DISTRIBUTION OF BLINDNESS AMONGST ABORIGINES
MORE THAN 60 YEARS OF AGE.

COVERAGE OF AUSTRALIA BY NATIONAL TRACHOMA AND

The Royal Australian College of Ophthamologists.
NATIONAL TRACHOMA & EYE HEALTH PROGRAM

The Royal Australian College of Ophthalmologists.
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ERRATA

Page 16: Second column, fourth last line — "Interpretation" should be "Interaction".

Page 20: First column, last line — "who" should be inserted after "those".

Page 26: Caption headings — "Figure 1" should be "Figure TOC 1"; "Figure 2" should be "Figure TOC 2"; "Figure 3" should be "Figure TOC 3"; "Figure 4" should be "Figure TOC 4"; "Figure 5" should be "Figure TOC 5"; "Figure 6" should be "Figure TOC 6"; "Figure 7" should be "Figure TOC 7".

Page 28: Second column, first line — "with trachoma follicles" should be deleted.

Page 112: Figure 6 caption should read — "Discharge from a case of chronic otitis media (wet perforation)"

PREFACE

It now seems a long time since the Council of The Royal Australian College of Ophthalmology resolved on 12 April 1975 that Professor Hollows be asked to advise on the feasibility of the College organizing a campaign to eliminate trachoma in Australia.

So many people have been examined in so many places, so many given medical and surgical treatment, so many spectacles prescribed, so much statistical data compiled, so much money spent and now so many words written in this report.

With the fullest co-operation and financial support (now exceeding two million dollars) of the Commonwealth Government, the National Trachoma and Eye Health Program was established by the College with a three-fold purpose —

(i) the presentation to interested agencies of the state of ocular health of people living in rural Australia;

(ii) the provision of immediate eye care to these people; and

(iii) in the light of the experience gained in the above, consideration of the establishment of ongoing eye care programs and the training of medical, paramedical and interested lay persons in the skills necessary to provide eye care in rural Australia.

The following report more than adequately deals with the first two of these objectives and outlines the College's views on what should be done in respect of the third.

The findings of the Program published here reveal the extent and incidence of trachoma and other eye health problems in the outback; they also highlight dramatic disparities between the general health situations of different groups in the Australian rural population. Recommendations are made to guide and promote the type of direct activities which could rectify these problems.

To conduct the NTEHP and compile this report has required an enormous effort by a great number of people. Foremost amongst these is a man of great humanity and unlimited enthusiasm — Frederick C. Hollows, Associate Professor of Ophthalmology, University of New South Wales. He has been remarkable for his unerring dedication to the task and his qualities have been an inspiration to all who have been associated with him in the Program.

Those involved in the Program are too numerous to name individually. They include the eighty or more ophthalmologists who went voluntarily to the outback to participate in the campaign; the orthoptists, nurses, optical dispensers, microbiologists and others who supported them; and then those who drove trucks, performed clerical duties or helped in other ways. On many occasions the field teams worked without time off for weeks on end and, in doing so, provided a coverage of rural Australia unmatched by any previous health exercise. The thanks of the College go to them all.

To the Commonwealth, State and Territory Health Officers who helped the Program in many different ways during the last three years, we also express our gratitude. Without their co-operation the Program could not have been fulfilled.

Of the Program's staff, special reference must be made to the efforts of Dr. David Moran, Misses Rosie Denholm, Susan Bennett, Ken and Rose Murray, Trevor Buzzacott, Sister Marjorie Baldwin, Penny Cook and Gabi O'Sullivan and Messrs Gordon Briscoe, Jack Waterford, and Dr. David Jones of the N.S.W. Health Commission. Though tempted to name more, the only Fellows of the College besides Professor Hollows to be publicly thanked are Dr. W.E. Gillies, the Chairman of the College's NTEHP Committee, and Dr. Hugh Taylor, who did so much of the field work.

From its inception, the work of the Program has been aided by the guidance and participation of the Aboriginal people whose advice was actively sought at every stage. The unique rapport the Program achieved with Aborigines was largely due to this input.

Finally, it should be stated, the College sincerely hopes that the various governments of Australia — Commonwealth, State and Territory — will give serious consideration to the recommendations made in this report. There is much to be done and we look forward to their continued co-operation. If we are to eliminate trachoma and other health problems associated with the outback in the foreseeable future, a concerted large-scale effort must be made.

In this regard, The Royal Australian College of Ophthalmologists is anxious and willing to do all it can to assist in this great national task.

Geoffrey Harley
President
The Royal Australian College of Ophthalmologists

November 1979
Trachoma in Australia
The Development of the NATIONAL TRACHOMA and EYE HEALTH PROGRAM

Trachoma has been endemic in Australia from at least the last part of the 18th century, originally affecting both whites and blacks.

Whether it was present in Aboriginal communities before the European settlement of Australia in 1788 is still a matter for debate, although there is some evidence to suggest that it might have been, perhaps introduced by earlier visitors to the north of Australia, such as the Chinese, Japanese, Macassans and Indonesians.

The first description of Aborigines by a European, William Dampier, in 1688, suggests that Aborigines in the Kimberleys region, on the north coast of Western Australia, may have had eye problems.

"They have great heads, round foreheads and great brows . . . their eyelids are always half-closed to keep the flies out of their eyes". 1

Among the early settlers, however, trachoma called "Sandy Blight" was endemic and frequently led to serious visual loss. There is little doubt that the early explorers, and the pastoralists and miners who followed them, had the disease. The pressures placed on Aboriginal communities by settlement, especially when large groups of them formed into settlement communities, probably caused the disease to flourish.

While trachoma, the frequently blinding "Sandy Blight", was well known to medical practitioners and ophthalmologists at the time, the transfer of the disease and its disastrous effects on Aborigines passed largely unnoticed.

As living conditions improved for Europeans, the disease gradually began to disappear. Increasingly, the only signs of trachoma encountered among Europeans were scarring among the older people. The disease began to abate firstly in eastern Australia, the first area to be intensely settled by Europeans and the first to develop health amenities capable of warding off infectious diseases. In the less-settled parts of Australia, especially western NSW, Queensland, the Northern Territory and the arid and Kimberley regions of Western Australia, the disease persisted well into the 20th century.

Although trachoma had been occasionally noted among Aboriginal communities beforehand, there was very little understanding of its extent or effects until the early 1940's when Father Frank Flynn, an ophthalmologist who had had extensive experience with trachoma from his work at the Moorfields Hospital in London, was posted to an Australian Army hospital at Alice Springs.

In his first surveys into the extent of the disease, Father Flynn found that up to 90 per cent of the Aboriginal population of the Centre had some signs of the disease, many in severe form, with up to 7 per cent being blind in one or both eyes.

Father Flynn established a treatment program using sulphonamide drugs and eye ointments.

After the war he remained in the Northern Territory and continued his surveys, working with the Commonwealth Department of Health. Over the next 10 years, he surveyed the whole Territory, seeing about 10,000 Aborigines.

He found little difference in prevalence of trachoma between the Centre and Top End (some communities in the north having up to 84 per cent of their population with some trachoma signs), but striking differences in the course the disease took as one moved from the Alice Springs area to the Top End.

In the dry and arid Centre, cataract 
estages of the disease were fre-
quently severe causing visual loss; as 
one went further toward the more 
tropical north, a smaller percentage 
of severe cataract cases were found, 
with fewer being blinded or suffering 
substantial visual loss.

Father Flynn identified some of 
the factors associated with this trend 
as being the presence of secondary 
infection, aggravating the course 
of trachoma, and the climate, which 
led to irritation of the conjunctiva 
and cornea; particularly the drying 
effects of low humidity, heat, wind 
and dust.

In the Eastern Goldfields region, 
about 58 per cent of the Aboriginal 
population seen had trachoma; al-
most 70 per cent of the children 
had follicular disease, while about 
47 per cent of those affected were 
blinded by it.

Taking into account other eye 
conditions leading to blindness, more 
than 3 per cent of Aborigines and 
part-Aborigines she saw were blind 
in both eyes, with a similar proportion 
blind in one eye. The figures were 
much higher in the Kimberleys, but 
decreased in the south and southeast-
west. The overall white blindness 
rate was about 0.2 per cent.

After the pioneering work of 
Professor Mann and Father Flynn, 
other ophthalmologists entered the 
field, including Dr. M. Moore, in South 
Australia, and Dr. Tom Boyd-Law 
in NSW, and gradual action was taken 
by the authorities. Programs were 
devised to identify and treat sufferers, 
particularly in schools; mobile 
trachoma nurses were appointed to 
travel in some of the endemic areas 
organising treatment and educational 
programs; some money was permitted 
for microbiological research into the 
trachoma organism.

In general, however, progress was 
very slow, with some workers feeling 
that any improvement was more 
attributable to gradual improvements 
in living conditions than to medical-
treatment programs. Public aware-
ness of the problem, especially in 
the cities, was low, as was public 
and political willingness to commit 
funds to health programs and to 
further material improvement in living 
conditions of Aborigines.

Professor Mann had always argued 
strongly that the disease would only 
be eliminated after a substantial 
investment was made to improve 
living conditions for Aborigines. 
In his article reviewing the trachoma 
situation in Australia in 1972 he said: 
"It has become increasingly clear 
that only by raising the standard of 
living of the Aborigines can the 
disease be controlled. This appears 
impossible at the moment for the 
following reasons: a lack of trained 
personnel; a lack of funds; a lack 
of understanding of the Aborigines' point 
of view and the fact that most Aust-
ralians are town dwellers and are 
hardly aware of the problems of the 
Aborigines.

The problem of trachoma control 
in Australia is only one facet of the 
complex native problem which is 
in Australia is only one facet of the 
complex native problem which is 
the theoretical framework of the 
now-spread existence of trachoma and 
some of the problems faced in 
other territories which are similar. 
In the late 1960s and early 1970s, 
the Northern Territory to assess the 
overall status of Aborigines and to 
treat those with surgically correct-
able eye problems. Later that year, 
Professor Hollows made another trip 
to the Wave Hill and Hooker Creek 
area, where he confirmed the wide-
spread existence of trachoma and 
operated on a number of people.

The visits, like the work of Professor 
Father Flynn and Dr. Moore, did much to spell out 
the importance of the N.T.E.H.P. program fully, 
demonstrating that it was possible to 
examine large numbers of people in 
their own communities and to organ-
ise and run this program of trachoma 
control in communities. The visits 
led to calls for extensive surgical 
treatment of trachoma, with programs 
to treat and surgically relieve the 
disease, as well as improve the 
environment.

Professor Hollows was also con-
ducting field work at trachoma 
outbreaks in Eungella in Western NSW, and, 
at the suggestion of Professor Max 
Kamien and Barrie Jones, undertook 
taking treatment trials of Co-tri-
methoxypyrrolidine, (topical 
therapy, screening for eye disease. Of 
more than 1,000 children examined 
for signs of follicular trachoma, 
prevalence rates of up to 80 per cent 
were found.

The Development of the 
National Trachoma 
and Eye Health Program

In early 1975, the then executive 
secretary of the Australian College of 
Ophthalmologists, Mr. Jim Fair, 
had a discussion with Senator 
Peter Baume, a Liberal Senator active in 
health issues, in Canberra, during which Senator 
Baume said that private doctors should 
demonstrate their commitment to 
public health by action rather than 
words. He suggested that the college 
could involve itself in a project to 
tackle trachoma and trachomatous 
blindness among Aborigines.

Mr. Fair took the suggestion to 
the council of the college which re-
commended it. He then asked Mr. Fair to discuss its feasibility with 
Professor Hollows.

About that time, the then Min-
ister for Health, Dr. Eric Emmanuel, 
asked his department to prepare 
an analysis of trachoma in Australia 
and which could be taken 
action. This came after comments 
by a leading worker in Aboriginal 
health, Dr. Des Coe-Kabbe, about the 
high levels of trachomatous blind-
ness in the Northern Territory.

By the beginning of this decade 
however, the political climate for 
change was beginning to emerge, 
and the need for action was 
recognised. Professor Hollows and 
Professor Mann, at the 
federal government's request, 
toured the Kimberleys in 1975. 
He found that the disease had spread 
throughout the whole 
Aboriginal population.

The Federal Department of 
Health had prepared a plan for 
a national survey of the ocular 
health of rural Australians, particularly 
Aborigines, in 1976. The 
formation of the National Trachoma 
Treatment Model for the 
Northern Territory, based on the Wave Hill and 
Hooker Creek areas, 
was quickly realised that the project 
should be organised through the 
college rather than an ophthalmology 
department of a university because it 
would then have access to volunteer 
help from ophthalmologists through- 
out the country.

In early 1975, a full-time 
organiser, Ms Rosie 
Denholm, was engaged by the 
college rather than an ophthalmology 
department, to help draw up the 
final plans. The Department of 
Health had agreed to sound out each of 
the various State health authorities 
and had met with them, but 
agreed on the absolute importance 
of such consultation and of 
knowing more about the Aboriginal 
communities to be visited.

The proposal was approved in 
principle by the Department of 
Health and its Minister, but formal 
approval for funding was seriously 
delayed by the constitutional and 
political crisis in Canberra. The De-
Planning for fieldwork began in January, 1976, with the understanding that the first clinics would be held in New South Wales in April. Equipment and supplies for field teams were ordered, and educational and publicity material prepared.

A short visit by program staff to Walgett in north-west NSW in March, with a NSW Health Commission team, helped set the pattern for future clinics and develop techniques for examining large numbers of people. By then it was obvious that large-scale fieldwork in NSW would be impossible because of widespread flooding in the west of the State, and predictions of further flooding in the south west.

After consulting the South Australian Department of Health, the program decided to begin its fieldwork in South Australia, rather than wait for the flooding to ease in NSW. The assistant director of the program, Mr. Gordon Briscoe, and the program epidemiologist, Dr. David Moran, went ahead of the team to liaise and consult leaders of the communities the program hoped to visit, and to employ liaison officers to inform people of the purpose of the program and how it would work. An itinerary was prepared, the team arrived in Adelaide on May 19, and after collecting vehicles from the Department of Administrative Services, arrived in Port Augusta on May 20.

The Aboriginal flag represents the black people moving over the red sands of Australia, under a golden sun. It symbolizes for Aboriginal people their aspirations for national unity and improved status and health. The N.T.E.H.P. adopted the flag as its masthead, modifying the ‘sun’ into an eye, a symbol for better vision to all.

The final title of the program — the National Trachoma and Eye Health Program — was suggested by the college council in March. The title was chosen to emphasise that the team was providing a total eye-care service, as well as looking for and treating trachoma.

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Fieldwork resumed in the Northern Territory in late September, with two teams working radially from Alice Springs where an office had been established to co-ordinate activities. After covering settlements, outstations and cattle properties in Central Aust-
ralia, the teams moved north, holding clinics at Katherine, Pine Creek and southern Arnhem land, travelling as far eastwards as Borrooloola, then working southwards back to Alice Springs.

In two-and-half months of field-
work in the Northern Territory, the teams visited more than 50 comm-
unities and examined more than 6,500 people.

In November, again following close consultation with the Piljinjarratjara Council, an army surgical exercise was held at Amata, where some 41 Piljinjarratjara people had eye operations. The technique of bringing in the army to deliver surgical treat-
ment in the area where people lived proved an outstanding success.

In early December, two field teams left Alice Springs for Sydney, trav-
elling via Queensland and holding clinics in several far-western comm-
unities in that State, including Cam-
bowal, Bourke and Dujaara. These clinics confirmed the presence of trachoma in these communities.

Three teams also held clinics at Mereen and Toomelah, in northern NSW, before returning to Sydney last Christmas. Meanwhile, a third team had returned from Alice Springs via South Australia, review-
ing the way patients who had had operations, and holding clinics in sev-
eral western NSW towns, Menindee, Wilcannia and Kumbia.

After the second team had confi-
dently moved into the country of the Northern Terr-
itory, visiting cattle stations such as Wishart (near Katherine), and Abor-
iginal settlements such as Lajamanu (founded in 1971), the team moved northwards to Darwin, where it was used as a base for the completion of screening in the top end of the Territory. With poor road links between mainland communities, and screening carried out in such offshore communities as Bathurst Island, Elcho Island and Gove, extensive use was made of air transport, both commercial and chart-
er, during this period.

Through much of this area, the program worked in three teams and during the three months until the end of September, the teams saw about 12,000 people in 99 comm-
unities. Concurrently, a surgery exer-
cise was held at the Darwin hospital and also at Port Keats.

The first of a two-phase campaign in the Eastern Goldfields and Mur-
chison areas of Western Australia was carried out, with 4,500 people being treated, with 60 Aboriginal heath workers and 200 students being employed over the period.

Two teams left Darwin at the end of September, each working their way to the north-west, and four had been established.

A third team, disbanded with the medical personnel flying to Alice Springs for a surgery exercise, after-
wards conducting a review clinic in the south-western area before rejoining one of the screening teams at Mount Isa. One team travelled west to Borrooloola (rescreening the children and reviewing the adults previously found to have eye problems), Doom-
adgee and towns centred around the bottoms of the Gulf of Carpentaria,
Burketown, Normanby and Croydon: the others were visiting the Cloncurry, Croydon and Cloncurry areas, travelling as far south as Bourke.

A third team was formed in Cairns, and three communities the rescreening of the Gulf and Cape York country, the Torres Straits and glasses where necessary.

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ing the way patients who had had operations, and holding clinics in sev-
eral western NSW towns, Menindee, Wilcannia and Kumbia.

The teams then returned to Sydney, having seen more than 3,000 people in 26 different centres in southern Australia, and a further 2,300 people in and near Alice Springs.

Before fieldwork recommenced in late September, some members return-
ed to the Centre to help with the program's first treatment campaign, carried out by a group of medical and nursing workers assisted by medical students, after arrangements worked out in discussions with Professor Holt, the program's director, the program's liaison staff and the Piljinjarratjara Council. More than 2,000 people were treated in a 20-day period.

Almost 21,000 people, including 13,000 Aboriginal children, were seen; analysis of the findings showed, as in Central Australia that there was a significant improvement in the level of trachoma among children.

In March and April of 1979, a re-screening program was conducted in the Northern Territory, rescreening the 10 communities visited in the previous exercise at Bourke, holding joint clinics there. One team returned to NSW for a surgical exercise, while another worked in the Dubbo area before returning to Sydney. The other team travelled through the Darling Downs area hold-
ing clinics until early in July. At the end of the exercise, 75 communities had been visited, and nearly 18,000 people had been screened for trachoma and other eye conditions.

Before the second team had com-
pleted its coverage of Queensland, a small team had travelled to Central Australia, where, over eight days, eight communities had been visited and more than 1,000 people rescreen-
ed for the presence of trachoma. This rescreening indicated a heart-
ting treatment effect, showing the level of follicular trachoma to have fallen.

In late July another team was formed to work in the desert areas of southern NSW and Victoria. The team left Sydney on August 1, travelling to Wagga Wagga and then working its way west to Mildura and Gerani, after which the team met in Sydney. The team also visited Griffith, Hay, Narrandera, Albury and Tamworth, before travelling down to Melbourne and along the eastern coast and Gippsland country of Victoria, returning to Sydney after rejoining one of the screening teams at Mount Isa in mid-June. The other team started in Brisbane and went northwards up the Queensland coast, then inland to the Western Australian coastline and rescreening Townsville in the process. One team returned to NSW after a surgical exercise in the Dubbo area, and another team worked in the desert north of Alice Springs.

The teams then worked in comm-
unities as south on the Eastern Coast as Townsville and Palm Island. In six weeks, 99 communities were visited, during which time the team moved northwards back to Alice Springs.
The program also took the opportunity during this trip to grade for the first time a community in the southwest corner of the State, the only rural area of Western Australia not previously covered by the program. Gnowangerup was chosen to be a rescreening of the Pilbara region of Western Australia took place in May, 1979, and nine places were visited with a total of 1,688 people being examined in a fortnight.

In both the Pilbara and the Eastern Goldfields the prevalence rates for follicular trachoma were found to have been examined in a fortnight. Follicular trachoma were found to have been diagnosed in nine of the places visited with a total of 1,688 people being examined in a fortnight.

**SUMMARY**

The above is a basic summary of the program's progress in Australia and it must be borne in mind that many of the field activities were taking place concurrently, although independently.

Good liaison and program flexibility proved to be the key to smooth running and efficiency of the program's operations.

**Good Liaison**

In many communities where ophthalmic services had not previously been offered, a major investment in Aboriginal liaison was required both before, during and after screening to consolidate and further promote confidence and an understanding of the surgical and systemic treatment procedures employed by the program.

To ensure maximum co-operation with the States, team leaders at various stages during field operations were seconded to do advance liaison work at a high level between the different State departments and health agencies; this taking place before Aboriginal liaison officers started co-ordinating and appointing local liaison personnel (the latter being chosen as community representatives by the respective Aboriginal councils) in preparation for the arrival of the screening teams.

The pattern of travel was very much determined by feedback on advance liaison: whether a high proportion of the community would be there at the proposed time of visit or whether they would be "out bush" or visiting another community; also, climatic conditions often necessitated a "last-minute" change of schedule.

**Flexibility**

According to medical requirements and availability of resources, systemic treatment campaigns and surgical exercises took place as shortly after the initial screening as could be arranged. This often necessitated the withdrawal of medical personnel from a field team, leaving one or perhaps two teams still operating, in order to provide immediate eye care services (this being the third aim of the program). After completion of the exercise, the medical personnel then either rejoined the main screening body or formed a smaller grading team operating nearby.

To further facilitate team flexibility, a central secretariat, co-ordinating and controlling alternate travel arrangements by air or sea, was usually established in regions where access to communities by road was not possible either physically or in terms of maximum use of time. Private charter was often the only method of transportation where normal routes were inappropriate for team requirements.

The teams carried a minimum amount of equipment but, at all times, whether travelling by road or by air and/or sea, were completely self-sufficient, to avoid having to draw upon the scanty and very often inadequate resources of the community.

In all, more than 84,000 kilometres were covered during the initial screening of rural Australia; this does not include distances travelled by air and sea to otherwise inaccessible communities.

Apart from local liaison staff, of whom more than 500 were employed during the course of the screening and Aboriginal health workers, of whom more than 200 were employed during treatment programs, the program employed as many as 50 people concurrently at various stages during the screening exercises. These included ophthalmologists, orthoptists, optical dispensers, microbiologists, nurses, clerical staff and, of course, Aboriginal liaison officers.

The program was assisted by 80 ophthalmologists who gave their time voluntarily in the field for periods of up to three weeks, receiving travelling expenses only.

"Teams travelled through dusty and inhospitable conditions to reach isolated communities."

**Methodology**

**Screening Programs**

The program's screening was based on the following principles:

1. The team should be able to provide a range of ophthalmic diagnostic and therapeutic services to everyone, and these should be of the highest standard.
2. Services should be given immediately in order to minimize the dropout from medical care and surveillance, to encourage the use of future services, and to show that specialist care need not be complicated.
3. The services should be available and accessible to all.
4. The teams and their equipment should be mobile in order to provide the service in locations convenient to the target populations.
5. The teams should at all times work closely with the Aboriginal communities through liaison officers engaged from the communities for this purpose, to ensure that the service is suitable to the needs of the community, that the community is willing to use the service, and to advise teams on how to give the best possible service.
6. The team should use Aboriginal staff to the fullest: employing them in preference to similar qualified Europeans; consolidating existing skills; helping them acquire new ones; and ensuring that the use of future services, and consolidation of community-based medical services throughout Australia.

The above is a basic summary of the program's methods in establishing ophthalmic services in Central Australia, and with the development of strong community-based medical services throughout Australia.

Under the guidance of Mr. Briscoe, the program employed many liaison officers in many parts of Australia: local Aborigines with the confidence and support of their own communities and with an extensive knowledge of the areas in which they were working. Additionally, the role of these personnel was superintended and co-ordinated by senior Aboriginal liaison officers.

**Chapter 3:**

9. The team should note any factors within the community's environment which could be deleterious to the health of its members, and should advise the appropriate authorities, in consultation with the community, on how to rectify them.

**Liaison**

As later chapters in this report bear out, the program's success at reaching and effectively delivering services to rural Australians depended on its liaison officers, all of whom were Aborigines.

The program's liaison was organised through Mr. Gordon Briscoe, a senior project officer in the Department of Health who has been over the years a key figure in the expansion and development of medical services for Aborigines, particularly services for which Aborigines have made a substantial input and were able to control. Since 1970, Mr. Briscoe has been associated with the development of the Redfern Aboriginal Medical Service, with the Central Australian Aboriginal Congress and other health services in Central Australia, and with the development of strong community-based medical services throughout Australia.
other diseases; provided spectacles, treatment and surgery; and, in different locations, assisted local health agents to handle their communities' own health problems within their communities' own traditions. The program worked in a critical area where change had to occur.

The program's success in meeting its aims and objectives was due to a number of reasons, amongst which were:

1. The program's teams sought to identify and deal with the problems being faced by communities in the areas where the problems were: in hot, dusty climates with poor living conditions, often geographically remote and with irregular, if any, professional eye-care services being available.

2. The examinations were simple and easily understood by the communities, and involved participation by all field staff and the Aboriginal people.

3. There was considerable participation by Aboriginal people, as liaison officers and field workers in all communities.

4. Consultations with communities, local elders and different organisations were done by Aboriginal staff.

5. The program's advance fieldwork ensured that all Aboriginal communities were informed of the teams' visits well in advance, knew of the teams' aims and objectives, and ensured that informed permission was obtained from the community before the program began providing services.

All these factors helped break down communication barriers, and enabled the program to examine persons who were resident, with only a few teams. Because of past experiences with medical personnel and organisations, treatment and surgery, many Aboriginal people were afraid of being examined in many cases, they did not have the information from which they could know that eye surgery, treatment for trachoma in children.

Consultation and communication was the most important factor in the program's success in reaching into Aboriginal communities. Through its liaison and consultation efforts, the program sought to involve people from the communities in its decision-making, and to show them its willingness to participate in movements for improved health, and its commitment to the communities among whom it was working. Unless the community was aware of and approved of what the program was doing, co-operation was not total, the best results would not be obtained, and the screening program would be regarded as merely another useless survey. The program sought to make itself known with understanding.

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...
enabled it to be made aware of changes which had taken place, which meant that staff to schedules or ways of operating could take place without causing great difficulties. The 'grapevine' communication was able to get information very rapidly even to the most remote areas.

Working within this network meant that the program was able to leave some aspects of necessary follow-up with local or regional Aboriginal organisations, and to give them the necessary support and assistance in meeting their own aims and objectives, almost invariably inherent in the program's own.

The empathy and support the program obtained from Aboriginal communities throughout Australia was not given without a price. It was secured on a clear understanding that the objectives of the program were genuine, and that the program's activities provided a starting point for improved health services in the future.

There is still an enormous need to consolidate the gains made by the program — and in dealing with trachoma and other eye diseases, in providing specialist ophthalmic services to the largely neglected areas of rural Australia, and in outlining some of the changes necessary if Aboriginal health is to improve.

Aboriginal people who co-operated with, and supported the activities of the program, did so on the basis that this consolidation and follow-up would take place. If it does not the gains made by the program will prove short-term, and the empathy and support of Aboriginal communities will be lost.

The experience of the program was that the effectiveness of liaison and consultation was the single most important factor in the success of a screening visit to a community. Failure to properly consult or make adequate liaison arrangements almost invariably led to low turnouts and a degree of suspicion about the team; when the preliminary work was done well, few problems were encountered.

The Teams

Each team consisted of up to nine full-time staff: an ophthalmologist, usually a volunteer from the Royal Australian College of Ophthalmologists spending several weeks with the team; an orthoptist; a trained nurse; an optical dispenser; a microbiologist; a field secretary; a mechanic and baggage master; and a trachoma grader, usually an ophthalmologist.

Frequently teams would be smaller, with members of the permanent team able to do the duties of others. Over all, about half the staff were Aboriginal, the proportion being greater at clinics where local people helped with clerical duties, liaison and interpreting, and transport.

Except in particularly remote areas in northern parts of Australia, the teams travelled by road, using four-wheel-drive vehicles — three or four to a team, able to carry all the staff and equipment. A team carried its own sufficient ophthalmic equipment to set up a normal clinic, and also drugs, camping gear, food and clothing.

Clinics

Once a team had arrived in a community and contacted the liaison staff, it would move to the clinic site and unload and prepare its equipment.

The site chosen was crucial to the team's success, particularly with those most in need of the services. The team was often immobile, while those with visual impairment were often unable or unwilling to attend, whether because of disability or shame (especially if other conditions, such as leprosy or disfigurement, made them embarrassed) or because they had accepted their disability and were pessimistic about the prospects of improvement.

Effective liaison ensured that such people were known and, where necessary, the examination was taken to them. This might entail door-to-door visits, with vision testing and initial assessment of ocular status being conducted in or outside willing tents.

In many communities such visits were essential in gaining an accurate assessment of those who were blind, those with sight-threatening lesions, and those who could be helped by surgery.

Cases presented by local health agencies did not always accurately reflect the number of people in the community with such conditions, nor the extent of such problems.

Many cases of cataract and trichiasis urgently needing surgery have been identified and helped by the program, but may never have received specialist attention had they been required to attend the clinic.

The program also found it worthwhile to stop and examine people while on the road. Once, a roadside examination of nine Aboriginal stockmen showed that four needed surgery for sight-threatening trachoma.

The largest number of people could be screened, however, at appropriately located and properly set up clinics, whether in the community's health centre, school, meeting hall or elsewhere.

A single experienced examiner with four or five well-trained staff could examine up to 500 children for trachoma signs during a school day, each child being tested for visual acuity and also examined for ear pathology. Clinics with substantial proportions of older people were considerably slower, with large numbers of people needing refractions while on the road. Once, a roadside examination of nine Aboriginal stockmen showed that four needed surgery for sight-threatening trachoma.

The Examination

The subject's identifying particulars were recorded. Visual acuity was tested by orthoptists or other trained persons. The most appropriate method was to use the illiterate Snellen E chart, (see Chapter 6 page 54), with the subject standing six metres from the tester, covering one eye and indicating by a hand movement the direction in which the E is pointed. The orthoptist would also note the presence of any strabismus.
The subject would then be seen by the trachoma grader, who would exert each eye to check for signs of follicular disease and note the presence of any other ocular pathology. The second ophthalmologist would perform any further examination or action as indicated. The trachoma grader would also make an astigmatic examination of each eye to note the presence or absence of ciliitis media and its sequelae, and make a quick visual examination for nasal discharge and skin infection, all results being noted on the clinic card.

Those who showed no signs of any eye pathology or visual problems could then leave. If closer examination was warranted, the person would be referred for a full ophthalmological examination.

Refractions, slit-lamp examinations, applanation tonometry, and direct and indirect ophthalmoscopy would be performed as in an ordinary ophthalmic clinic. Those who needed spectacles would have them prescribed and an optical dispenser would help in the selection of frames and would fit and measure them on the spot, making arrangements if the person could afford it, to have them paid for. If a person could not afford them, under different arrangements made by the State or either the State authorities, the Federal Department of Health or the program would pay.

If surgery was indicated, the ophthalmologist would discuss the alternatives with the patient and relatives, perhaps helped by one of the field workers or liaison workers.

Running tallies would be kept by the field clerks of the race, age and sex groupings seen, so that if any group was under-represented deficiencies could be made good.

Liaison workers would also help arrange follow-up for patients needing treatment or surgery, make decisions about the appropriate place for surgery or treatment, or further examinations.

Once the clinics were completed, a report would be prepared for members of the community and their local health agents, perhaps a nurse, sometimes a doctor, and in some circumstances the teacher or station-owner's wife. The report would set out the results being noted on the clinic card. The trachoma grader, who would perform any further examination or action as indicated. The subject would then be seen by the trachoma grader, who would exert each eye to check for signs of follicular disease and note the presence of any other ocular pathology. The second ophthalmologist would perform any further examination or action as indicated. The trachoma grader would also make an astigmatic examination of each eye to note the presence or absence of ciliitis media and its sequelae, and make a quick visual examination for nasal discharge and skin infection, all results being noted on the clinic card.

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Once the clinics were completed, a report would be prepared for members of the community and their local health agents, perhaps a nurse, sometimes a doctor, and in some circumstances the teacher or station-owner's wife. The report would set out the numbers of those seen, giving details of those identified as having eye, skin or respiratory-tract infections, as well as summarising the pattern of follicular trachoma in the area. It would also list all those for whom spectacles had been prescribed, those found to be blind, or to have poor vision, and those needing surgery. An original of each of the clinic cards would also be left with the local health agent, so that individual records could be incorporated in local health-record systems, and be available to any health practitioner who may visit the area.

Team members would also discuss with senior members of the community those features of the community's environment which it was felt contributed to any of the poor health found during the visit. When the community wanted it, the program lent weight to community applications for better water supplies, the provision of housing or the establishment of health-care systems. Some of the ways in which the program participated in community actions to try to improve living conditions are discussed in another chapter.

Discussions would also take place about the sort of follow-up appropriate to the community's needs. Where mass treatment programs were indicated, preliminary arrangements would be made, although final plans were not adopted until further, more extensive consultations and liaison were held, where there was surgery needed, the opinion of the community about the most appropriate way of doing it would be sought. Especially in more remote areas, the possibility of establishing a mobile Army hospital close to the communities would be discussed. In other cases, arrangements would be made for special surgical expeditions, operating in local facilities, and in some areas arrangements were made about referring the patients to ophthalmologists working in towns and rural areas.

Some recommendations for examining Aborigines

1. Aborigines place greater value on person - to - person encounters than do most other Australians. The clinical examination to them is seen as an integration with the examiner rather than a procedure. Aborigines have a heightened awareness of other people's feelings, attitudes and demeanour and are especially sensitive to visual clues. There are in some situations personal avoidance regulations such as between a male examiner and an unmarried younger woman but these aside the examiner is well advised to use eye-to-eye contact and gestures rather than loud intonations in a vernacular that is not local, any local words such as 'nitka salt' - sit down (Western Desert) and a friendly manual indication towards the examination chair will be well responded to. Speak quietly and directly person-to-person.

2. To erect the upper eye in the often deep Aboriginal orbit, a glass rod is a useful aid.

3. Get used to using at least 3 x biconical loupes.

4. For subjective testing a mirror and E chart are essential in that they keep the bond between examiner and subject tight and enable the responses to be gauged.

5. Use a local person as 'head holder' and interpreter whenever possible.

6. Be wary of overdiagnosing catarract. With the small pupils usually found, and the high ambient light intensity, you do not want to assume a cataactar present until confirmed by dilatation of the pupil.

7. Use a lens rack for retinoscopy but remember the difficulties of keeping the small lenses clean in the Australian bush.

8. Pack all your lenses very carefully. A hundred kilometres in the Australian bush is not local. Any local words such as 'nitka salt' - sit down (Western Desert) and a friendly manual indication towards the examination chair will be well responded to. Speak quietly and directly person-to-person.

9. For presbyopic subjects use the reduced E chart and remember the difficulties of keeping the small lenses clean in the Australian bush.

10. Keep your epilation forceps at the ready. Pull the lashes individually and do not break them.

11. Make sure that the patient understands for which distance glasses are prescribed. This is
The Sample

The program's findings were based on the screening of more than 100,000 people, some of whom were examined on two or more occasions. As such, a very large sample was involved.

At the time the program was conceived, members were aware of these considerations and made provision on the clinic cards and computer records for the accurate collection and recording of these details.

Each clinic card contained an exclusive number, through which the record could later be pulled out and checked. Also recorded on the clinic cards and punched on to the program's computer records were:

1. Personal identifying details, including name, and where appropriate, tribal affiliation and subsection name; address; the identity of close relatives if this might be necessary in arranging follow-up.

2. The state and community at which the screening took place. Each community visited by the program had an exclusive number. In some cases where outstations clustered about a particular community, these outstations were given separate numbers.

3. The race of the person being examined. During screening, persons examined were coded as being Aboriginal, of primarily European descent, or of other, usually Asian descent.

4. The sex of the person being examined.

5. The age of the person being examined.

Computer analysis of the program's findings was made on the basis of 13 zones of rural Australia, the boundaries of which were chosen because of retention similarity in geographic, climatic, industrial and demographic conditions. Each community visited was placed in one of these zones. The zones are shown in Figure SAM 1 (the names of the various communities in each zone are listed in Appendix two at the rear of the report) and were given a name as follows, according to the main geographic feature of the zones:

Zone 1: Red Centre, covering Aboriginal communities in Central Australia, including the communities within the Pitjantjatjara Homelands in South Australia and Western Australia.

Zone 2: Cattle Country, covering the middle areas of the Northern Territory and communities within the Kimberleys of Western Australia based around the cattle industry.

Zone 3: Western Desert, covering inland regions of the Pitjantjatjara Homelands and the workforce of the cattle industry.

Zone 4: Goldfields, covering communities in the Eastern Goldfields region of Western Australia.

Zone 5: Coastal Missions WA, primarily Aboriginal communities in north and northwestern coastal regions of Western Australia.

Zone 6: Coastal Towns WA, European settlements along the north and north-west coastal regions of Western Australia in which Aborigines live, either on the fringes or integrated into the main townships.

Zone 7: Arid Eastern, the dry far-western regions of NSW and Queensland together with arid rural regions of South Australia, other than the Pitjantjatjara homelands communities.

Zone 8: Top End NT, including the islands, Darwin and Arnhem Land.

Zone 9: Gulf and Cape Country, Queensland.

Zone 10: Torres Strait Islands.

Zone 11: Coastal Queensland, most of the people in this zone actually lived very close to Australia's eastern coast. Also included in this zone, however, were those living in non-arid inner-western regions of the State.

Zone 12: Coastal NSW.

Zone 13: Southern Mainland, including the Riverina areas of NSW, Victoria and non-arid regions of South Australia.

Although separate findings for each of the communities visited by the program will be published, and have already been made available in interim form to the communities, local health authorities and State and Federal health and welfare authorities, the findings presented in this report will be the general findings for each of these zones only.

This is not to suggest that the disease picture seen was necessarily uniform in the zones. Frequently it was not. Those differences, however, tend to be a similar pattern of disease throughout each zone, with variations frequently wholly attributable to differences in environmental facilities such as water, housing, and waste and sewage-disposal systems as well as climatic variations. These factors are considered elsewhere. For the purpose of outlining the general findings, however, the overall pattern within each zone will be described.

The Nature of the Sample

Tables SAM 1 and SAM 2 show the age and racial distribution of persons seen by the program. In all 100,732 people are considered in this report; of these 62,116 were Aboriginals and 38,616 were non-Aboriginals.

<table>
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<tr>
<th>AGE GROUPS</th>
<th>0 - 9</th>
<th>10 - 19</th>
<th>20 - 29</th>
<th>30 - 39</th>
<th>40 - 49</th>
<th>50 - 59</th>
<th>60 +</th>
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<td>138</td>
<td>162</td>
<td>178</td>
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AGE AND DISTRIBUTION OF ABORIGINES SEEN BY THE NTEHP

TABLE SAM 1
The program's intention was to achieve a large coverage of at-risk groups and communities to obtain an accurate assessment of the prevalence of trachoma and other diseases and conditions, and also to see everyone in those communities who had eye problems requiring specialist care.

In the planning of the program, it was known that the bulk of the problems which would be encountered would be found among Aborigines. Because of this, the program's itinerary was devised so as to achieve maximum coverage of Aborigines, particularly in those areas where the problems were expected to be the worst. The young and the elderly of these were the main forces of the program's activities, the former because the highest prevalences of the follicular form of trachoma was likely to be found among them; the latter because they were the groups most likely to have sight-imparing problems as a result of trachoma or other disease.

The program also attempted to see enough people of Aboriginal descent in areas where facilities and access to specialist services were better in order to draw sound conclusions about the prevalence and pattern of eye disease in these communities. In practice this meant that the coverage in these areas was lower, although there was still a relatively high coverage of the young and the elderly.

The program's services were open to all, whether Aboriginal or non-Aboriginal, and, in the course of the survey, large numbers of non-Aborigines, especially non-Aboriginal children and adolescents, were seen. The high coverage of children was related especially to the fact that the program saw all, or nearly all, school children, Aboriginal and non-Aboriginal, in communities where there was a substantial number of Aborigines. Although it was made known that the services were available to non-Aborigines beyond school age, it made little effort to obtain a full coverage of them. Non-Aborigines over the age of 16, however, were regarded as being more self-selected, and the program's findings for these must be considered with some caution: those who attended clinics were probably more likely to have had eye problems than those who did not.

Table SAM 2 shows the program's estimates of its coverage in these two areas, with population figures for the region being projected from figures supplied by the Australian Bureau of Statistics.

It can be seen from the table that a high coverage was obtained in Zones 1, 2, 3, 4, 5 and 6, as expected from the program's findings for these areas. It represented nonetheless an estimate of conditions in that area. There may have been a tendency for the sample to be less random. On such occasions the program saw numbers lower, but improved with increasing age.

Overall, the program estimates that it saw about half the Aboriginal population of rural Australia, including more than two of every three Aboriginals aged 60 or more, and almost every five of every eight persons aged 60 or more.

TABLE SAM 2

<table>
<thead>
<tr>
<th>AGE GROUPS</th>
<th>0 - 9</th>
<th>10 - 19</th>
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<th>40 - 49</th>
<th>50 - 59</th>
<th>60 +</th>
<th>TOTAL</th>
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* Listed as traditional areas are Zones 1, 2, 3, 4, 5, 6 & 8.

* Listed as less-traditional areas are Zones 7, 9, 10, 11, 12 & 13.

Figure 2 is a population pyramid that compares the program's sample of Aborigines with an estimate of the total rural Aboriginal population.

As later chapters will show, the highest prevalence of disease tended to be found in the zones labeled as being more traditional (Zones 1, 2, 3, 4, 5, 6 and 8). It was in these areas that the highest coverage was achieved. In general, it was possible to obtain very high coverages in small and remote communities, especially when adequate fieldwork had been carried out. The program saw the entire population of some outstations, cattle-station communities, and small settlements.

In Table SAM 3 we show the program's findings for these Zones 1, 2, 3, 4, 5 and 6 and for Zones 7, 9, 10, 11, 12 and 13.

TABLE SAM 3 - ABORIGINAL POPULATION COVERAGE IN TRACHOMA SCREENING

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<th>LESS TRADITIONAL AREAS**</th>
<th>OVERALL</th>
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</thead>
<tbody>
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<td>Seen by NTEHP Per-Cent Age</td>
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</tr>
<tr>
<td>5 - 9</td>
<td>6,730</td>
<td>6,208</td>
<td>81</td>
</tr>
<tr>
<td>10 - 14</td>
<td>6,740</td>
<td>6,839</td>
<td>72</td>
</tr>
<tr>
<td>15 - 19</td>
<td>5,269</td>
<td>2,984</td>
<td>49</td>
</tr>
<tr>
<td>20 - 29</td>
<td>7,620</td>
<td>3,779</td>
<td>48</td>
</tr>
<tr>
<td>30 - 39</td>
<td>4,970</td>
<td>2,844</td>
<td>47</td>
</tr>
<tr>
<td>40 - 49</td>
<td>3,720</td>
<td>1,944</td>
<td>52</td>
</tr>
<tr>
<td>50 - 59</td>
<td>3,269</td>
<td>1,337</td>
<td>39</td>
</tr>
<tr>
<td>60 +</td>
<td>4,090</td>
<td>2,547</td>
<td>33</td>
</tr>
</tbody>
</table>

** Listed as less-traditional areas are Zones 7, 9, 10, 11, 12 & 13.

Figure 2 shows the population pyramid compares the program's sample of Aborigines with an estimate of the total rural Aboriginal population.

As later chapters will show, the highest prevalence of disease tended to be found in the zones labeled as being more traditional (Zones 1, 2, 3, 4, 5 and 6). It was in these areas that the highest coverage was achieved. In general, it was possible to obtain very high coverages in small and remote communities, especially when adequate fieldwork had been carried out. The program saw the entire population of some outstations, cattle-station communities, and small settlements.

In Table SAM 3 we show the program's findings for these Zones 1, 2, 3, 4, 5 and 6 and for Zones 7, 9, 10, 11, 12 and 13.

Overall, the program estimates that it saw about half the Aboriginal population of rural Australia, including more than two of every three Aboriginals aged 60 or more, and almost every five of every eight persons aged 60 or more.
TABLE SAM 4:

**EXPECTED AGE DISTRIBUTION, NON-ABORIGINAL AUSTRALIANS**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Number per 1000</th>
<th>Sample Obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>88</td>
<td>18</td>
</tr>
<tr>
<td>5-9</td>
<td>92</td>
<td>18</td>
</tr>
<tr>
<td>10-14</td>
<td>91</td>
<td>18</td>
</tr>
<tr>
<td>15-19</td>
<td>90</td>
<td>18</td>
</tr>
<tr>
<td>20-29</td>
<td>168</td>
<td>36</td>
</tr>
<tr>
<td>30-39</td>
<td>130</td>
<td>26</td>
</tr>
<tr>
<td>40-49</td>
<td>109</td>
<td>22</td>
</tr>
<tr>
<td>50-59</td>
<td>101</td>
<td>22</td>
</tr>
<tr>
<td>60+</td>
<td>130</td>
<td>23</td>
</tr>
</tbody>
</table>

Of the remainder, about 40 per cent were seen by one of three observers: Drs. Pararajasegaram, Francis and Cole, each of whom spent several months leading field screening teams. The rest were screened by visiting ophthalmologists who joined screening teams for several weeks at a week.

All observers were given consideration to the grading of the various trachoma signs and to their degree, both by practical demonstration and by the preparation of slide presentations of typical trachoma pathology in different stages of the disease.

Frequent conferences were held between the trachoma graders in an effort to achieve standardisation of grading.

In spite of this, a certain amount of variation in grading was observed within any group of observers who were examining the same group. The likely source of this variation was considered to be due to factors relating to the health of the individual, observer's skill and the degree of trachoma present.

**TABLE SAM 5:**

Examiners for Trachoma Examination

<table>
<thead>
<tr>
<th>Examiner</th>
<th>Total Persons Seen</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCH</td>
<td>34,316</td>
<td>33.0</td>
</tr>
<tr>
<td>DM</td>
<td>10,588</td>
<td>10.8</td>
</tr>
<tr>
<td>HRT</td>
<td>9,028</td>
<td>9.2</td>
</tr>
<tr>
<td>PRS, IF and GG</td>
<td>17,327</td>
<td>17.7</td>
</tr>
<tr>
<td>Others</td>
<td>26,661</td>
<td>27.2</td>
</tr>
<tr>
<td>Total coded for trachoma by examiners</td>
<td>97,920</td>
<td>100.0</td>
</tr>
<tr>
<td>Not coded for examiner</td>
<td>2,251</td>
<td></td>
</tr>
</tbody>
</table>

TOTAL SCREENED FOR TRACHOMA:

100,171

Intra-observer Variation

When each of the three major observers had viewed the slides on two occasions and the diagnostic criteria for follicular and cicatricial trachoma were applied, it was seen that no observer made exactly the same grading on any occasion. Tables SAM 6 and 7 show the pattern.

TABLE SAM 6:

**INTRA-OBSERVER VARIATION : FOLLICULAR TRACHOMA**

<table>
<thead>
<tr>
<th>Examiner</th>
<th>First Viewing Present</th>
<th>Absent</th>
<th>Total</th>
<th>Second Viewing Present</th>
<th>Absent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCH</td>
<td>20</td>
<td>5</td>
<td>25</td>
<td>22</td>
<td>4</td>
<td>26</td>
</tr>
<tr>
<td>DM</td>
<td>25</td>
<td>66</td>
<td>91</td>
<td>26</td>
<td>69</td>
<td>95</td>
</tr>
<tr>
<td>HRT</td>
<td>27</td>
<td>74</td>
<td>101</td>
<td>25</td>
<td>71</td>
<td>96</td>
</tr>
<tr>
<td>TOTAL</td>
<td>72</td>
<td>159</td>
<td>231</td>
<td>73</td>
<td>170</td>
<td>243</td>
</tr>
</tbody>
</table>

TABLE SAM 7:

**INTRA-OBSERVER VARIATION : CICATRICIAL TRACHOMA**

<table>
<thead>
<tr>
<th>Examiner</th>
<th>First Viewing Present</th>
<th>Absent</th>
<th>Total</th>
<th>Second Viewing Present</th>
<th>Absent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCH</td>
<td>60</td>
<td>7</td>
<td>67</td>
<td>61</td>
<td>9</td>
<td>70</td>
</tr>
<tr>
<td>DM</td>
<td>66</td>
<td>9</td>
<td>75</td>
<td>69</td>
<td>14</td>
<td>83</td>
</tr>
<tr>
<td>HRT</td>
<td>67</td>
<td>16</td>
<td>83</td>
<td>68</td>
<td>14</td>
<td>82</td>
</tr>
<tr>
<td>TOTAL</td>
<td>193</td>
<td>22</td>
<td>215</td>
<td>194</td>
<td>23</td>
<td>217</td>
</tr>
</tbody>
</table>

None of the examiners actually found that follicular or cicatricial trachoma was or was not present. Instead they graded for the presence or absence of different signs which, considered in combination, accord-
sliding he graded for follicular trachoma being inconsistent with two, or 3 per cent of the time. There was no difference with his overall findings on each occasion. The considered 26 of the 91 persons had follicular trachoma.

With cicatricial trachoma, HRT was consistent on 70 of 83 slides examined, being inconsistent with four, or 5 per cent of the time. In overall findings about cicatricial trachoma prevalence, there was a 2 per cent difference.

In summary, considered individually each of the three observers was consistent about nine times in every 10. There was, however, a cancelling-out effect when the results were considered on a community basis; the overall findings agreed about 19 times in every 20.

If these figures can be assumed to accurately reflect scoring patterns when persons are being graded in field conditions, it can be confidently expected that an observer's findings for a particular community are likely to be comparable with his findings in another community, within the confidence limits suggested.

Inter-observer Variation

Tables SAM 6 and 7 show a high degree of consistency between findings made by an observer on one occasion and on a second occasion. To what extent, however, do observers agree with each other, and how easily can the results of one observer be compared with findings made by others with less experience with trachoma signs from which a diagnosis could be made, while on three he thought it to be present. If the consensus view is to be accepted, his findings slightly overstate the "true" situation.

HRT's findings with the consensus view on 135 of 171 occasions when FCH disagreed. As Table SAM 11 shows, FCH agreed with the consensus view on all but 10 occasions, on seven of which he thought the sign to be absent while on three he thought it to be present. If the consensus view is considered on a community basis; on each occasion and on a second occasion. It can be seen that in almost three-quarters of the cases all three observers agreed. In two-thirds of the remaining cases, two examiners agreed while the others disagreed. This is balanced by the fact that he underscores about 3 per cent of the time.

If these findings can be presumed to be an accurate reflection of field conditions, it can be seen that FCH's findings for follicular trachoma are overstating the "true" situation by about 3 per cent. DM underscores it by about 2 per cent and HRT overestimates it by about 8 per cent of the time.

In terms of community score, no observer is significantly different from the consensus (the highest level of significance is with HRT for whom p = 0.2). The difference between DM and HRT is, however, significant (p = 0.025), though only just.

With cicatricial trachoma there is less unanimity, although FCH and DM are in closer agreement than either is with HRT. Table SAM 10 shows the findings in respect of the slides by the three observers.

On 116 occasions all observers agreed about whether or not cicatricial trachoma was present. On a further 36 occasions FCH and DM agreed about a sign but HRT disagreed, while FCH and HRT agreed on nine occasions when DM disagreed, and HRT and DM agreed on 10 occasions when FCH disagreed.

As Table SAM 11 shows, FCH showed a higher degree of relationship between the observers' scores and the true or consensus scores with no observer varying significantly from the consensus view with either follicular trachoma or cicatricial trachoma. With each form of the disease, some observers tended to over score and some to underestimate; sometimes the differences between observers would have to be taken into account when the results were considered on a community basis. Doing this was shown from the observer and community score tables (Tables SAM 9 and 12).

No attempt has been made to assess the observer error of any of the other observers. In respect of Drs Pararajasegaram, Francis and Gof, it would be expected that there would be little difference between what was found with the three major observers; with other observers the range could be expected to be wider, with more significant differences.

It is emphasised, however, that all other observers were working under the supervision of observers with considerable experience in grading trachoma, who not only spent time in demonstrating the various trachoma signs from which a diagnosis could be made, but who also made efforts to check and standardise grading by others with less experience with trachoma.

It is also emphasised that no field staff actually made a diagnosis of whether or not follicular or cicatricial trachoma was present; graders assessed the presence of each of the seven trachoma signs in the eyes of persons being examined according to the absence or their presence and degree. These were coded for computer analysis – the diagnosis of trachoma being made from the application of the program's diagnostic criteria.
Trachoma — the Ocular Condition

Trachoma is an eye condition which at first affects only the conjunctiva (see Figure TOC 1, Chapter 8). The conjunctiva is the membrane which lines the inside of the eyelids and the front surface of the eyeball (except for the cornea). Trachoma is a form of conjunctivitis or inflammation of the conjunctiva associated with the presence of an organism called Chlamydia Trachomatis. As a result of infection with this bacteria, usually in childhood, a chronic conjunctivitis develops, which progresses to scarring on the inside of the eyelid. This may directly or indirectly cause the cornea to be scarred and opaque, thus causing blindness. Trachoma may be the most common, serious eye disease in the world, with about 700 million people affected by it. Some 20 million of these are blind. The disease is especially common and severe in countries with desert climates and poor living conditions.

Trachoma may be recognised by a number of clinical signs, some of which are peculiar to the disease and others which are also found associated with other forms of conjunctivitis. Some of these signs are most commonly seen in early forms of the disease and others at later stages. A system of grading these signs has been devised by the program: the understatement of trachoma in communities visited by the program: the program may understate the level of trachoma in communities when the prevalence of trachoma is more than 50 per cent, and up to 0.5 per cent in communities where the prevalence is lower.

Follicular trachoma was said to be present when the following trachoma signs were observed in one or both eyes:

- Follicles grade 1 or 2 or Limbal follicles grade 2 or 3 or Follicles grade 1 with papillae grade 1 with pannus grade 1, 2 or 3 or Limbal follicles grade 1, with pannus grade 1, 2 or 3 or Follicles 1, with Herbert’s Pits 2 or 3 or Herbert’s Pits grade 2 or 3 is added because previous sequential photographic grading systems demonstrated that limited follicles from which Herbert’s Pits derive are frequently unrecognised.

This means that follicles 1 alone, or follicles 1 alone, Herbert’s Pits grade 1 and pannus grade 1 accompanied by follicles were insufficient to diagnose follicular trachoma. This is the reason for the slight underestimate mentioned in the preceding paragraph.

Papillae grade 1, 2 or 3 or Scarring grade 1, or Scarring grade 2 or 3 or Herbert’s Pits grade 2 or 3 or Scarring grade 1, with pannus grade 2, 3, 4 or 5 or Scarring grade 1, with Herbert’s Pits grade 1 this means that grading follicles 1 alone, or follicles 1 alone, Herbert’s Pits grade 1, pannus grade 1, 2 or 3, Herbert’s Pits grade 1, were not considered sufficient to diagnose cicatricial trachoma.

These criteria indicate the presence of other forms of trachoma, but do not give an indication of its severity. The program used the various grades

Trichiasis grade 1, 2 or 3 or Herbert’s Pits grade 2 or 3 or Scarring grade 1, 2 or 3 or Herbert’s Pits grade 2 or 3 or Scarring grade 1, with pannus grade 2, 3, 4 or 5 or Scarring grade 1, with Herbert’s Pits grade 1 this means that grading follicles 1 alone, or follicles 1 alone, Herbert’s Pits grade 1, pannus grade 1, 2 or 3, Herbert’s Pits grade 1, were not considered sufficient to diagnose cicatricial trachoma.

These criteria indicate the presence of other forms of trachoma, but do not give an indication of its severity. The program used the various grades