

me add, that while Carrel's procedure gives us a new and improved technique for the application of antiseptics, much more does it give us a new and improved technique for physiological treatment. For that treatment the assiduous removal of corrupted and corruptible discharges is, as you know, the primary desideratum.

We now turn to the results of the treatment of infected wound surfaces by Carrel's method, and we may take them from Carrel's book. But it will be well, in order to keep to the kind of wound infection here under discussion, to exclude from consideration wounds complicated with fractures—for in those effective washing is difficult. Within our purview will then only lie wounds of soft parts, and in Carrel's book these are distributed under (a) fresh wounds—wounds taken in hand when 5 to 24 hours old; (b) phlegmonous and gangrenous wounds; and (c) suppurating wounds. The first of these categories would broadly correspond to wounds with a naked tissue surface lightly infected. The others would correspond to wounds which have, through postponement of treatment or its interruption by transport, suffered a set-back, converting an originally light surface infection into a heavy infection with invasion of the deeper tissues. Having now got your bearings, you will see that we have already, in discussing remedial treatment for the set-back, discussed the last two of Carrel's three classes of wounds. And we learn from the data he gives with respect to these only this—that the combined operation of treating the set-back and reducing the remaining light infection to a negligible infection permitting successful re-suture occupies by his method 3 to 4 weeks. This, of course, does not tell us how long it takes to convert a light surface infection into a negligible one. For that we must turn to the data relating to fresh wounds; and under that heading we find that where there are sloughs to be dealt with 15 to 20 days; and, where there are none, 5 to 12 days are required. That gives us a measure of what can be done by what I have, I hope not without good warranty, called Carrel's "combined antiseptic and physiological treatment."

Let us consider what Carrel's results tell us. They tell us in the first place that, whatever else it is, Carrel's treatment is not in any sense a *therapia magna steriisans*. Regarded as an antiseptic method, it is a method of "fractional sterilisation" requiring for the case we are considering—the simplest case of all—at the rate of 12 douches a day a series of 60 to 144 antiseptic douches. And if I am right in regarding Carrel's treatment as a combined antiseptic and physiological treatment, we have, superadded to the antiseptic, a series of 60 to 144 physiological attacks upon the microbes—each such attack starting from an atryptic condition.

The consideration of these figures leads directly to what I have to say in conclusion. While Carrel's work constitutes a very notable practical achievement, regarded as science it comes short in the respect that adequate control experiments are lacking. I do not mean that it has not been demonstrated that Carrel's treatment accomplishes what was impossible by the old system of syringing with antiseptics and leaving the wound afterwards to fill with pus. The inefficacy of that older treatment was attested by tens and hundreds of thousands of control experiments. What I mean is, that we have not in Carrel's work any control experiments with more potent and penetrating antiseptics to negative the idea that with these one could with less than 60 to 144 consecutive douches convert a light surface infection into a negligible one. And again, we have not from Carrel any control experiments with a well-thought-out physiological treatment to negative the idea that one could achieve a similar sterilisation by 60 to 144 successive physiological attacks upon the microbes, starting each time from an atryptic condition.

If we would abide in the spirit of science, every unwarranted assumption must go. We must not assume that when we have successfully combated a surface infection by a series of 60 to 144 therapeutic operations we have reached finality. And much less must we, from the fact that a treatment successfully combats surface infections, infer that it is also an effective treatment for infections which penetrate into the deeper tissues. It ought to come home to us instead that we must never look to find for quite different categories of wound infections—i.e., for quite diverse conditions—any one routine (antiseptic or physiological) treatment.

MASKS FOR FACIAL WOUNDS.

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IN describing the use of modelled masks for covering facial wounds I have to call attention at the outset to two important points: no attempt is made in any of my contrivances for the alleviation of the sufferings of the wounded, to restore functioning or to produce a cosmetic effect by plastic methods.

In certain cases the effects of impaired functioning may be alleviated to a greater or lesser extent, as, for instance, where the nerves affecting the salivary glands have been destroyed, or where the nerves of the eye have been so injured that the control of the tear-ducts is defective and a constant discharge is the result. In such cases I arrange for the attachment of an absorbent pad or pads within the mask which relieve the patients from considerable inconvenience.

Dr. A. Pont, the director of the Dental School of Lyons, in an article in the *British Dental Journal*, deal constructively with the question of nasal prosthesis, and incidentally remarks that "living restorations are indicated for cases of flattened noses, in certain cases of fracture, &c., but cannot enter into account where it is a question of replacing the nose totally or partially."

My work begins where the work of the surgeon is completed. When the surgeon has done all he can to restore functions, to heal wounds, to support fleshy tissues by bone-grafting, to cover areas by skin-grafting, I endeavour by means of the skill I happen to possess as a sculptor to make a man's face as near as possible to what it looked like before he was wounded. My cases are generally extreme cases that plastic surgery has, perforce, had to abandon; but, as in plastic surgery, the psychological effect is the same. The patient acquires his old self-respect, self-assurance, self-reliance, and, discarding his induced despondency, takes once more to a pride in his personal appearance. His presence is no longer a source of melancholy to himself nor of sadness to his relatives and friends.

As a general rule the cases that come to me are those in which the wounds or depredations of disease have been so severe as to remove them beyond the range of even the most advanced plastic surgical operations. So far as my treatment goes the size of the area affected is negligible. In theory it is as easy to make a mask for a whole face as for a space an inch square to cover a small palpitating area such as is often done in the case of skull wounds.

The essential of the treatment is the restoration of features; the features may have been originally ugly or beautiful. As they were in life so I try to reproduce them, beautiful or ugly; the one desideratum is to make them natural. Considerable experiment has proved that only a rigid mask can be depended upon, both for hygienic and cosmetic reasons. Various soft substances, such as gelatine mixtures, have been tried and have failed. Such applications cannot be either healthy or beautiful.

Description of Technique.

In order to approach as near as possible to nature, by my method a casting is made of the patient's face in plaster-of-Paris. This can only be done when the surgeon has discharged him as superficially clean and healed. This cast is essential, for a perfect edge-fit is required, so that adjustment is reduced to a minimum. All wound cavities are filled up with dressing and cotton-wool, and these in turn covered with goldbeater's skin. The nostrils are blocked with cotton-wool, the patient breathing through the mouth; if through the nose a quill is inserted for breathing throughout this operation. It depends on the area of wound, of course, as to whether nose or mouth breathing can be allowed during the process.

Having obtained the mould and dried it slowly the next stage is to French-chalk it and take from it a clay or plasticine squeeze, which provides a positive model of the patient's healed wound and the surrounding normal tissue surface. This model is further developed by means of sittings of the patient, and this stage is completed by taking another cast—a negative.

The task now before the manipulator is to reconstruct the destroyed feature or features from the model taken from this



CASE 1.—Artificial pinna.



CASE 2.—Replacement of lost parts by metallic nose.



CASE 3.—Showing artificial nose and cheek, artificial eye, and metallic eyelashes.



CASE 4.—Mask used in case of rodent ulcer.

negative mould, by building them up to match the corresponding or adjoining features of the patient, or from pre-wound photographs, taking the utmost care the whole time to keep the adjustment of the edges to the patient's face-planes. A cast is then taken of this; further manipulation is required for the fitting of an artificial eye (if the case includes such); a last comparison with the original is made, and the mask, in plaster, is complete.

From this an electrotype plate is deposited. It is of pure copper, 1/32 inch in thickness. The necessary fitments for glass eye and attachments are fixed, and it is finally well covered with an electric deposit of silver.

The last adjustments are now made to the patient's face, the securing of the plate to the face being carefully considered. The attachment is usually made by means of strong spectacles, but spirit-gum and ribbons have sometimes to be used, varying with the character of the wounded area.

The utmost care has to be made in fitting the attachments. I have received great help from Messrs. J. Hamblin, Ltd., the makers of the spectacles, who have devoted special care and attention to the work. Everything depends on the efficiency of the attachments in the matter of comfort to the patient, which is necessary in such cases; so that his attention shall never be drawn to his deficiency unless necessarily. The adjustment must be exact, therefore, and the edges of the plate can in no case be allowed to part from the sections of the patient's skin with which they coincide.

The plate has now to be pigmented to match the complexion of the patient. A thin coating of cream-coloured spirit enamel forms a good basis for the subsequent flesh-colour matching, as it leaves the oil-colour mat when dry, which facilitates the blending of plate with face. If the patient has an oily or shiny skin a semblance is easily obtained by varnish rubbed down to match. I do not use false hair for eyebrows and eyelashes now. The eyebrows are painted to match and the eyelashes I make of thin metallic foil, carefully soldered to the plate, cut finely by scissors, and tinted to match. I purchase the plain glass eye-sections and paint the eye-match on the concave reverse myself. Sometimes I do not use glass at all, but paint a semblance to match direct upon the metal mask, due preparation for this mode, of course, having been made in the plate.

The plate can now be worn and the patient finally discharged. Renewal of the pigmentation must be made from time to time, however, for scar tissue changes the contours of the face, and readjustments must occasionally be made. If these changes are very great a new plate might have to be substituted for the original, but in this only the same difficulties that were met with in the original stage would be encountered.

The Cases Dealt with.

My work has been done in close and constant coöperation with Lieutenant-Colonel Bruce Porter, C.M.G., R.A.M.C. (T.), and the medical staff of the 3rd London General Hospital at Wandsworth. It grew out of the establishment there of the splint room, of which I was in charge, and in which specific splints were prepared for exceptional wounds, and plaster casts taken of all such and kept to form the museum of cases there.

Sir Alfred Keogh, G.C.B., Director-General A.M.D., has directed the staffs of the various military hospitals to place all cases suitable for this treatment at the 3rd London General Hospital, and I am always glad to know of cases from those or other sources in order that all that is possible to be done for the facially disfigured shall be done.

It is obvious that if, in the cases hereafter described, plastic surgical operations could have brought about an enduring result, then such would have been preferable. To wear an artificial substitute for any feature must necessarily be always a burden added to the consciousness of the man or woman so sorely stricken. The fact remains, however, that through lack of time or accommodation in hospitals, or through plastic-surgical failures due to immense pressure of work, cases come out which only the hand of the sculptor can deal with, or hands trained to serve both plastic and sculptural manipulations, or a process combined of both.

In the cases of which particulars are given I have selected three of soldiers and one of a civilian, a woman. The latter I selected for the reason that the ravages of the disease were very extensive, and the surgical operation therefore com-

prised a considerable area of the lower half of the face, and, further, to note the fact that it is not only the wounded in battle or by accident that may take advantage of this remedial treatment, based on the skill (such as I and others may possess) and the knowledge of the sculptor. On these two things the success of the treatment entirely depends.

CASE 1.—Injury: Loss of right pinna by abrasion. The parts torn were so fragmentary as to be useless for a plastic operation. They were cut away, leaving the external orifice only exposed. (The functions of the inner ear are retained.) **Treatment:** A metallic pinna to match the left was modelled. **Attachment:** No mechanical means. Spirit-gum secures a perfect adhesion. The artificial pinna is only liberated with difficulty.

CASE 2.—Injury: Loss of nasal bones and cartilages, nasal process of frontal and superficial portions of both zygomatic processes of superior maxillæ. (After healing, by a slight operation, some nasal breathing was restored.) **Treatment:** Modelled metallic nose. **Attachment:** Spectacles, soldered on to the plate at bridge of nose. (Very simple, but quite effective.)

CASE 3.—Injury: Loss of nasal bones and upper part of cartilages, part of zygomatic process of superior maxillæ and right eye. **Treatment:** Metallic plate about 4 inches by 3 inches, inclusive of artificial nose and cheek, artificial eye and metallic eyelashes. **Attachment:** Spectacles on plate at bridge of nose, with a pillar fastening the limb of the spectacles to the side of the plate on the cheek-bone. For this extensive plate further security is obtained by the internal pressure of the fleshy terminal remains of the nose which becomes straightened when the mask is worn and fits into the plate. (Due care is taken to prevent discomfort by the pressure.)

Note.—In this photograph a special effort was made to indicate the plate-line (edges of the plate) by placing the camera only 3 feet from the patient. This to exhibit clearly the area covered. As a general rule the edges are not readily apparent.

CASE 4.—Injury: Effects of rodent ulcer and treatment. Lower face and nose. Loss of cartilaginous portion of nose, greater portion of alveolar part of superior maxillæ and symphysis menti, including on each side 1½ inches of the rami. (There is no control of salivation.) One aperture only serves the double purpose of respiration and alimentation. **Treatment:** An extensive mask, with modelled nose, lips, chin, &c., from bridge of nose to the cicatrice on neck; laterally fitting under both cheek-bones. **Attachments:** (1) Spectacles (which are detachable) fitting on bridge of nose; and (2) narrow ribbon, slotted through lower section of mask in front of throat, tied at back of neck. (The mask is worn with the greatest comfort and a large wad is fixed in the ample interior space for absorption of the effects of involuntary salivation, giving the patient increased comfort as well as the cosmetic advantage. The patient removes the mask when feeding and uses a feeding-cup.)

ALBUMINURIA IN THE TRENCHES.

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In view of the investigations on albuminuria and trench nephritis that are now being carried out in casualty clearing stations and base hospitals, the following figures from the records of a field ambulance may perhaps serve a useful purpose.

Many patients are treated entirely in a field ambulance; others stay for several days before being sent down the line. In this field ambulance, during the months of December, 1916, and January and February, 1917, the testing of every patient's urine was adopted as a routine procedure. The results obtained are sufficiently interesting to warrant their being placed on record. In the three months under review all the sick of the division passed through this field ambulance, and the urines of all these patients were tested.

For the purpose of collecting the urine from large numbers pickle-jars were used, and proved very good substitutes for the specimen glasses of the general hospital. With the resources of a field ambulance the tests were simple. Acidulation and boiling, cold nitric acid were the tests used. No microscope, centrifuge, or other apparatus was available.

The following are the figures for the three months. The number of urines tested was 4085; the number of urines,