"Thus times do shift; each thing his turn does hold:  
New things succeed, as former things grow old."

Robert Herrick.

The advent of modern chemotherapy, and in particular the use of sulphonamide and its derivatives, has radically altered the method of treatment and the prognosis in many pathological conditions. One of the prime underlying principles of medicine and surgery is to prevent disease, and, where this is possible, to prevent further infection or complications in an already established lesion. Many examples of this are to be found in everyday medicine and surgery, but it is to sulphonamide and its derivatives, in this war, that one looks for the true fulfilment of these cardinal principles.

Sulphonamide and its derivatives have opened a vista in prophylaxis and healing unsurpassed in the annals of medicine and surgery. It is in the sphere of prophylaxis—used in the widest sense—that these drugs will achieve their greatest triumphs.
For the purpose of this article, two of the drugs at present in common use have been chosen in order to show how the principles enunciated above can be furthered by ophthalmologists in everyday clinical practice.

The drugs chosen were sulphonamide and red "prontosil soluble." The sulphonamide was given by internal administration in the form of $7\frac{1}{2}$ gr. tablets, while red "prontosil soluble" was given as a local instillation in the conjunctival sac. The latter drug, being supplied in ampoules of 5 per cent. solution, was diluted with an equal volume of aqua pura to make up the strength of solution employed in these cases.

The following were the methods adopted and the lesions in which the drugs were employed.

A. Red "Prontosil Soluble"

*For Diagnosis.*—All traumatic lesions of the cornea and conjunctiva, including all burns, chemical or otherwise.

*For Prophylaxis.*—(1) To prevent secondary infections in all traumatic lesions of the globe and its adnexa.

(2) Before and after all operative procedures on the globe and adnexa.

(3) To prevent complications in established disease, as in corneal lesions which have the character of prehypopyon.

Prophylaxis has thus a triple function, first, of initiating primary healing, secondly, of limiting corneal involvement, and thirdly, of the preservation of corneal transparency by permitting a rapid epithelialisation of the lesions in the absence of sepsis.

*For Treatment.*—With the limited clinical material at my disposal, treatment has been confined to such cases as acute and chronic conjunctivitis, blepharitis, marginal ulcers, prehypopyon ulcers, hordeola, infected traumatic lesions, post operative infection about stitches of the conjunctivae, swabbing out suppurating cysts and for impregnating gauze used in packing wounds.

B. Sulphonamide

*For Prophylaxis.*—(1) Pre-operatively before abscission of an iris prolapse or performing any intra-ocular operation. In these cases, red "prontosil soluble" is employed as an additional safeguard.

*For Treatment.*—(1) Iritis and iridocyclitis non-specific, choroiditis.

(2) Iritis and iridocyclitis specific (gonorrhoeal).

(3) Prehypopyon ulcers. No cases of hypopyon ulcers have occurred since the introduction of sulphonamide therapy.

(4) Episcleritis non-specific in origin.
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(5) Cellulitis of the orbit.
(6) Stitch (abscess) cellulitis.
(7) Intra-ocular infections.
(8) Trachoma.

A discussion on the merits of the treatment follows and deductions have been made from the clinical phenomena observed during treatment. The case histories have been left to the last. An endeavour has been made to give as diverse a list of cases as the scope of this article permits.

Clinical observations.—“Prontosil soluble” 2.5 per cent. local application.

For all traumatic lesions of the conjunctiva and the cornea, “Prontosil soluble” has no peer. The contrast caused by the red dye against the white of the sclera and the background of the coloured iris gives the wound a red raw-meat appearance which is unmistakable. In burns of a chemical nature—cement, lime, etc.—the initial colouring of the lesion approximates more to a methyl orange colour, particularly in the conjunctival lesions. Moreover the daily instillation of “prontosil soluble” for the purpose of keeping down secondary infection of lesions also enables one to judge simultaneously the extent of epithelial regeneration, without the necessity of instilling fluorescein for this purpose. I have been amazed at the extraordinary rapidity with which epithelium regenerates if one can prevent, or control, the secondary infections of these traumatic lesions.

The principles which underlie my treatment of traumatic ocular lesions are as follows:

In all trauma cases, irrespective of whether the conjunctiva or the cornea is involved, gutt. atropine 1 per cent. is instilled as a routine. In the case of elderly patients, homatropine is used as an alternative.

Secondary infection is prevented or controlled with “prontosil soluble,” while warmth and the removal of non-viable epithelium and organisms are accomplished by warm lotio boracic irrigations. The resistance of the tissues and epithelial regeneration is enhanced by cod liver oil (neutral) drops and vitamin C tablets given by mouth or intramuscular injection. Where the lesion is of long standing and presents the appearance of a prehypopyon ulcer, the local action of “prontosil soluble” is fortified by oral sulphonamide medication in order to reach the organisms which have become entrenched in the oedematous tissues surrounding the ulcer.

Apart from these traumatic lesions, “prontosil soluble” has been used in a variety of conditions, such as preoperative sterilisant of the conjunctival sac; in the treatment of blepharitis; acute
conjunctivitis, angular, follicular and mucopurulent; chronic conjunctivitis; marginal ulcers; infected sockets; after epilation; post-operatively, in such cases as Meibomian cysts and where conjunctival stitches have been employed. Finally, it has been employed after enucleation of the globe. The orbital wound is then filled with "prontosil soluble."

The action of "prontosil soluble" in these infective conditions is quite different, clinically, from that which one sees in other forms of therapy for the same condition. Take acute conjunctivitis for instance and contrast the treatment by silver nitrate paintings and "prontosil soluble." In severe cases we get the following results:

**Silver Nitrate.**

*Time of Healing*—10-17 days.

Whitens more rapidly but with discharge over a longer period. More active treatment required and more discomfort. The lesion shows more rapid healing but symptoms do not subside until later.

Warm lavage necessary, otherwise the lesion tends to regress with excessive discharge.

**Conclusion:** Silver nitrate acts in a more critical manner with delayed convalescence.

**"Prontosil Soluble."**

*Time of Healing*—7-12 days.

Whitens slowly but surely and with little discharge. Almost immediate relief with simple instillations. The lesion mends slowly, but when the eye is white complete control of the infective process has been established. Warm lavage of the eye is necessary with "prontosil soluble" otherwise the lesion tends to remain "fixed" at the level of healing established before warm batheings were discontinued.

**Conclusion:** "Prontosil soluble" promotes healing by a lytic process.

These points one will see in those cases of conjunctivitis which are associated with impetiginous lesions of the skin.

In blepharitis, "prontosil soluble" is an excellent diagnostic agent for determining clinically the more active areas of inflammation, for these stain readily and, during the process of healing, one can follow these areas and check the extent of healing at any given moment. "Prontosil soluble" will not completely cure blepharitis without active attention to the other factors which operate in this condition. It rapidly controls the infection and reduces the ordinary ulcerative blepharitis to a stage of blepharitis sicca in a remarkably short time and with great comfort to the patient.
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The conjunctival infection and lid oedema which are associated with marginal ulceration is greatly helped by "prontosil soluble" since it dominates the infection and enables the corneal lesions to epithelialise over more rapidly. "Prontosil soluble" will not cure the lesion unless the associated focal infection, so frequently found in association with this particular lesion, is dealt with. The persistence of a mild infection of the bulbar conjunctiva (when slit-lamp examination shows that the ulcers have healed) would seem to prove that there is a local nervous reflex at work causing this dilation of the vessels.

In the virus infections of the eye, some lesions appear to clear more rapidly than others. The pain of herpetic cases does not appear to undergo any special amelioration such as occurs in other types of ocular inflammation. With the condition of superficial punctate keratitis complicating marginal ulceration, "prontosil soluble" is most helpful in controlling the associated conjunctival infection and in hastening the convalescence. The drug is then given in addition to the usual silver nitrate paintings and atropine drops.

The follicular infections of the conjunctiva respond especially well to the combined medication of "prontosil soluble" guttae and internal chemotherapy.

With regard to fatty orbital tissue, which has been the site of severe trauma and in which fatty necrosis and sloughing is inevitable, "prontosil soluble" is invaluable. It is instilled into the wound area after the enucleation of the remains of the globe and after every dressing. By this means, the extent of necrosis is limited, the secondary infection is kept to a minimum and the resulting scarring and contracture very much less. It must be remembered that the lining membrane of a socket is the conjunctiva, hence powdered sulphonamide is contra-indicated.

Trachoma is a condition in which I have had no experience with "prontosil soluble" therapy, except as regards one case only and that of very recent origin before there had been an opportunity for any gross pathology to develop. This was a case of 21 days' standing in which the lower lid conjunctiva and particularly the upper tarsal conjunctiva were very oedematous and the follicular reaction was most marked, but in which the bulbar conjunctiva was practically unaffected at the time of consultation. There was no pannus. Twenty-four hours treatment with sulphonamide and "prontosil soluble" sufficed to make the patient feel comfortable. Vide Case "T."

As this case came to hand after this article had been completed, the details up to the present time have been included to show that, while "prontosil soluble" may not eventually cure the condition, it has had a very favourable effect upon the course of
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the disease, bringing it rapidly under control, to be dealt with by the usual methods should this combined treatment fail to effect a cure.

Contra-indications and incompatibles do not appear to exist where "prontosil soluble" therapy is employed in ocular lesions. One can employ in addition, atropine, cocaine, homatropine, paraffin, cod liver oil, ung. ac. boric, ung. hydrarg., ox. flav., silver nitrate paintings and various lotions, which include lotio ac. boric., oxy. cyanide, or salines (a supposed contra-indication in sulphonamide therapy). What is more, the efficacy of "prontosil soluble" is unaffected, and no peculiar precipitations occur in the conjunctival sac from intermixture of the drugs. The corneal epithelium is in no way damaged. In cases of cement and lime burns of the eye, the intermixture of cod liver oil, "prontosil soluble," and atropine produces a very rapid epithelialisation of the denuded areas. A 1/1000 strength for red "prontosil soluble" lotion would be most beneficial, but the cost of making it in sufficient quantity for this purpose is completely negativized by its economical use as a guttæ.

"Prontosil soluble" therapy can be continued when internal sulphonamide medication has to be abandoned. Moreover, no cases of allergy have occurred and if they exist at all they must be very rare indeed. It can therefore be used as a regular outpatient therapy. In this connection, guttæ "prontosil soluble" do not produce sulphonamide poisoning.

Ultra-violet light therapy does not appear to be a contra-indication in either oral chemotherapy or in "prontosil soluble" therapy. This combined form of treatment has been used without any skin complications developing, or the exhibition of any other untoward general symptoms.

Permanent staining of the cornea or the conjunctiva does not result from the use of red "prontosil soluble."

As to the strength of "prontosil soluble" to be employed, 2·5 per cent. has been selected because it has been successfully used in a case of spring catarrh (vide references). There is, however, a therapeutic argument in favour of this strength as chemotherapy acts more efficiently in concentrated doses, and if one is to treat virulent infections of the conjunctival sac, this drug must be given in a concentrated form and of such a p.H. that the cornea is not affected. The 2·5 per cent. solution meets these needs clinically. Practice has shown the value of the 2·5 per cent. solution and there is no need to revert to a weaker dose, especially as it may mitigate against the full therapeutic efficiency of the drug.

"Prontosil soluble" therapy acts so efficiently in such a great number of ocular conditions, that there is a tendency for one to
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Forget that other drugs exist. While cases may be "cured," the primary source of the whole trouble may be allowed to lie unexplored and produce a recrudescence of the lesion at some later date. This sense of false confidence is one of the pitfalls of chemotherapy which must be rigidly guarded against if one is to assess the final place of sulphonamide therapy in medicine.

Clinical Observations—Sulphonamide

The numerous clinical conditions, previously mentioned, deal with the successful treatments for which sulphonamide has been given, but it must not be assumed that the drug will be successful in all similar cases.

Its action in iritis can be dramatic and produce a cure, in another case all the acute symptoms quickly abate but one is left with a white eye and some fine "K.P." which does not clear up so rapidly. Where the cause of an iritis or an iridocyclitis is unknown, sulphonamide is the drug of choice while the aetiology is in the process of being discovered, for this drug has a faculty of making a patient comfortable as regards his ocular condition, and abates the acuteness of the attack, even if it does not cure the lesion. This point is well demonstrated in case history D.

Hypopyon ulcer is a condition in which sulphonamide should be invaluable. Up to the present however, this complication has been successfully combated by combined local and general chemotherapy.

Non-specific episcleritis responds well to oral sulphonamide medication. It is most useful in combating the reactions which result from the removal of septic foci.

With regard to intra-ocular infections the results are variable, and those infections present in the company of a friable non-metallic foreign body such as limestone may be held in check for a certain length of time but infection eventually dominates the clinical picture.

Chemotherapy has also been tried in many of the virus infections, but with rather unsatisfactory results as regards the corneal lesions, but it is of definite value in controlling the conjunctivitis, found in association with marginal ulceration, when this has been complicated by a virus lesion, such as superficial punctate keratitis. This form of therapy for S.P.K. has no advantage over the silver nitrate technique which has eventually to be instituted, if the superficial punctate keratitis is to be cleared up rapidly.

In all cases of cellulitis, potential "stitch" abscess, and other infective conditions about the orbit, sulphonamide is indicated. What is more, it enables conservative measures to be adopted, instead of the more radical operative procedures which one is
tempted to undertake for the relief of symptoms, when pus is suspected and the temperature is rising. Sulphonamide produces an early resolution of the infection and the pus "points" at the wound site. At the same time, the temperature falls by crisis but the pulse rate remains up until the infection is overcome. It is at this stage that one can consider leaving off the sulphonamide medication. It is necessary in all these infective conditions to apply heat in the usual way as it reinforces the effective action of the sulphonamide in much the same way that warm irrigations further "prontosil soluble" therapy.

In operative conditions about the eye or in traumatic lesions, one can instil sulphonamide powder in the wounds, but, as there is always the risk that some of the powder may get into the eye one always uses "prontosil soluble" for wound prophylaxis.

With regard to infective lesions on the face which have been complicated by lymphangitis, sulphonamide ointment 10 per cent., in adeps. lanae, gently rubbed into the affected areas, combined with chemotherapy and heat, will rapidly resolve the condition. Local concentration of the drug seems to be the most important factor in this type of therapy.

With the dosage so far employed, i.e., grs. XV o.4 h., only the minor complications of internal chemotherapy have become manifest and these were: cyanosis, drug fever, acidosis, dizziness and headache. So far, vomiting has not occurred although nausea was experienced. With or without nausea, disinclination for food was evident. Mental depression was not common and only seen in two cases. No cases of anuria, haematuria, nephritis, jaundice, leucopenia, agranulocytosis or haemolytic anaemia were met with. With a moderate dosage therefore, clinical results can be achieved without severe therapeutic complications.

Special Note:

(1) Chemotherapy and Chemical Warfare.—From the experience gained in the use of local chemotherapy in ocular chemical burns, I am convinced that "prontosil soluble" will be of incalculable assistance in the treatment of all ocular lesions which may result from chemical warfare.

(2) The use of sulphonamide in the treatment of other lesions, resulting from war trauma, will greatly improve the prognosis, not only as regards the ultimate cosmetic effect to be achieved, but also in respect of the functional capacity of the eye as a visual organ.

The case histories which follow are somewhat abbreviated and indicate the advantages and limitations of chemotherapy in ocular trauma and disease.
Case Histories—Local "Pontosil Soluble" Therapy

Case 1.—E.H., dockyard worker, aged 34 years.  

History.—While engaged in cutting steel with a machine, a large piece of steel flew off and struck the left eye. Admitted the same day, August 11, 1941.

On Examination.—V.R. 6/9. V.L. 6/9. Left eye, tension softish, but no perforation present. Left cornea shows two large vertical lacerations either side of the optical zone of the cornea, cutting deep into the corneal substance. Circumcorneal injection present. Found fairly clean cut. Confirmed by slit-lamp. Treatment given included warm bathings, guttae atropine 1 per cent., "prontosil soluble" guttae 2-5 per cent., vitamin C and cod liver oil instillation, all being given t.d.s. No complications developed, vision remained unchanged and the patient's eye was white within seven days. He was discharged to full duty on the 11th day. V.R. 6/9. V.L. 6/9.


History.—Chemical burn (cement). While lowering cement down a 25 foot shaft to the patient, the bucket slipped and cement was thrown into his eyes.

On Examination.—V.R. less than 6/60. V.L. 6/36. Face covered in cement dust and the right conjunctival sac filled with it. A number of fine particles were seen in the left conjunctival sac and cornea.

Treatment.—All excess cement on face and around eye wiped off with moist swabs and the eyes irrigated with boracic lotion. Where the conjunctiva was impregnated, moist swabs were used for the removal of the cement dust. The impregnated cornea was cleared of cement by irrigation, moist swabs and by a blunt spud. Where necessary the epithelium was removed in order to obtain a clean surface.

The eye was then stained with 2.5 per cent. "prontosil soluble" in order to show clearly the extent of the burn and by contrast expose any of the greeny-yellow cement which had been overlooked in the preliminary cleansing. Two-thirds of the conjunctiva and the lower two-thirds of the cornea were seen to be badly burnt. Cement impregnated in the lid conjunctiva was well shown up and removed with a blunt spud. Note: For sheer contrast in all traumatic injuries of the conjunctiva and the cornea, red "prontosil soluble" has no peer as a diagnostic agent. Both eyes being absolutely clear of all irritant, treatment was concentrated on mydriasis, cleansing of the conjunctival sacs, prevention of secondary infection and epithelial regeneration. To this end lotio
boracic irrigations, gutt. atropine 1 per cent. b.d. were given. "Prontosil soluble" 2·5 per cent. gutt. t.i.d., cod liver oil drops every two hours and vitamin C one tab. daily. Epithelial regeneration was very rapid, the cornea being completely covered on the morning of October 1, 1941. It was interesting to note at this stage that the cod liver oil drops had ceased to sting the patient. On October 3, 1941, there was no staining of the cornea or conjunctiva. The right cornea showed a faint haziness in its lower half.

On October 5, 1941, V.R. 6/60, V.L. 6/36 (dilated pupils) and with correction V.R.—2·25 D. sph./—1·5 D. cyl. = 6/5, V.L.—1·5 D. sph./—1·25 D. cyl. = 6/6. There was no staining of the newly regenerated epithelial cells of the cornea. The patient was transferred to the convalescent home on October 8, 1941. This was a remarkable case, the original poor prognosis having to be completely reversed.

Case 3.—Sapper J.P.M. History.—Fuel oil entered the eyes three months ago and since then has had three attacks of conjunctivitis, but this last attack was by far the worst. Treated in the Medical Inspection Room for one week prior to admission. Has been "off colour" the last two months.

General condition.—The skin shows poor tone and the patient looks jaded and drawn about the face. Admitted September 27, 1941. Ocular examination: V.R.—6/18, V.L. 6/9. Both eyes equally affected, with lid oedema, eczematous lid reaction from excessive lacrymation, oedematous conjunctiva, dilated vessels and mucopurulent discharge. The ocular clinical picture was that usually seen in severe marginal keratitis but there was no staining of the cornea. There were to be found, under oblique focal illumination small pin-point "blebs" but these were only discernible by noting the alteration in the corneal light reflexes at the limbus. These "blebs" did not burst or ulcerate and disappeared after thirty-six hours. No evidence of icteric reaction could be found, but it was decided to use gutt. atropine in case marginal ulceration should develop. Treatment consisted of lotio ac. boracic bathings, gutt. "prontosil soluble" 2·5 per cent. t.i.d., vitamin C one tab. daily, ung. hydrarg. ox. flav. 1 per cent. nocte, and a tonic R/mist. ferri et ammon. cit. 1 oz. with liq. arsenicalis M.ii added. Sig—½ oz. t.d.s. p.c. The whole condition cleared up in seven days and the patient was discharged to the convalescent home for seven days' rest. This eye whitened so gradually from day to day that there was some doubt as to the efficacy of "prontosil soluble" in this type of lesion but at the end of seven days the eye was perfectly healed.
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Case Histories Illustrating Sulphonamide Therapy

CASE A.—Through and through perforation of the globe. A.F., seaman. Aged 42 years.

History.—Right eye injured in a bombing attack nine days previously, when it was pierced by a piece of shrapnel from one of the cannon gun shells of an enemy plane. Admitted 1941. He stated that at the time of injury he experienced great pain in the affected eye which was immediately followed by loss of vision.

On Examination.—R.V. = P.L. only, L.V. 3/60ths—3·5 D. sph./3·5 D. cyl. = 6/12ths. The right eye showed a perforating linear wound at the lateral limbus at “9·30 o’clock” with iris prolapse. There were adhesions between the iris and the lips of the corneal wound with commencing infection in the form of a cloudy infiltration of the cornea. The iris prolapse was covered with a fine exudate. The anterior chamber had reformed but the wound and the prolapsed iris appeared to be infected and the vessels of the non-prolapsed iris engorged. The aqueous, apart from the hyphaema which had in part absorbed, appeared fairly clear. The infection had, therefore, not yet become intra-ocular. The iris was adherent to the perforated lens capsule. X-Ray disclosed a foreign body deep in the orbit and outside the globe. Enucleation of the globe was advised. The patient refused operation and, in order to gain the patient’s confidence, a time limit was agreed upon, then, if the ocular condition had not radically improved, operation must be performed in the interest of the remaining eye.

Treatment.—Sulphonamide therapy was started at once, commencing with 15 grs. every four hours, and after 10 doses, this was reduced to 7½ grs. t.d.s. Having given the patient about 90 grs. of sulphonamide, an operation was performed tofree the infected prolapse from its adhesions to the corneal wound and abscede this prolapse, after pulling it clear of the corneal wound. The pillars were replaced. As the corneal wound edges came together naturally, no conjunctival flap was made and the wound allowed to drain freely into the conjunctival sac. Heat, gutt. atropine 1 per cent. and sulphonamide were continued. Within twelve hours the anterior chamber had reformed, the aqueous showed no sign of infection but there was some hyphaema present in the region of the iridectomy, which seemed as if it would most certainly become infected. After 36 hours it was evident that the eye would recover, as the cornea began to clear rapidly and the hyphaema was absorbing. At the end of three days the eye showed such remarkable improvement that the patient was informed that it might not be necessary to enucleate the damaged eye. This right eye made an uneventful recovery and, being perfectly white, the patient was discharged from the hospital 21 days after admission.
With regard to the sulphonamide therapy, the patient developed cyanosis and a temperature as complications, which subsided as soon as the sulphonamide was discontinued. This occurred on the sixth day and it was not found necessary to re-introduce sulphonamide into the treatment.

Case B.—Cellulitis of orbit. W.S.G., seaman, tripped on deck and struck his right eye on a depth charge and deeply lacerated the skin in the region of the left eyebrow. The lesion was not stitched but when seen three days later in consultation, had a nasty cellulitis in the right superior orbital tissues. Suspecting necrosis of the right frontal bone, the patient was X-Rayed the same day, August 6, 1941, but this was negative. The wound was gently probed for evidence of suppuration but no pus was found. The temperature at this stage was 100° F. As the risk of spreading the infection into fresh tissue and involving the superior muscles of the globe, with the consequent contraction hypophoria, was very great, no further radical operative procedure was deemed advisable. Sulphonamide therapy was then commenced, 15 grs. every four hours for 48 hours and then 7½ grs. t.d.s. till the pulse rate came back to normal. The temperature dropped to normal within 15 hours and remained down. The pulse rate fell on the fourth day and the patient was discharged on the sixth day after admission.

Case C.—Early stitch abscess following operation for bilateral chronic dacryocystitis. W.E.H., Pte. Aged 32 years. Inflamed and “discharging” eyes for 7 years, with inflamed lids and recurrent styes.

On Examination.—R.V. 6/6, L.V. 6/12. Bilateral blepharitis with bilateral chronic dacryocystitis was present.

In view of the long standing infection of the lacrimal sacs, the lacrimal bones were X-Rayed for necrosis. Necrosis of the left lacrimal bone was present. Bilateral dacryocystectomy was performed and the necrosed left lacrimal bone removed making a fistula into the middle meatus of the nose. A horsehair suture was passed through each internal canthal ligament. The wound healed without any recurrence of the original trouble, but the right stitch showed evidence of a spreading cellulitis in this region. The patient was given sulphonamide therapy, the stitch removed, the infection clearing within 24 hours. The operation took place on August 12, 1941. The patient was finally discharged with both sacs and lids healed on August 26, 1941, to full duty.

Case D.—W.A.H., P.O. Aged 28 years.

History.—Left eye inflamed and very painful for four days. There had been an increasing dimness of vision in the affected eye. Had been feeling a little “off colour” for the last two weeks. History of gonorrhoea 4 years previously. The patient was married one month ago.
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*On Examination.*—R.V. 6/6, L.V. 6/18, 6/12 pt. Left acute iridocyclitis present. Special features: Annular synechiae present with fibro-gelatinous exudate in the pupillary zone. Iris very engorged. Slit-lamp confirmed. There was no evidence of gummatous infiltration but very fine “K.P.” present. The patient was admitted and the usual treatment prescribed but in addition a sub-conjunctival injection of “mydricain equivalent” (prepared by the hospital Dispenser) and sulphonamide, 15 grs. every four hours, were given for 48 hours and then 7½ grs. three times a day. The iridocyclitis settled down very rapidly and by September 15, 1941, the eye was quiet, except for a yellowish discoulouration of the sclera. The slit-lamp revealed, however, that fine “K.P.” was still present.

The day previously, September 14, 1941, the patient’s temperature had risen to 101° F. and cyanosis was present. As the eye was white, chemotherapy was suspended. The temperature and pulse rate immediately reverted to normal. On Sunday morning, the 21st, fine “K.P.” was still present and sulphonamide therapy was re-introduced. The eye was still without any vestige of circumciliary injection. Kahn test at this stage was negative and a blood count, taken on the day that the patient reached a temperature of 101° F., showed a moderate leucocytosis 18,000 w.b.cs., with a diminution of polymorphs and an increase in proportion of all the other cell elements, the greatest increase being in the lymphocytes, which numbered 28 per cent. General physical examination disclosed nil abnormal except an intense pallor. The blood culture was negative and the haemoglobin percentage was 10½ per cent. An X-Ray of the chest proved negative. As the patient’s ship was leaving for the United Kingdom, he was discharged to a base hospital establishment for further observation. Fine precipitates were still present, but the eye was white.

**Case E.**—F.B., dockyard worker. Aged 28 years.

*History.*—While working among explosive charges with a number of other workmen, one of the cordite charges for shells was accidentally touched off. The patient was badly pitted with small pieces of rock, and a number of pieces of expended cordite debris were recovered from his hair. At the time of the explosion the left eye was damaged and the patient experienced great pain, with loss of sight. An X-Ray was done to localise the foreign body and assist in its identity. Three non-magnetic foreign bodies were localised within the globe area.

*On Examination.*—Left eye showed a large irregular perforation at two o’clock on the corneo-scleral junction. The wound edges were gaping and showed evidence of powdery opacity, the anterior chamber was collapsed.

A large area of the left iris had been torn away and displaced.
into the wound of the lens. The aqueous was milky but no obvious hyphaema present. Traumatic perforation of the left lens was present and the vitreous was cloudy. Patient admitted for treatment.

Enucleation of the left globe was advised, especially as the single foreign body, in passing through the globe, had crumbled into pieces. The patient was adverse to having the eye enucleated without a trial treatment first, and a course of sulphonamide therapy was decided upon. The usual doses (grs. 15 four times a day for 48 hours) were given at the beginning, easing off to the maintenance dose of 7½ grs. t.d.s., gutt. atropine 1 per cent., warm bathings and guttae "prontosil soluble" 2-5 per cent. were prescribed in addition.

The left eye appeared to be going on nicely, but for an increasing oedema of the conjunctiva, in spite of perfect wound healing, and a steadily clearing aqueous. A peculiar fluorescence of the vitreous and a rising ocular tension told a different story. Left fronto-temporal cephalalgia of increasing intensity was another feature of this infection. These signs and symptoms were obvious from the tenth to the twelfth day, on which day the eye was enucleated.

A post-mortem on the globe showed that almost the whole of the vitreous was infected, one fragment of limestone being impacted in the ciliary body and the other two pieces were to be seen in the vitreous.

**Case F.**—Private. Aged 21 years. First seen January 6, 1941, and admitted January 7, 1941.

*History.*—"Had been under treatment at the Infectious Diseases Hospital for impetigo of the face and arms during the last three days and had developed a nasty conjunctivitis in the right eye."

*On Examination.*—R.V. 6/6, L.V. 6/6. The usual signs and symptoms were present and the case looked typical of those cases of conjunctivitis which are found as complications of impetiginous lesions of the skin. Patient had had treatment at the Infectious Diseases Hospital prior to seeing me at consultation. As the skin lesion was practically healed, the patient was admitted to the Military Hospital. On October 8, 1941, the right eye was recovering but the left one became involved and this eye was given the same treatment, which consisted of lotio boracic bathings, gutt. "prontosil soluble" 2-5 per cent. t.d.s., ung. h.o.f. 1 per cent. nocte. Both eyes were completely healed on October 16, 1941.

**Case G.**—A.B., October 2, 1941.

*History.*—Left eye red and inflamed seven days prior to admission.

*On Examination.*—R.V. 6/6, L.V. 6/6. A large marginal ulcer 3 mm. by 1 mm. in size was seen in the "one o'clock" limbal
area of the cornea. This ulcer was filled with whitish-yellow necrotic debris and had quite a leash of vessels going to it from the nearby conjunctiva. There was also a fair amount of purplish ciliary injection. Another ulcer, not so large, and with necrotic debris, was also to be seen at "3.30 o'clock." Treatment was commenced with warm boracic bathings, gutt. atropine 1 per cent., gutt. "prontosil soluble" 2.5 per cent. and with sulphonamide 7.5 grs. t.d.s. Six days later the eye was almost white, only a small amount of necrotic debris and a few fine vessels being left in the conjunctiva adjoining the large ulcer area. The other ulcer had healed and ciliary injection had gone. On October 14, 1941, the eye was quiet but the patient's general condition, which was not so satisfactory, necessitated his being placed on U.V.L. therapy. He was discharged on October 20, 1941.

Combined guttae "prontosil soluble" and internal sulphonamide medication.


History.—"Twelve years ago, whilst painting, splashed some paint in the left eye. Was in hospital for fifteen days with the injury. The sight in the left eye had been getting worse."

Present History.—"While welding three days ago, received a 'flash' from the welding arc and at the same time felt something strike the left eye which had since become progressively red and painful." Admitted September 23, 1941.

On Examination.—V.R. 6/9, V.L. < 6/60. Left eye showed evidence of a corneal ulcer at "6 o'clock" in the paracentral zone of the cornea with infiltration of this area. No evidence of hypopyon seen, but the ulcer looked suspicious. In association with this there was a marked injection of the conjunctiva and severe iritic reaction. There was also an immature cataract of a diffuse type. The tension was normal. There was no evidence of perforation, the cataract looked essentially of the senile type but an X-Ray was done to confirm the absence of foreign body. The X-Ray was negative. Treatment was then given as follows: Gutt. atropine 1 per cent. b.d., gutt. "prontosil soluble" 2.5 per cent. t.i.d., warm lotio boracic bathings every four hours, sulphonamide 15 grs. t.d.s. for 48 hours and vitamin C on tablet daily. The patient was discharged to full duty six days later, September 28, 1941.


"Red and inflamed right eye for 21 days, which had been discharging, particularly in the early morning. Since the attack developed, the right eyelid has begun to droop and continued to do so, although this eye had become white. It has never been really painful, but has always felt 'uncomfortable.' About this

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time, six other members of the crew developed a similar condition, which appeared to be of greater severity but without the drooping eyelid.'

On Examination.—R.V. —6/9 pt., L.V. —6/6. Right palpebral fissure smaller than the left, no muscular weakness present in upper lid, nerve supply intact. Some injection of the bulbar conjunctiva, mainly veins and slight iri appearance. Right lower fornix shallower than the left fornix. The right upper lid conjunctiva showed marked follicular reaction, with oedema, over the whole of the lid area. The lid conjunctival vessels were not seen and the lid had a granular appearance in which the follicles were poorly delineated. There was no evidence of pannus, but the clinical picture was suggestive of trachoma.

Treatment.—Sulphonamide, grs. 15, by internal medication, was given t.i.d. for three days, followed by maintenance doses of grs. 7 ½ t.i.d. In addition, "prontosil soluble" 2-5 per cent. guttae were given t.i.d. after bathing with warm boric acid lotion. Ung. hydrarg, ox. flav. was prescribed noce.

Course of the lesion.—The infective process began to show improvement within the first 24 hours and manifested itself as a subjective reaction in which the patient said the eye felt comfortable and he did not feel conscious of the defect as he had done before. On October 16, 1941, the first lid reactions to the treatment made their appearance, the conjunctiva becoming less oedematous and the follicles standing out a little more clearly. On October 24, 1941, the conjunctival oedema had almost subsided. The follicles were beautifully delineated over the whole of the conjunctiva covering the upper tarsal plate, but the follicles were massed in greater quantity on the upper tarsal side. In the lower lid, the conjunctival folds were covered with follicles and they were particularly well seen just below the free edge of the lid on its conjunctival surface.

On October 31, 1941, the lids were free of all follicle formation except at the outer upper end of the tarsal plate, where two fine follicles were to be seen. The lower lid appeared clear and, clinically, the eye was almost healed. The ptosis had disappeared completely.

Patient discharged to the United Kingdom on November 2, 1941, for further observation.

REFERENCES


A REPORT ON AN ANALYSIS OF CASES AT AN EYE CLINIC IN LAGOS, NIGERIA*

BY

G. E. DODDS, M.B.

WEST AFRICA MEDICAL SERVICE

This report is based on personal experiences during ten months part-time work at an eye clinic at the African Hospital, Lagos, in 1939-40.

The majority of the cases were referred from the general outpatients as well as from a school clinic. The report consists of an analysis of the larger groups of diseases and was made to act as a guide for future work.

Some observations have been made on a few of the diseases commonly seen and the problems connected with them.

Statistics extracted from Annual Medical Reports for Nigeria have been added.

More than 1,200 cases attended the clinic but this report is based on 801 only, as it was impossible, in the time allotted for

<table>
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Clinical Observations and Deductions in the Therapeutic use of Sulphonamide and its Derivatives in Ophthalmology

J. Horton Young

Br J Ophthalmol 1942 26: 241-257
doi: 10.1136/bjo.26.6.241

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