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T H E S I S

THE INCIDENCE OF EYE DISEASE  
IN AUSTRALIA WITH SPECIAL  
REFERENCE TO NEW SOUTH WALES.

B Y

CHARLES GORDON MACLEOD,

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*Charles Gordon Macleod*  
*157 Macquarie Street*  
*Sydney N.S.W.*



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In the following pages I propose to consider diseases of the eye met with in Australia (more especially in New South Wales), in so far as they appear either to be peculiar to that continent (or to a part of it) or to show any special features whether in frequency or rarity of incidence, or in the particular form or the phases assumed, offering points of distinction from similar diseases met with in the old world and more particularly Great Britain.

In the main my remarks are a personal record of hospital and private ophthalmic work in Australia extending over a period of seventeen years and as such are necessarily in some measure incomplete and fragmentary. I have, however, in many instances been able to amplify the data by the recorded and personally communicated experience of others. All these additional sources of information are acknowledged in due course.

In addition to private practice my clinical experience has been largely gained by having been for over fifteen years on the Ophthalmic Staff of the Sydney Hospital, for several years as

an Assistant Ophthalmic Surgeon and latterly as Ophthalmic Surgeon. The eye out-patient Department of the Hospital numbers 3000 new cases and nearly 10,000 attendances yearly. The indoor compartment consists of a special Ophthalmic Hospital (Moorcliff Eye Hospital) with 66 beds in constant occupation, shared between my colleague on the full staff and myself. Indoor cases are admitted from every part of the State and many from Queensland and the Islands. Some of my data are from the Royal Alexandra Hospital for Children to which I am attached as Ophthalmic Surgeon and also from the Government Hospital (Coast Hospital, Little Bay) where infectious and contagious diseases are segregated and on which I hold a consulting post. Previous to settling in New South Wales I took for eight months the work of Dr. Symons of Adelaide, South Australia, which involved the duties of Ophthalmic Surgeon to the Adelaide Hospital, the Children's Hospital, Adelaide, and the University Lectureship on Ophthalmic Surgery.

Our climate is described by the "Imperial Gazetteer" as "perhaps the most salubrious in the world," but at the same time it has characteristics that make for conjunctival trouble. Conjunctival affections of a more or less chronic nature varying from simple hyperaemia to the worst forms of trachoma, form a very leading feature of distinction in ophthalmic work. The slighter forms of trouble, though not in themselves serious, (unless on account of their intractability), aggravate the symptoms of other complaints, e.g. accommodative and muscular asthenopia, and the grosser forms cause individual disabilities which are a serious economic loss to the community.

As far back as the end of the seventeenth Century we find reference made by Dampier<sup>1</sup> to eye trouble amongst the natives on the North-West Coast:-

"The poor winking people of New Holland," is how he heads the page. "Their eyelids are always half closed, to keep the flies out of their eyes, they being so troublesome here, that no fanning will keep them from coming to one's face, and without the assistance of both hands to keep them off, they will creep into one's nostrils and mouth too, if the lips are not shut very close. So that from their infancy, being thus annoyed with these insects, they do never open their eyes as other people, and therefore they cannot see, unless they hold up their heads, as if they were looking at something over them".

SANDY BLIGHT.

Sandy Blight, which appears to be a loose popular term applied indiscriminately to acute catarrhal conjunctivitis, apparently of the Koch-Weekes variety, or to the acute phases of granular conjunctivitis (but most generally to the former) is often referred to as affecting both natives and whites in the early days of settlement in New South Wales, and as occurring from time to time in an epidemic form.

Surgeon P. Cunningham, R.N.<sup>2</sup> in his descriptive account of New South Wales, published in 1827 writes:-

"An inflammation of the eyes, called the 'blight' often follows hot Northern winds; the lower palpebrae are the chief seat of the disease, becoming red and swollen and discharging glutinous sort of matter, which seals the eyelids together. This disease is attended with a painful itching sensation, which induces the patient to be constantly rubbing his eyes and thus increasing the symptoms. The winds that cause the ophthalmia occur about October and November, subsiding about April and May. This common disease is more troublesome than severe, being mild in the symptoms and generally very easily remediable by shading from the sun and washing the eyes with a little weak goulard water."

George Bennett<sup>3</sup> writing in 1834, referring to the same matter, makes the following observations:-

"There is an affection of the eye which much prevails at this season of the year in the interior of the Colony, attacking both European Settlers and natives, and is called by the colonists the 'blight'. It occurs only during the summer season, no doubt proceeding from the bite of a gnat or some other insect. I had an opportunity of witnessing a case of this malady, which occurred in a native.

"The integuments surrounding the orbit were puffed up so much as to totally close the eye, which was found much inflamed, as in acute ophthalmia, and attended with symptoms in some degree similar, with severe itching and pricking pain, as if sand had been lodged in it, with a profuse flow of tears. This disease seldom continues for more than three days, even if no remedy be applied. A spirit lotion has been found the most beneficial application. Last summer every individual at one of the farms was attacked by it in both eyes, occasioning temporary blindness, and much inconvenience was experienced from all being attacked at the same period."

Sporadic cases of acute ophthalmia occurring among the members of expeditions travelling through uninhabited and hitherto unexplored portions of the continent, are frequently referred to in explorers' journals. In illustration of this I may quote the following from Sir Thomas Mitchell's<sup>4</sup> diary:-

"Near the Bogan, Jan. 24. 1846.

"This morning I awoke completely blind from ophthalmia, and I was obliged to have poultices laid on my eyes. Several of the men also were affected in the same manner. The exciting cause of this malady in an organ presenting a moist appearance was, obviously, the warm air wholly devoid of moisture, and likely to produce the same



"effect until the weather changed." (Page 42)

"January 25.

"My eyes were so far recovered that I could observed the altitude of a star."

"On the Barcom Major, April 4th.

"Mr. Kennedy was was led into the camp quite blind, having been suddenly attacked with purulent ophthalmia when engaged in the survey of our route, about four miles from the camp. The heat had somewhat abated, but still this complaint, which we had attributed to it, had lately affected several of the party suddenly, as in the case of Mr. Kennedy."  
(Page 116)

"April 16.

"Mr. Kennedy's eyes still very bad."

The term "swelling blight" appears to be used by some of the early writers as synonymous with "bung eye" - quite a different thing.

BUNG EYE.

Bung eye is a condition characterised by intense oedema of the lids, chiefly of the lower lid . Its onset is sudden and it reaches its maximum within 24 hours as a rule, after which it gradually subsides, leaving some discolouration, which goes through the stages of a bruise. There is a certain amount

of conjunctivitis, but usually no injection of the bulbar conjunctiva, and the patient suffers little discomfort.

It is particularly prevalent in the western districts of the State, and is generally considered to be due to the bite of a fly. Mr. Froggart, the Government Entomologist, however, informs me that the agent is really a small midge, but as yet he has been unable to identify the exact species, although he has made many attempts. It is also doubtful whether the condition is actually due to the bite of the insect or to a particular quality in its body brought in action when the insect is entrapped by the lids.

Dr. Cleland, of the Microbiological Bureau, states that the *Stomoxys calcitrans* has been suggested by some as the insect in question, but the latter is a deliberate biter, while the insect that causes the trouble is very active in its movements, and moreover the *Stomoxys calcitrans* has a wide distribution over the whole world. Bung eye is, as far as I am aware a purely Australian affection.

T R A C H O M A.

With regard to the incidence of trachoma, one has an initial difficulty in drawing deductions from data which are, more or less, approximate, and where in the production of such, various misleading factors may be at work.

One has only to consider the huge mass of material dealing with the subject in general, the contrary results arrived at as to the aetiological factors of climatic, racial and social conditions, to approach the subject at all with the greatest diffidence. Treacher Collins sums up the discordant views that have been held on the matter, and incidentally draws his own conclusions in the following words:-

"Those who have to contend with the disease in hot arid countries, such as Arabia and Egypt, have attributed its wide dissemination to the dryness of the atmosphere and the dust; whilst those who had recorded its extreme frequency in damp countries, such as Finland and Ireland, have thought the moistness of the atmosphere and marshy character of the soil particularly favourable to its prevalence.

"The comparative freedom of the Swiss from trachoma led to the theory that an altitude of 200 metres was prejudicial to its spread. It has since been pointed out that there are several districts in Europe 400 and 600 metres above the sea-level

"where it is fairly prevalent, and the writer can  
"testify to its extreme frequency amongst the tribes  
"who inhabit the mountainous districts to the west  
"of Persia.

"The comparative infrequency of trachoma in  
"parts of France led some to regard the Celts as  
"enjoying a certain degree of immunity to the dis-  
"ease. On the other hand, its frequency amongst  
"the Irish has led to its being asserted that the  
"Celts are as a race particularly prone to be at-  
"tacked.

"The alleged predisposition of Jews to trach-  
"oma, which has been so strongly held by some in  
"this country, shrinks into insignificance when we  
"consider that the well-to-do Jew is as free from  
"the disease as his Christian neighbour, and that it  
"is in those who are wanderers on the face of the  
"earth, or who are herded together in the poorest  
"and dirtiest quarters of large towns in whom it is  
"so rife.

"Throughout Asia trachoma is found to be no  
"respector of race, the Aryan, Semitic, and Mongo-  
"lian suffering with equal and terrible frequency.

"Out of all the confusing and contradictory  
"observations which have been made in connection  
"with trachoma, the contagious character of the af-  
"fection stands to-day clear and undoubted." (5)

Trachoma has been endemic in New South Wales  
since the early days of settlement. According to  
Hirschberg <sup>6</sup> it was introduced by immigrants, al-  
though others have suggested that it spread down  
from the north through the Malays. There is cer-  
tainly a relation between its local prevalence and  
physiographical conditions.

Speaking in broad terms the physical features  
of New South Wales are determined by the Main Divid-  
ing Range which traverses the country from north to

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∅ In one place he says "immigrants" in another "convicts"

south, falling abruptly on the seaward side, and to the west merging into a central plateau, which in its turn slopes towards the Western Plains, the surface of the State ranging itself naturally into zones differing much in general character and aspect.

The coastal strip consists of well-watered fertile country, extending for an average of 50 miles from the seaboard to the foot-hills. Beyond the Great Dividing Range broad, high table-lands and undulating slopes form the chief pastoral districts of the State. The northern tableland is drained by tributaries of the Darling and Barwon, and the southern by the Murrumbidgee, both of which rivers flow into the Murray. Alternating conditions of drought and floods, chiefly drought, obtain on the western slope and plains, as during the hot weather all the rivers, except the Murray, dry up, and during the wet seasons miles of the lower lying country may be under water.

On the coastal strip we have the summer heat modified by prevailing north-easterly sea-winds. The dividing range robs the latter of their moisture

and deflects them from a horizontal to an ascending plain. There are no cloud condensing peaks in the interior, hence the further inland the greater are the extremes of heat, and temperatures of 130 degrees in the shade have been recorded on the Darling. Hot winds and dust-storms are the ordinary summer accompaniment.

With the object of getting some approximate idea of the relative incidence of the disease in different parts of the State, I have made an analysis of all the cases admitted for treatment to the Moorcliff Ophthalmic Branch of the Sydney Hospital for a period extending over five consecutive years, and the results are seen in the subjoined map and table:-

<u>State Divisions.</u>	<u>Percentage.</u>	<u>Average Rainfall.</u>
North Coast ... ..	0.709	56.78
South Coast ... ..	2.86	38.87
Hunter & Manning ... ..	3.22	40.11
Southern Tableland ..	4.12	27.22
Riverina ... ..	5.55	16.27
Northern Tableland...	6.63	34.06
Central Tableland ...	8.24	30.93

Central Western Slope ... ..	8.24	25.21
North-western Plains ... ..	10.03	20.42
North-western Slope ... ..	10.21	27.79
South-western Slope ... ..	10.57	24.67
Central-western Plains .. ..	10.75	18.75
Western Division ... ..	18.81	13.02

The Analysis comprised 3318 cases of admission of which 762 were cases of trachoma.

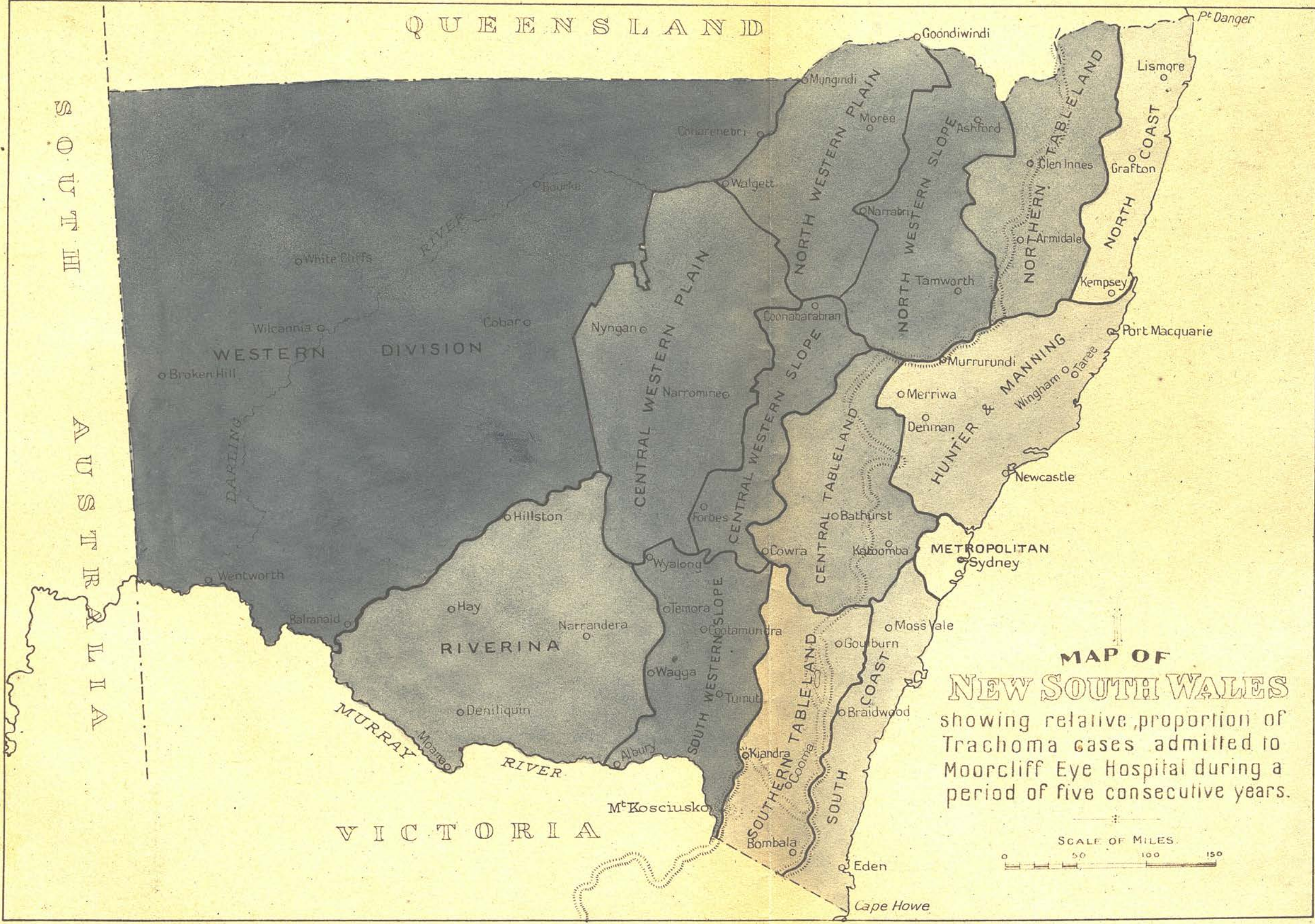
From these statistics I have left out the County of Cumberland, including the metropolitan area (numbering 215 cases) owing to the fact that many patients entered as coming from the latter had only recently come to Sydney with a view to treatment, and belonged to various country districts.

It is to be noted that there is a relative increase in incidence in going from east to west, and that the incidence and rainfall are almost in inverse ratio throughout. A notable exception, however, is seen in those parts of the State adjoining Victoria, where the trend of travel might be in other directions than towards Sydney.

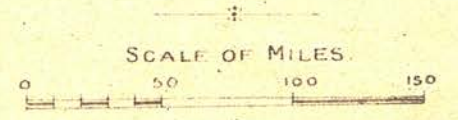
With the distribution of trachoma in the other

QUEENSLAND

SOUTH AUSTRALIA



**MAP OF  
NEW SOUTH WALES**  
showing relative proportion of  
Trachoma cases admitted to  
Moorcliff Eye Hospital during a  
period of five consecutive years.



VICTORIA

Cape Howe



States of the Commonwealth I wish to deal very briefly. The general principle of comparative immunity of the coastal strips and of increasing incidence on going further inland towards the great Austral Plain applies (with some modifications as to degree) more or less to all the States. The Main Dividing Range is continued up through Queensland parallel to the coast and I can speak from personal experience of the numbers of cases of trachoma in the Western portions of that State, compared with their sparseness in the Eastern portions. Recent examination of school children has brought this out statistically.<sup>7</sup>

From the physical configuration of the State of Victoria the trend is to the North and North West as shown by Barrett and Orr. ( 8 ) In a map prepared by them the deepest shading is adjoining the parts of New South Wales which in my map have a shade lighter than the real incidence warrants, through facilities of communication presumably taking many cases to Melbourne. My personal knowledge of cases met with in private practice coming from Hay and Narrandera (in the Riverina) bears this statement out.

In South Australia I found the most and the worst cases came from the North. There is an abrupt change in the character of the country near the head of Spencer's Gulf, about a hundred and fifty miles North of Adelaide, as was pointed out fifty years ago by a former Surveyor General of South Australia, named Goyder (who did much towards perfecting physiological knowledge of the then little known interior) The contrast is so definite that an imaginary line, to which his name is given, running to the New South Wales border sharply defines the arid barren Northern portions with its scanty and uncertain rainfall from the actively and potentially productive Southern or coastal portion having a fair average rainfall. It was from the North of this line and from the New South Wales border, especially from the Broken Hill district (x)<sup>x</sup> that cases came to the Adelaide Hospital that were a veritable heartbreak.

Compared with Sydney and its moist heat Adelaide itself, though only a few miles from the coast, has a dry heat in summer and hot winds and dust storms are very frequent.

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(x)<sup>x</sup> Broken Hill, though in New South Wales has its outlet to Adelaide by means of direct railway communication.

The contrast in climatic conditions is seen in the following figures:-

	<u>Sydney.</u>	<u>Adelaide.</u>
Average rainfall	48.80	20.89
Mean humidity	73.	56.
Evaporation	37.42	54.97

In Sydney one seems to get some help from the climate alone towards the bettering of patients, in Adelaide this help seemed to be largely lacking.

The hilly district of Mount Gambier to the South of Adelaide and close to the coast had, however, a great reputation of being conducive to improvement in this respect. Some years before I was in Adelaide, a medical man whom I knew - now a leading ophthalmic surgeon in a large centre - was credited with being largely helped by the climate of this district, in which he then practised, for his successful treatment of trachoma cases that had come down from the interior.

With the distribution of trachoma in Western Australia I have no personal knowledge but I find that Hope ( 9 ) remarks on the greater increase of

the incidence of trachoma inland from Perth.

In Tasmania with its climate approximating that of the South of England trachoma is practically non-existent, Dr. Gertrude Halley<sup>10</sup> in a medical examination of 12,000 school children found only one case. The infrequency of trachoma in Tasmania has been used as an argument to discredit Hirschberg's statement as to the convicts having conveyed it to Australia. As a matter of fact it would merely seem to bear out the supposition that in the one case the virus found congenial surroundings for its growth, in the other it did not.

Turning again to the question of aetiology, most European authorities lay down that trachoma is a contagious disease spread by contact, contagiousness varying according to the amount of discharge, that family life is the chief means by which the disease is spread, and that those most subject to the disease are "weak, delicate people with pale faces, flabby muscles, and narrow chests" (von Graefe).

Accepting this as amply proved with regard to trachoma in Europe, there are certain circumstances that considerably modify these dicta as applying to our local variety of the disease. For one thing it is much more common to find it attacking people in robust health, and external determining conditions bulk much more largely as factors. There is no doubt cachexia is to be found in advanced cases, but this is rather a result than a causal factor. The patient is helpless and unable to get about and get sufficient exercise and the general health suffers accordingly. A priori, on anatomical grounds, a scrofulous individual with a loose connective tissue reticulum in the conjunctiva tending to the

the formation of adenoid tissue, and whose conjunctiva, being loose and rough, affords a nidus for the disease, ought to be less immune than one whose conjunctiva is smooth and allows no such foothold, but the close association of trachoma and the scrofulous diathesis is not to be observed here with the same frequency as it is in Europe.

Further, it is not exclusively a disease of the proletariat, but affects all classes of the community from the well-to-do squatter to the labourer. True, the more disastrous sequelae are generally found in the lower grades of the social scale, but that is largely due to neglect until the symptoms are so pressing that the following of an occupation is interfered with. The treatment of early trachoma forms a considerable part of private practice, but operations for entropion and trichiasis are proportionately very rare compared with those met with in hospital practice.

That the family is the seat of the disease is a point which has been again and again emphasised by European writers, community of towels, handkerchiefs, pillow slips and washing utensils being

regarded as the unfailing means of communication in the long run. Yet admitting the soundness and importance of the conclusion as making for the practice of cleanliness, one may doubt whether in our local conditions this factor is quite as active a one as in some other parts of the world.

I can recall the case of two brothers, the elder of whom had had trachoma for years, having acquired it in the West. The condition according to the history had been in an active state for several months and the eyes had been freely discharging. He had not had any medical attention within a recent date, merely using some drops ordered for him by a doctor when his eyes got bad first. All the time since his return to Sydney, nearly a year previous to my seeing him, he had shared the same bedroom with a younger brother, and they practically shared everything in common, no attempt being made at keeping towels, etc., separate. The elder youth was advised to have operative treatment and was removed to hospital. Some months later I saw the younger brother for a refractive error and found his conjunctivae .....

perfectly healthy. Since his brother went to hospital he had lived in another part of Sydney. I did not see the younger brother for nearly three years when he came back from the West, where he had lived for several months, with well-marked symptoms of acute trachoma. I quote this case because it appears to show that external determining conditions play at least as important a part in the disease being acquired as the mere contiguity with infected individuals. As far as the probability of infection was concerned the younger brother had every chance of being infected, but had absolutely escaped, but when exposed to conditions similar to those to which his brother had been subjected he readily acquired the disease.

I have met with somewhat similar instances, but in the one given the sequence of events is very definite.

The principal external determining conditions are glare, dry heat, dust and flies. How far the influence of dust is purely irritative and how far it is a carrier of infection it is



hard to say (it has never been absolutely proved that the trachoma virus has an ectogenic existence), or can much distinction be drawn between the dust of the black soil and sandy districts. The black soil takes longer to disintegrate, but once it has done so it forms a very voluminous dust.

The sea coast and low lying ground in its neighbourhood, which is so prolific of trachoma in many countries, is here comparatively immune.

How far the irritating effect of external physical and mechanical agencies contribute to the increase of contagion by heightening the respective susceptibility of the one individual and the contagiousness of another, and how far the contagion from individuals is direct or indirect by means of flies, etc., is doubtful. But there is abundant evidence that residence in particular areas is the common condition under which the disease is acquired, and that an infected individual if removed to a more favourable area is not necessarily a very virulent focus for the spread of the disease, even when his

symptoms are active.

I do not propose to say anything in this connection as to the practical bearing of the very important research work recently done in the aetiology of trachoma by various investigators, especially by Halberstadt and von Prowazek. But I would like to refer to the suggestive and attractive theory advanced by Eaton.<sup>12</sup> Eaton considers trachoma to be a blood infection caused by organisms which he calls "protoplasmic bodies."

"They are of two kinds, exogenous and endogenous, and enter the circulation through the palpebral conjunctiva. The life-cycle of the exogenous parasite is completed in the blood and tissues of certain animals and birds, and is carried to the human conjunctiva by the legs, bodies, etc., of insects. The endogenous parasite is infective from one human being to another. Trachoma is found in two forms, clinically indistinguishable but biologically different. The contagious form is caused by the endogenous parasite, the non-contagious by the exogenous parasite."<sup>13</sup>

If this theory has grounds of confirmation it might explain some of the anomalies of transmission.

The bush fly (*Musca vetustissima*) found in the drier parts of the interior does not, it may be said, usually come into the houses, and invariably in its search for moisture makes more directly for the eye

than the ordinary house-fly.

Lieut. Colonel Yarr, R.A.M.C.,<sup>14</sup>, holds very strong views on racial influence. He considers it by far the most dominant factor, followed, but long intervals, by climate, all other considerations being very subsidiary. Absolute immunity has been claimed for the Canadian indigenous tribes, including the Esquimaux, whose living conditions are in every way favourable to the spread of the disease. Full-blooded negroes enjoy a relative immunity as compared with the whites; and in the United States the immunity is said to be almost absolute. Swan Burnett gave a notable instance of this in a paper read at the International Congress in Ophthalmology, New York, in 1876, where he showed that in the construction of a railway in Tennessee, negro labourers remained quite free from trachoma, while living side by side and working under the same conditions as whites, who were severely affected. The receptive white races are generally stated to be Jews, Poles, Italians and Celtic Irish.

In a young country, whose population is composed of the fusion of race stocks, it is difficult

to estimate them. As most of the patients in question are Australian natives, the only guide to the parent stock, apart from individual inquiry, is the name, and this is a very broken reed to lean on. I made an attempt to estimate the proportion of nationality on this basis, but on coming to the name of one patient who had very pronounced trachoma, and remembering something about his case, I became discouraged. His name was Hector MacGregor, and he was a coal black negro (x)<sup>x</sup>. If there is a slight preponderance of Irish Celtic names, that might be put down as much to occupation as to enhanced receptivity, large numbers of that nationality being employed in out-door pursuits, just as another receptive race - the Jews - usually find occupation in the towns. The Chinese seen in Sydney seem especially prone to corneal complications quite out of proportion to the palpebral findings. Cases are met with amongst aboriginals, who are certainly not immune from the disease, but on the other hand appear rather less inclined to it than whites.

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(x)<sup>x</sup> In any case he proved the rule that a member of an immune race is not necessarily immune when removed to another climate.

The clinical picture is with one exception practically the same as described in all the textbooks, and the disease runs through the classical stages of lymphoid infiltration of the conjunctiva and the formation of the typical follicles followed by destructive changes in the conjunctiva, accompanied by corneal complications and leading to the formation of fibrous tissue with deformity of the lids, misplacement of the lashes, and other sequelae.

The whole body of authoritative opinion, as expressed in textbooks, states with great definiteness that the disease has its usual commencement in the retrotarsal folds.

Thus:-

"Clinical experience has established the fact that the formation of granulations is for a long time confined to the retrotarsal folds." (Boldt) 15.

"They (the trachoma granules) are formed principally in the retrotarsal folds". (Fuchs) 16.

"The chief focus of disease is always in the superior cul-de-sac". (Darier) 17.

My personal observation of cases examined locally has been that while the maximum of pathological change in the proliferative stage, is at the junction of the tarsal conjunctiva and the cul-de-sac, the latter in the bulk of instances may be

found after careful examination perfectly healthy. I have noted this for several years, and am not aware whether others have made similar observations. I once examined a series of cases with a view to arriving at some approximate result as to frequency, and out of 50 found as follows:-

13 cul-de-sac affected.  
10 doubtfully affected,  
27 quite healthy.

I record the above as a pure matter of personal observation, and I do not consider the figures quoted as sufficient to form a conclusion as to the proportion of cases in which an unaffected cul-de-sac occurs in well-marked trachoma. I will content myself by saying that it occurs in a large number of cases.(x)<sup>x</sup>

The only comment on this I have to make is a practical one, viz:- that excision of the cul-de-sac in such cases as a method of treatment is quite unsuitable by sacrificing healthy conjunctiva. This treatment, however, which had a vogue some 15 years

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(x)<sup>x</sup> I have just completed the examination of a second series of fifty cases with the following result:-

In 10 cul-de-sac affected,  
" 9 " " " doubtfully affected.  
" 31 " " " quite healthy.

ago, seems to have fallen into the background even in cases in which it might have an application.

TREATMENT OF TRACHOMA.

In cases where surgical interference is indicated I find expression with Knapp's roller forceps gives the best results for routine treatment, a sharp Beer's knife being used to prick the follicles before manipulating the rollers. General anaesthesia is a great aid to the thoroughness of the operation, even in an adult. After operation the conjunctival surface is vigorously scrubbed with a swab soaked in Hydrarg. Perchlor. (1-500). Sterilised vaseline is

placed between the lids and the eyes bandaged for twenty-four hours, when the Perchloride application reduced to (1 in 1000) is repeated to the everted lids but with less vigour than on the former occasion and the eyes are covered with a hanging pad or a shade. The same application is continued once daily for about ten days or a fortnight when Silver Nitrate (gr.X to oz.Ī ) is substituted and continued once daily for some weeks.

With pannus itself I do not deal surgically and have long abandoned peritomy as of little or no use in such cases. But if on using fluorescin I find the tiniest pin point of staining on the vascularised cornea I invariably give a light touch with the electro cautery with very manifest improvement of the patient's symptoms.

Nearly twenty years ago Symons of Adelaide introduced the use of pure Liq. Sodae Ethylatis with the view of shortening the stages of a case going on to cicatrization. I have seen him use it frequently and used it myself for some time with considerable success. Its method of application



was in a way a tour de force of finesse. The lids being everted and held in position by the left hand so that the cornea is completely protected the application was made by a glass rod held between the fourth and fifth fingers of the right hand. The excess was at once removed by a swab held between the thumb and fore-finger of the same hand and an application of vaseline made by the middle finger followed, every digit thus having some thing to do.

Certainly if one were to use solutions of caustic strength it is as efficient and painless as one could apply but even in the stages when the papillary and follicular proliferation have lost distinction and blended into a more or less uniformly thickened surface, manipulation with the rollers followed by the perchloride rubbing seems to give better results.

Having had ample opportunity of weighing the relative value of the host of operations devised for entropion and trichiasis of the upper lid, I have no hesitation in deciding in favour of those in which the mucous membrane from the lip is introduced, over wedge operations or those like ....

Dianoux's, where a strip of skin is transposed with the lash bearing tissue. Against the former is the fact that their usefulness is limited to cases where the central area of the lid margin is affected, as it is only there that the version of the wedge is complete, and wedge operations are not applicable to misplaced lashes near the canthi.

Where the skin from the lid takes the place of the misplaced lashes I generally find that though surgically the operation is a neat one and gives a pretty result the patients complain almost as much of the irritation of the fine downy hairs of the skin as they did of the misplaced lashes.

For several years I used to find a Burow a most serviceable operation in giving a good result, with the minimum of mutilation. In some cases I inserted the stitches as recommended, in others I passed a probe through the incision down to the skin every day for four days.

This operation, however, is not sufficiently permanent in advanced cases of entropion and in 1896 my senior colleague, Dr. Odillo Maher,<sup>φ</sup> suggested

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Late Hon. Ophthalmic Surgeon, Sydney Hospital.

putting a strip of mucous membrane from the lip in the gap and keeping it in position by sutures knotted on the mucous membrane aspect and brought through the skin of the lid where they are tied.

Dr. Maher has described his method fully in the Archives of Ophthalmology<sup>11</sup> but as the diagram does not show the stitches emerging in the skin surface, it is not fully intelligible.

I have performed this operation on several hundred cases during the last fourteen years and have every reason to be satisfied with it. The flap takes readily - I have hardly ever known it to fail - and the cosmetic result is excellent. A slight modification that I make is to continue the incision externally right out to the junction with the skin at the neighbourhood of the outer canthus and to place the external stitch as far externally as possible. This takes the place of a canthoplasty, if it has not been done before and accentuates its effect if it has. I usually, however, do a canthoplasty as a preliminary operation. To facilitate removing the mucous membrane strips from the mouth I have had a clamp made on lines similar to Snellen's

for the lids but larger and with a stronger screw, the under surface of the portion applied to the mucous membrane being deeply grooved, to prevent slipping. The removal of the strips and the stitching up of the wound can thus be done without an assistant and without troublesome bleeding.

With regard to marked entropion and trichiasis of the lower lid, having done a canthoplasty my procedure is to make a vertical incision through the tarsus in the intermarginal space through the whole length of the lid of from 4 to 5 mm. depth having the cilia in front and the mucous membrane behind. Two vertical incisions through the skin surface are then made at the outer and inner extremities of the first incision and extending down equally far, taking care that the inner incision is external to the punctum. By hinging down the cilia-carrying tissue a plateau is formed like an opened book. An elliptical portion of skin with a portion of orbicularis muscle is next removed as in the operation for spasmodic entropion and the lashes kept in position by three stitches. The immediate effect is not particularly sightly and the object aimed at

appears to be grossly overdone but as cicatrization takes place the result is good cosmetically and effective in removing the trichiasis. I have tried inserting mucous membrane flaps here but found on the whole that I got as good if not better results without.

I am not aware whether this method has ever been described or adopted by others. I have never, at any rate, seen an account of it.

I confess, however, that an operation suitable for cases where electrolysis is inapplicable and where an operation as drastic as that described above is not indicated, is still to seek.

Ophthalmic literature seems singularly barren of suggestion on the point.

Operations for trachoma and its sequelae form an average of 16.89 per cent. of the total of eye operations at the Sydney Hospital, compared with an average of from 5 to 1 per cent. in British hospitals.

With a succession of good seasons there has been a marked diminution in the cases of trachoma admittance.

One now and then comes across patients who have spent several years in Fiji, and stated that they have suffered from a conjunctival affection called "thika". In the cases I have seen of this there has been a certain amount of scarring in the upper lid, but the most marked changes have been in the lower, the latter being drawn downwards and outwards, especially in the neighbourhood of the outer canthus. I have never seen the disease in the recent state.

#### P T E R Y G I U M.

Pterygium is described by the text-books as being due to heat, dust, wind, and residence in tropical climates. It is common in New South Wales and in Australia generally. Symons, of Adelaide,<sup>18</sup> considers the condition to be mainly due to too rapid evaporation of moisture from the conjunctival surface. In the Moorcliff operation lists for eight years 201 cases were operated on

out of a total of 4115 operations, an average of 25 yearly, or 4.88 per cent. This is in marked contrast to the complete absence of it, or stray cases at most, that occur in the home hospitals. In occurrence it does not follow the prevalence in distribution of trachoma, but is common in the coastal districts, and I have noticed it frequently in those engaged in the coastal shipping trade. This is rather against the dust irritation and evaporation theory as to causation in New South Wales at any rate, as the coastal air is moist but I think wind is largely the factor to be considered. As to corneal ulceration playing a part with regard to the encroachment on the cornea I have never been able to satisfy myself as to its actual presence but once the growth is sufficiently above the level of the surrounding interpalpebral conjunctival area, the nipping by the lids is easily demonstrable as a cause of further growth as being compressed vertically it tends to expand longitudinally in the line of least resistance, i.e. towards the centre of the cornea. It is, on the whole, uncommon to find trachoma and

pterygium in the same individual. It is extremely rare amongst aboriginals, if it occurs at all, even where their external conditions favour its appearance. I have never seen a case in an aboriginal, and Symons after examining several hundred aboriginals in South Australia with this specific object failed to find a single instance, although he found a small one in a half caste.

With regard to operations I have tried the various operations recommended for removal by stitches, excision, etc., and prefer complete simple excision for the smaller ones, seizing the apex with forceps at the limbus and raising it up so that the point of a Beer's knife can be inserted under it and made to cut from the periphery towards the centre of the cornea, the pterygium head being meanwhile held taut with the forceps. For large fleshy ones I find a method suggested by Evans (p 19) and not mentioned in any text books, of great service and yielding an excellent result. The pterygium is dissected off the cornea, and then dissected cleanly back to the base, then a median horizontal incision made through it

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to its base and the lower portion removed by a vertical cut at the base. (In miniature as in the first stage of Whitehead's operation for partial excision of the tongue). The apex of the upper portion is then united to the root of the lower half by stitches and the conjunctiva freed and brought together by stitches as seen in the accompanying illustration.\* The ultimate effect both cosmetically and as preventing recurrence is excellent.

#### SPRING CATARRH.

Spring Catarrh is comparatively rare, and the palpebral variety with characteristic "Giant's Causeway" formation is more common than the circumcorneal type. The former is very often confused with trachoma. The two conditions are rarely found to occur typically in the same individual. The cases I have met with have nearly all been from the coastal region, and the symptoms have been markedly worse during the warm weather. I have seen one case with a typical ovoid plaque on the bulbar conjunctiva, some distance from the limbus similar to a case

\* See Page 39

recorded by Trantas.<sup>20</sup> I have seen a second case combined with lymphangectasis and of so unique a nature that a brief description may be given of it.

R.F. aged 3 was first seen by me in 1896, with the history that the condition in the R.E. had been noticed two months previously. There was no evidence of tubercle in the family history.

On examination the whole bulbar conjunctiva was studded with the clear bead-like blebs characteristic of lymphangectasis, the condition extending to both cul-de-sacs and suggesting in its appearance the worked chair seat seen in Middle Victorian drawing rooms. In portions the blebs were redundant and hung in festoons like miniature bunches of grapes. In striking contrast to these blebs in size and appearance were a large number of sago-grain looking bodies studding the limbus and forming a complete ring round the cornea. The cornea and palpebral conjunctiva were unaffected and the eye otherwise normal as was also the left eye.

I had the case under observation for a long time removing as much of the lymphangectasis as possible with the minimum of conjunctiva. The portions removed showed dilated lymphatic tissue only. Later on I tried electrolysis with no result.

I lost sight of the case for many years when some weeks ago he came to see me again. He is now 17 years old and the present condition is admirably shown in the photograph my junior colleague Dr. D'Ombra has been kind enough to take for me. The lymphangectasis has largely disappeared being replaced by a more uniform thickening of the bulbar conjunctiva. The circumcorneal condition is a little less uniform than it was fifteen years ago but is otherwise unchanged. Though apparently succulent the elevations are densely tough and fibrous. The eye is otherwise normal and the sight good.

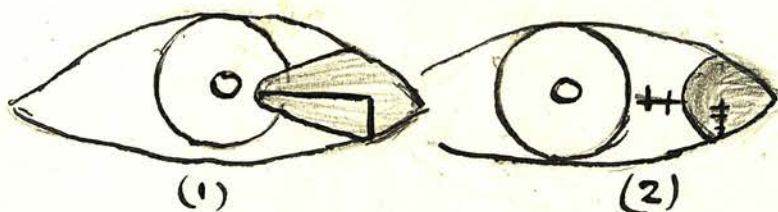
I showed the case recently to a number of ophthalmic surgeons, none of whom had ever seen anything at all similar.

My present intention is to try the effect of radium.



R.F. Case of Spring Catarrh (?)  
combined with lymphangectasis.

Diagram illustrating Evans' operation  
for pterygium.



PHLYCTENULAR CONJUNCTIVITIS is much less frequently met with here than in London clinics. Without being able to give the exact figures, I have from my experience of out-patients practice at the Sydney Hospital and the Royal Alexandra Hospital computed the proportion at about one-third. T.K.Hamilton<sup>21</sup> records its very great rarity in South Australia, having only seen a dozen cases in five years.

HYPOPYON KERATITIS:- In an analysis of one hundred cases I found that over 50 per cent. either were miners from the coal districts or were otherwise occupied in connection with coal.

LAMELLAR CATARACT:- In 1894 Treacher Collins<sup>22</sup> made an enquiry into the relative frequency of the incidence of rachitis and lamellar cataract in Australia, and from the information he gathered from the various States, he formed the following conclusion -

"To sum up; then, the evidence I have gathered goes to show that in Adelaide rickets is a rare disease, and lamellar cataract very infrequent"  
"In Melbourne rickets was until recently comparatively rare, that it is more common now, but that the severity of the affection is much less than in the old world; lamellar cataract is exceedingly rare, and the honeycombed condition of

"the enamel of the teeth is not often met with."

"In Sydney, the oldest city in Australia, rickets is said to be as common as in England, but I have no statement as to its comparative severity; lamellar cataract is less frequent than in this country."

After sifting the Moorcliff returns and differentiating the lamellar form from other congenital forms, there appear to have been 20 cases admitted for treatment in five years, each name being counted only once, and re-admissions not considered. This gives an average of 4 annually, or .602 per cent., of all cases admitted during five years compared with 2.31 per cent., admissions to Moorfields and .13 per cent., and .08 per cent., to the Bradford and Manchester Eye Hospitals respectively.

The incidence of rickets and lamellar cataract is undoubtedly less than in London. Dr. Litchfield<sup>23</sup> of this city, after an analysis of out-patient attendances at the Royal Alexandra Hospital, concluded that rickets was not a common disease, and that when it occurred in Sydney it was generally of a mild type, enlargement of the long bones being rare in the active stage and severe deformity of the bones rare in the later stages.

In the cases of lamellar cataract I have met with I have usually found some evidence of rickets, a rosary chest being by far the most frequent, but the grosser changes have always been absent. A single family may very materially swell the number of cases. I have operated on five members of one family, and Dr. Odillo Maher records more than one similar instance.

I have only seen one case at the Royal Alexandra Hospital for Children. Symons<sup>22</sup> found that in the Adelaide Hospital, with an average of over 2000 cases annually there were only <sup>of nephritis and three</sup> three cases of lamellar cataract in 17 years. In the course of eight months, during which I took Dr. Symon's work at the Adelaide Hospital and the Adelaide Children's Hospital, I never met with a case of lamellar cataract, and prior to that R.H. Jones,<sup>24</sup> who was house surgeon at the Adelaide Hospital, met with a similar experience.

The immunity of South Australia is probably due to the high standard of physical well-being that has marked that community since its earliest settlement.

SENILE CATARACT does not appear to show any particular characteristics, although it has been surmised by some writers that its incidence is earlier.

I found the average age of 391 cases ready for operation to be 64. Even by taking some years off this to allow for the difference between incipience and maturity, this age of incidence is not unduly early. I have, however, seen advanced senile cataract in an aboriginal and also in a Bengalee (who had lived in New South Wales since childhood) both being under 40. Early incidence appears to be largely influenced by racial consideration. Headgear, however, has also to be taken into account, the white races usually wearing more protection from direct sunlight.

Strong sunlight, direct or reflected, may affect the deeper portions of the eye, either primarily or secondarily. I have only seen one case of definite macular changes (fine tick points accompanied by metamorphopsia) where exposure to direct or reflected sunlight could be considered as a possible cause but in the following cases the



cause is more definite.

INSOLATION:- After a heat wave of notable intensity some years ago, I saw a young man between 30 and 35 years of age, who was engaged in farming some 200 miles from Sydney. He stated that on the second day of the heat wave he had been going about his work as usual, when he was seized with a violent pain in the head. He was put to bed and seen by the local medical man, who told him he had had a "touch of the sun". Besides the intense headache, he had numbness and tingling in the hands and some twitching of the lower limbs. His symptoms gradually subsided, but with this improvement, he noticed that his sight, which soon after the onset of his illness he had noticed to be impaired, had, instead of improving *pari passu* with his general health, on the contrary got worse, and when well enough to travel he had come to Sydney for further advice.

R.V. Fingers at 2m. not improved.

L.V. do.

Pupils equal, active.

Ophthalmoscopic Examinations:- Moderate but

quite definite optic neuritis present in each eye, more pronounced in the left. No retinal haemorrhages or extensive exudation, and changes limited to vicinity of discs.

Medical examination showed a slight exaggeration of reflexes, but nothing else abnormal, and there was no albumen or sugar in the urine. He was a married man with a family of four. His wife had had no miscarriages or still births.

The condition improved slowly, and the appearances of the discs were practically normal in six or eight weeks by which time his vision had come up to  $\frac{6}{12}$  lett  $\frac{6}{9}$  lett in each eye.

I think the above was an undoubted case of optic neuritis, secondary to a meningitis caused by insolation.

One meets with occasional records of such cases more in the American Journals than anywhere else. The only two cases that I have seen recorded in Australasia have been by Lindo Ferguson <sup>25</sup> and they occurred in New Zealand - one in a sailor followed by post-neuritic atrophy, and another in a child, who made a complete recovery.

NIGHT BLINDNESS is a condition which undoubtedly occurs with some frequency in the western portions of the State, although it is only now and then that a typical case comes under observation. I have had the opportunity of examining two cases occurring in bushmen. The first case, A.J. aged 34 employed on a station several miles beyond Bourke, complained that, although still seeing fairly well through the day, his site was not as good as it formerly was. At night, however, he saw so badly that he could not trust himself to get about alone. He was a powerfully-built and apparently well-nourished man, but gave a history of having for many weeks previously been living almost exclusively on "corned horse", without any vegetable variation, and had been travelling for long distances without food and exposed to the glare of the summer sun reflected from the plains. There was no history of malaria.

Vision  $\frac{6}{12}$  lett  $\frac{6}{9}$  lett in each eye, not improved by glasses.

On reducing the illumination the vision suffered a quite abnormal reduction. Had no central scotomata. The fields for white were full

on a first examination, but on immediately repeating the examination showed concentric contraction, evidencing retinal fatigue. The fields for red and green were markedly contracted, especially the red which lay within the green field within each eye. The palpebral conjunctivae showed some scarring from old granular trouble, but the inter-palpebral area was perfectly healthy, and any signs of epithelial xerosis were quite absent. The cornea were clear. Ophthalmoscopic examination was completely negative. The retinal reflexes did not appear to be increased either round the nasal margin of the disc or elsewhere.

M.K. aged 40, who came from the Queensland border near Cunnamulla, had similar symptoms and a very similar history. Had a less robust physique and was obviously out of condition. He had, however, no definite scorbutic symptoms. His vision was

R.V.  $\frac{6}{12}$  lett, not improved by glasses.

L.V.  $\frac{6}{18}$  lett, do.

The fields for white were not contracted, but further examination induced contracted fatigue fields. The fields for red and green were contracted.

the red lying partly within the green, but the inversion was not complete. The palpebral conjunctivæ were hyperaemic, but otherwise showed nothing of note, and the inter-palpebral areas were healthy. The corneæ and media were clear. Ophthalmoscopic examination showed the discs to be slightly on the pale side, but not outside physiological limits. The retinal reflexes were not increased.

Both patients were ordered iron and strychnine, a mixed diet with abundance of fresh fruit and vegetables, and the wearing of tinted glasses. They improved rapidly while under observation, but had to leave Sydney before completely cured. A case somewhat similar to the above is recorded by T.K. Hamilton<sup>26</sup> as occurring in South Australia.

Night blindness has in recent years been chiefly considered in connection with xerosis of the conjunctiva, and one would gather that it is exceptional for one or other condition to exist separately. The relation between the two conditions has been exhaustively dealt with by Sydney Stephenson.<sup>27</sup>

The characteristic changes in epithelial xerosis consist of greasy, glistening, dry-looking patches occurring on that part of the bulbar conjunctiva not ordinarily covered by the lids. The spots are slightly raised and not wetted by the tears and rod shaped bacilli with rounded ends are found on the surface of the epithelial cells.

Stephenson after an elaborate investigation was unable to establish any causal relation between the bacilli and the conjunctival condition, but showed that they were invariably found in the characteristic silvery grey conjunctival spots.

With the majority of cases, night blindness was a concomitant, and he concluded with Sæmisch and Leber that xerosis and hemeralopia occur so frequently side by side that the association between them is likely to be something more than merely accidental. According to Fuchs, however, xerosis of the conjunctiva has no other connection with torpor retinae than that both are symptoms of a reduced state of nutrition of the eyeball. Fuchs further considers that the general health is the main cause of hemeralopia and discounts the effects of dazzling

by a bright light. But in this connection he is dealing chiefly with European conditions, especially with the epidemic hemeralopia which occurs in Russia during the long Easter fast (for which the routine treatment is cooked liver).

In the cases I have quoted the points of interest are :-

1st. The constitutional cause, chiefly dietetic in origin, tending to a scorbutic condition, though symptoms of this last were not definitely pronounced.

2nd. Long exposure to glare as an undoubted determining cause.

3rd. The typical symptoms of hemeralopia, especially the fatigue field and the contraction of the fields for red and green, and the inversion of the red and green fields - complete in the one case and partial in the other.

4th. The absence of any sign of epithelial xerosis.

An examination of the blood was made in the second case and showed a reduction of haemoglobin.

RETINITIS PIGMENTOSA.

A curious survival of the restricted intercourse that was the lot of the earlier settler in certain parts of the State has in two instances at least been brought to my knowledge.

In the early days one or two families-often related to each other in the first instance-had made their homes in remote parts of the State and remained for many years practically isolated from the rest of the world until with increased means of communication and further settlement they have been brought more in touch with their fellows. Meanwhile they had married and given in marriage solely among their own kith and kin, and the results of consanguinity were seen in the third generation. In one small hamlet on one of the Northern Rivers I found three instances of Retinitis Pigmentosa in one family, with a history of three cousins - one first and two second being affected, and a further history of various members of the previous, or second, generation having night blindness. In another hamlet among the mountains in the



South of the State I examined two of the members of a family with typical Retinitis Pigmentosa and an equally definite history of a similar condition obtaining among cousins and aunts.

**MALARIAL AFFECTIONS:-** From time to time one meets with patients domiciled in Sydney but who have lived for periods on one or other of the islands in the tropical belt and acquired the so-called "Island fever" (which is generally tertian ague), and as a result have eye complications.

Supraorbital Neuralgia with conjunctival injection is fairly frequent in such cases, and under treatment the prognosis good, though recurrences are apt to take place. Retinal haemorrhage without other changes are also to be found. I have seen them chiefly round the disc. Optic neuritis of a very marked type also occurs either with or without inflammatory changes in the anterior part of the globe.

I had last year one case under my care of a European interested in the pearl-fishing industry, who had first an optic neuritis in the right eye, followed by very marked reduction of vision (to barely p.l. with haemorrhages round the disc). The

condition was beginning to clear up slowly when the left disc became affected and similar appearances developed. Then a few weeks later iritis developed in the right eye. Contrary to expectation he made an almost complete recovery both as to the fundus appearances and restoration of vision. The latter with correction came up to  $\frac{6}{6}$  in each eye. As far as the history went it was definitely malarial, and no other cause, specific or otherwise, could be assigned.

I find that a favourable prognosis as regards vision is a characteristic of this form of optic neuritis. Sulzer<sup>28</sup> refers to it, and Macnamara<sup>29</sup> describes a case where vision came up from perception of light to normal. Iritis due to malaria is mentioned as a rare complication by Deadrick<sup>30</sup> and by Knies<sup>31</sup>. None of the authorities that I have seen refers to a very striking complication to which my attention was first called by the late Dr. Evans, viz., a very pronounced irido-cyclitis, with intense ciliary tenderness, turbid vitreous, a hazy cornea, a slight rise of tension, and, later, keratitis punctata.

The malarial history in the above case was very definite case and other constitutional causes could be excluded. I have seen four or five similar cases since, In one case both eyes were effected, and in the other the condition was monocular.

DENDRITIC ULCERATION OF THE CORNEA I have found very frequently to be met with in New South Wales. In an analysis I made of eighteen consecutive cases I found a definite history of malaria in six, in four a history of prolonged residence in the tropics, but without any clear history of malarial attacks. The remainder had spent the most of their lives in New South Wales, but shortly antecedent to the trouble had had acute febrile attacks apparently of an influenzal nature.

HYDATIDS:- With reference to hydatids in connection with the eye and adnexa, my own experience is limited to two cases.

The first, a very unique case of the cyst floating free in the anterior chamber of a child six years old, was shown me by Dr. Evans, under

whose care the case was. The cyst had a diameter of 3 mm. to 4 mm. It was in contact with the cornea in front, its posterior wall touching the lense, and during accommodation its contour became flattened. The cyst was removed through an upward corneal section, and the child made an excellent recovery with good vision.<sup>32</sup>

The other case was that of an unilocular cyst which I removed from the upper and inner part of the orbit of a child 12 years of age. The cyst was causing displacement of the eye downwards and outwards, a very pronounced optic neuritis and reduction of V. to p.l. A year after removal of the cyst the eye showed little difference in appearance from its fellow, the optic neuritis had entirely subsided, and the vision in the eye was  $\frac{6}{18}$ .

Dr. Pockley<sup>o</sup> tells me he once had a case of an hydatid growing in the socket from which an eye had previously been enucleated. If it could have been left it would have given admirable support to an artificial eye.

Dr. Maher tells me he has removed three sub-conjunctival cysts in succession from the lower

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o Hon. Ophthalmic Surgeon, Royal Prince Alfred Hospital.

cul-de-sac of one patient.

FILARIA LOA:- Most of our knowledge of this West African importation is the result of investigation made by Argyll Robertson <sup>33</sup> fifteen years ago. I only know of one case being met with in New South Wales, and here, though the history and description of the symptoms as given by the patient were quite definite and typical, the worm always kept discreetly away from the anterior parts of the eye when under medical observation. Its movements under the conjunctiva, however, were often quite apparent to the patient's friends. A few cases are recorded in other states. In 1874 Tassie (34) gave a minute and graphic description of his removing from under the ocular conjunctiva what appears to have been a F.Loa, though he was unable to give a name to his capture. Barrett <sup>35</sup> also makes reference to two cases.

TICK POISONING:- A child of ten was brought to me some years ago with an enormous degree of oedema of the upper lid; the lower was not affected, and on separately the lids the appearance of the

eye was normal. The history given was that the swelling had started three days previously, and had gradually increased. While manipulating the lids I discovered just above the ciliary margin the almost buried body of the common bush tick (*Ixodes holocyclus*, Neum).

There were no constitutional symptoms in this case, but T.L. Bancroft <sup>36</sup> reports the following as occurring in a married woman of 40. The tick was attached to the skin of the ear. The patient complained of weakness and fear of falling on stooping, and of great reduction of distant and near vision, being "only able to read half-inch type with difficulty". The pupils were active, the eye free from all inflammatory trouble and a careful ophthalmoscopic examination gave negative results. She recovered steadily after the tick had been removed and tonic treatment prescribed, all other nervous symptoms having disappeared in a fortnight, and "in a month she could read ordinary newspaper type."

Bancroft states that the tick poison acts similarly to snake poison, but more slowly, and it

is almost more slowly got rid of by the secretion.

SNAKE-BITE:- I once saw paralysis of the right external rectus muscle follow a bite from a black snake (*Pseudechis porphyriacus*). The history given was that the patient, a child of five years old, had been bitten ten days previously, but under medical treatment had quite recovered otherwise. The lesion in this case was probably haemorrhagic. In three weeks the muscle had quite recovered its power.

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The following matter though not affecting human beings is of very considerable ophthalmological interest and is moreover an eye disease not only purely Australian in its occurrence but definitely limited to certain portions in New South Wales.

BLINDNESS IN HORSES.

De Schweinitz <sup>37</sup> in his work on Toxic Amblyopias mentions a curious form of blindness occurring in horses in New South Wales, and refers to the disease as "a serious affection with inflammatory symptoms of the external tunics of the eye", which is not quite accurate.

He quotes from Huseman of Gottingen who in his turn has got his information from a lay paper. On referring to Huseman's article <sup>38</sup> however, I find the confusion of the form of blindness in question, with outbreaks of muco purulent ophthalmia in horses and other animals, is due to De Schweinitz and not to Huseman. The latter defin-



finitely states:-

"Diese Krankheit ist nicht mit den bisher  
"bekannten Formen Epizoöcher-Blindheit von  
"Thieren zu verwechseln die in Australien vor-  
"kommen und nicht blos bei Pferden, sondern auch  
"bei Rindvieh und Schafen beobachtet werden. Diese  
"sind mit entzündlichen Affectionen des Auges  
"verbunden während die in Frage stehende Augen-  
"Affection keinen inflammatorischen Charakter  
"trägt."

Husemann, however, heads his article "Zur  
Tabaksamaurose" and in his definiteness as to the  
cause is, in view of present knowledge on the  
matter, somewhat premature.

I have made several attempts to get an oppor-  
tunity of examining a case personally but as the  
disease usually occurs in the extreme South West  
of the State and is moreover in abeyance at pres-  
ent, I have not had an opportunity so far.

I have, however, endeavoured to collect the  
information that is known about this disease to  
date by enquiry from scientific and lay sources  
and by consulting reports, etc., and the follow-  
ing summarises all that is definitely known, so  
far, about the condition.

~~In 1893~~ Nearly twenty years ago, reports were  
made from the Western and South Western portions

of the State as to there being heavy loss through blindness of horses on the Darling, reports showing that in the Wentworth District alone 401 horses had been affected, twenty remaining blind both by day and night and 53 blind by night.

The start of the trouble followed on unusual floods and occurred only when horses had fed in flooded paddocks. There was nothing to show that the disease was contagious or even hereditary as the foals of blind mares were said to have good eye sight. Animals of all ages and conditions were attacked but a large percentage enjoyed immunity. The symptoms consisted in gradual impairment of vision, slowly progressing to absolute blindness. In the early stages the loss of vision was only noticed when the light became dim, the sight being fairly good through the day but with the coming of dusk, affected animals were noticed to stumble and run against posts and to be quite incapable of judging distances. The disease progressed to the total destruction of vision even in the brightest light.

Externally the appearances of the eye were

unaltered and no active inflammatory changes were present. Total blindness generally ensued after a period of six to twelve months. When partially blind animals ~~were~~<sup>were</sup> removed from the district in which the disease was prevalent their condition was stated by some to improve, by others to remain stationary without tendency to recovery or to increase of blindness. On their return to the original district the disease again became progressive. It was, however, noted that although its action was sluggish the pupil reflex was retained after complete blindness had ensued though it has not been shown whether this remained persistent or ultimately became lost.<sup>39</sup>

Pathological examination of the nerves removed from an affected horse were examined by Dr. Tidswell of the Micro-Biological Bureau who found on transverse section of the optic nerves an increase of the inter-fascicular connective tissue and that the fasciculi exhibited a general want of compactness as compared with normal nerves. Under the high power the inter-fasciculi interstitial tissue appeared slightly increased. Some

of the nerve fibres showed a distorted irregular outline and were shrunken and granular.<sup>40.</sup>

The cause of the disease has been variously put down by stockmen and veterinaries to the

- (1) Toxic effects from eating the tobacco plant (*Nicotiana Suaveolens*)
- (2) Toxic effects from eating the native melon (*Cucumis Myriocarpus*)
- (3) Infection by a specific germ probably of a malarial nature.

It has been advanced in favour of the native tobacco plant being the cause

- (1) that its advent on the affected districts as a result of floods was only slightly antecedent to the advent of the affection in horses.
- (2) that the acute effect of a decoction of this plant was identical with that produced by a decoction of ordinary tobacco.
- (3) the pathological examination of the nerves showed a condition microscopically, that was similar to that found in tobacco amblyopia in man.

On the other hand I have learned from proprietors of stations in the affected districts that they have had the native tobacco plant on their stations for years before the 1890 floods and that their horses never showed the slightest inclination to feed on it. Further, the affected horses seeing worse at dusk, is not suggestive of the condition being analogous to the central scotomata of tobacco amblyopia in human beings. Dr. Tidswell further told me that the specimens examined by him were not sufficiently in good condition or sufficiently numerous to form any opinion as to the changes being consistently present in particular bundles of nerve fibres.

As to the native melon which is believed more generally to be the cause I have frequently been told by squatters, stockmen and others that they have known instances of horses eating it freely without any bad effect.

Dr. Tidswell told me some years ago that judging from the data brought before him then that he was inclined to consider the disease microbic or at any rate that this possibility

would require to be kept in view in further investigations. He considers it possible that the eye symptoms may be only local symptoms of a widely spread affection of the nerves. As a matter of fact other nerves have been observed <sup>to be affected</sup> in several instances - ~~especially~~ paresis or paralysis of the hind limbs *having been especially noticed.*

I recently asked Professor Watt of the Department of Agriculture and Professor Douglas Stewart of the Department of Veterinary Science in the University of Sydney, whether there was anything more definite known about the disease than what I have stated above. They tell me that there is nothing to add and that the whole matter is still very obscure but will, as opportunity arises, be further investigated.

With all previous considerations of eye diseases my data have been purely relative and approximate and often merely personal impressions and experiences. In the two following diseases

with eye complications I think that facts as to their incidence in New South Wales at any rate may be considered as practically absolute, for the obvious reason that every case was or has been segregated and under observation by Government authorities.

The two diseases in question are plague and leprosy.

### P E S T I S.

In the early years of the last decade Sydney had the unenviable notoriety of being the only white community in which plague had secured a foothold in modern times and threatened to become endemic. Little was known of its nature, symptoms and the means by which it was spread, and the work of investigation done by two medical officers of the Health Department, Dr. Ashburton Thompson, the President, and Dr. Tidswell the

Government Microbiologist did much towards clearing up doubtful points and smoothed the way for the health authorities in European centres when later the disease made its appearance there.

In the first epidemic of 1900 when over three hundred patients were treated in the Quarantine Station at North Head I was asked by the Health Department to see the cases of eye complications in consultation with the medical officers in charge.

There were at that time 303 patients (30% of whom died) and the cases of eye complication were 16, making an average percentage of 5.28%. This is higher than the percentage given by Mizno (41) who gives the percentage as 4.3.

Nearly all the cases were of the bubonic type and some suffusion of the conjunctiva was practically invariable in them all at the onset, but when the eye condition did not advance further these cases are not included among the eye complications.

Great conjunctivital congestion with extensive small haemorrhages in the bulbar conjunctiva was a characteristic of the majority of the



cases of the eyes examined in the early stages. In some the conditions stopped short at this and receded, in others further trouble developed either concurrently with the conjunctival condition or following its partial or complete abatement. In three, simple iritis was present as well - in one case bilateral. There were two cases of corneal ulcer - one a small central one, and the other a large superficial one - dendritic in type. In three cases there was hypopyon - in two without any corneal ulceration. In the cases where iritis and corneal ulceration alone were present there was nothing in the appearance to distinguish them from similar trouble occurring apart from the plague though their presence here was apparently more incidental than accidental. The intra ocular condition, where extensive exudation of puro-lymph occurred in the anterior chamber with no corneal lesion, pointing undoubtedly to an embolus, was pathognomonic of the general disease and I made a short note of this at the time which is embodied in the official report.<sup>42</sup> There was no mention of this condition

to be found in plague literature prior to that date (and very little on eye complication to be found at all). One of the two cases developed the more typical signs of a general panophthalmitis, but in the other, beyond the exudation in the anterior chamber, there was nothing but a mild iritis with little ciliary injection.

Like all the other patients at the time he was treated with Haffkine's specific and the process seemed to become absolutely arrested. I saw him at the Sydney Hospital a year after his discharge from quarantine. In the anterior chamber a large partly organised flocculent mass was still to be seen covering the pupil but the eye though blind was quite quiet and of normal tension.

In the isolated cases that occurred in succeeding years I saw two cases similar to the last. The first recovered and the second died. P.M. examination showed the contents of the anterior chamber to be teeming with the *Bacillus Pestis Bubonicae*.

L E P R A.

Lepers are segregated in New South Wales in Lazarets situated on the grounds of, but separate from, the Coast Hospital (338 beds) at Little Bay. There are two lazarets, one for males and one for females. The patients' quarters consist of detached cottages with verandahs with a bedroom and sitting room, as a rule, for each patient. <sup>7</sup>The first recorded case of leprosy occurred in 1859 and the notification of lepers dates from 1890. 118 have been received in the Lazarets since they were opened. Of these some have died, others have been released and a large batch of Chinese were repatriated by arrangement with their friends.

In Queensland the cases are rather more numerous chiefly owing to larger employment of Kanaka (x)<sup>x</sup> labour. In 1908 for instance, I find that over twenty were certified including only two of European descent - one a Scotsman.

Western Australia comes next to New South Wales

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(x)<sup>x</sup> Kanaka is a generic term applied to a native of the Pacific Islands indentured for labour in the Sugar Cane fields. The "White Australia" policy has put an end to further importations.

but in the other States only an occasional stray case occurs.

At present there are 15 inmates at Little Bay. I have from time to time as occasion arose seen a case in consultation with the medical officers in charge but lately I made a detailed examination of the eyes and adnexa of all the inmates and append the following brief notes of my findings.

Case I :-

Name. G.M.S. Age 25. Sex. Female.

Native of N.S.Wales . (of European descent)

Admitted 1904. From Tweed River, N.S.W.

Type of L.- Tuberosa.

Father was and daughter is affected with same disease.

Bronzing and capillary stasis over forehead and malar bones.

Nodular infiltration of supra ciliary regions, eyebrows missing in outer halves. Eye lashes similarly affected. Conjunctivæ slightly yellowish pink

No ciliary injection.

Cornea shows superficial haziness over upper portions in each eye.

Irides. R. retracted to point of maximum dilatation on outer side and similarly on nasal side the retracted pupillary margin being about 2 to 3 mm. in extent (see diagrams page 90)

No posterior synechiæ. Fundus normal.

L. Retraction of pupillary border downwards and outwards, a thin rim of 4 to 5 mm. alone being visible. Posterior synechiæ upwards and outwards. Fundus normal.

$V = \frac{6}{24}$  in each eye. No high refractive error  
No obvious further changes in irides.

Case 2:-

Name A.R. Age 10. Sex. Female.

Native of N.S.W. (of European descent) Daughter of G.M.S.

Admitted 1908. From Sydney.

Type of L.-Tuberosa.

Cyanosis over malar bones.

Eyes and adnexa unaffected.  $V = \frac{6}{6}$  in each eye.

Case 3:-

Name V.M.W. Age 24. Sex. Female.

Native of N.S.Wales. (of European descent)

Admitted 1904. From Sydney.

Type of L.- Tuberosa.

Supra ciliary regions nodular, cyanosed. Eyebrow hairs missing as are also the cilia from both eyelids in each eye.

Eyes normal. V =  $\frac{6}{6}$  in each eye.

Case 4:-

Name C.S.C. Age 56. Sex. Female.

Native of Victoria (of European descent).

Admitted 1907.

Type of L.- Maculo Anaesthetica.

Macular staining on forehead. Slight thinning of eyebrows. No infiltration of supra ciliary region.

No corneal or conjunctival anaesthesia.

Vision =  $\frac{6}{6}$  in each eye. No fundus finding.

Case 5:-

Name F.E.B. Age 35. Sex. Male.

Native of N.S.Wales. (of European descent)

Admitted 1903.

Type of L.- Maculo Anaesthetica.

Has no eye symptoms, no anaesthesia of cornea or conjunctiva.

No lagophthalmos.

Case 6:-

Name R.B. Age 29. Sex .Male

Native of N.S.W. (of European descent).

Admitted 1904. From Sydney.

Type of L.- Tuberosa.

Had dense infiltration of supraciliary regions and glabella which has receded leaving surface deeply lined. Thickening of lid margins. Some scarring of palpebral conjunctivæ Bulbar conjunctivæ faint reddish yellow with some circumcorneal injection.

Caruncle infiltrated in right eye.

Symmetrical superficial faint corneal haze

Case 6 (con)

in upper quadrants. Irides, pattern blurred in patches and signs of parenchymatous infiltration but no obvious nodules.

R. Pupil irregular, acts badly. Posterior synechiae

L. Segmental retraction downwards of pupillary margin with two posterior synechiae (as in diagram)

V =  $\frac{6}{24}$  in each eye.

Fundi normal.

Case 7:-

Name H.W. Age 68. Sex. Male.

Native of U.S.A. (of European descent).

Admitted 1897. From Lord Howe Island.

Type of L. - Maculo Anaesthetic.

Lagophthalmos both eyes. Marked ectropion. L.E.

R.E. Intense conjunctival hyperaemia with chemosis, especially near limbus on nasal side of cornea.

General superficial haziness of cornea.

Small central corneal ulcer. ←



Case 7 (con)

Anaesthesia of cornea and conjunctiva.

L.E. Conjunctival hyperaemia.

Diffuse opacities throughout cornea, no ulceration, cornea and conjunctiva anaesthetic.

V = fingers at 2 m. each eye.

Fundi cannot be examined.

Case 8:-

Name J.C. Age 48. Sex. Male.

Name of N.S.Wales (of European descent).

Admitted 1910. From Sydney.

Type of L. - Tuberos.

Slight infiltration of supraciliary region in each eye and eyebrows scanty on outer side.

Eyelids, eyelashes, conjunctiva and episclera normal in each eye.

Old iritis with adhesions of many years standing in each eye.

R.E. had iridectomy done upwards and later downwards by Dr. Maher at Moorcliff five years ago. Lens opaque, R.V. = p.l. good.

L.E. Old iritic adhesions, iridectomy done by me in 1908 which gives him L.V. = fing. at 1 m.

Has lenticular opacities.

Case 9:-

Name J.A. Age 35. Sex.Male.

Native of Mount Lebanon.

Admitted 1910. From N.S.Wales.

Type of L.- Tuberos.

Slight thickening of supraciliary region,  
eyes and adnexa otherwise quite normal and sight  
good.

Case 10:-

Name W.M. Age 45. Sex. Male.

Native of Buka Buka.

Admitted 1903. From Tweed River.

Type of L.- Tuberos.

Thickening of supraciliary region in each  
eye.

Absence of cilia in each eye. Slight corn-  
eal opacity in R.E.

Pupils ,equal ,active ,good fundus reflex.

No ophthalmoscopic finding. Vision good.

Case 11:-

Name G.B. Age 42. Sex. Male.

Native of New Hebrides.

Admitted 1906. From Tweed River.

Type of L.- Tuberos.

Three years before admission had twitching in eye lids and eyes were noticed to be red and lids thickened.

Face leonine. Supraciliary regions and glabella infiltrated with much nodular thickening and impairment of action of frontal and corrugator muscles.

Eyebrows largely missing. Infiltration of margins of eyelids and cilia missing from upper and lower eyelids of each eye.

Conjunctivæ dirty reddish yellow with circumcorneal injection.

Both corneæ densely leucomatous (see photograph) and staphylomatous.

In Left old perforation with Leucoma adhesions.

Vision = hand reflex in each eye.

Only case of early incidence of eye symptoms.

Case 12:-

Name F.C. Age 25. Sex. Male.

Native of Fiji.

Admitted 1903. From Fiji.

Type of L.- Mixed.

Eyebrows very scanty, replaced by lanugo.

Eyelashes absent, both lids in each eye.

Pupils equal, active. Sight good.

Ophthalmoscopic examination negative.

Case 13:-

Name H.G. Age 41. Sex. Male.

Native of Gala, Solomon Islands.

Admitted 1905, From Tweed River.

Type of L.- Tuberos.

Eyebrows missing. Much thickening and nodulation in both supraciliary regions with hampering of action of frontal and corrugator muscles. Cilia missing in patches. Both lids nodular, infiltration of lid margins.

R.E. Marked episcleritic patch on outer side between limbus and equator and between external and inferior recti. Small corneal opacity downwards and

Case 13 (con)

outwards.

L.E. Dusky raised patch symmetrically placed to that in R.E. but smaller and with a corresponding though smaller corneal opacity.

Pupils in each eye small, irregular, bound down by adhesions.

No fundus findings.

V = Fingers at 3 m.E.E.

Case 14:-

Name T.A. Age 41. Sex. Male.

Native of New Hebrides.

Admitted 1905. From Maclean, N.S.Wales.

Type of L.- Maculo-Anaesthetic.

Slight conjunctivitis, pigmentary spots on conjunctiva, slight episcleral patch L.E.

Sight excellent. Fundi normal.

Case 15:-

Name C.T. Age 46. Sex. Male.

Native of Java.

Admitted 1886. From Cooper's Creek, N.S.Wales.

Type of L.- Maculo-Anaesthetic.

Has pterygia in each eye. Very slight anaesthesia of conjunctiva and cornea but otherwise no eye symptoms.

No lagophthalmos. Sight excellent.

Ophthalmoscopic examination negative.

From these notes it will be seen that four males and four females of European descent are affected.

Of the four males, - two are cases of L.Anaesthetica and two of L.- Tuberosa.

Of the four females,- three are cases of L.-Tuberosa and one of L.Anaesthetica.

Of the remainder,- four are cases of L.-Tuberosa, two are cases of L.Anaesthetica, and one is a mixed case.

The adnexa were leprously affected in thirteen cases.

The eyes themselves were leprously affected in seven cases. In no case where the eyes themselves were found leprously affected had the patient been in the Lazaret for a lesser period than five years.

There are two statements almost amounting to aphorisms that are frequently made with reference to leprous eye affections.

(1) That they are always secondary,

(2) That sooner or later, if the patient is not cut off by an inter-current affection, the eyes become affected.

G.B. is a case of early eye involvement but the history though conclusive on this point is not sufficient to prove that the eye trouble was primary. His is a very marked case of the whole series of destructive changes following on tuberculous leprosy, and this is well brought out in the accompanying photograph.



G. B. A typical case of Lepra Tuberosa.



H.W. is a clinical picture of the typical condition of the advanced Lepra Anaesthetica. On the other hand C.T. has had the disease in the same form for eleven years longer than H.W. viz:- for twenty-five years and his eyes are still practically unaffected by it. He has a chance of proving the exception to the rule as to all patients becoming sooner or later affected if they live long enough.

Leloir remarks of one <sup>case</sup> ~~case~~ of L.Tuberosa however, that after eleven years:- "Les conjunctives oculaires et les cornees sont intactes", etc. 43.

For the lagophthalmos of the Anaesthetica I had more than once suggested shortening of the palpebral fissure as giving an undoubted chance of postponing eye trouble, but the patients in question (Chinese) had either refused operation or been repatriated before anything was done.

H. G. is an excellent example of the fact of the seat of selection of leprous changes in the globe being primarily in the anterior parts, generally in the plane of the insertion of the recti

muscles. The two symmetrical raised dusky episcleral patches situated between the external and inferior recti in the plane of their insertion is quite typical. When the episcleral patch is advancing on the cornea excision or scraping is advised by some, as is also an attempt to get a cicatricial band between the advancing episcleral patch and the cornea. I have never had a case (prior to H.G.) where the question of operation to prevent corneal invasion was worth considering, but from what I can gather the effect of any operation is very temporary. The cases of corneal affection that I have seen have resembled more an interstitial keratitis and have not been secondary to an episcleritis or a scleritis. In R.B. and G.M.S. it may be noted that the corneal affection is more or less symmetrical and limited to the upper parts of the cornea. Conjunctival affection is stated to be always secondary to episcleral and I have never seen anything contrary to this.

J.C. was only admitted last year and the question arose as to whether his eye condition was leprous or not. On examining, at request, there was no difficulty in deciding in the negative.

His first attack of iritis dates from more than ten years back and five years ago the right eye was operated on, many recurrent attacks of acute iritis having taken place before then. The leprous manifestations were mostly macular and on portions of the body usually covered so that it is just possible that early signs of the disease were present when I did an iridectomy in 1908 for unless the house surgeon had had reason to make a thorough overhaul of him they might readily have been overlooked. But the nature of the iritic attacks were quite unlike the leprous variety.

The chief characteristics of leprous iritis is its extreme quietness and insidiousness. There is little or no ciliary injection accompanying it, with often little to mark its presence but a posterior synechiae with no present or past evidence of acute inflammatory trouble.

Most generally the pupillary portion of the iris is affected, in which case one gets exudation and deposits on the capsule of the lens for the obvious reasons given in the textbooks when

dealing with iritis in general, viz:-

- (1) the capillary vessels are more numerous in the pupillary margin.
- (2) that portion of the iris is in close approximation to the lens.

Jeanselme and V. Morax<sup>44</sup>, state that they observed one form of iritis not previously described in which the surface of the iris was speckled with tiny grey points scattered over the iris but much more numerous near the sphincter.

Again localised lepromata may occur at the base of the iris as has been found by Hirschberg and the two French observers referred to. These may resemble gummata in appearance. I have never seen the speckling of the iris in the neighbourhood of the margin of the pupil though I have looked for it with the corneal loupe, nor have I seen discrete lepromata at the root of the iris, but I have noticed in some cases distinct patches of infiltration in the iris showing a difference in colour and an interference with the iris pattern as contrasted with the surrounding parts of the

iris. These patches have generally been roughly triangular or sector shaped with the base towards the root of the iris and the apex directed towards the pupil.

Now with regard to R.B. and G.M.S. I saw the former about two years ago, ~~the~~ question at issue being whether he had any refractive error requiring correction. The eyes were then very much as at present except the irides which to the best of my recollection showed nothing of particular remark.

Some months ago I saw G.M.S. for the first time, the unusual appearance of the pupils having attracted the attention of Dr. Ashburton Thompson. The only appearance resembling the right eye that I have seen was a case of "cat's eye" associated with polycoria in the other eye which I had described,<sup>45</sup> (~~Werk Wood~~<sup>46</sup> ~~showed a similar case~~). and I felt unable to account for the condition without admitting a congenital element.

Quite lately I again examined R.B. and the change in his left eye since I had previously seen him gave me an explanation of the unique

appearance of G.M.S's pupils,viz:- that lepromatous infiltration had started from the root of the iris and advanced with a narrowing front towards the pupil but the pupillary area had not been in the first instance affected. Hence when radial contraction took place later,a segment of the pupil margin was drawn away to the periphery without being checked by posterior synechiaæ.

I have gone through all the long series of cases examined twice by Karl Grossmann <sup>47</sup> in Iceland and through the records of eye lesions in the standard work of Henri Leloir,in addition to consulting the article of Jean Selme and V.Morax already referred to, but I can find no reference to anything at all resembling the condition I have described as present in those three eyes,though the appearances are so striking that they could hardly fail to arrest attention when once seen.

I have not,however, had the opportunity of perusing the plates in the work of Lyder Borthen (of Trondheim <sup>48</sup>) but I have recently read a detailed review by Hansen Grut of the German trans-



G.M.S. Irides shewing retraction of pupillary margins.



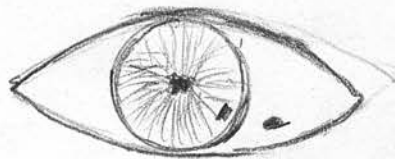
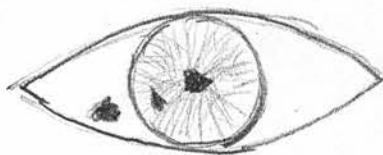
G.M.S. Under Homatropine shewing absence of posterior  
\* synechiae in right eye.



R.B. Corneae shewing symmetrical nebulae.



R.B. Iris L.E. shewing (1) segmental retraction of  
pupillary margin, (2) by reflected light shewing  
posterior synechiae.



H.G. Shewing symmetrical episcleral patches in plane  
of insertion of recti with corresponding corneal  
opacities, and irregular bound down pupils.

lation of it <sup>49</sup>, and I can find no mention of anything approaching the condition in question.

I suppose the reason is that the association of basal lepromatous processes with pupillary exudation is so constant that the segmental retraction of the pupil is a great rarity and it is remarkable that I should be able to find it in three eyes out of thirty. When the lepromata are sufficiently discrete to resemble gummata considerable reaction has been noticed to occur and a general iritis to be present, and it is apparently only when the infiltration is of a less intense nature, that the basal condition exists separately.

With regard to the ordinary form of leprous iritis where one posterior synechia succeeds another, the process going on, in the fullness of time, to excluded and occluded pupils, the outlook is bad and the treatment very unsatisfactory. I have performed iridectomy in a case of closed pupil with a fair immediate result (x)<sup>x</sup>, which, however, was not maintained, the coloboma gradually narrowing and finally closing.

Fundus changes were absent in all the cases

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(x)<sup>x</sup> The Leptra Bacillus of Hansen was found in the excised portion.



observed.

These are to be seen in a few cases. Lyder Borthen in an article I have read (Lepra 1900, p. 132) refers to a few, Notably one recorded by Trantas and two cases by Bistis (Ueber zwei Fälle von Lepröser Chorio-retinitis). These both occurred in cases of Anaesthetic Leprosy.

As a rule by the time the fundus is affected, ophthalmoscopic examination is impossible owing to the state of the cornea and media.

The order of incidence of affection of eyes and adnexa in L. Tuberosa is generally

- (1) Supraciliary region and eyebrows.
- (2) Margin of eyelids (upper first) and eyelashes.
- (3) Episclera and sclera and conjunctiva, (secondarily)
- (4) Cornea, (4 may occur without 3).
- (5) Iris and ciliary body, (active cyclitis very rare).
- (6) Fundus.

And this order was fairly well maintained in the cases examined at Little Bay.

One point more may be noted, viz:- the fact that the portion of skin in the sulcus between

the upper lid and the eyebrow and between the lower lid and the lower margin of the orbit usually remains intact even with gross changes on each side of it. This I found to be the case in all the patients I examined.

GENERAL SUMMARY AND CONCLUSIONS.

Chiefly from climatic reasons conjunctival affections of a more or less chronic nature are more prevalent in Australasia than in Great Britain.

"Sandy Blight" and "Bung Eye" are two local expressions. The former is a loose popular term applied to mucopurulent ophthalmia occurring often in an epidemic form, and the latter is considered to be due to an insect of a still undetermined species, and is believed to be a purely Australian affection.

The writer finds with regard to trachoma

(1) That the prevalence of the disease is in a great measure determined by physiographic conditions, the coastal strip of country in New South Wales being comparatively immune, while the incidence relatively increases in a westward direction from the Dividing Range towards the Western Plains. This is borne out by statistics which the writer has compiled from the records of the Eye Department of the Sydney Hospital.

It is further shewn that throughout the different State Divisions the percentage of trachoma patients and the average rainfall are in almost every case in direct inverse ratio.

The general principle of the sea coast being comparatively immune and of increasing prevalence

towards the interior of the continent holds (with some variations as to degree) with regard to the other States.

(2) Trachoma attacks the physically robust and is a disease determined by external conditions rather than by diathesis. The close association of trachoma and scrofula is not seen here as in Europe.

(3) It is not a disease of the proletariat exclusively but attacks also the well to do, though sequelae through lack of attention are more common in the former.

(4) The conditions of family life cannot be accepted implicitly as the prime factor in its transmission. A case in point is cited in this connection.

(5) The principal external determinating conditions are dry heat, dust, and flies. How far the latter two are carriers of contagion is doubtful. A theory as to a life cycle completed by the agency of the bush fly would help to explain some anomalies of transmission.

(6) Residence in particular areas is the common condition under which the disease is acquired and an infected individual removed to a more favoured district is not necessarily a virulent focus for the spread of the disease.

(7) Racial considerations, where there is a fusion of race stocks cannot be well estimated.

(8) The writer has found by personal observation that in the majority of instances of marked trachoma

the upper cul-de-sac is unaffected, this being quite contrary to what is laid down authoritatively as to the European variety. Hence excision of the cul-de-sac is, as a rule, contra-indicated.

Pterygium does not follow the district distribution of trachoma but is equally prevalent on the coast and commonly found in those engaged in the coastal shipping trade. It is practically never found in aboriginals.

Spring Catarrh is not common and is generally found on the coast. Some instances of the rarer forms have been seen and one unique case is described.

Phlyctenular Conjunctivitis is estimated as only being  $\frac{1}{3}$  as common as at home and hypopyon keratitis as occurring in New South Wales principally among coal miners.

Lamellar Cataract, is shewn to be less common in Sydney than in London and to be almost unknown in South Australia.

Senile Cataract, from statistics given, does not appear to be earlier in incidence than in Great Britain.

The effects of direct or reflected sunlight under Australian conditions affect the eyes primarily or secondarily. A case of optic neuritis secondary to insolation is an instance of direct sunlight affecting the eyes secondarily and two cases of idiopathic night blindness following on prolonged exposure to the reflected glare from the Western Plains are examples of reflected

sunlight affecting the eyes primarily. In the latter cases epithelial xerosis of the conjunctiva was completely absent.

A note is made with reference to consanguinity and Retinitis Pigmentosa. As a result of the isolation of early settlers in remote parts of the state marriages had been made mainly among cousins. In two cases evidence was found of several cases of Retinitis Pigmentosa in the second and third generations of such families.

The principal malarial eye affections <sup>occurring</sup> among individuals domiciled in Sydney and living for periods in the Islands are

(1) Optic neuritis, where in spite of its frequent severity the prognosis is usually favourable.

(2) A very violent form of iridocyclitis which the writer has not seen mentioned in text books on malaria.

Dendritic ulcer is mentioned as being common in Sydney.

References are made to Hydatids and Filaria Loa in connection with the eye and adnexa and to the results of snake bite and poisoning by the bush tick causing toxic amblyopia. The latter condition is distinctly Australian.

The available facts are collated as to a mysterious form of blindness occurring in horses, which is not only peculiarly Australian but is limited to certain portions of New South Wales. The cause has been variously ascribed to (1) The native tobacco plant. (2) The native melon. (3) Microbic infection. The disease is at present in abeyance and its cause still obscure.

Data as to the incidence of all foregoing eye affections referred to, have necessarily been only approximate at the best, and in many cases merely personal impressions. In the two following diseases with eye complications, viz plague and leprosy, the data of incidence as far as New South Wales is concerned, may be considered as practically absolute, every case, when detected, having been segregated and kept under Government supervision.

During the epidemic of plague in 1900 the writer at the request of the authorities examined all the cases with eye complications. These formed 5.28 percent of the whole number of cases. The most characteristic eye feature was hypopyon without any corneal breach of surface. This was considered due to embolic infection and to be pathognomonic of the disease. Prior to a note of this condition being made by the writer in the official report at the time, there was no description of it to be found in medical literature, as far he is aware, although frequent reference has been made since then.

The writer has made a detailed examination of all the cases of leprosy in New South Wales at the present time and finds involvement of the ocular adnexa in 90 per cent of the cases and affection of the eyes themselves in 49 per cent of the cases.

In no case examined where the eye was leprously affected had the patient been confined for a lesser period than five years.

In every case, eye complications were secondary to manifestations of the disease elsewhere, though the adnexa had frequently shewn evidence of the disease at an early stage.

The cases examined were sufficiently representative in presenting collectively all the salient features of the leprous eye. The writer refers to a striking appearance met with in the two eyes of one patient and in one eye of another patient and of which he finds no note in any available authority. To this he gives the name of Segmental retraction of the pupil. The cause of this he ascribes to a peripheral infiltration of the iris unaccompanied by pupillary exudation, subsequent contraction giving to the pupil its very unusual shape



B I B L I O G R A P H Y.

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A P P E N D I X . I .

COMPARATIVE TABLES

Framed on Australian and British Hospital Reports.

I

TRACHOMA AND SEQUELAE.

AUSTRALIAN HOSPITALS.

Average for four years or more.

Sydney Hospital	16.89%	of total eye operations		
Brisbane General Hospital	12.36%	"	"	"
Adelaide Hospital	16.29%	"	"	"

BRITISH HOSPITALS.

Average for three years.

Royal London Ophthalmic Hospital.Moorfields.	2.71%	"	"	"
In-patients	2.71%	"	"	"
Out-patients	9.8%	"	"	"
Average	5.2%	"	"	"
Royal Eye and Ear Hospital.Bradford.	1.07%	"	"	"
Royal Eye Hospital, Manchester.	1.97%	"	"	"
Edinburgh Royal Infirmary.	Nil	unless included under monor operations.		
Glasgow Eye Infirmary	4.03%	of total eye operations		
Royal Dundee Infirmary 2 years only available	6.42%	"	"	"

P T E R Y G I U M.  
AUSTRALIAN HOSPITALS.

Average for four consecutive years or more.

Sydney Hospital	4.28%	of total eye operations			
Brisbane General Hospital.	14.29%	"	"	"	"
Adelaide Hospital	7.62%	"	"	"	"

BRITISH HOSPITALS.

Royal London Ophthalmic Hospital, Moorfields. Indoor & outdoor patients	.184%	of total eye operations			
Royal Eye and Ear Hospital, Bradford.	.11%	"	"	"	"
Royal Eye Hospital, Manchester.	17	but no operations.			
Glasgow Eye Infirmary.	.12%	of total eye operations			
Glasgow Ophthalmic Institution.	.235%	"	"	"	"

L A M E L L A R   C A T A R A C T .

A U S T R A L I A N   H O S P I T A L S .

Average for four or more consecutive years.

Sydney Hospital	.602%	to admissions.
Brisbane General Hospital.	No data	
Adelaide Hospital.		

B R I T I S H   H O S P I T A L S .

Royal London Ophthalmic Hospital, Moorfields.	2.31%	to admissions.
Royal Eye & Ear Hospital, Bradford.	.13%	" "
Royal Eye Hospital, Manchester.	.08%	" "

APPENDIX II.

Note re Dr Pockley and trachoma data.

By a coincidence of which neither of us were aware until our work was respectively completed, my friend Dr Antill Pockley and myself have, to our mutual surprise, accidentally learned in the course of conversation, that we had each been independently collecting data on the distribution of trachoma for a similar purpose. I understand however from Dr Pockley that his work has been an intensive study of trachoma throughout the whole of Australasia while mine has been a more extensive survey of eye disease in Australia in general and New South Wales in particular, trachoma forming only a portion of my subject matter.

For the sake of comparison I have furnished Dr Pockley with a copy of the figures I had compiled from the Moorcliff Eye Hospital returns and with the map I have had made to represent these graphically. He tells me that our results and conclusions though formed entirely independently and on entirely different data are on the whole very similar but that he discounts the contagious theory even more than I do and in his map he is able to make the coastal districts quite white. Dr Pockley further tells me that he has based his statistics

mainly on information supplied by local medical men throughout Australasia.

Unless trachoma were a notifiable disease and every individual had to be specially examined to determine its presence or absence all data on such matters must be purely relative and incomplete. I think however that by taking the figures extending over a number of consecutive years of a large eye hospital like Moorcliff to which patients from all parts of the State have access, the relative proportion of patients from the various country districts could not be put forth in a more representative or consistent way.

There is a certain amount of migration, it is true, which may explain some of the coastal cases, but not all. I have within recent weeks seen three cases - all young people - of well marked trachoma. Two (in one family) came from the North Coast and one from the South Coast. None of the three had seen a local medical man for the trouble but had come directly to Sydney. Moreover none of the three had ever in their lives been away from the coastal districts.

It would make my findings more decisive to be able to consider the coastal districts absolutely immune. I am afraid however I can only go the length of saying



that they are comparatively so and I must leave them with a faint tinge of colour in my map.