the end result is obtained. In cases, therefore, in which one recession is not enough to bring the eyes straight, I prefer to wait some weeks before doing a second operation.

When a second operation is necessary, either an advancement of the external rectus of the same eye, or a recession of the internal rectus of the other eye, is done. In this series four cases have had recession followed by advancement, and three of these were straight; the other had to have, as well, a recession on the other eye (Case 12). Two have had recession on each side, and these are straight. I am inclined to think that in an amblyopic eye it is better to do the second operation on this eye, and leave the good eye alone, but in an alternating squint a recession on both may be done.

With regard to the amount of recession, I do not believe it is worth while trying to work out how many millimetres of recession are equivalent to degrees of squint. Each case varies to some extent, and in any event, as is seen from several of the cases in Table II, the end result is not the same as the immediate result.

From Table II we see that the amount expected of a recession is about 25°, and in a squint of this size I endeavour to recess as far back as the equator; if the squint is more than 25°, I try and recess a little further back still, but usually the equator is as far as can conveniently be managed. If the squint is less than 25°, say 15°, then the muscle should be re-inserted just in front of the equator. It is useless to recess 2 or 3 millimetres. In fact, if we remember that 1 millimetre is left at the insertion, 2 millimetres are taken up by the forceps, (and we insert our stitches just behind this) and then we "recess" 3 millimetres, we are really re-attaching the muscle exactly where that part of it originally lay in contact with the sclera, and the result of the operation is nothing.

REFERENCE

EXPERIENCES WITH GLAUCOSAN

BY

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BERLIN

The French Ophthalmologist Darier was the first to make the experiment (1896) of utilizing the hormone of the suprarenal gland for the purposes of ophthalmology.

His most important discovery, subsequently confirmed by general observations, was an enlargement of the pupil (sympathetic excitation) while reducing the eye pressure. Not until 20-30
years later was this medicament applied generally to the human body in the form of subconjunctival injections, more especially for the purpose of rupturing posterior synechiae. Success was obtained in severing synechiae, which had withstood all other mydriatics.

Undesired effects, such as increase of blood pressure which had been frequently observed when applying adrenalin and suprarenin, led to glaucosan being introduced, which is named according to its composition as dextro- or laevo-glaucosan.

The preparation designated dextro-glaucosan consisting of suprarenin of right-hand rotation, with an optically inactive preliminary stage, leaves the blood pressure unaffected and acts solely locally, although subconjunctival injection is necessary when applying it. Not until success had been reached by means of laevo-glaucosan (glaucosan drops) i.e., a combination of left-hand rotating suprarenin with an optically inactive preliminary stage (thus substituting by drops the inconvenient injection) was the method keenly discussed in ophthalmological circles in all countries of culture, and not the least important physicians to gain merit in the expansion of the method are the Americans: Gifford of Omaha; Kasp. Pischel of San Francisco and others.

The application of this preparation is due above all to its incomparable pupil-enlarging effect while at the same time reducing the pressure (emollient). It is, therefore, particularly valuable for severe iritis, providing the iris-lens coalescence is not too long established. Although it does not render atropine and scopolamine indispensable, (which, previously, frequently had to be given up to symptoms of intoxication) it exceeds them appreciably in effect. The effect obtained, that is, the dilatation of the pupil, is preferably maintained by atropine or scopolamine because the effect of glaucosan will only persist for a few hours. Where a drop (laevo-glaucosan) is insufficient to get a wide enough pupil, the organ is massaged near the limbus corneae according to the proposal of Grad (Prague) at the particular spot with a fine, wadding-covered probe for about 10 seconds. The high pupillo-motor force is shown in particularly clear manner by a perforating, central injury with inclusion of the iris; the medicament drew the iris completely out of the wound. Also a secondary cataract operation became unnecessary, because the coalescence between lens capsule and iris was ruptured.

Furthermore, secondary glaucoma is an important therapeutic object in glaucosan treatment. Operative intervention will here frequently entail the danger, in view of the atrophic condition of the iris, that the iris forceps might pull away a piece of the lens capsule; the operation may therefore readily lead to opacity of the lens, that is, to grey cataract, a very annoying complication
Experiences with Glaucosan

with glaucoma (with its shallow anterior chamber). It is, therefore, of the utmost importance to possess a medium which will frequently permit, by a severing of synechiae, of dispensing with operation. "In secondary glaucoma glaucosan will succeed in rupturing synechiae, which with other mydriatics remain unaffected." (Brit. Med. Jl., March 30, 1929, pp. 590-2).

Glaucosan drops should be just as indispensable in iritis glaucomatosa. Here is indicated; on the one hand an enlargement of the pupil; on the other hand a reduction of the eye pressure. This double effect: mollification and mydriasis is accomplished by no other medicament, only laevo-glaucosan will perform it! Atropine is contraindicated, as it enhances the pressure (nor does it come up to the powerful dilating force of glaucosan) and miotics are contraindicated, because they will increase through inflammation iris-lens agglutination. The verdict is therefore right: "Glaucosan has up to the present remained unexcelled in its effect upon the iris, where synechiae require to be ruptured." This property will secure a firm position for glaucosan drops in ophthalmology, because it helps to avoid the great danger which extensive or even annular iris-lens synechiae mean to the eye for the duration of life.

Let us emphasize yet one indication particularly: the test as to whether optical iridectomy offers any prospects for extensive opacity of the cornea. According to the proposal of Vannas (Helsingfors), the pupil is enlarged eccentrically where the optical coloboma is to be applied in a circumscribed place: by means of a wadding-covered probe but slightly moistened with glaucosan the conjunctiva is massaged at the circumscribed place of the limbus. None of the glaucosan must flow into the conjunctival sac, otherwise instead of an eccentric a concentric mydriasis would arise.

In glaucoma simplex, this most pernicious and varied form of glaucoma, glaucosan is capable, in cases where eserine and pilocarpine remain ineffective, of bringing about an appreciable reduction of pressure and to sensitize the eye in such a way that miotics again become effective. A trial should therefore be made with glaucosan in suitable cases where miotics fail, prior to operative intervention, viz.: not drops the first time but according to Vannas's proposal "massage," so tenderly that the pupil will yield but little, owing to the danger of subsequent increase of pressure. If the "circumscribed massage" has been well stood, one drop should be given according to Gifford's suggestion to the eserined eye. The pupil it to be enlarged only half wide.

After ½ hour, at latest, apply miotics, frequently, in intervals of 15 to 20 minutes; the pupil has to become narrow again and to remain so. All this is preferably carried out in the forenoon, with
a view to apply observation; for the first time in a clinic, if possible. If the pressure drops adequately, it may be left at one drop, otherwise two drops may be allowed, this being repeated if necessary two or three times at intervals of a quarter of an hour. Gifford emphasizes particularly that he does not desire to discourage by mentioning the occasional increase of the pressure. Although it cannot be determined definitely which glaucoma simplex eyes will react by increased pressure, nevertheless it may be maintained from experience that it is primarily eyes of a T. of 40 mm. and above which have such a propensity*).

A further very important question is: What happens if the operation was unsuccessful? This is unfortunately very often the case; even with acute glaucoma the pressure not infrequently rises again, but more especially after the operation of glaucoma simplex. Should the anxious patients, mostly of considerable age, now immediately be confronted by a further operative intervention? It is better when vision declines in such cases first of all to make a trial with glaucosan drops. Huber (Glarus, Switzerland) writes: "As it was throughout a question of cases where all other therapy had failed, the three cures are after all remarkable."

Professor Hegner (Lucerne, Switzerland) has communicated two gratifying results on unsuccessfully operated eyes. To this should be added that acute attacks on operated eyes are rare. "If the operations fail, adrenalin is able to reduce the pressure to normal." (Ungerer, Marseille. Sur le traitement du glaucoma par l'adrenaline, 1928). First of all the application of glaucosan should here also take place with every caution, as on an untouched eye, but thereafter more frequently and regularly—once or twice a week; many clinicians apply glaucosan drops in fact up to twice daily in unsuccessfully operated cases, invariably alternately with miotics. There is no doubt that many an operated glaucoma eye is in this manner spared another operation for months and years; and after all it is mostly a matter of people of advanced age.

Quite definitely glaucosan drops will not render operations superfluous; the operation may frequently represent a real delivery. But the criticism of Ungerer should be recalled to mind who in his aforementioned work surveys this treatment in detail; also the words of Darier (Clinique ophthalmologique, 1926, Nr. 6,

* Jess, chief of the eye-clinic, University of Leipzig, writes (Medizin. Welt., No. 26, 1931): "it is undoubtedly the merit of Hamburger to have, by systematical ever renewed experiences, considerably enriched the medicinal treatment of glaucoma. If we have in glaucosan no panacea for glaucoma—as Hamburger admits himself—one must however say, that in many cases of glaucoma simplex, when eserine and pilocarpine proved inefficient, glaucosan produced a considerable decline of tension; moreover, after application of glaucosan, miotics proved more efficient than before. It is not to be concealed however, that here and there unexpected increase of pressure leads to serious complications. In most cases one can speedily do away with them by an intravenous injection of 10 c.cm. of a 10 per cent. NaCl-Solution (introduced by Hertel)."
Knife for Corneal Grafting

1927, Nr. 5), according to which this treatment is worthy of every consideration; similarly the criticism of Gifford, according to which the value of the method is considerable and definite.

This applies in our opinion above all—(1) to iritis glauomatosa, and (2) to glaucoma cases unsuccessfully operated on or with but transitory success.

A Knife for Corneal Grafting

By

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An essential part of the modern technique of corneal grafting is the cutting of a shelf through the deeper layers of the cornea in order to prevent the graft from slipping into the anterior chamber of the recipient's eye. It is desirable that as far as possible the shelving of the donor's graft and the corneal bed of the recipient should correspond.

Tudor Thomas uses scissors to cut this shelf after the trephine has entered the anterior chamber. However skilful the operator these cuts with the scissors are at the best rough and irregular and the adjacent tissues are crushed and mutilated to some extent.

On this account I felt prompted to design and try a small corneal knife, a diagram of which is shown below.

Diagram of Corneal Knife

(a) Magnified view of the knife blade. The cutting edge is 1.5 mm. long and is continued half way round the curved extremity of the knife, shown in the diagram by the bracket (c). (b) Is the shaft, which in section is a flat oval. (d) The edge (d) is rounded and smooth. (e) Bakelite handle.
EXPERIENCES WITH GLAUCOSAN

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