the uvea and corpus vitreum of the rabbit, after inoculation of material from human conjunctivitis vernalis. Since further experiments with other types of material are being pursued, we should prefer not to hazard any further opinion on this question for the moment, but rather to await later publication, should the results warrant it. However, it seems just, even now, to question the absolute specificity of the described findings for trachoma and, with certain modifications, for sympathetic ophthalmitis. We are, as is von Szily, far from taking as the result of our experiments a "unitarian" standpoint in regard to the supposed agent of the disease in question; we believe, however, that the zone of influence of the "follicle-building" or "germinal-centre-building" agent will have to be widened.

BIBLIOGRAPHY

Herrmann and Kiewe.—48 Congrès de la Société française d'Ophthalmologie, 1935.

ABSTRACTS

I.—ANATOMY AND PHYSIOLOGY


(1) Stilo has examined the developing orbital fascia in foetuses of various ages and in children as well as in the adult. In the earliest foetus examined (46 mm.), he states that between the walls of the orbit and the eye there is abundant mesodermal tissue, which represents a continuation of the intra-cranial perimeningeal tissue. This has all the appearances of embryonic connective tissue. It is specially dense in the neighbourhood of the orbital walls, the sheath of the optic nerve and the separate muscles and around the eye. There is no sign of orbital fat.

The outer part becomes attached and forms part of the periosteum of the orbit, the part round the optic nerve forms the outer layer of the dural sheath, and the part in the region of the globe becomes Tenon's capsule and the supporting fasciae of the
several structures. In the space between, the peri-meningeal tissue is converted into fat, which serves to support the eye in its normal position.

Harold Grimsdale.


(2) With the increased use of contact lenses, a knowledge of the true form of the sclerotic in the neighbourhood of the cornea has become very desirable. It is not possible to calculate the curvature from the reflex, as it is in the case of the cornea. Biffis has attempted to work it out by examination of enucleated eyes after death; he finds that there is no regular curve in the eyes that he has examined (but inasmuch as he kept the eyes for some time in formalin before making the measurements, it seems doubtful whether the shape would be preserved unaltered.)

Harold Grimsdale.

(3) Marchesini (Genoa).—Changes in the scleral canals for the venae vorticosae at increasing ages. (Il comportamento dei canali sclerali e loro rapporti colle vene vorticosae nelle varie eta). Ann. di Ottal., September, 1935.

(3) It has been known for a long time that the sclerotic changed in character with advancing years; in youth the eye, if divided by an equatorial section, collapses when the vitreous is removed; in old age, it retains its hemispherical form. Examining a number of eyes of subjects of different ages, Marchesini finds that in youth the walls of the vorticose veins are separated from the surrounding sclera by a sleeve of loose connective tissue, and the veins are collapsed; as age advances this sheath of connective tissue becomes less and less and finally disappears. The vein is kept open by its close connection with the hard sclera, which seems specially dense in this region, in most old people.

Harold Grimsdale.


(4) The nerves of the ciliary body and iris have been examined by many, but their arrangement is still not certainly known. The authors Rossi and Mocchi, have selected for this study, the eyes of albino rats; the absence of pigment simplifies the microscopical examination. They find that two kinds of nerve
fibres reach the ciliary body from the choroid; the first are some large bundles which run a straight course through the choroid without giving any branches of importance thereto.

At the region of the ciliary body they give off very numerous twigs which form a dense plexus, called by the authors the annular plexus. Some large bundles pass beyond the ciliary body direct to the iris.

A second set of nerve fibres come in great numbers from the peri-vascular plexuses of the choroid, and join the annular plexus; relatively few filaments follow the capillary blood vessels.

The authors draw the following conclusions from their observations: (1) the greater part of the very abundant nerve fibres of the ciliary body and iris break up into a diffuse rete which is probably sensitive in function.

(2) In the ciliary processes there is great development of peri-vascular plexuses; it is probable that this has to do with the secretion of the aqueous humour.

(3) The peri-vascular nerves of the iris do not form plexuses and do not appear to have the close connection with the vessels, of vasomotor nerves.

(4) In the iris there is a superficial rete, which is probably sensitive, and a second rete occupying the region of the sphincter pupillae which seems to be motor in function.

Harold Grimsdale.

(5) Rapisada (Catania).—The effect of fatigue on certain functions of the eye. (Sul comportamento del diametro pupillare, dell’ampiezza di accomodazione e della tensione endoculare in soggetti affaticati). Boll. d’Ocul., April, 1936.

(5) The eye in sport has been the subject of many papers but not much has been written on the subject of fatigue and the resultant changes in the eye. Rapisada has examined the pupil size, the extent of accommodation, and the intra-ocular pressure in subjects who have undergone measured tasks; and has compared the results in trained and untrained. The means used to produce fatigue were (1) a rowing machine and (2) an apparatus for lifting a known weight to a known height. The examinee stopped as he felt tired and his reactions were taken. The author finds that almost constantly the intra-ocular pressure is lowered; the loss being greater in the untrained. The pupil is larger after fatigue; the increase being similar for both groups and the loss of accommodative power is also almost equal.

As to the causation of these changes, he thinks the change in the size of the pupil to be due to some irritation of the sympathetic, acting either directly on the dilator or by constriction of the vessels of the iris. The loss of accommodation he attributes
to the action of the products of the excessive muscular action; and the fall in the intra-ocular pressure to the ischaemia of the tissues of the globe, consequent on the increased bloodflow to the active muscles.

HAROLD GRIMSDALE.

II.—CORNEA


(1) In the Prentice Montgomery Lecture at Trinity College, Dublin, April 23, 1936, Tudor Thomas gives a brief summary of the history of corneal grafting and describes at length the experimental work which he has done during the past 14 years. After eight years' experimental work he proceeded to apply the results to the human being.

During the past six years he has done 36 operations for corneal transplantation, of which 24 operations were done on 21 suitable eyes.

Seven cases are briefly described, three were suitable cases, one, a favourable case, one, an amblyopic eye, and one an unfavourable case.

The following is his brief statement of results.

"To date I have done 36 operations for corneal transplantation, of which 24 operations were performed on 21 suitable eyes. I do not propose to detail the results on the unfavourable eyes, except to say that in only one case did the graft fail to unite, and no eye was lost.

The period covered by these operations is a period of more than five years, and the most recent of the suitable cases was operated on nearly three months ago. In every case the graft united.

Eighty per cent. of the patients benefited by the operation, and 28 per cent. were clear with vision of 6/36 or better.

Seventy per cent. of the operations were successful, and 25 per cent. resulted in clear grafts. The best result, as stated above, was a patient who became able to read 6/9 partly and Jaeger 1.

It is necessary to point out that my cases were not chosen especially with a view to obtaining the best statistical results, but were taken as they came, when there seemed to be some chance of improvement by the operation."

It is his opinion that the future will hold some chance of improvement for many cases that are, for various reasons, classified as unfavourable. His researches are being continued.

R. R. J.
(2) Fiore (Naples).—Conical cornea complicated by (1) cataract and (2) glaucoma. (Su alcuni casi di cheratocono complicati rispettivamente con cataratta senile e con glaucoma cronico semplice). Boll. d'Ocul., April, 1936.

Since von Szily in 1928 drew attention to the rarity of these complications in conical cornea, a few cases have been recorded; Fiore adds two of cataract, which were successfully operated on; he draws attention to the need of a good conjunctival flap in these cases; if this is made, the prognosis is good for operation.

Glaucoma is an even rarer complication. In the author's case one eye was blind and the other had a contracted field and vision of 6/24. The anterior chambers were deep, T.=40 mm. Hg. There seemed no doubt that the conical cornea had existed for many years and that the glaucoma was a recent addition. Unfortunately, as the patient was lost sight of, after the first visit, at which pilocarpine was prescribed, the final result is not recorded. The author thinks it certain that the two conditions were entirely unconnected in origin.

HAROLD GRIMSDALE.


(3) Puglisi-Duranti publishes notes of three cases of this condition, two of whom were hypermetropes. As a result of his observations with the slit-lamp, he thinks he has proved the effective cause to be an alteration of the endothelium of Descemet's membrane. The disturbance of the pigment he considers a normal process of old age and of myopia.

HAROLD GRIMSDALE.

III.—CATARACT


(1) von Bahr's thesis is devoted to a theoretical discussion on the pathogenesis of lamellar cataract, and to laboratory experiments aiming to clear up some of the outstanding points. The view that lamellar cataract is congenital in origin (the clear peripheral part representing post natal fibres) represents a difficulty in that the lamellar cataract may be larger than the whole of the
lens of the new born. On the other hand the occurrence of hereditary forms questions the significance of extraneous factors in the production of this form of cataract. This underlying conflict of views is indeed old, and as early as the eighteenth century a sort of compromise theory was advanced suggesting that lamellar cataract was caused by eclampsia in the mother. That this belief was not altogether unwarranted is shown by the author's own work. He was able to induce lamellar cataract in young rats if the diet was such that the animals were not only rickety but also developed tetany, either manifest or latent. Rickets in itself has no such effect. On the strength of much careful work he argues that hypocalcaemia is an essential factor in the production of experimental lamellar cataract, and he leaves the exact relationship to lamellar cataract in man an open problem. The treatise contains an excellent review of the literature on the subject and a full bibliography.

ARNOLD SORSBY.


(2) The real cause of senile cataract is still to seek; Mura has made detailed examination of twenty-two cases; his conclusions are negative; (1) that cataract does not depend on the age of the patient, neither on the blood pressure nor the intra-ocular pressure; (2) that it has no dependence on the glycaemia ratio nor (3) on the uraemic content, finally (4) the calcium-potassium ratio is seldom far from normal.

All these factors may therefore be excluded. It is impossible, however, to exclude a relation between cataract and disturbance of the general endocrine system, and the author thinks that special influence is exerted by the thyroid, the pituitary and the suprarenals which are known to regulate the involution of old age. Though he mentions in the body of the paper the probable importance of the parathyroids, the author does not name them in his conclusions.

HAROLD GRIMSDALE.

IV.—GLAUCOMA


(1) The advantages of a drug that will lower the tension in glaucoma and enable the surgeon to postpone operation, even
temporarily, are obvious; eserine and pilocarpine, valuable though they are, are not always well borne. The search for other and more efficient agents has brought to the market several preparations. Redslub, in 1930 drew attention to the effect of choline and acetylcholine in reducing the tension in glaucoma. Recently a new ether of choline has been prepared from the interaction of choline and carbamminic acid, and put on sale under the name of “Doryl.” Miloro reports the results of experiments made by him with this drug; he finds it to be both a miotic and able to reduce intra-ocular tension; it is not to any great degree superior to the older miotics, but it seems to be less irritating, and therefore can replace eserine and pilocarpine when these are badly tolerated.

Harold Grimsgale.


(2) Ciotola has compared the pressure in the veins of glaucomatous patients and the arterial pressure with that of normal subjects of the same age. He finds that the venous pressure is raised in almost all the cases of glaucoma, and that the mean and maximal arterial pressures also are often raised, the minimal pressure being usually about normal.

Harold Grimsgale.

V.—MISCELLANEOUS


(1) An interesting paper by Lavery discusses the more important features of ophthalmology in aviation. He says: “The presence of hypermetropia above a certain degree is a danger. The continued effort to focus is apt to induce spasm of the ciliary muscle and of the internal recti. This tonic action produces error of judgment of distance in flying. In addition, under the effects of high altitude, loss of accommodation is likely to occur, so that the pilot cannot see his instruments clearly, and he is also liable to make a bad landing.”

An Air Force machine of modern type has an air speed of about 220 miles an hour, while the landing speed with full margin of safety is somewhere in the region of 70-80 miles an hour. Immediately the plane loses touch with the ground the beginner
loses the one known definite quantity necessary in the judgment of distance to which he has always been accustomed, namely, contact with the ground. All verticals are more or less foreshortened and the size of known objects will be varied from that of previous experience, and, the speed at which the pilot is travelling is greater than any he has hitherto known.

"Imagine that you are in a plane by yourself for the first time, and that at last the problem of safe landing has to be faced. I can hardly imagine a more perfect subject for a nightmare! You circle round the landing-ground to note from the ground indicator the direction of the wind. Having brought the plane round until it is facing into the wind you throttle back the engine and, shoving the stick forward, begin the long downward glide. The comforting noise of the engine is stilled now, and you can hear the noise of the stays whistling in the wind. You are looking downwards in a slanting fashion upon objects that previously have been regarded from below. There is thus produced an unfamiliar foreshortening and tilting of vertical structures. You are approaching at anything from 75 to 95 miles per hour, and the ground beneath you is fast-moving, but appears almost at rest around the landing-point for which you are making. As the machine sinks the country on each side appears as if rising, so the effect is as though you were dropping into a bowl. You have got safely over the high hedge bordering the landing-ground, and flatten out in order to make a perfect landing. There is a rush of ground below, and objects suddenly assume the position of your normal experience. So far so good—but now the crucial test is to come. All your friends are standing around the hangar watching—ready to applaud or jeer! Personally, I wouldn't care what happened so long as I didn't break my neck! In order to land correctly, the machine should be allowed to sink down the last few feet so that the rear wheel, or skid, hits the ground shortly after the front wheels, making what is called technically a "three point landing." It is the judgment of these last few feet that is so difficult. The exophoric, thinking that he is nearer the ground than he actually is, flattens out his gliding angle too soon, with the result that gravity—the vertical component of the parallelogram of forces which is producing his diagonal glide—will take the upper hand. If his landing-speed is low, he pancakes on to the ground, while if he is landing at a high speed he is in grave danger of over-shooting the boundaries of the aerodrome. On the other hand, the esophoric, thinking that he is further away from the ground than he actually is, tends to fly into it, and stands his machine on its nose."

The author next describes and discusses some of the tests for ocular muscle imbalance which Air Force candidates have to pass.
"A man with good flying record may suddenly become a bad lander and have one or more crashes. He is sent up for investigation." Before resuming flying it is necessary that normal muscle balance should be restored.

After a rest he is put on to muscle balance training. In these cases the orthoptic training is carried out in the reverse order to that which obtains in a case of strabismus. Training is started with cards that demand the third degree of fusion and when a good amplitude has been obtained they are trained with cards which demand second and first degrees respectively. "They are not suffering from any fusional difficulty and it is, therefore, easier for them to maintain fusion with the third degree cards, and most difficult with those of the first degree. It is not until they have obtained good amplitude with the first degree cards that they are passed as fit for flying." With regard to uni-ocular aviators, such people do exist, but the author has no doubt that such are flying at a great disadvantage.

The paper ends with a note insisting on the importance of full fields of vision and enters into the question of flying at night; it will repay perusal in the original.

R. R. J.


(2) Woods gives a well balanced survey of the clinical features, pathology, treatment and prognosis of sympathetic ophthalmitis. Such statistics as he gives in this paper are based on 139 carefully reported cases by Fuchs (35), Joy (41), Verhoeff (35), and 28 of his own. The figures given for the probable incidence of sympathetic ophthalmitis after a perforating wound vary from 0.54 per cent. to 5 per cent. The disease appears to be more common after 50 years of age, an age at which intra-ocular operations are commoner than earlier in life but when accidental wounds are probably less frequent. Twenty-eight per cent. of the cases collected by the author were over 50 years of age. Penetrating wounds afford 63.3 per cent. and intra-ocular operations 23.9 per cent. of the cases of sympathetic ophthalmitis. The author refers to Joy's observation about the violence of sympathetic ophthalmitis after cataract extraction. Four cases of sympathetic ophthalmitis are recorded as occurring after simple contusion of the globe, two after subconjunctival rupture and 30 after a disintegrating intra-ocular new growth. Suppuration in an injured eye is not an absolute protection against sympathetic ophthalmitis. The author has seen one case and Schirmer reports two where this occurred.

Sympathetic ophthalmitis may follow a perforating wound that
is apparently healing without complications. An eye with an indolent long drawn out uveitis with occasional exacerbations leading to phthisis bulbi and recurrent ciliary pain is to be particularly feared.

The interval between the injury to the exciting eye and the onset of sympathetic ophthalmitis varies from 9 days to 48 years according to case reports in the literature. Sixty-four per cent. occur under two months and 90 per cent. in less than one year. Three months after the injury the chances of sympathetic ophthalmitis developing rapidly decline, although it is possible for it to occur one year after the injury, it is a rarity.

Among the clinical features of this disease the following are described in some detail by the author. Rigidity of the iris which becomes thickened and has large flat nodules in its central and inner portions. Extensive posterior synechiae confluent with the anterior lens capsule and traversed by small capillaries passing on to it from the iris. The uveal tract becomes converted into a rigid mass, in which there is massive, intermittent and progressive cellular reaction in contrast to the low intensity of the inflammatory reaction.

The author describes the presence of "Dalen Fuchs" nodules of proliferated pigment epithelial cells undergoing autolysis, phagocytosis and infiltration by epithelioid and giant cells.

In the local treatment of the disease the importance of mydriasis is stressed. In the general treatment sod. salicyl. is recommended, one grain to every lb. of body weight per diem in divided doses and combined with sod. bicarb.

In the non-specific therapy diphtheria antitoxin is advised after a preliminary determination of the patient’s sensitivity by the injection of 0.1 c.c., 0.2 c.c., 0.5 c.c., 1 c.c., 2 c.c. and 5 c.c. intramuscularly at 15 minute intervals. 20,000 units intra-muscularly every day for one week are recommended and if the case is advanced and improvement is insufficient after seven days this course should be repeated and then 20,000 units of diphtheria antitoxin administered once a week. Verhoeff claims that 66 per cent. of cases treated early by this method terminate favourably. For specific therapy the author recommends desensitization with uveal pigment.

H. B. Stallard.


(3) Bothman and Rolf review the literature of Wilson's disease, a rare neurological condition of unknown aetiology in which the train of clinical features are degenerative changes,
probably lipoidal in character, in the corpus striatum, putamen, globus pallidus and lenticular nucleus, associated with the presence of a golden brown and bluish green ring in the cornea, a sunflower copper cataract and multi-lobular cirrhosis of the liver.

The Kayser-Fleischer ring in the cornea consists of pigment granules situated in Descemet’s membrane at the limbus and extending from 1-2-5 mm. in width towards the centre of the cornea. The ring is wider above and below than nasally and temporally in many cases. Adjacent to the limbus it is golden brown and its central part is bluish green, fading gradually into the cornea. In some cases it is not a complete ring being broken or forming a semicircle.

The anterior part of the lens presents a sunflower cataract of grey-blue colour, the centre being lighter than the periphery. Night blindness has been noted in association with Wilson's disease and Fleischer and Metzger have noted well defined greyish-white, round or oval spots in the periphery of the upper half of the retina.

The disease is familial and insidious in onset. It begins with tremors of the extremities having a constant rhythm and at the rate of 4-8 per second. The body and head are also affected but to a lesser degree. Tonic and clonic movements are occasionally present and the muscles display hypertonia. Unilateral and bilateral contractures and inability to maintain balance occur in some cases. Dysarthria leading to anarthria, dribbling saliva, dysphagia, anorexia and a fixed grin are other clinical features. The disease is progressive and terminates fatally in 2-4 years.

The authors describe the clinical details of four cases under their care, two of which were brother and sister. The former was aged 15½ years and the latter aged eight years. Both showed the Kayser-Fleischer ring and are probably the youngest cases reported. The sister had microcephaly but as yet no evidence of extra-pyramidal disease. In none of the four cases reported by the authors was the liver enlarged.

H. B. Stallard.


(4) Charles and Hayward Post describe the case of a female who between the age of 26 and 46 years suffered a progressive and extensive loss of fat from the orbits, face, neck, breasts and down to the waist. The extremities were affected in a lesser degree. The globes sank back in the orbits and the lids were unsupported. Many cilia were absent from the lids of the right eye and all from the left eye.
A corneal ulcer developed in the right eye and there was evidence of choroidal atrophy around the optic disc and optic atrophy in this eye. The left cornea became opaque and vascularised. The conjunctivae became passively congested and the sclera resembled marbles. Degeneration and loss of fat continued and eventually the patient became blind.

The authors suggest that this condition may be due to an abiotrophy. Other views concerning hyperthyroidism and neurotrophic disorders are discussed.

H. B. Stallard.


(5) Jensen introduces his subject by an ophthalmoscopic study of the distribution of retinal vessels in the normal eyeground. Drawing on 50 patients (100 eyes) he shows that there is a general symmetry as regards the number of crossings on the two sides, and that the upper temporal quadrant contains the largest number of these, and the upper nasal quadrant the least. He further found that in 70 per cent. of cases the artery lies in front of the vein. Other points of interest that emerged were that the inferior nasal vein is missing in 22 per cent. of the cases, being replaced by a branch of the inferior temporal vein; that the superior temporal artery in 38 per cent. of cases gives off a large, almost horizontal branch issuing from near the papillary border and passing across the macula; that in 73 per cent. of cases macular arteries supply the macular area in addition to the twigs it receives from the temporal artery, cilio-retinal arteries being present in eight per cent.

His clinical studies concerned 54 patients with ages ranging from 43 to 74 years of age all showing thrombosis, not of the central vein, but of a branch; there were 61 obstructions, six patients presenting bilateral thrombosis and one having two thromboses in the same eye. In 75 per cent. of cases the reduction of visual acuity takes place suddenly and in about half of these cases vision does not exceed 6/60. In 56 per cent. the upper temporal vein is obstructed, and in 36 per cent. the lower temporal vein; obstruction on the nasal side is thus distinctly rare. What is of special interest is the author's observations on retinitis circinata; after an interval of six months he noted this in 19 of his cases. Another point of significance is the pigmentation that takes place in the macular area making the ultimate prognosis none too satisfactory. The author advances proof that extensive sclerotic changes take place both in the obstructed vein and in the corresponding artery—of a far greater degree than the original.
sclerosis which may have precipitated the thrombosis. In contrast to complete venous thrombosis, partial obstruction does not seem to bring on glaucoma, only one case having developed glaucoma, and this after an interval of seven years. From the aetiological aspect nothing new emerged from this study. In 92 per cent. of cases an increased blood pressure was found; nephrosclerosis was present in three cases; the cause of death in 14 cases was of a vascular character, but such accidents occur at such variable times that the author does not deem it justifiable to ascribe to the ocular affection any importance with regard to the prognosis of life.

**ARNOLD SORSBY.**


(6) Since Bailliart suggested his method of investigating the pressure in the arteria centralis retinae, the importance of the isolated increase of the pressure in this artery has been much discussed; normally the pressure in the central artery is about half that in the brachial; sometimes it is considerably more and then it generally indicates increased intracranial pressure. The sign, therefore, may be helpful in the diagnosis of the cause of headache.

Osvaldo quotes two cases in which persistent headache was accompanied by increase in the pressure in the central artery as revealed by Bailliart's method. Lumbar puncture in one case was followed by permanent relief; in the second the relief though great, was temporarily only. In both, the pressure of the fluid extracted was much above normal. The headache was presumably due to the raised intracranial pressure, for which no cause was found.

**HAROLD GRIMSDALE.**


(7) Casini gives notes of three cases of retinitis pigmentosa. Two, brothers, showed occipital meningocele. The elder brother also had xeroderma pigmentosa.

The third case had a marked deficiency of cholesterin. The author increased the cholesterin count in several ways and noted some slight improvement both in the extent of the visual field and the visual acuity. He thinks this may be attributed to the beneficial action of the cholesterin on the nervous elements of the
retina. In the brothers' cases he administered vitamin C, judging that the xeroderma might be connected with vitamin deficiency. There was no improvement in any respect.

Harold Grimsdale.

(8) Borsellino (Palermo).—Bilateral microphthalmos and macular degeneration in three brothers. (Microftalmo bilaterale familiare associato a degenerazione maculare congenita). 

(8) From the union of apparently perfectly healthy parents, four children were born, all of whom were blind; one died in infancy and the exact condition is not known; the three living were all microphthalmic, with complete blindness; in the eldest cataract prevented any view of the fundus; in the others there was optic atrophy and a large coloboma at the macula. Borsellino thinks that these cases may be allied to the familial retinal degeneration reported by other observers.

Harold Grimsdale.


(9) One of the authors observed a peculiar and characteristic form of opacity in the lens of one eye, following local copper poisoning. They wished to see whether chronic general poisoning would bring on similar opacities; to this end they injected copper sulphate in dilute solution into rabbits which survived for several months without showing any opacity of the lenses; the authors conclude that the "sunflower" cataract (catarrata a girasole) observed sometimes in pseudosclerotics, which has been attributed by some to the retention of copper salts in these subjects, cannot be due to this.

Harold Grimsdale.


(10) Duc has experimented on rabbits, placing fragments of copper wire in the anterior chamber and the vitreous, with the intention of preserving the animals alive for a long time and examining the eyes. Unfortunately an epidemic broke out so that none of the animals survived longer than two-and-a-half months. He has noted that copper is comparatively little irritating to the eye, and that in no case, except when the lens had been injured during the introduction of the foreign body, was there any change in the lens; this confirms the observations of many experimenters.
that the typical cataract follows only after the long retention of the metal. The author observed occasionally the presence of granules of copper in Descemet's membrane near the iris angle and also under the corneal epithelium in the same region.

**Harold Grimsdale.**


(11) Seidel holds that the best way to minimise inflammation after cataract extraction is (1) to reduce as far as possible the risk of infection from without by introducing into the eye the fewest possible instruments at the operation, and (2) to reduce operative trauma and irritation by leaving the iris intact (i.e., no iridectomy or iridotomy), which also avoids a cut surface in the iris that might facilitate the entry of any germs carried in by the instruments from the conjunctiva.

He dissents from the view that iritis is set up by lens matter left behind, and therefore does not insert any instrument to remove it.

In preparation for the operation maximal dilatation of the pupil (with paralysis of the sphincter) and efficient anaesthesia with atropine are most important. The former is obtained by the use of 1 per cent. atropine half an hour before the operation, while for the latter per cent. cocaine is instilled five or six times at one minute intervals with two drops of adrenalin.

A large incision, over 2/5 of the circumference of the cornea, is made at the limbus; this ensures easy delivery of the lens—cortex together with the nucleus—and avoids injury to the iris. A conjunctival flap is cut and turned over on the cornea, thus providing a sterile area of episclera for the capsule forceps and spatula as they are guided into the anterior chamber. With the capsule forceps the largest possible piece of capsule is removed; this facilitates the expression of the cortex with the nucleus, avoids a dense after-cataract, and allows any lens matter left behind to be completely absorbed. After extraction of the lens it usually suffices to introduce the spatula only once to secure complete reposition of the iris, and in order to prevent its prolapse in the first 24 hours a drop of 1 per cent. eserine is instilled immediately after the operation.

The author claims that by this method the whole operation is shortened and made easier, the danger of infection is diminished and the period of convalescence is reduced. In stating his objections to the intra-capsular operation he emphasises the fact that by this technique he has obtained equally good results in high myopes, diabetics, and in immature cataract.

**Thos. Snowball.**