Results

The accompanying Table shows that exposures of the outer table of 8 by 6, 12 by 10, and 7 by 6 cm. were healed in 6, 10, and 20 days respectively after removal of the whole of

Table showing Type of Case treated

Case	Site and Size	Cause	Day Grafted	Day Healed	Comment
1	Frontal, 8 by 6 cm. (Figs. 1 and 2)	Contact burn	24	30	Soundly healed throughout 8 months' observation
2	Frontal, 7 by 6 cm.	Mine	67	87	Extensive dirty multiple mine wounds. Gravely ill for many weeks before operation. Some osteitis of comminuted exposed external table. Case treated with Major Tutton, R.A.M.C.
3	Parietal occipital, 12 by 10 cm.	Electric burn	60	70	Had over 1,000 sq. cm. of full-thickness skin-loss of back also re-surfaced with patch grafts. Skull treated by Capt. Grossman and Jepsen, R.A.M.C.

the exposed external table and immediate application of free grafts. The delay in healing in the mine wound (20 days after operation) was attributed to the presence of osteitis in the external table at margins of the defect.

PERSPEX IN ORTHOPAEDICS

BY

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The suitability of plastics in orthopaedics has been under investigation at the Royal National Orthopaedic Hospital for some months, and this is an interim report on the work so far carried out. Methods previously used have involved the making of a positive from a negative plaster cast, and to this positive, perspex has been moulded. In order to reduce the time involved in the preparation of positive casts, a method was sought which eliminated this procedure. It has been found quite easy to make small moulded splints direct from the negative by hand. For large splints, however, the hand method was not adequate, and an apparatus was designed which could accurately mould the material to the large negative cast. For this type of moulding compressed air was found the most suitable means of applying pressure to the material.

Advantages of Perspex.—(1) Easy moulding by heat. (2) Light weight. (3) Durability. (4) Light-transparent, including ultra-violet band. (5) Permeable to x rays. (6) Cleanliness. (7) Waterproof—not affected by urine, etc. (8) Unbreakable—within limits. (9) Non-irritant to skin. (10) Reclaimable—material can be used again after reheating.

Disadvantage of Perspex.—Non-porous (see later).

It will be seen that this material offers many advantages over plaster-of-Paris, inasmuch as its durability, cleanliness, and light weight are features which have long been sought when patients are being treated for considerable lengths of time in orthopaedic splints. A patient can be nursed adequately, cleanly, and comfortably in a perspex shell without the disadvantages of softening by urine, reinfection of sinuses or wounds, and distortion or collapse of the shell, which are so often found when plaster-of-Paris shells are used. Moreover, for patients who cannot be moved—e.g., fractured spines—skiagrams can be taken *in situ*.

Method for Making Small Splints.—Suitably thick material (1/16 to 1/8 in.) of appropriate size is heated, pressed by hand into the negative cast (using asbestos gloves), and held until cool. The splint is trimmed with an electric saw, and the edges smoothed before fitting to the patient.

Method for Making Large Splints (Including Anterior and Posterior Shells).—A plaster cast of the part required, with 2-in. to 3-in. flanges on each side, is made (Fig. 1), and this is then placed in the lid of the moulding apparatus (Figs. 2 and 3).

FIG. 1.—Plaster cast for perspex shell with 4-in. flange.

FIG. 2.—Moulding apparatus with lid open.

FIG. 3.—Moulding apparatus opened after perspex mould has been blown. Plaster cast seen in lid and mould lying on base.

The remainder of the compartment is packed with sandbags (Fig. 4). The perspex sheet (1/8 to 3/16 in. thick), having been previously softened in an infra-red oven, is laid on the base of the apparatus and the lid clamped down. Air pressure is

applied (15 to 20 lb. per sq. in.), which forces the perspex into accurate contact with the cast. The air pressure is maintained for a short while to allow the perspex to cool, and the perspex mould is then removed from the apparatus (Fig. 3).

Mounting of Perspex Shells.—These are mounted in standard adjustable frames which, when the shell is discarded, can be used again. After cutting out the apertures for limb and toilet requirements the mould should be suspended from the frame

FIG. 4.—Sandbags being packed over plaster cast in lid of moulding apparatus.

FIG. 5.—Perspex shell mounted on standard adjustable frame, showing suspension of shell.

FIG. 6.—Adult patient being treated in perspex shell.

by turning the remaining part of the flanges over the upper bars (Figs. 5 and 6).

Observation.—It might seem that the method of pressing perspex into negative casts will reduce the diameter of the splint by double the thickness of the material used. It has been found that, while this is theoretically the case, in fact the "spring" in the material largely compensates, and a snugness of fit is obtained which is an improvement when compared with plaster-of-Paris casts.

Some Notes on Technique in Handling Perspex

1. The disadvantage of the material being non-porous can be overcome by drilling small ventilation holes in any area where moisture is likely to accumulate.
2. Cutting.—A high-speed saw is essential, otherwise the material is liable to fracture. Care must be taken that no saw cuts are left in the edge of the finished splint, otherwise stresses will cause such cuts to run into cracks. When an area has to be removed from the body of the splint large-diameter drill-holes should first be made at the apices of the intended meeting-point of the saw cuts.
3. Edges.—After cutting, all edges should be smoothed with a file or burred, and then sandpapered.
4. If local alteration in shape is required the area should be carefully flamed with a Bunsen burner on both sides till it softens, and then moulded by hand.
5. Cleaning and sterilization.—Cleaning should be done with soap and water (not boiling) or with cetavlon. After this the splints may be polished with any metal polish. Such cleaning agents as ether, benzene, chloroform, and xylol should not be used, as these are solvents.
6. Various methods of heating have been tried, but it has been found that the most satisfactory way is with radiant heat or infra-red ovens. These adequately soften the whole material, without over-heating the surface.

Perspex splints are being used for cases of tuberculosis of the spine, osteomyelitis of the sacrum, anterior poliomyelitis, fractured spine, and Still's disease, and have been found most suitable. They are preferred by patients to plaster-of-Paris splints.

Our thanks are due to the Royal National Orthopaedic Hospital for allowing us to carry out this experimental work, and to Mr. J. A. Cholmeley and Mr. E. P. Brockman for their encouragement and help. We are indebted to the Triplex Safety Glass Company for the design and presentation of the moulding apparatus, and particularly to Mr. Anstey and Mr. Chart, for whom no trouble has been too much; to Messrs. British Thomson Houston, Watford, for the presentation of the heating equipment; to Imperial Chemical Industries Ltd., for a research grant and material; and to Mr. Desoutter, of Desoutter Bros., for technical help and advice.

USE OF THE CAUTERY IN PLASTIC OPERATIONS ON THE EYELIDS

BY

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The following technique used by me in some plastic operations on the eyelids may be of interest. The results are obtained with the electric cautery alone or in combination with the scalpel, but the major part of the work is done with the cautery. So far as I know the method is not commonly practised, and the subject appears to receive less attention than it deserves from the majority of ophthalmologists. This short paper does not deal with the causes of the conditions found, but only with their repair.

Conditions Dealt With

The main types dealt with are: ectropion, entropion, symblepharon, distichiasis, and ptosis. The aim is to produce just enough contracture, by scarring in the underlying tissue, to cause the lids to assume a normal position. I use the ordinary Weiss cautery, and the size of point used will vary with the condition—from 5 mm. to 1 cm. long and 2 mm. to 1/2 mm. wide at the base. It is astonishing how little scarring the skin and conjunctiva suffer, even after very vigorous treatment.

Perhaps the commonest condition met with is *entropion* of the lower lid. An injection of 2% novutox along the whole length of lid secures analgesia; a point 1 cm. long and 2 mm. broad at the base is selected, and sufficient current to make it red-hot along its whole length is applied. The point is pushed through the skin down to the base of the tarsal plate, 4 mm. below the lid margin. This is done five or six times along the whole length of the lid. The point is held in each puncture about three seconds. No dressing is necessary and the puncture wound heals in about five days. The patient is given boric lotion and cotton-wool to wipe away secretion, but I doubt if even this is necessary.