COMMUNICATIONS

NATIONAL POLICY TO BE ADOPTED IN A TROPICAL COUNTRY FOR THE PREVENTION OF BLINDNESS*

BY

A. F. MacCallan, C.B.E.

NEARLY five thousand years ago, during the IIIrd Dynasty, there lived in Egypt a physician named Imhotep, whose reputation was such that he became an administrator of the realm, and finally was deified. However, it was not until the advent of the VIth Dynasty that the earliest known oculist of human history became known. His name was Pepi-Ankh or Iri, and his funeral stele was found near the Pyramids of Giza.

The hieroglyphic script of the Ebers papyrus, which is now at Leipzig, was written about 1500 B.C. It contains directions for the treatment of ocular diseases, culled from books of the XIIth and XIIIth Dynasties; from its perusal the deduction may be made that acute ophthalmias, trachoma and blindness had been prevalent in Egypt since times which, even then, were distant.

We have the authority of Homer for the statement "In Egypt men are more skilled in medicine than any of the human kind." This occurs in the Odyssey (Book IV, line 227), and was written

*Read at the XVth International Congress of Ophthalmology, Cairo, on December 11, 1937.
or sung on the Western Sea-board of Asia sometime before the Eleventh Century, B.C. Since I had the privilege of teaching ophthalmology in Egypt for a period of twenty years, I like to think that Homer's words are still true of modern Egyptian oculists.

During ancient times there was a great difference between the status of the medical profession in Egypt and that in countries further East. In Egypt there were able practitioners, who had the confidence of the people, while in Assyria it was necessary to threaten the surgeon with the loss of an eye or a hand if he failed in his proposed operation. In later times, Cyrus, King of Persia, requiring the services of an oculist, sent for one from Egypt, just as did His Majesty King Ibn Saud of Arabia more recently.

Since we are meeting in this ancient land of Egypt, where history may be learnt from the glorious monuments erected during epochs when Europe was inhabited by savage herdsmen, it may be permitted to refer to the later ophthalmological history of the country in so far as it impinges on the causes of blindness.

About the time that Euclid studied the first elements of optics at Alexandria, at the end of the fourth century, B.C., Herophilus wrote a book on the eyes, which unhappily has not been preserved.

In the beginning of the second century, B.C., Heliodorus, who practised at Alexandria, wrote a work on surgery, a fragment of which has survived, describing an operation for ingrowing eyelashes and various remedies for ophthalmia.

In the seventh century of the present era Paul of Aegina, who lived at Alexandria, made a compilation from works of the great Graeco-Roman doctors of earlier times for three ophthalmological chapters of his book on medicine. He described the operation for ingrowing eyelashes which was in common use in Egypt thirty or forty years ago. The operation consisted in an attempt to evert the ingrowing lashes of the upper lid by the removal of a piece of skin; this was effected by including a fold of skin between two pieces of reed or stick which were tied tightly together at their extremities. Since its blood-supply was cut off, the skin necrosed and became detached after some days. The inversion of the lid was occasionally cured, but always at the expense of a shortened upper lid, which no longer sufficed to cover the eye, blindness frequently resulting. Such cases were seen frequently thirty years ago, but their quack perpetrators were ruined by the advent of the Egyptian Ophthalmic Hospitals.

Between the VIIIth and XIVth centuries there were numerous Arab ophthalmologists who left treatises which are still extant.

Thus the medical literature of the Arabs not only adopted and preserved the ophthalmic lore of the Graeco-Roman physicians
of an earlier epoch, but considerably enriched it at a period when in Europe all the sciences were in a state of profound decadence. It should be particularly noted that both Greek and Arab surgeons distinguished exactly between chronic trachoma and acute ophthalmia, a clarity which disappeared with the decline of Arab science. From these times onward until the commencement of the XIXth century the history of ocular science is vague throughout the world. Much has been written about the ophthalmias which ravaged the European armies during the first half of the XIXth century. This subject has been ably described by Meyerhof, and is of importance because it was during this time that their contagious nature was first appreciated. This theory, for so it was considered at the time, was first suggested by Dr. Brigges, the surgeon of the warship Ajax, when stationed at Alexandria in February, 1802. In the same year Dr. Edmonston, a young Scottish surgeon of the second regiment of the Argyllshire Fencibles, published a communication on the contagious nature of ophthalmia. In his “History of the Expeditionary Force in Egypt,” published in 1803, Lieutenant-Colonel Wilson referred to the horrors of ophthalmia. He said: “Lately some extraordinary cases have appeared which prove that ophthalmia is highly infectious.” So this cavalry officer seems to have been very receptive of new ideas, and was not afraid to counter the generally accepted medical opinion of the time. It is chiefly in the light of our present-day knowledge of the cause of conjunctival infections in Egypt, that we are able to make a retrospective diagnosis of the eye diseases which raged in the British and French armies at that time. In 1801 more than 3,000 French soldiers were attacked by ophthalmia without a single one losing his sight. This accords with what we know of the period of occurrence and course of conjunctivitis due to infection with the Koch-Weeks bacillus. The British troops suffered more severely, from what must have been gonococcal ophthalmia, for this is a more formidable enemy than the Koch-Weeks infection. The subsequent history of large numbers of British and other European troops showed that after the acute ophthalmia had subsided, the chronic disease, trachoma, made its appearance. When these troops were disbanded they propagated trachoma among their families, and by these means the disease became widespread throughout Europe. However, it must not be supposed that the Napoleonic wars introduced trachoma into Europe. Already Italy, if not other countries, had been trachomatized as the result of the return from Palestine of infected Crusaders.
Causes of Blindness in a Tropical Country

It is obviously necessary to determine the causes of blindness before enunciating any national policy to be adopted in a tropical country for its prevention. Even before this we must say what we mean by blindness. In the statistics of the Egyptian Government Ophthalmic Hospitals, since the year 1908 up to the present time, the definition adopted has been that suggested by the great French surgeon, Trousseau, namely, inability to count the fingers of a hand held up in front of the eye at a distance of one metre. In highly industrialized countries, and where the tabulation of statistical details has reached a fine art, much more elaborate definitions and data are employed. However, it is probable that in their simple form the Egyptian statistics give an exact idea of the common causes of blindness in the country. In my opinion none of the International Classifications of Blindness which have been suggested is applicable to tropical countries.

An examination of the statistics of the Ophthalmic Hospitals of Egypt for the year 1933 shows that out of 838,625 patients examined the number of those blind in one or both eyes was 60,157.

Causes of Blindness

<table>
<thead>
<tr>
<th>Causes of Blindness</th>
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<tbody>
<tr>
<td>Congenital</td>
<td>6</td>
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<td>Acquired:</td>
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<td>Unclassified</td>
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60,157

Various forms of conjunctivitis, including the sequelae of trachoma accounted for more than 80 per cent., primary glaucoma for about 9 per cent., cataract for about 4 per cent., and iritis for nearly 3 per cent.; while other causes were less than 4 per cent.

As far as is known at the present time there are no means for the prevention of the development of glaucoma or cataract, and the causes of the endogenous iritis in Egypt have not been sufficiently studied; it is therefore left to us to devise means for the prevention of the dangers attendant on inflammation of the
conjunctiva, that is to say of the mucous membrane which lines the eyelid and the globe of the eye, and shuts off the interior tissues of the orbit from the atmosphere.

Before undertaking a consideration of this subject it is of interest to compare the incidence of blindness in some European countries with that in countries further East. It is usual for statisticians to consider the rate per 100,000 of the population, and that is done here: In England and Wales it is 119, in France 73, and in Holland 55; it is to be remembered that in England and in France there are a large number of industrial accidents resulting in blindness but apart from a diminishing amount of ophthalmia neonatorum there are comparatively few purely conjunctival causes.

Now note the difference in countries where conjunctival diseases are rife: Palestine 843, Egypt 776, Cyprus 730 (all from Census Reports), and India (according to the estimate of the Director General of Medical Services, Major-General Sir John Megaw), 570.

It is clear that blindness is much more common in countries where inflammation of the conjunctiva is of frequent occurrence. Now this conjunctivitis is of two kinds, the acute variety, in which the eye may be rapidly destroyed, and the other is a special form of chronic conjunctivitis called trachoma, which is not of bacterial origin. The action of these two forms of inflammation will be briefly described.

**Acute Conjunctivitis as a Cause of Blindness**

Ophthalmia neonatorum or "babies' sore eyes" is very common in India among newly born infants. It is the result of infection from the maternal passages during birth. The causative organism is usually the gonococcus, but may be one of several other varieties of bacteria, while occasionally the inflammation may occur in the absence of any bacterial organism.

While ophthalmia neonatorum is very rare in Egypt and Palestine, children early fall victims to other forms of conjunctivitis, due to the pneumococcus, the gonococcus, the Koch-Weeks bacillus or the diplobacillus of Morax-Axenfeld. These may occur in acute or chronic form. All are endemic throughout Egypt, and may be found at all times of the year.

It has been well-known for centuries that acute inflammations of the eye were especially prevalent during the summer in Egypt, but the seasonal variations of the Koch-Weeks bacillus and the gonococcus have been more closely studied by Meyerhof, by myself and by Wilson.

In the coldest part of the year, January and February, there is
very little acute conjunctivitis of any kind. As the weather gets warmer the incidence of Koch-Weeks conjunctivitis increases, and reaches its maximum in May or June. After this there is a marked falling off in the number of cases seen, although the temperature remains high; but about the middle of August there is an exacerbation, but this is never so great as the earlier one.

Very few cases of gonococcal conjunctivitis are seen during the winter; indeed it is not until June that they increase; then after a temporary check they reach a maximum in October.

Wilson has offered an interesting explanation of these seasonal variations: first in the case of the Morax-Axenfeld bacillus, the increase of inflammation due to this organism coincides with two factors, the increase of the atmospheric temperature, and the first fly-breeding season. Then with increased dessication due to heat there is a diminution both of flies and of ophthalmia, until the rise of the Nile produces greater humidity with the second fly-breeding season beginning about the middle of September, when there is another exacerbation. This is followed by a gradual fall until the month of December.

Second in the case of the gonococcus, the incidence remains low until there is a certain degree of heat, as in July. Then there is some diminution in the cases due to this organism, owing to the fact that it does not stand drying very well, nor do the flies. Later when there is much greater humidity, and the second fly-breeding season having begun in October, there is a vast increase of gonococcal ophthalmia. When the temperature falls at the end of October and beginning of November there is a very rapid diminution. However, there are always a certain number of cases which last throughout the winter, and form a reservoir of infection.

It is thus seen that the seasonal epidemics are closely related to the three factors: temperature, humidity and flies.

**Trachoma as a Cause of Blindness**

Uncomplicated trachoma is typically a quiet inflammation of the mucous membrane of the eyelids which spreads quickly to the cornea, causing a vascular opacity called pannus. It is transmitted mainly by the fingers and by such articles as towels; it is probable that flies may convey the contagious material from an infected to a healthy eye, but this is not the rule. Trachoma is not due to the action of bacteria but to that of a virus, as is the case with small-pox and with the foot and mouth disease of cattle.

It is probable that trachoma arose among the nomad races of the plains of Mongolia. From here it spread westward with the Mongol invasions, infecting the inhabitants of every country
through which they passed, until it reached the Mediterranean Sea, around the shores of which it reached its apogee.

Travelling eastward through China and Siberia with the vast migrations which crossed to the American continent, the disease found another permanent home among their descendants, the American Indians.

Such a theory of the dispersion of trachoma, explains its worldwide distribution.

Uncomplicated trachoma may be the cause of very serious depreciation of visual acuity, though improvement may occur after treatment. However, when the disease has spread to the supporting structure of the eyelids, as usually happens after the disease has been present for some time, they become thickened and their lashbearing margins become inverted. The eyelashes then play upon the surface of the eye and abrade the cornea. While such an abrasion is merely superficial, and if the lid inversion is corrected by operation, it may be healed readily without loss of transparency of the cornea. If, however, the inversion persists, and especially if the abrasion, now having become an ulcer, becomes infected with dangerous bacteria, complete destruction of the eye may result. Indeed this is what happens in 80 per cent. of the cases in Egypt and Palestine.

The virulent effects of trachoma in a heavily trachomatised country are exhibited with great clarity by Wilson as the result of his examination of the inhabitants of a village, Bahtim, within some miles of Cairo. This village had 3,549 inhabitants, of whom 491 were absent and not examined; also 140 babies under one year old were excluded, and formed the subject of a separate study. It was found that 97.6 per cent. had trachoma, and 2.4 per cent. had acute conjunctivitis. Of the trachomatous subjects who had cicatricial changes in the conjunctiva 21 per cent. had ingrowing eyelashes, and 4 per cent. had been operated on already for this sequela. I have already referred to the danger to the eye of ingrowing eyelashes, so it is not surprising to learn that 5.5 per cent. were blind in one eye, and 1 per cent. blind in both eyes.

There is no reason to suppose that ocular conditions in other villages of Egypt, and in other countries where trachoma and acute ophthalmias coexist, differ very much from those of Bahtim. (See "Trachoma" by A. F. MacCallan. Butterworth and Co., 1936.)

Other Causes of Blindness in Tropical Countries

Small-pox used to exact a heavy toll of blindness in Egypt and in Palestine, but since the introduction of compulsory vaccination this has disappeared. In India and other oriental countries,
where vaccination is not universal, small-pox is still a fruitful cause of blindness.

The industrial causes of blindness, that is accidents in factories and workshops, are much less frequent in Egypt and India than in more highly industrialised countries, such as England, France and Germany, although with increasing industrialisation there is no doubt that they will increase.

In India a starvation disease called keratomalacia is a very common cause of blindness among young children in some parts. The conjunctiva becomes dry and greasy-looking, the cornea quickly undergoes ulceration, and blindness frequently results. It is due to a lack of the vitamins contained in milk, butter, and fresh vegetables. In the case of breast-fed babies the condition may be cured, if taken early enough, by giving the mother cod-liver oil.

Squint is a more frequent cause of blindness in the East than it is in European countries owing to the frequency of corneal opacity, which prevents the co-ordination of the two eyes.

Among conditions which cause blindness in tropical countries there are others which cannot be considered now, such as retinitis pigmentosa due to deficiency of vitamins in the diet, pyorrhoea which is a stimulus to iritis, and leprosy.

N.B.—It is particularly to be noted that blindness is much more common among a rural population than among town-dwellers.

The Means of Prevention

The means of prevention embrace many medical, sanitary and social measures, the value of which differs according to the geographical position of a country and the cultural standards of its inhabitants; also the causes of blindness differ in different countries.

I shall describe the means of prevention which exist in Egypt, and for which I have been largely responsible.

(1) Hospitals.—In 1903 Sir Ernest Cassel, who had financed the building of the Asswan Dam, created a trust fund of £40,000 "for the purpose of training Egyptian doctors in the special work of ophthalmology, in order that their poorer fellow-countrymen might be able to receive from them gratuitous advice and treatment for the all-pervading ocular diseases."

It was decided to create a travelling ophthalmic hospital under canvas where young Egyptian doctors might practise under the direction of a British Ophthalmic Surgeon, and I was invited to inaugurate the work. The success of the hospital was immediate, and its popularity was so great that it was frequently impossible to treat all cases; when this became known men suffering from
ingrowing eyelashes sometimes fought to get the next turn in the operating tent.

A second hospital was added in the following year, and in 1906, as the result of my advocacy, money was granted to build, equip and maintain two hospitals, one in Lower and one in Upper Egypt, and they all became part of the Egyptian Department of Public Health.

Later when credits for new hospitals could not be granted, I obtained an undertaking from the Government that credits for maintenance should become available for hospitals built by local effort in each of the fourteen provinces of Egypt. These hospitals were all completed before I left Egypt in 1924. The capital sums required were raised through my influence by subscription, or from the funds of the Provincial Councils.

The need for further means of ophthalmic relief in the densely populated country districts enabled me to organise several more permanent and travelling hospitals, entirely paid for out of local funds.

All the hospitals are staffed by Egyptian oculists, who engage in the practice of no other branch of medicine.

During his latter years the influence of His Majesty King Fuad the First gave powerful assistance to the campaign against blindness in Egypt.

The Ophthalmic Section of the Ministry of Health administers the hospitals, of which 25 have been specially designed and built, 15 are travelling hospitals under canvas, and 38 are ophthalmic departments of General Hospitals.

An immense amount of ophthalmic work of all kinds is carried out at these hospitals, where in 1934 approximately a million patients were examined, and 100,000 operations performed.

There has been no change in hospital policy since I resigned from the service of the Egyptian Government in 1923, and the present administration of the hospitals gives me great satisfaction.

It is especially gratifying to me that the system of hospital and school statistics which was introduced in my first printed Report in 1911 is still being used, and I have quoted from them several times in this paper. I wish to make my acknowledgments for this to the Under Secretary of State and the Director of the Ophthalmic Section of the Ministry of Public Health.

I have always insisted on the importance of establishing a hospital under the charge of an ophthalmic surgeon, as a preliminary to any campaign for the reduction of blindness and eye-diseases, wherever such is not already in existence. Its place can be taken, though less satisfactorily, by the ophthalmic department of a general hospital. It is to be understood that I am speaking about Eastern lands, where acute conjunctival affections
are so prevalent that patients suffering from them largely outnumber patients suffering from general diseases.

The ophthalmic hospital must be in the clinical charge of an ophthalmic surgeon who is prepared to undertake the diagnosis and surgical treatment of all diseases of the eye. My reason being that if the father of a family has ingrowing eyelashes causing pain and the gradual onset of blindness, and is unable to obtain relief at a hospital where a surgical operation can almost instantly cure him, he is not likely to pay much attention to the ocular disability of his little daughter who has a slight discharge from her eyes, caused by conjunctivitis, which at any moment may become acute and lead to ulceration and blindness.

It is to be noted that in the terms of Sir Ernest Cassel's original gift all treatment in the hospitals is entirely gratuitous, and is provided for the poor. Such persons who are in a position to pay for treatment are directed to the private clinic of the ophthalmic surgeon, which is not in connection with the hospital enclosure.

(2) Pathological and bacteriological work.—During the earlier years of the history of the hospitals the examination of pathological and bacteriological materials was carried out in small laboratories, one in Upper Egypt and one in Lower Egypt. Later a centralised laboratory and library were established at one of the hospitals near Cairo, which was built and equipped at the expense of my personal friends and of the ophthalmic surgeons who worked under my direction. This did excellent work until the opportunity presented itself of establishing a first-class laboratory where research work could be carried on in a more elaborate manner than had been possible before.

(3) Memorial Ophthalmic Laboratory.—The Imperial War Graves Commission decided to erect some Memorial to the men of the Egyptian Labour Corps and Egyptian Camel Transport Corps who gave their lives during the Great War, while serving with the Armies of the British Empire. I placed before the Commission the project of an ophthalmic laboratory which would serve the clinical and scientific needs of the Egyptian Ophthalmic Hospitals. Owing to the support given to my project by His Excellency the Prime Minister, a sum of £6,600 was granted. I then obtained a grant of land at Giza on the outskirts of Cairo from the State Domains Administration on which to build the Laboratory. This was situated adjacent to the new King Fuad the First Ophthalmic Hospital at Giza, which I had designed. I drew up the interior plans of the laboratory, which the architect incorporated in magnificent memorial form. I asked for and obtained a grant of £2,000 from the Ministry of Finance to equip the laboratory adequately with all the most recent instruments,
and arranged for the income of the Cassel Fund to be used for the maintenance of the laboratory and for the salaries of the staff; to this was afterwards added the interest of a trust fund established by the British Red Cross, and a grant from the Egyptian Government. His Excellency the British Ambassador is the trustee of the two funds and the administration is in the hands of the Ministry of Health of the Egyptian Government.

The success which attended the work of the laboratory is due to the appointment as Director of Dr. Wilson who publishes an annual report containing an account of the clinical researches on which he has been engaged, from which I have quoted several times in this report. In this he has the assistance of the pathologist, Major Stewart, formerly of the Indian Medical Service.

Besides the research and pathological sections of the work, the laboratory is the centre for post-graduate ophthalmic education, for which there are two courses every year. Between 15 and 20 doctors attend each course.

(4) Prophylaxis of blindness in day schools.—In countries where inflammatory affections of the conjunctiva are prevalent the inception of some form of regular treatment in day schools is of the greatest educative value. It teaches the pupil to become eye-conscious, and it is not only they who learn, but also the inhabitants of the home of each pupil.

There is a National Egyptian Committee for the Prevention of Blindness. The official Public Health organisation and the Egyptian Society for the Welfare of the Blind take a particular interest in the study of this question.

In 1907 I obtained permission to carry out regular ophthalmic inspection at a school of 464 boys, every one of whom I personally examined by eversion of the eyelids at the beginning and ending of each school session. The operative and medical treatment was carried out by an ophthalmologist on five days a week. The experience was of vital interest to both inspecting surgeon and to the local ophthalmologist. The value of the arrangement was soon recognised by the Educational authorities, and now 32 schools are inspected and treated. During the year 1934-1935 10,469 boys underwent inspection and treatment.

Although 98.67 per cent. were trachomatous, it was found that 95.18 per cent. had both corneae clear to the naked eye on focal illumination at the end of the school year, a satisfactory result of the year's work.

It may be noted that in spite of the ophthalmic campaign, which I inaugurated more than thirty years ago, practically all the boys in the Government Primary Schools show evidence of trachomatous infection. This universal incidence includes boys
who merely exhibit slight stigmata of healed trachoma (Trachoma stage IV).

It is correct to class as trachomatous every individual who exhibits any sign of active or healed trachoma, for in many cases it is impossible to state that an exacerbation or a fresh infection will not occur.

Since infection with trachoma occurs in the family, about 25 per cent. of children becoming infected before the age of one year, it appears to be a permanent scourge inflicted on the country, and the only thing that can be done by ophthalmologists and hospitals, is to minimise the ill effects of the disease, and prevent the occurrence of complications. The importance of sanitary measures in the prophylaxis of trachoma and in the prevention of the blindness due to it, will be discussed later.

(5) *Children's Dispensaries and Ophthalmic Welfare Clinics.*—Dispensaries for children, under the charge of qualified British nursing sisters were introduced in several towns in Egypt by the late Lady Cromer. They have been of the greatest value, in the treatment of general and eye diseases and in giving advice to mothers as to children’s diet.

During a period of reorganisation I had the pleasure of giving some help to the Committee of Management.

Two of these Children’s Dispensaries, one in Cairo (Madbouli) and the other on the road to the Pyramids (El Haram), are managed by a Committee of British ladies, and are staffed by British Nursing Sisters.

The Children’s Dispensaries in the Provinces are administered by the Provincial Councils under the direction of the Mudir or Governor of the Province. They are managed by Egyptian Nursing Sisters (Hakimas).

(6) Other hospitals where eye treatment is carried out in Egypt are numerous, such as the Cairo Hospital of Kasr-el-Aini, the ancient Qalaoon Hospital also in Cairo, the Church Missionary Society’s Hospital in Old Cairo, the Municipal Hospital of Alexandria, and some others.

(7) There are many classes of social work which can be carried on by non-medical organisations which are calculated to aid in the prevention of blindness in tropical countries.

Such work is carried on by the Indian Red Cross and by its Junior branch. Great credit is due to those who give their time or money to the work of these or analogous organisations in other countries. 

*The International Association for the Prevention of Blindness* is of great importance, but I can only refer to it briefly. The main-spring of the Association for eight years has been Professor de
Lapersonne, and now Dr. Bailliart is giving his time, and using his undoubted genius for the same object. The Association is extremely fortunate in having the services of Dr. A. Churchill as Associate Secretary General; it is difficult to imagine a more efficient or more agreeable officer.

La Ligue contre le Trachome was founded by Morax and Nicolle, whom we have no longer with us. Again Dr. Bailliart has undertaken the care of La Ligue, with the help of Dr. Paul J. Petit. Its publication, La Revue Internationale du Trachome has also become the organ of the International Organisation against Trachoma, and is exerting a great influence throughout the ophthalmic world in reducing the loss of visual acuity due to trachoma.

There are other branches of social work which are of great value which will be dealt with by other reporters, but with which I have no personal experience.

(8) Treatment in remote districts by non-medical assistants.—The value of children’s dispensaries conducted by qualified nursing sisters has already been noted; some allusion must be made to the allocation of native-trained hospital attendants to remote country districts. The idea is that such men should be supplied with simple lotions and eye drops, and receive some instruction in first aid treatment for acute ophthalmias and for cases of trachoma. I can imagine that they would be of some service if they were kept under rigorous discipline by the frequent inspections of an ophthalmologist, and provided that they had not a number of extraneous duties to perform. The difficulty is that such men can with difficulty be prevented from claiming backsheesh for their services, and if they meet with any success they set up as eye-doctors, if not as physicians.

(9) Sanitary measures.—By the application of modern sanitary measures, such as are known in rich and highly civilised communities it would be possible to reduce the incidence of blindness in tropical countries to a tenth of the existing figure. Such measures would include good dwelling accommodation, a water-supply and the provision of latrines and drainage. Imagine how possible it is to envisage these at some village in Southern Palestine, at El Deir opposite the Temple of Abu Simbel, at El Badari opposite Assiut, or at some village in the plains of Central India!

In places where ophthalmias are now prevalent: where water is scarce, where dwellings are mere mud huts; and where neither latrines nor any system of drainage has ever been heard of, the suggestion of making sanitary improvements at the present day sounds fantastic.
Yet without such sanitary improvements no amount of medical aid, whether by hospitals or dispensaries, will make any marked impression on the incidence of blindness, nor on the liability of the children to contract trachoma at an early age.

**Conclusion**

The value of the ophthalmic campaign in Egypt may be judged by the percentage of persons, blind in one or both eyes, who present themselves at the hospitals and crave treatment.

**Yearly percentage of blindness among the patients of the Egyptian Government Ophthalmic Hospitals**

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<tr>
<th>Year</th>
<th>Percentage of blindness in one or both eyes including cataract cases</th>
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<tbody>
<tr>
<td>1911</td>
<td>19.2</td>
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<td>1912</td>
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In the year 1911 this percentage was 19.2; it has been gradually reduced, until in 1935 it was 6. So that in less than a quarter of a century the percentage of blindness among hospital patients has been reduced by nearly one third.

I therefore think that the system adopted for the Egyptian Ophthalmic Campaign has been justified by results.