husbands about 1 in 20 foetuses will suffer from haemolytic disease. The proportion of affected infants will increase somewhat with successive pregnancies. Once a woman has become immunized to the Rh factor all her subsequent Rh-positive children will suffer from haemolytic disease. If her husband is homozygous Rh-positive—that is, if he has received the Rh or D factor from both of his parents—then all the children will be Rh-positive (and therefore affected by the disease), whereas if the husband is heterozygous Rh-positive (having received the Rh or D factor from one parent only and the Rh-negative or d factor from the other parent) then any subsequent child has equal chances of being Rh-positive and affected or Rh-negative and healthy.

If any child of the couple is known to be Rh-negative this shows the husband to be heterozygous. Tests carried out on the husband's blood alone can never show with complete certainty whether he is homozygous or heterozygous, but they can do so with a high degree of probability. Where, therefore, an Rh-negative woman has become immunized to the Rh factor and there is a desire to increase the family, the Rh genotype of the husband should be determined. The necessary test requires the use of scarce and valuable kinds of antisera and can be carried out only at regional transfusion centres and a few other laboratories.

The above paragraphs have been written as though the Rh or D factor were the only one responsible for haemolytic disease of the newborn. In rare cases other Rh antigens, the A and B antigens, and antigens of other blood-group systems may be responsible. Where such cases are detected the medical officer in charge of the testing laboratory will readily give the necessary advice on such matters as prognosis for future pregnancies.

It is well known that Rh-negative persons should, in general, be transfused only with Rh-negative blood. If they have become immunized to the Rh factor by pregnancy or transfusion, any further transfusion of Rh-positive blood may be fatal. It is unnecessary to alarm such persons regarding their "condition," but they must be warned always to carry their blood-group cards and to proffer these when entering hospital for any reason.

Next article on Clinical Pathology.—"Investigation of Outbreaks of Infection," by Dr. R. E. O. Williams.

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OPHTHALMIC SURGERY IN INDIA SOME ENCOURAGING FEATURES*

BY

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A visit to India was organized in 1951 by Dr. R. U. Hingorani, an Indian ophthalmic surgeon practising in London. It was primarily a pleasure trip, a sight-seeing tour, but as the party was composed mainly of medical consultants and their wives, with a core of European ophthalmic surgeons, medical conditions aroused most interest, especially the efforts made to remove that great affliction of India, disease of the eye.

The amount of suffering in India is appalling, most of it preventable. This is not surprising, for there is a great shortage of trained medical personnel. A recent estimate states that there is only one trained doctor for

every 10,000 of the population, as against one for 900 in Great Britain. In addition, the doctors are poorly distributed, being congregated mostly in the towns. Facilities for the application of modern scientific medicine are lacking, and there still exists a good deal of native prejudice. Quacks abound. Some have a useful knowledge of Indian herbs and a skill in their application, passed on from father to son, but many indulge in superstitious practices concerned with the exorcizing of demons or the placating of evil spirits, practices which are often both crude and cruel. A man in any walk of life may pick up something about cataract extraction, set up in practice, and soon acquire a reputation as an eye specialist. Government intervention is not yet considered necessary, but it must come sooner or later.

Living Conditions

Poverty abounds. Most of our party had to revise their conception of the meaning of the word "poverty." In some of the refugee camps human beings were seen with scarcely a roof to cover their head. In the village huts we visited there was sometimes little else than some cooking utensils, a few fowls, and a receptacle to hold the family's supply of rice for the year.

With poverty go overcrowding and malnutrition. In the city of Bombay some 200,000 people sleep on the streets. This is partly a matter of choice owing to the heat, but is also partly due to the fact that many have little more than an accommodation address, a room which 20 or more people use to hold their worldly possessions while they eat and sleep on the streets.

Rice is the staple food; indeed, it is almost the only one, with resulting lack of balance in diet and deficiency disease. The fields given over to the cultivation of rice may provide excellent breeding grounds for mosquitoes and the spread of malaria.

A feature of Indian life that strikes the stranger forcibly is the lack of adequate attention to sanitation. Large cities like Calcutta still have open sewers in the streets, and cows are allowed to wander about unmolested even in the main thoroughfares. Some of the villages we visited were quite unprovided with streets, lighting, and sanitation, so that the spread of epidemics in the time of the monsoons can scarcely be avoided.

Finally, there is still to be found the secluded life of many women living in purdah. This system intensifies the lack of medical attention for women and children, and thus leads to needless suffering. A recent estimate gives the expectation of life for an Indian woman as 27 years as against 67 in Great Britain.

It is not my purpose to dwell on the lethargy, poverty, ignorance, and superstition of India. Rather do I wish to draw attention to some signs of an awakening to the need for action which is going on, particularly among Indian doctors. The Government also is becoming more alive to the need to do something to remove the great scourge of disease from India.

The most serious medical affliction is tuberculosis. Next comes eye disease; and here most authorities agree that at least 90% of it is preventable. I shall refer to one or two encouraging features in the ophthalmological field.

The Gandhi Eye Hospital

The Gandhi Eye Hospital is in Aligarh, a Moslem university town of 140,000 inhabitants, in the State of Uttar Pradesh (formerly United Provinces), 84 miles south-east of Delhi. The hospital has 100 beds, and plans to increase the number to 250. It began in 1928 as the private clinic

*A lecture delivered in the Department of Ophthalmology, University of Glasgow, on May 14, 1952.

of a public-spirited Indian, Dr. Mohanlal, who developed the work on a voluntary basis, and in 1941 handed over the assets to a public trust. Since then the hospital has been rebuilt, partly by voluntary subscription and partly by Government grant, and now stands on a new site covering 16 acres. With only 100 beds, extra accommodation has to be found sometimes for as many as 300 patients; and in winter some 500-600 patients may have to be provided for by means of extra tentage. Winter is the best time for cataract operation. In summer it is too hot, patients are restless, there is a constant battle against flies, and infection is more likely. In summer patients with diseases such as trachoma are more likely to find their way to the operating theatre. The hospital building is new and is provided with much up-to-date and expensive equipment. There are separate departments for refraction, radiotherapy, orthoptics and optical dispensing.

The staff consists of one chief medical officer, four ophthalmic surgeons, three assistant ophthalmic surgeons, two refractionists, one laboratory assistant, and several compounders, theatre assistants, and ward boys. Female nurses are conspicuous by their absence, for nursing is regarded as an unsuitable occupation for a girl of education or social standing.

The following figures show the yearly amount of work carried out:

New patients	20,000
Total patients	80,000
Refractions	5,000
Operations	6,000

The patients bring their own food and linen, with someone to look after them. Those who are too poor (10%) get free food. Private patients are provided for; these pay 100 rupees (£7 10s.) for treatment and lodging.

The cataract operations in the height of the season number 60 a day. One surgeon generally operates, with three or four tables. The usual mode of extraction is the intracapsular.

The hospital is intended to be the centre for postgraduate study and for research. The most significant feature of this hospital, however, is its interest in rural work and its use of the mobile eye hospital. To appreciate the significance of this it is necessary to know something about the district in which the hospital is situated.

Uttar Pradesh is one of the most important States of India. It is right at the heart of the country—Hindustan of the old Moslem chronologers. It includes important cities like Agra, Aligarh, Lucknow, Allahabad, and Benares. Together with Delhi on the west and Patna on the east, it represents the area of the dawn of Indian history. There Brahminism took form; Buddha was born, preached, and died; the Mogul Dynasty had its most brilliant period; the Indian Mutiny took place, with the establishment of British dominion; and there also New India has more recently taken shape. The State has an area of over 106,000 square miles and a population of some 60 millions.

Before 1930 the facilities for the treatment of eye disease in this Province were meagre indeed. Eye cases tended to find their way to the district general hospitals, the State being divided into 51 districts. There they were seen by the civil surgeon, and treatment was mostly operative. At Agra and Lucknow there were medical colleges, each with an eye department, and at Allahabad there was a hospital where a limited number of eye patients were treated. In addition, in winter a well-known Indian eye surgeon used to hold eye camps where mass surgery was done. The great majority of eye patients were at the mercy, however, of village quacks or couchers.

Around 1930 in Uttar Pradesh there developed two eye hospitals, one at Aligarh and the other in Khairabad. This latter hospital has also recently been rebuilt, and is now at Sitapur. Both these hospitals set out to do village work, and in 1949 the Government approved of a State-wide scheme with them as base hospitals.

In the area allotted to the Gandhi Eye Hospital it is intended that in, say, 15 years each district will have an eye clinic in charge of a properly trained eye specialist. Meantime, however, a short-term policy provides for four mobile eye hospitals. Each of these will have 100 beds, a field operation theatre, and accommodation in tents for staff and patients. Except in the hill areas, work will be done mainly in winter. The hospital will visit one district for six to eight weeks and remain in one centre for, say, 20 days. There will be a permanent staff, with visits from the surgeon of the Gandhi Eye Hospital, and use will be made of Government medical officers and local eye specialists.

The proposed personnel will still be woefully short for such a vast area, but the step taken is considerable and is in the right direction. It will help to break away from outmoded and pernicious eye camps, which, while popular with the people and the Government, have not been run on scientific lines. It will provide for the treatment of eye disease apart from cataract. It will educate the people regarding the prevention and control of eye disease, develop an eye consciousness in school health administration, and break down much prejudice against scientific treatment.

At present eye disease and consequent blindness in the countryside are said to be increasing day by day, so this scheme is a welcome effort to tackle an enormous and serious problem.

Experience in Bombay Province

A well-known Indian ophthalmic surgeon has classified his colleagues into three groups: (a) mass surgeons, (b) scientific surgeons, and (c) occasional surgeons. That classification implies that mass surgeons are not scientific surgeons, and the statement was no doubt true when it was written. In recent years, however, there has been a growing concern in the highest quarters about mass-operation camps, and steps are being taken in some parts to place these camps on an irreproachable basis.

In Bombay Province, for example, the surgeons have become concerned about the advent of outsiders with a medical training, but no training in ophthalmic surgery, who stay for three or four days and conduct a large number of operations for cataract. The cases are then left in the hands of compounders and much sepsis results. In spite of their shortcomings such camps are welcomed by the people, who are often satisfied if they can see even a little again.

The ophthalmic surgeons in Bombay approached the Government to see what could be done, and at once received the challenge, "What can you do to help?" The outcome was the establishment of two camps yearly by the surgeons themselves—one in April and one in October—alternating between the northern and southern parts of the province.

A school or military barracks provides a suitable building for the requirements of the camp. When we visited the province in November one such camp had just finished at Pandharpur, and for some details I am indebted to Dr. Pradhan, of Poona, who took part.

The staff of this camp consisted of two senior surgeons, two assistant surgeons, three postgraduate students, and two additional surgeons from the district. One of the senior surgeons of Bombay was in charge.

An attempt was made to get all patients examined first by local Government doctors so that undesirable cases could be weeded out. When the camp began all the staff devoted the whole of the first day to seeing out-patients. Those with less than a certain standard (6/60 Snellen) were generally admitted. On the second day one-half of the staff operated in the forenoon while the other half saw patients; in the afternoon the order was reversed. Operations went on for four days and then stopped.

The patients were given a careful examination, attention being paid to teeth, lacrimal ducts, blood pressure, and urine,

and the usual dark-room investigation was done. On admission the patient was given a brisk purge; until operation the eye was washed and penicillin drops, 2,500 units per ml., were instilled three times daily. 5 ml. of milk was injected intramuscularly—a non-specific protein therapy which increases leucocytosis. On the operating-table penicillin drops were instilled and 50,000 units injected subconjunctivally in 0.5 ml. of solution before or after the operation. Sulphadiazine tablets were also given for four days. Forty-eight hours after the operation the eye was dressed; if it was satisfactory the other eye was left uncovered. The dressing was repeated every second day and dark glasses were given on the eighth day. Intracapsular extraction was generally done for immature and hypermature cataract; for intermediate types the surgeon used his own discretion regarding the best method of procedure.

This project is financed by the Government. Glasses are supplied free, lodging is free, and the patient's rail fare is paid if necessary.

The following is a brief summary of the work done and the results achieved:

Total No. of out-patients	..	..	3,372
" " " in-patients	..	..	845
" " " operations	..	..	1,084
" " " cataract operations	..	..	676

Of the 676 cataract operations, only 40 showed any post-operative complication, and only four eyes were lost—one from sepsis and three from intraocular haemorrhage. Such results would adorn the records of ophthalmic surgery anywhere.

A High Standard

The ophthalmic surgery is of a very high standard in the leading eye hospitals. In Bombay I had more time to see the hospital work than elsewhere, but members of our party had an opportunity of seeing similar work in Calcutta and Patna; and, as is well known, Madras has been an important centre of ophthalmic surgery for many years. The standard of cataract work in the leading eye hospitals in Bombay is very high indeed, and the results of the keratoplasty work are most encouraging. In a land where corneal opacities are so numerous there must be great scope for grafting, and it will expand in the near future if grafting material becomes more readily available. In Bombay research is being pursued with considerable success.

Eye surgery would seem to be handicapped at present by lack of personnel and lack of finance—both dependent, no doubt, on the general economy of the country. Another difficulty, and one which should be easier to overcome, is the apparent scarcity of surgical instruments of high quality. It should not be impossible to produce one or more Indian firms capable of manufacturing and maintaining ophthalmic surgical instruments adequate in quantity and quality.

Finally, it was a pleasure to meet with so many Indian colleagues, to discuss their problems, and to appreciate their work. There is still much to be done, and signs are not wanting that the magnitude of the task is appreciated and that a bright future lies ahead.

PRESENTATION TO PROFESSOR CHARLES SINGER

Professor Charles Singer has for many years been the leading historian in this country both of medicine and its allied sciences and of technology. When, therefore, the project was mooted of presenting him with a volume composed of a series of special contributions written by his friends and admirers, it met with an enthusiastic response. The responsible and difficult task of collecting and editing the contributions was undertaken by Dr. Ashworth Underwood, and to him must also be given the credit for arranging the various essays into groups having a similar theme or dealing with a definite period. The 90 contributors represent many countries, and the work has been published by the

Oxford Press in two excellent volumes, and entitled *Medicine, Science, and History*. It was arranged that specially bound copies of the two volumes should be presented to Professor Singer at Fowey, which is fairly near his home, and on December 19 the presentation took place at the end of a luncheon which was given in his honour. Among those present were his talented wife, Mrs. Dorothea Singer, Professor Gordon Childe, Professor K. J. Franklin, Dr. F. A. Freeth, Mr. Affleck Greeves, Dr. C. T. Andrews, Mr. Douglas McKie, Dr. Ashworth Underwood, and Professor Singer's son and daughter. The occasion was to have been presided over by Sir Arthur MacNalty, but in his unavoidable absence Sir Zachary Cope deputized for him. A special menu card had been prepared which included a photograph of Professor Singer and also sketches of the four places

[George W. F. Ellis, Dodman

Professor Singer receiving the presentation volumes from Sir Zachary Cope.

with which he had been most closely associated, while the different items on the menu had been given names which recalled many of the subjects on which he had written with authority. Dr. Underwood read out many messages of congratulation sent by friends who had been unable to make the journey to Cornwall. In making the presentation to Professor Singer, the chairman said that it was a unique occasion. Never before had any celebrated medical historian received in person such a noteworthy testimony of the high regard in which he was held by his contemporaries. He recalled that they were both alumni of St. Mary's Hospital medical school and that they had been house officers in the hospital together. In handing to Professor Singer the sumptuous volumes, Sir Zachary remarked that they were accompanied by the great respect, admiration, and affection felt towards him, not only by the whole body of contributors, but by a much wider circle of admirers over the whole civilized world.

Professor Singer, who was much moved by the occasion, said that it was the happiest day in his life. He commented on the factors which enabled him to accomplish what he had done. First the influence of his home, for his father was a great scholar and an erudite man, and from his earliest years he had lived in an atmosphere of learning. Among colleagues who had helped him he specially mentioned the late Professor Arthur Platt. He finally paid a glowing and affectionate tribute to his wife, Mrs. Dorothea Singer, who was not only a distinguished scholar in her own right but had inspired and helped him to an incalculable degree. This unity of endeavour was signally shown in his closing sentence: "We thank you from the bottom of our hearts."

Tributes were afterwards paid to their honoured guest by others who were present. Professor Singer is 77 years old.