Overhauling the Human Mechanism

Some of the Extraordinary Things That the Twentieth Century Surgeon Has Learned to Do

By William A. McGarry

THE possibilities conjured up in the most prosaic imagination by even a casual summary of happenings at the Eleventh Annual Congress of the American College of Surgeons, held in Philadelphia recently, make an appeal of outstanding general interest. Perhaps the most amazing single item was the war-born work in facial reconstruction. But at first glance the rebuilding of a human face seems a phenomenal achievement, its importance to the whole public dwindles perceptibly in comparison to some other trails that daring surgeons are blazing with encouraging success in sections of the human body almost uncharted, so far as the knife of the operator is concerned.

The brain, for instance, has been approached by the most skillful surgeons, even in recent years, with hesitancy. Intra-cranial operations have been a last resort. By actual operations at the recent Congress it was demonstrated not only that this condition no longer exists, but that the specialist in brain surgery is now as sure of his ground as the bone-setter. In the presence of famous surgeons from many countries of Europe and South America one surgeon, working by the light of a tiny electric bulb inserted into the hole which he had cut in the patient's skull, performed an operation consuming more than two hours.

This use of electricity is a natural development of steps taken by surgeons in earlier years. Six years ago at a Congress of the College a daring surgeon operated on a boy who was subject to fits. The ordinary diagnoses had failed to disclose any sign of a blood clot. Knowing the exact spot on the face of the child at which the contractions started, the surgeon made a small opening in the skull and with an electric needle gently touched the surface of the brain over a widening area. When the muscular contractions resulting occurred at the point where the fits always had their start, the surgeon examined the interior of the skull and found a small piece of scar tissue. This was removed, and the boy recovered.

Since then a famous Baltimore surgeon has made possible the definite location of brain tumors and other obstructions by X-ray. Until a few years ago X-ray pictures of the brain were of little value, because the fluid produced in the spine and which passes up over the brain surface and through the ventricles is of the same consistency photographically as the actual brain cells. The Baltimore surgeon discovered that the fluid could be withdrawn through a small hole bored in the back of the skull, thus letting in the air, with no ill effects to the patient. An X-ray plate then gave a clear impression of the brain and of a tumor or other malignant growth.

The use of an electric bulb within the skull robs cerebral surgery of one of its greatest difficulties. This was demonstrated at the Congress by Dr. Charles Frazier, a specialist in this field of the profession. The patient was a middle-aged woman. She was wheeled into the clinical amphitheater of the University Hospital, strapped upright in a chair, a position which surgeons now recognize as superior for intra-cranial operations. A steel brace held the head rigid and in position. Bandages covered all but the small area over the left temple where the operation was to be. During the early stages of the operation, while the skin flap was being laid back and the surgeon was cutting through tissues to the bone without disturbing essential nerves and muscles, the amphitheater was illuminated by the usual high-power, overhead electric lights.

The beginning of the cut through the bone of the skull was made with a small hammer and chisel. Then a drill was used. When this had penetrated the section, about an inch and a half in diameter, was cut around with an instrument similar to a pair of cutting pliers. With the orifice completed, Dr. Frazier picked up a metal band like the handle of a spoon, to the end of which was the small electric light bulb. This was inserted in the hole, the handle resting on the head and holding the bulb rigid. Then all the overhead lights were extinguished and the surgeons filling the rising tiers of seats could see only a dull red glow in the opening of the patient's skull.

After what seemed an age, during which the fingers of the surgeon's right hand were busy within the skull

as he explained to the visiting specialists each step in the operation, he moved back to permit the others to look within. He lifted on the point of an instrument the ganglia which he had been seeking. Then, when the operation was completed, an electrode was introduced into the opening until the point of it touched the motor nerve center. The patient's jaws snapped shut with a click, proving that the motor and not the sensory nerve center had been isolated.

In a general way it might be said that the three years which have elapsed since the armistice have served to crystallize the information that medical science gained in the world war, so that many of the things done under the desperate stress of war are just now coming into general use. Facial reconstruction is in this class. The members of the Congress were particularly interested in the work of Dr. Vilray P. Blair, of St. Louis, who was consulting surgeon to the American Expeditionary Forces in France in charge of reconstruction surgery. He was able to present final statistics, showing that 2600 American soldiers needed the services of this division. Of this number about 2000 were treated abroad and 600 sent home for treatment.

At the outset of his discussion, Dr. Blair emphasized the importance of the work to civilian life by pointing out that larger facial defects are created by cancer operations than by battle casualties, on the average. He predicted that the results achieved in this line are opening up a new field of surgery.

"The most important part of any surgical procedure is a plan," said Dr. Blair, "and the more closely and

AMONG the scientific developments of the present generation none are more marvelous than those of surgery—most practical of all applied science. We recall, some fifteen years ago, when surgery inside the chest was just beginning to be practiced, that a very competent physician and surgeon patiently explained to us six separate and distinct reasons why it could never be done, and why the reports that it had been done were newspaper fabrications. What the same gentleman would say to the prospect of working for two hours within a patient's skull by the light of a tiny lamp introduced therein we can hardly imagine. Such achievements as this make it plain that the surgeon of today takes his patient apart, repairs him, and puts him together again, with somewhat the same freedom displayed by a mechanic in overhauling the internals of an automobile. This story, as revealed by the Eleventh Annual Congress of the American College of Surgeons, Mr. McGarry tells us here.—THE EDITOR.

intimately this plan fits the needs of the case, the better will be the results. In reconstruction of the face, the plan should be as accurate and comprehensive as those used by the oculist, the dentist or the journeyman tailor. In the creation of the plan, we should mimic the methods of the sculptor and tailor who materialize their conceptions in clay or chalk before attacking the marble or cloth.

"If reconstruction surgery of the face should continue to develop along the lines upon which it is well started, I can see no reason why in the majority of cases a really good surgeon, given a healthy patient, the feeling of an artist, the skill of an ordinary tailor and the tenacity of a rat terrier, could not produce in flesh and bone features that compare favorably with those created by the accepted sculptor or painter. But it will require special skill and training and no end of hard work.

"Until such men are trained to work in this line the results must continue to be archaic and not incomparable to the results that would follow if each man were forced to make his own clothes. Satisfaction at one's appearance has a tremendous bearing on poise and self-confidence and, disregarding battle casualties, skill in the correction of facial defects will open up a very substantial field of legislation and much-needed surgery.

"If a man, through being wounded or an accident, has lost his nose, we first make a clay cast of the face without the missing feature. This negative is then filled with plaster and a positive cast made. On this the artist works, developing the missing feature according to the best æsthetic rules. When this is completed, we

have the patient's face with the built up new features in plaster. The added feature is then covered with tin-foil and a pattern is made, when the foil is flattened out. From this pattern we cut the cartilage with which we build up the new feature from the patient's body, cut it into shape and apply it to the old wound. Then a piece of adjacent skin is cut to the size covering the newly built feature, and is left joined like a flap in its old position until it begins to graft on the new structure, after which it is cut away."

Perhaps the greatest single constructive action of the Congress was the appointment of a committee that will make a complete survey of the results attained by the use of radium in the treatment of cancer and other malignant growths. This action was the outcome of an unexpected criticism from Dr. John B. Deaver, of Philadelphia. Just after being installed as the new president of the academy, Dr. Deaver said that while he hesitated to express a fear that radium will go the way of other new methods which could not stand the test of practice, the fact is that radium has failed in many cases where it was depended on. He pointed out that it is not by any means a cure-all for cancer and warned the members of the college from placing too much reliance on its value.

Heretofore the results from radium have been made known to the profession as a whole only through the energy of the individual user, or the institution in which he works. The college has created the machinery that will in effect chart the activity of every milligram of radium for every moment of its use, making annual reports. This action was particularly timely in view

of the fact that great progress was made at the Congress toward the completion of the fund for the Dr. John B. Murphy Memorial which is to be built in Chicago. Citizens of that city have pledged \$300,000 to be paid over when the college raises \$200,000.

In this memorial the College of Surgeons will have its own laboratory and research center in which the problems that have baffled the greatest of individual surgeons may be placed before the composite minds of all. It is expected that the fund will be completed and work started within another year, and in that event the radium investigation doubtless will be one of the first launched. Another problem, referred to at the sessions, concerns the expected isolation of the organism in the blood which is now held to be responsible for certain forms of internal hemorrhages that have heretofore been a mystery to science and death to the victim. It was announced that ex-

periments have been made demonstrating that this condition is caused by a germ. The blood of infants stricken with the disease, injected in small quantities into the blood of adults, has caused hemorrhages. Blood transfusion from a healthy volunteer was held out as the best known treatment. Indeed, it was stated that the profession is just beginning to realize the wide range of value of blood transfusion.

Specifications for Varnish

THE present high price of varnish for all purposes, and the great variety of uses to which it is applied, both in the home and commercial work, make proper specifications for the purchase of this material a matter of great importance. The government itself is a large user of varnish for both indoor and outdoor use, and samples of all this material submitted to the various departments are tested by the Bureau of Standards.

Two publications, Circulars Nos. 103 and 117 of the Bureau of Standards, have just been issued and may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5c per copy. They deal with specifications for water-resisting spar varnish and interior varnish, respectively. The specifications are unique in that they state the requirements which a satisfactory varnish must meet, but leave to the manufacturer a very wide latitude in the preparation of the material. This is believed to be a step in the right direction as it allows each manufacturer to follow his own ideas in the composition of the material, the only stipulation being that it shall be satisfactory under the most severe conditions.