Iritis occurred 3 weeks after operation in one case but there was no sign of it in any other. In this respect the post-operative course differs from that of the trephine operation where some degree of iritis commonly occurs.

To-date there has been no case of choroidal detachment and no evidence that lens opacities have appeared or increased as a result of this operation.

It has been effective in two cases of acute congestive glaucoma.

ALLERGIC CONDITIONS OF THE EYE*†

1.—Keratitis Rosacea

BY

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THE term "allergy" as used in the experimental section of this paper denotes an altered reaction rather than a hyper-sensitivity, as seen in the following example. Atropine in small doses, say one drop of 1/200 solution, dilates the pupil in 20 minutes, and in a slightly longer time causes immobilisation of the ciliary muscle and of the iris. In a few people, a much smaller dose, say 1/200,000, will produce this effect in 20 minutes, and we say they are *hypersensitive*. Occasionally we find that this smaller dose produces not only the expected reactions, but also oedema and irritation of the surrounding tissues, acute lacrymation, acute rhinitis and/or eczema of the eyelids. This is an allergic or altered reaction. In this sense one particular tissue, *e.g.*, conjunctiva, cornea or iris may be affected, and this is the usual finding; but occasionally several, and more rarely all, parts of the eye are involved simultaneously or successively.

Most allergic conditions are acute in onset and if recognised and treated at once clear up quickly, often within a few minutes or hours, leaving no permanent damage to the tissues involved. It is for this reason that this paper is entitled "Allergic Conditions of the Eye," rather than "Allergic Diseases," but it must be realised that once a tissue has remained in an abnormal physiological condition for some time, as in recurrent keratitis or iridocyclitis, there are secondary changes, due either to inflammation or to infection, which must be healed by routine treatment, though the

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allergist may be able to help in preventing a recurrence of the lesions.

We do not know why one tissue rather than another should be the "shock" tissue in any patient, and we are left wondering whether some damage, possibly congenital, and probably traumatic, must have been a forerunner of the condition. The presenting clinical signs and symptoms will depend upon the underlying structures of the various tissues involved.

In 1935 the Johns Hopkins Press published Woods' monograph on "Allergy and Immunity in Ophthalmology" in which the subject is presented from an immunologist's viewpoint, dealing with the relationship of allergy to focal infections, especially syphilis, tuberculosis and trachoma, but since that time recent work, especially in America, has shown that perhaps true allergy is rather a physiological or pharmacological abnormality, involving sensitised tissues and wet mucous membranes. In those conditions in which an infection is proved, this infection is secondary to the allergic diathesis. It will be seen from the case-sheets quoted below, that a most important point in diagnosis is an accurate family history, for almost without exception the patient has other allergic manifestations, or some of his relatives have asthma, urticaria, hay-fever or migraine.

During the last ten years many distinguished workers have written about the antigen-antibody reaction, which gives rise to the allergic reaction. Bothman¹ (1941) describes an allergic reaction as "an antigen-antibody reaction freeing a histamine-like substance which leads to capillary dilatation, increased permeability of vessel walls, and an exudation of serum which contains toxic substances." The earlier work was ably summarised by Duggan³ (1946). He is an ophthalmologist, who, after working for some years in the Department of Physiology at the College of Physicians and Surgeons, Columbia University, stated that "To me, allergy includes all those aseptic and abacterial lesions in which the basic pathological process can be reduced to a common denominator of either increased capillary permeability or excessive contraction (spasm) of smooth muscle, or both . . . since except for the muscles of the iris and the ciliary body, most of the smooth muscle of the eye is found in the walls of the arteries and arterioles. I think that allergy of the eye can be interpreted as a problem in vascular physiology."

Whether the accumulation of histamine, due to exogenous or endogenous allergens, and the effect of that histamine on the smooth muscle of the body is a whole explanation of the changes seen, or only part of it, still remains uncertain, although Duggan's interpretation seems to offer a satisfactory explanation of most, if

TABLE I

Presenting pathology	Approximate per cent. of cases which can be proved to be allergic
Angioneurotic oedema	70
Blepharitis	10+
Conjunctivitis	40+
Keratitis	10
Keratitis rosacea	70
Iritis	3
Iridocyclitis	2.5
Glaucoma	5
Retinal haemorrhage or detachment	1
Choroiditis	3
Cataract	0.2
Migraine	54

not all, of the conditions seen in the various tissues of the eye. Depending on which tissue is sensitised to the offending allergen—*i.e.*, the “shock” tissue—we may see angioneurotic oedema, blepharitis, conjunctivitis, keratitis, iritis, iridocyclitis, keratitis rosacea, retinal haemorrhage or detachment, choroiditis, glaucoma, cataract or migraine. From Table I it will be seen that some of these conditions are frequently allergic, and some only occasionally so. Tables II and III show that in keratitis rosacea, 70 per cent. of the cases can be satisfactorily investigated and treated by desensitisation.

Keratitis rosacea

Rosacea, a relatively common abnormality of the skin of the face of adults between the ages of 20 and 50 years, is frequently accompanied by ocular manifestations, varying in degree from a mild conjunctivitis, through all the stages of blepharo-conjunctivitis, episcleritis and keratitis, to eventual visual incapacity. It is all too frequent to find the patient, and sometimes his doctor, too, confident that each recurrence will be less severe, and that he will “grow out of it” when aged 50. If possible before marginal vascular infiltration shows that the cornea is involved, and whether accompanied by an exacerbation of facial acne or not, a note of warning should be given. Numerous as the list of possible causes of keratitis rosacea may be, almost all authors agree that the condition is “a metabolic, rather than a local one”; digestive

upsets (Ryle and Barber,⁸ 1920; Brown,² 1925; Eastwood,⁴ 1928, 1934), deficiency diseases (Johnson and Eckardt,⁷ 1940; Sydenstricker, Sebrell, Cleckley and Kruse,¹⁰ 1940; Johnson,⁶ 1941; Fish,⁵ 1943), and hormonal disorders (Zondek, Landau and Bromberg,¹² 1947), all play a part, and must be treated appropriately, but even after all these have been corrected, and all bacteria removed, there is still an underlying condition which predisposes to recurrence. From a survey of the 76 cases in Tables II and III it will be seen that allergy plays a fundamental part in the syndrome :—

TABLE II

Total number of cases investigated, all with skin lesions	...	76
With conjunctivitis or blepharitis, but not yet keratitis	...	26
First attack of keratitis, 13	}	50
Recurrences - - - 37		
<hr/>		
		Specific allergens found
Family history of allergy		56 43
Induced allergy after measles, or other high temperature disease		7 5
After "protein-shock" therapy		2 1
No explanation of allergy		11 3
		<hr/>
		76 52=70%
Allergy not <i>proved</i> in		24

TREATMENT

Local (1) Removal of secondary infection with pen. ung., sulphathiazole, Dettol, or other disinfectant ;
(2) Application of a dithranol* (0·1 per cent.) cream to the skin b.d. for at least two weeks ;
General. Desensitisation of the 52 with specific antigens by a six-weeks' course of injections ;
Non-specific desensitisation of the other 24 with *Histamine-azo-globulin*, by 10 graded intramuscular injections (0·05 c.c., 0·1 c.c., 0·2 c.c., 0·3 c.c., 0·4 c.c., 0·5 c.c., 0·6 c.c., 0·7 c.c., 0·8 c.c., 1·0 c.c.) at the rate of two injections a week for 5 consecutive weeks.
If at a later date a recurrence of symptoms of either eye or face occurs, then give 0·5 c.c. histamine-azo-globulin immediately, and repeat after four days.
* dithranol = dihydroxy-anthranol.

TABLE III

Group A = Specific allergens found (see Table II).
Group B = Specific allergens not found.

Year	No. of cases investigated	Recurrence in six months	Recurrence in two years
A			
1942	6	2	3
1943	9	1	2
1944	9	2	2
1945	10	1	3
1946	8	0	1
1947	10	2	—
	52	8	11/42 = 25%
B			
1945	2	0	1
1946	12	2	5
1947	10	3	—
	24	5	6/14 = 43%

$$\frac{11 + 6}{42 + 14} = 39/56 = 70 \text{ per cent. symptom-free for 2 years (both face and cornea).}$$

The 20 cases treated in 1947 are not included in this percentage, as two years have not elapsed since completion of their treatment.

From these tables it can be seen that 70 per cent. of the patients with keratitis rosacea have not had a recurrence of symptoms within the two years following their treatment; many of these 70 per cent. are still symptom-free after three, four or five years.

There is, however, a significant difference between Group A, in which specific allergens were found, and Group B, in which all were treated with histamine. In Group A, the percentage remaining symptom-free was nearly twice as great as in Group B.

I would like to emphasise the urgency of referring all cases of keratitis rosacea to the allergists for investigation; and indeed other patients with keratitis of unknown origin, especially those with a family history of acne, eczema or urticaria, even though their own skin manifestations have not yet become obvious.

Summary

An analysis of 76 cases of keratitis rosacea is presented. In 52 of them an allergic cause for both the skin and corneal lesions has been found.

After desensitisation, 70 per cent. of cases remained symptom-free for at least 2 years.

I take this opportunity of expressing to my colleagues at the Oxford Eye Hospital and at the Horton General Hospital, Banbury, my appreciation of their generous co-operation in this investigation; also of thanking Messrs. Parke, Davis Ltd. for supplies of histamine-azo-globulin used for 24 patients.

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ALLERGIC CONDITIONS OF THE EYE * †

2.—Migraine

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MIGRAINE is of importance to ophthalmologists, *first* because all humans with severe headaches, from whatever cause, eventually find their way to an eye hospital to be checked for refraction errors, and *second* because 50 per cent. of migraine cases have eye symptoms, often very severe in onset.

As early as 1820 some French authors were classifying migraine with epilepsy, eczema and asthma as manifestations of allergy, but Strümpell¹ (1860) was the first to suggest an allergic basis for some cases of migraine, and he spoke of it as "an exudative process comparable to urticaria and angio-neurotic oedema." Liveing's² (1873) monograph "On megrim" is a classical work on the subject.

In the 20th century many papers have been written quoting cases of migraine attacks in patients who gave positive skin reactions

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