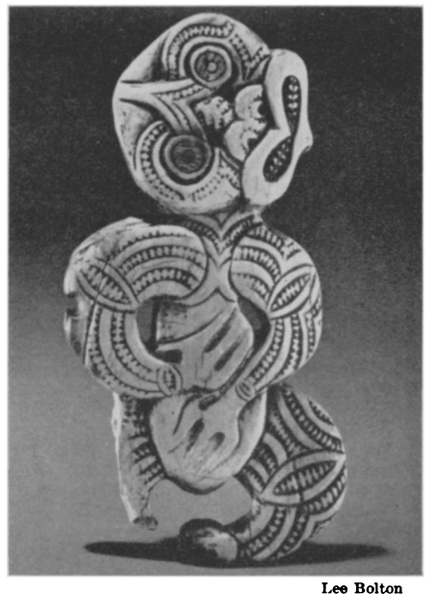

Lee Bolton

TIKI STANCE—Appearing in a new exhibition, "Faces and Figures," at the American Museum of Natural History in New York, this tiki from New Zealand has been carved in the characteristic strange position, believed by some to be symbolic of fetal position and by others to represent a god of petition.