

# The red eye

By

C. M. Phillips, O.B.E., M.A., M.B., B. Chir. (U. Cantab), F.R.C.S. (Eng.), D.O.M.S.

Consultant Ophthalmologist,  
Lusaka Central Hospital

## INTRODUCTION

The majority of recently-qualified practitioners approach the red eye with considerable trepidation, presumably because ophthalmology occupied a small part of their training, or, more likely, that it was improbable that an 'eye case' would feature in the written or clinical parts of their final examination and so could be ignored with a high degree of safety—for the student, if not for subsequent patients. Once qualified, there seems to be a marked reluctance on the part of most practitioners to close this gap in their medical knowledge.

Here in Zambia it is safe to say that nearly every person develops ocular pathology at some time in his life, and I do not include errors of refraction in the category of pathology.

The diagnosis of the red eye is made more difficult for the practitioner by the fact that seldom is any attempt made to take a proper history, and even less attempt to record the eye's function, i.e. to record the visual acuity. Even such basic factors as to whether the pathology was spontaneous or the result of trauma and the duration of the complaint are usually omitted. Any previous ophthalmic history, including surgery, is only recorded if the patient vouchsafes the information. I hope that no practitioner would refer a patient to a consultant surgeon with the entire contribution towards a diagnosis being "abdominal pain" or to a consultant physician with "coughing" but it is extremely common to find a patient referred to a consultant ophthalmologist with "sore eyes" "poor sight" or "bad eyes" as the total sum of symptoms and signs.

It is to help the general duties Medical Officers, especially those far distant from consultant help that the following article has been prepared.

## A. TRAUMA

As will be appreciated this covers an enormous field in ocular pathology and is extremely common. Such trauma may be from physical contact or instrumental injury such as is seen so frequently with beer-hall fights, car, industrial and other accidents, burns, caustic and chemical injuries (including cobra-venom), thermal as with eclipse scotoma and abiotic as with 'arc eyes'. Many of these require specialist attention, but the following are listed as frequent and/or important.

**1. Non-perforating Injury.** This may show any degree of damage from the simple 'black eye', to massive intra-ocular haemorrhage with gross destruction of the contents of the eye. Very commonly seen as a result of fighting are subconjunctival haemorrhages with hyphaema (blood in the anterior chamber) with partial paralysis of the sphincter pupillae giving a semi-dilated, usually oval, non-reacting pupil. It is stressed here that secondary intra-ocular haemorrhage is not infrequent, leading to a total hyphaema which can then progress to permanent blindness from the increased intra-ocular tension forcing the blood into the corneal stroma and rendering this structure permanently opaque. To avoid this ideally a patient with hyphaema should have complete bed rest and binocular bandaging until the hyphaema has cleared and GUTT. ATROPINE MUST NEVER BE USED IN TREATMENT.

**2. Superficial Foreign Bodies.** These are very common and of many varieties. Frequently seen are:

(a) Corneal metallic foreign bodies, and, for the patient's comfort not only the foreign body but also the rust ring must be removed under local anaesthetic. Treatment does not end here but the eye must have an antibiotic ointment and pad for 2-5 days depending on clinical circumstances and removal trauma.

(b) Husks of grass seed. Not infrequently the husk floats into the eye with the patient hardly aware of it and usually lodges at the limbus (corneo-scleral junction). Being semi-transparent, it is then diagnosed as a marginal corneal ulcer or labelled conjunctivitis and treated as such sometimes for weeks, especially when the foreign body excites a surrounding infiltrate in the cornea. Careful inspection shows the real cause and they can usually be removed without an anaesthetic locally.

(c) Maize and other seeds. These are very small seeds, frequently barbed, which are often the cause of ophthalmia in cattle, and they invariably embed themselves in the palpebral conjunctiva under the upper lid and they are very painful as they abrade the cornea each time the patient blinks. They may be so small that eversion of the upper lid fails to show them, but their presence can be assumed from the localised spot of acute hyperaemia. Their removal can present considerable

difficulty even with good illumination, binocular loupe and fine forceps, and it may be necessary to snip off the involved palpebral conjunctiva with the foreign body.

### 3. Perforating injuries.

(a) With retained metallic intra-ocular foreign body (I.O.F.B.). Here the importance of history must be stressed. The exact circumstances of the injury must be sought if it is not volunteered (quite apart from medico-legal considerations and Workmen's Compensation requirements). If the injury was caused by a high speed particle, e.g. hammer and chisel, rivetting, etc., the entry wound may be so small as to be missed, pain or discomfort may be minimal or absent, vision may be excellent at first and the patient dismissed as having suffered a very trivial injury. It is essential to look for an entry wound which may show as a small insignificant-looking corneal opacity, and the underlying iris inspected for a hole made by the passage of the foreign body. Even with all clinical findings negative a diagnosis of I.O.F.B. must be made from a suggestive history until proven otherwise by X-ray. The outcome of the neglected metallic I.O.F.B. is blindness from ocular degeneration. Treatment of the condition is, of course, the province of the ophthalmic surgeon.

(b) With retained other I.O.F.Bs. A condition far more common in Zambia than the above is the perforating injury, usually of the cornea, by a sliver of dry grass or reed which then breaks off flush with the surface of the globe, and is quite obvious on inspection. It is usually seen in children. In contrast to the above, the chances of intra-ocular infection are high, and immediate antibiotic coverage must be instituted. Removal with fine forceps is often quite simple, but it is important to ensure that the entire F.B. is removed as the stem tends to split longitudinally and a fine sliver of F.B. may be left behind.

There are, of course, many other I.O.F.Bs. notably glass in car accidents, chips of stone, the products of black powder explosions used in primitive or home-made firearms, etc., and these usually cause gross destruction of the eye. Each case must be considered on its merits with regard to treatment, but most of them require enucleation or evisceration if the contents of the globe are infected.

(c) Without retained F.B. Such an injury may be from the same cause as a non-perforating injury, the greater force causing a ruptured eyeball invariably in the anterior segment, and this is a very frequent end-result of the beer-hall fracas, the injury being caused by a stone or brick held in the fist rather than a punch. Far less common causes than these assaults (certainly in Lusaka) are the direct perforating accidental injuries from car and cycle accidents, branches of trees, cattle-herding injuries from horn or whip, etc: It must be mentioned that the rupture of the globe may be subconjunctival and not obvious on ordinary external examination which in any case may be difficult or impossible at first because of gross lid oedema or haemorrhage. Once again, each case must be treated on merit, but the majority requires surgery, usually enucleation or evisceration.

Here it can be mentioned that sympathetic ophthalmia is excessively rare in the African which allows conservative and reparative surgery to a far greater extent than might be wise or safe in the European.

### 4. Other Injuries.

(a) "Arc Eyes". Apart from superficial corneal foreign bodies, this is probably the most common of all industrial accidents. It is caused by the emanation of ultra-violet light during welding and the severity of the symptoms depends on the duration and distance of exposure to the welding process. There is an incubation period of several hours before the onset of symptoms of pain, photophobia, blepharospasm and conjunctival injection, all the result of the punctate superficial keratitis present. Treatment is purely symptomatic with dark glasses, cold compresses, adrenaline drops and antibiotic ointment.

(b) Snake venom. A comparatively common condition where the spitting cobra (*Naja nigricollis*) ejects venom towards the face with great accuracy and so enters the eyes. The immediate acute pain and blepharospasm effectively blinds the victim thus enabling the snake to escape. The clinical picture is one of a chemotic conjunctivitis and there is no effective treatment, but complete recovery takes place in virtually all cases.

(c) Lacratory gases. The use of tear-gas is becoming commonplace throughout the world today and any doctor anywhere may be confronted with such a patient. Under normal circumstances completely harmless, but in confined spaces and if the fluid actually enters the eyes there can be permanent corneal damage. In the ordinary case symptoms of blepharospasm and lacrimation are transient and no treatment is required.

## B. CONJUNCTIVITIS.

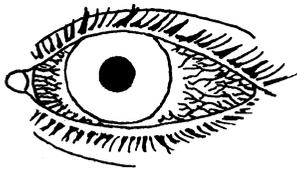
1. **Acute Infective.** This is probably one of the commonest conditions seen in out-patient departments in Zambia, and also, unfortunately, the label that is put on just about every red eye that attends for treatment. The condition can vary from the mild simple catarrhal type to the virulent purulent type, but the usual is muco-purulent conjunctivitis due to a variety of organisms of which the Koch-Weeks bacillus is the commonest. The symptoms and signs are so well known they do not require listing here but may be found in the Differential Diagnosis Table. There are two rules which, if observed, will prevent the label of 'conjunctivitis' being put on an eye with a more serious complaint; these are

CONJUNCTIVITIS IS NEVER A UNILATERAL DISEASE

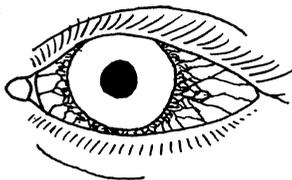
CIRCUMCORNEAL INJECTION INVALIDATES A DIAGNOSIS OF CONJUNCTIVITIS

You will see in Figure 1(a) and (b) the difference in the injection of the conjunctiva in conjunctivitis, which is peripheral i.e. mostly in the fornices, and the circumcorneal injection or ciliary flush indicative of corneal and iritic diseases. Do not forget also to look at the eyelashes where the presence or absence of crusting supports or detracts from a diagnosis of conjunctivitis.

Note also that in the common catarrhal and mucopurulent types that vision is not affected, apart from mechanically when mucus or pus crosses the pupillary area, whereas in the more serious diseases vision is always adversely affected. Concentration on these points will save the patient at least a lot of grief and possibly his sight.



(a)



(b)

Fig. 1.

**Conjunctival injection**

- (a) in conjunctivitis
- (b) in corneal and iritis diseases

The main complication of conjunctivitis is corneal ulceration, usually limbal and often multiple.

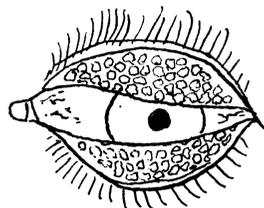
Treatment is with local sulphónamides e.g. Gutt. Sulphacetamide Sod (Albucid) 30% and/or antibiotics, e.g. Gutt. penicillin, framycetin (Soframycin), chloramphenicol by day and a different antibiotic ointment nocte. Do not use an ointment by day and there is no need to prescribe blunderbuss therapy of antibiotic/steroid combination either as drops or ointment. The frequency of application depends on the severity of the condition. Ideally Gutt. hourly the first day, 2-hourly the second day, then q.i.d. continued for at least three days after the patient is symptom- and sign-free. Only in the purulent type are antibiotics by I.M.I. required for in these cases the lids are so swollen it is often impossible to introduce drops locally.

**2. Allergic (Vernal) Conjunctivitis.**

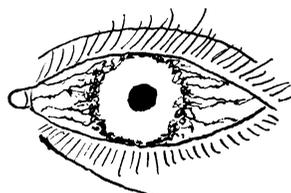
Like infective conjunctivitis this is a bilateral disease. In the common seasonal variety where pollens are the allergens the condition is very prevalent September to November and regresses once the rains set in. Children are the main sufferers. The symptoms of irritation, lacrimation, mild injection, absence of discharge and a long or recurrent history together with the signs make the diagnosis easy. The clinical findings show distinct racial differences as is shown in Figure 2(a) and (b).

(a) Palpebral type seen in Europeans and Asians in which the palpebral conjunctiva show a cobblestone effect usually in the upper more than the lower lids. It could be mistaken for early trachoma but this is very rare in Europeans in Zambia.

(b) limbal type seen in Africans. Here a gelatinous-looking hypertrophic granulation right on the limbus usually as a complete ring is seen, but sometimes only part of the circumference is affected. This area and the adjacent conjunctiva becomes more pigmented so that often the presenting picture is that of the parents bringing the child because of the increasing discolouration of the conjunctiva.



(a)



(b)

Fig. 2.

**Allergic (vernal) conjunctivitis**

- (a) palpebral type
- (b) limbal type

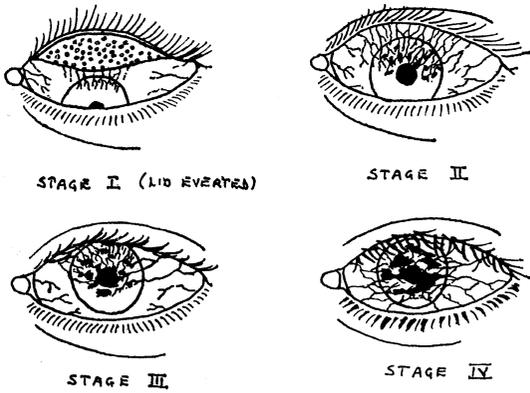
Treatment with antihistamines such as Gutt. Antistine Privine or Benadryl may be sufficient for the milder cases of the palpebral type, but usually steroid drops are required and may be supplemented with a steroid ointment at night. The limbal type is often very recalcitrant to treatment.

**C. TRACHOMA.**

This condition is the leading cause of blindness in the world to-day. It is an important cause of blindness in Zambia, being the cause of 7.7% of all blind and being especially prevalent in Barotse Province where it is responsible for 16% of the blind (Phillips 1961). It is a chronic bilateral infection traditionally divided into four stages as depicted in Figure 3.

Stage I. Active Infiltration with early follicular hyperplasia and papillary hypertrophy giving a velvety appearance of the upper palpebral conjunctiva with very early pannus formation not discernable with the naked eye but evident on slit-lamp examination. These

cases can be spotted at a glance quite often because the drooping upper lids give a sleepy appearance.



**Fig. 3.**  
**The Stages of Trachoma**

Stage II. Active Inflammation. Follicular and papillary hypertrophy increase to give a sago-grain appearance of the palpebral conjunctiva, and now the pannus can be seen quite clearly in the upper part of the cornea as a grey infiltration with superficial neovascularisation often with small ulcers (Herbert's pits). The diagnosis should easily be made at this stage. It is not uncommon for spontaneous healing to take place at this stage by regression of the inflammation, but more usually it progresses to:—

Stage III. Healing by cicatrization with scarring under the upper lid to show as smooth avascular, usually pigmented, tissue and the pannus regresses.

Stage IV. Scar tissue replacement which will lead to many complications of which the commonest is entropion.

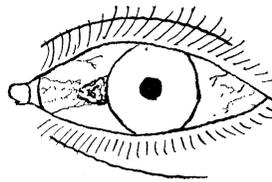
The classical sequence is frequently modified by two factors, coincidental bacterial conjunctivitis and, especially as this is a chronic disease, the instillation of native concoctions into the eyes. As the patients very often attend in the late stages of the disease, cases present themselves with both corneae totally involved with infiltration and vascularisation from the entire corneal periphery and usually with entropion. As patients frequently epilate or cut short their upper eyelashes, the entropion often escapes the notice of the unobservant examiner.

Treatment is medical in the active inflammatory stages of the disease with sulphonamides orally as a course for 10—14 days, Gutt. sulphacetamide Sod. (Albucid) 30% three-hourly and Oc. tetracycline 1% b.d. for at least one month, continuing ideally as the Gutt. and Oc. b.d. for another two months. For entropion the treatment is naturally surgical, and, as a word of warning, a simple 'skin and muscle' operation is useless; it is essential that the inverted tarsal plate be tackled and everted or excised. For the patient so frequently seen with bilateral total leucomata, xerotic conjunctivae

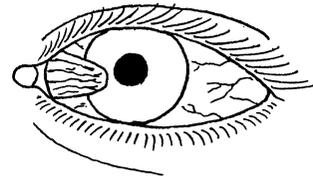
and corneae a simple excision of the lash-bearing border of the upper lid is easy to do, requires no special ophthalmic instruments, and permanently relieves their distressing symptom.

#### D. PINGUECULA AND PTERYGIUM

A pinguecula is so frequently mistaken for a pterygium that these have been included, though not really a 'red eye' in the meaning of this article. The two conditions are depicted in Figures 4 and 5. Basically the pinguecula is a triangular area with its base at the limbus and apex pointing towards the medial canthus, while the pterygium has its base at the canthus and apex pointing towards



**Fig. 4.**  
**Pinguecula**



**Fig. 5.**  
**Pterygium**

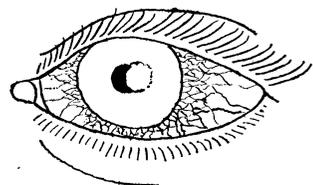
the pupil with the head across the limbus. As a pinguecula can be a precursor of a pterygium some case will show the transition from one to the other, but the majority are definitively one or the other. The pinguecula seldom needs excision, but, when irritable, can be relieved with Gutt. Zinc c Adrenaline, while the pterygium does require surgery when it is advancing and progressive.

#### E. CORNEAL ULCERATION

There is a considerable number of different types of corneal ulceration, and the commoner ones are:—

1. **Catarrhal**, usually marginal and a complication of bacterial conjunctivitis. It is always present in purulent conjunctivitis. The majority will heal when the conjunctivitis is cured to leave a corneal scar or leucoma.

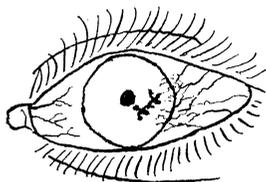
2. **Hypopyon Ulcer**. This may follow a simple injury to the cornea which becomes infected with virulent organisms, and is not infrequently seen in debilitated persons and malnourished children especially with or following measles. It is depicted in Figure 6, which shows the ulcer, usually circular, and the diagnostic appearance of the pool of sterile pus in the anterior chamber. If untreated, perforation or necrosis of the cornea with resultant panophthalmitis is inevitable. Treatment must



**Fig. 6.**  
**Hypopyon Ulcer**

be immediate and vigorous, with Inj. penicillin and streptomycin, a mixture of antibiotics locally, e.g. penicillin, soframycin and chloromycetin with Gutt. atropine b.d. and padding the eye. This will lead to a cure in the majority of the patients if not seen too late. Subconjunctival injections of penicillin in mydraine daily may save an eye that would otherwise be lost.

**3. Dendritic Ulcer.** This is one of the clinical pictures of a herpes simplex infection of the cornea and tends to be a recurrent condition breaking down whenever the patient has a febrile illness or severe upper respiratory infection. Unlike most corneal infections this is not especially painful but the pattern of the vascularisation as shown in Figure 7 is a guide to the site of the lesion. Fluorescein staining will show the extent of the superficial ulcer, but, even without this, examination of the reduced image of a window on the cornea as the patient moves his eye in various directions will show distortion of this image as it crosses the lesion. The typical branching ulcer is shown in the Figure, but recurrent attacks will show ulceration over and/or alongside the site of a previous lesion and

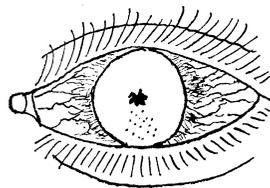


**Fig. 7.**  
**Dendritic Ulcer**

will not be typical but may show any form. The sheet-anchor of treatment is with idoxyuridine, "Stoxil" being available in this country, as Gutt. hourly by day and Oc. nocte. Local antibiotic treatment to prevent secondary infection and padding the eye are also required. Gutt. atropine need not be used as a routine. A full course of three weeks is advised and will cure the vast majority of patients. **STEROIDS MUST NEVER BE USED** otherwise the ulcer will spread in width and depth. Some cases do not respond to local treatment and require cauterization of the cornea by an ophthalmic surgeon.

#### F. ACUTE IRIDOCYCLITIS

This is a recurrent condition, invariably unilateral though both eyes may be involved at different times, and the untreated cases comprise 3% of the blind in Zambia (Phillips 1961). The classical picture of a unilateral, painful, watering eye with ciliary flush or circumcorneal injection as shown in Figure 8, in which vision has markedly deteriorated is again completely different from conjunctivitis. The signs of a small irregular pupil with muddy iris (not easily seen in the dark brown irides), posterior synechiae and K.P. (keratic precipitates) on the back of an otherwise clear cornea make



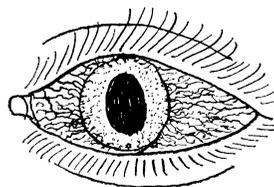
**Fig. 8.**  
**Acute Iridocyclitis**

the diagnosis obvious. Whatever the cause, which can be investigated at more leisure, local treatment of heat, steroid drops 2-3 hourly and Gutt. atropine q.i.d. until the pupil is dilated when it can be reduced to once daily quickly settle the early cases. Without slit-lamp control of cure, it is a good rule to continue treatment for a full two weeks after the eye is completely white.

#### G. ACUTE GLAUCOMA

Amongst ophthalmologists this is now termed closed-angle glaucoma. Primary glaucoma is seen from time to time in Europeans, but is rare in Africans. Secondary 'acute' glaucoma, however, is not at all uncommon in Africans, the usual cause being a hypermature cataract. Whether primary or secondary it can give rise to very severe pain in the eye, radiating to the ophthalmic division of the trigeminal nerve, and even the maxillary and mandibular divisions. It is on record that the patient can be so prostrated and vomiting with the pain that a diagnosis of perforated gastric ulcer has been made and laparotomy performed!

In those with less severe onset, the blind watering injected eye with stony hard tension, steamy cornea and fixed semi-dilated, usually oval pupil as shown in Figure 9 makes the diagnosis quite obvious, and, in African practice, the majority will show a milky-white cataract in the pupil.



**Fig. 9.**  
**'Acute Glaucoma'**

Medical treatment is not very effective especially as most of them are of at least several days duration before being seen. Inj. morphia, Tabs Diamox and Gutt. physostigmine 1% hourly should be given. In primary cases, because it is not uncommon for a similar condition to be precipitated in the fellow eye, Gutt. physostigmine

1% should be instilled into the unaffected eye t.i.d. **ATROPINE MUST NEVER BE USED.** Referral to an ophthalmic surgeon as an emergency is the only possible way of saving some vision from this medical catastrophe as some form of surgery will be required in every case.

### CONCLUSION

Though there are a host of other causes of a red eye, they are uncommon compared with the ones briefly discussed in this article. They comprise at least 90% of

cases of red eyes that will be seen in African practice. A differential diagnosis table summarizes the salient points. It will be seen that with a knowledge of very basic ophthalmology and nothing more complicated than intelligent inspection, with a light if necessary, the correct diagnosis can be made without difficulty in the vast majority of patients.

### REFERENCE

Phillips, C. M. (1961). C. Afri. J. of M. 7. 153.

## DIFFERENTIAL DIAGNOSIS TABLE.

|                 |              | Infective Conjunctivitis | Trachoma                         | Herpetic Ulcer                   | Acute Irido-cyclitis                                  | Acute Glaucoma                      |
|-----------------|--------------|--------------------------|----------------------------------|----------------------------------|---|-------------------------------------|
| <b>SYMPTOMS</b> | Onset        | Gradual                  | Very gradual                     | Gradual                          | Usually gradual                                       | Sudden                              |
|                 | Pain         | Discomfort               | Gritty Sensation                 | Discomfort                       | Moderate<br>May radiate                               | Very severe<br>Radiates area of V   |
|                 | Vision       | Good                     | Good in early stages             | Depends on site                  | Fair  | Very poor indeed                    |
|                 | Secretion    | Muco-purulent            | Watery-slight                    | Watery                           | Watery<br>Often copious                               | Watery<br>Very copious              |
|                 | Bilateral    | Nearly always            | Always                           | Unilateral                       | Usually unilateral                                    | Unilateral<br>May be bilateral      |
|                 | <b>SIGNS</b> | Injection                | Superficial<br>Peripheral        | Upper conjunctiva<br>and cornea  | Ciliary   | Deep ciliary                        |
| Tenderness      |              | Nil or slight            | Nil                              | Nil or slight                    | Marked  | Extreme                             |
| Pupil           |              | Normal                   | Normal                           | May be smaller<br>than other eye | Small, irregular<br>crenated                          | Large and oval                      |
| Tension         |              | Normal                   | Normal                           | Normal                           | Normal or Low   | Very high                           |
| Media           |              | Clear                    | Vascularised<br>cornea above     | Corneal lesion                   | Opacities at back<br>of cornea (K.P.)<br>and in pupil | Cornea steamy                       |
| Basic treatment |              | Antibiotics              | Sulphonamides<br>and antibiotics | Idoxyridine<br>NEVER steroids    | Steroids<br>Atropine                                  | Physostigmine<br>Morphia<br>Surgery |