

CHAPTER V

PUBLIC HEALTH

CLIMATE

Early official records are full of references to the unhealthiness of the climate of the hill tracts of Koraput. D. F. Carmichael's *Manual of the Visagapatam District*, published in 1869, remarks that 'there is scarcely a man who visits these parts who does not return with an enlarged spleen or liver, more or less affection of the head, making business irksome, and with a constitution broken down'. Even at the present time the district cannot strictly be called healthy, for malaria is endemic almost everywhere and a special allowance is paid to officials serving there, who are not natives or domiciles of the district, to compensate them for the unhealthiness of the climate. But, malaria and its complications apart, the district is more salubrious than most parts of the province. The cold weather is pleasant and the summer, except in the Malkanagiri taluk, is not trying. Most parts of the district are naturally well drained and have a good supply of pure drinking water. The day is perhaps not far off when the 3,000-foot plateau of Koraput will come to be regarded rather as a health resort for the summer months than a place to be avoided on account of its fevers.

VITAL
STATISTICS

Vital statistics are only maintained in six towns which have been constituted Unions under the Local Boards Act, namely Jeypore, Koraput, Nowrangpur, Kotapad, Rayaghada and Gunupur. The presidents of these Boards are responsible for the collection of the statistics, and no obligation is imposed on householders to make reports. Elsewhere, owing to the absence of any suitable agency for collecting information, no attempt is made to keep any record of births and deaths.

DISEASES
Malaria

Malaria is hyperendemic throughout the district, except in a small strip along the western border of the Jeypore and Nowrangpur taluks. The indigenous people gradually develop a relative immunity and in adult life, do not suffer much, and that dread form of malaria, black-water fever, has rarely been seen among them. Immigrants, however, suffer both from the ordinary forms of malaria and from its severer complications, black-water fever and cerebral malaria. Black-water fever is not now as fatal a disease as it used to be, possibly owing to the recognition of the part that indiscriminate or excessive use of quinine plays both in the causation and the aggravation of the disease. In recent years the Bengal-Nagpur Railway Company and the Madras and Orissa Governments have taken measures to reduce the risk of malarial infection at various places in the district. An account of the efforts of the Railway Company is given in a later section of this chapter. Government prophylactic work has mainly been concentrated on protecting Koraput, the headquarters of the district, and an account of the work done there will be found on page 171. Similar work has been done on a smaller scale in Jeypore and one or two other places. Observations made since 1930, when a special Malaria Officer

was first appointed, and since when preventive work has been continuously done, show that there has been a slight but definite improvement in the health both of Koraput and Jeypore.

One of the distinctive medical features of the district is **Yaws** the prevalence of the disease known as 'yaws', which bears a close outward resemblance to syphilis. This infection is common among the more backward of the hill tribes and especially among the Koyyas of Malkanagiri, and it is locally known as 'Koyya disease'. 'Yaws' is a specific infectious granuloma caused by a spirochaete *Treponema pertinua*. It is not a congenital or venereal disease, though the course resembles syphilis. The primary lesion occurs extra-genitally and is not always demonstrable. The secondary stage consists of the development of papules which may coalesce into larger masses. Later the scales from the papules fall off and a yellowish fluid is exuded and forms a heaped up yellow crust resembling syphilitic rupia. The tertiary stage, seen only in long standing cases, includes periostitis, inflammation of joints, caries of bones and ulcerations of the mouth and palate. Different forms of the disease occur, affecting the soles of the feet, causing ulcerations in the palate, larynx or nose, causing nodular painful swelling on the nose, or forming tumours near the knees or elbows; these latter are painless. 'Yaws' is distinguished from syphilis by the facts that the primary lesion is never venereal, the central nervous system is never affected, the disease is not hereditary, and it fails to yield to Mercury treatment. It responds readily however to injection of arsenicals. In the year 1937, 497 cases were treated in the district, chiefly in the Malkanagiri and Gunupur taluks. In a large proportion of these cases the patients were relieved, but as blood examination was not made it was impossible to ascertain the percentage of cures.

Leprosy appears to be comparatively rare, except in the **Other diseases** Gunupur taluk, where it is common. On the other hand infection with venereal disease is common all over the district. Among epidemics smallpox is a regular visitant to the district, but accurate figures of attacks and deaths are not available. Cholera makes comparatively rare appearances, and it is many years since there has been a severe outbreak. The worst of recent epidemics was in 1934. The district has hitherto been free from plague.

Vaccination in some areas is a charge on the revenues of **VACCINATION** the Taluk Boards and elsewhere is paid for by the Government. Altogether 26 vaccinators are at work in the district and they are supervised by six Health Inspectors. Vaccination is free, but has not been notified as compulsory. But hillmen generally are quite willing to allow their children to be vaccinated. In 1937, 28,994 vaccinations and 40,996 revaccinations were performed. There is at present no proper system for reporting outbreaks of smallpox to the Health Inspectors. The headmen of villages do not realize their responsibilities in this matter, and information frequently only reaches the authorities through the channel of the police or other touring officials and after it has become too late to take preventive measures.

**MEDICAL
INSTITU-
TIONS.**

The medical needs of the district are met by seven hospitals and sixteen dispensaries. One hospital and nine dispensaries are maintained by the Government, six hospitals and six dispensaries by the Taluk Boards, and one dispensary by a private practitioner with the aid of subsidies from the Government and the Koraput Taluk Board. Particulars of the institutions are given below:—

Institution	Year of opening	Managing authority	Daily average for 1987	
			Out-patients	In-patients
Koraput Hospital ..	1908	Government	106·60	10·17
Ambodala Dispensary..	1927	Ditto ..	31·85	1·08
Bhairava Singapur Dispensary.	1927	Ditto ..	54·88	·01
Boipariguda Dispensary	1932	Ditto ..	27·37	·43
Dabugam Dispensary ..	1927	Ditto ..	43·08	..
Kotapad Dispensary ..	1931	Ditto ..	86·63	1·84
Lakshmipur Dispensary	1927	Ditto ..	56·58	..
Nandapur Dispensary..	1923	Ditto ..	54·22	..
Narayanapatnam Dispensary.	1925	Ditto ..	53·76	..
Venkatapalem Dispensary.	1927	Ditto ..	5·16	..
Jeypore Hospital ..	1887	K o r a p u t Taluk Board	114·30	5·62
Jeypore Ghosha Hospital	1936	Ditto ..	110·98	6·97
Nowrangpur Hospital	1890	Ditto ..	115·22	12·24
Mattili Dispensary ..	1923	Ditto ..	21·53	·54
Malkanagiri Dispensary	1899	Ditto ..	28·38	..
Padwa Dispensary ..	1904	Ditto ..	42·03	1·54
Pottangi Dispensary ..	1913	Ditto ..	42·31	..
Umarkote Dispensary..	1921	Ditto ..	66·60	5·85
Bissamkatak Hospital.	1888	Rayagha d a Taluk Board	41·97	1·25
Gunupur Hospital ..	1869	Ditto ..	94·53	4·97
Rayaghada Hospital ..	1887	Ditto ..	91·90	2·68
Gudari Dispensary ..	1922	Ditto ..	69·72	·91
Borigumma Dispensary	1926	Subsidised	52·06	·14

All indigent patients are treated free at the public hospitals, while at the subsidised rural dispensary the practitioner is obliged to give free treatment to the poor.

The Ghosha Hospital at Jeypore, where only women are treated, was built by the late Maharaja of Jeypore in memory of his mother Sri Sita Patta Mahadevi, and handed over to the Taluk Board for maintenance. The present Maharaja contributes annually a third of the cost of its maintenance.

There are 82 beds available for in-patients in the various institutions.

The following account of the anti-malarial work done by the Bengal-Nagpur Railway Company has been contributed by Mr. R. Senior White, F.R.S.E., Malariologist to that Railway. It throws an interesting light on the difficulties of malaria protection in the district.

MALARIA
CONTROL ON
THE BENGAL
NAGPUR
RAILWAY

The Jeypore hill tracts have always been notorious for their malaria, and following on the discovery of the mosquito transmission of the disease by Sir Ronald Ross, some of the earliest investigations into malaria in India were conducted in the Koraput area in 1902 by Prof. J. W. W. Stephens and Colonel Sir Rickard Christophers, I.M.S. Major E. L. Perry, I.M.S., spent sixteen months on malaria investigations in these hills in 1912-13, making Koraput his headquarters. But none of these investigators penetrated the Bissamkatak taluk in the north-east of the district, about which all that continued to be known was that the Vizagapatam District Gazetteer gave it the palm for being the most malarious area of the whole district. It was through this notorious, but scientifically unknown, region that the Bengal-Nagpur Railway constructed their Raipur-Vizianagram line in 1925-31.

The route of the Raipur-Vizianagram Railway was originally surveyed by the now defunct East Coast Railway in 1883-86. Two years were spent on reconnaissance before a practical route across the Eastern Ghats was discovered, two years more in actual survey. The records of this party are lost, but it is known that they suffered very severely from malaria. In 1897 a further survey by the same railway, to change the alignment from that of a metre to that of a broad gauge line, was undertaken. This party broke down from malaria 99 miles from Vizianagram, just south of the summit of the pass at Satikona, after traversing barely 40 miles of the hyperendemic zone. In 1907 yet another party of Bengal-Nagpur Railway Engineers essayed a resurvey, but likewise broke down after achieving only two miles further than their predecessors of ten years before. Lastly, in 1923, the 24 miles across the summit of the Range, from a point north of what is now Singapur Road Station to the site of the present Muniguda Station, were again resurveyed. By this time the railway from Vizianagram to Parvatipur (48 miles) was open, and motor transport was to a certain extent available. Only three months, January to March, were spent in the field, and the engineer-in-charge left rail-head with all his staff duplicated. On completion, only 25 per cent were effective.

When therefore actual construction was authorized, it was obvious to the Railway administration that malaria was going to be a most potent factor in the forthcoming operations, and, before any importation of labour was commenced, a whole-time Malariologist was added to the cadre of the medical department of the railway, and posted to the construction. The problem was an immense one. Of the 242* miles to be built from Raipur to Parvatipur, only the first thirty and the last four were found to be in non-malarious country, but the highest incidence of the disease lay between mile 147 (in Kalahandi State) and mile 228 (the boundary of the new Orissa Province, formerly the old Agency limit). On this length it was quite exceptional to find a village with a child splenic index of under 70 per cent. The only town, Rayaghada, had an index of 39 per cent.

Of the 44 species of Anopheline mosquitoes found within the Indian Empire no less than 23 have now been found in the district. These are:—

- Anopheles aitkeni*—James
A. hyrcanus nigerrimus—Giles
A. barbirostris v.d.—Wulp
A. vagus—Donitz
A. subpictus—Grassi
A. culicifacies—Giles
A. fluviatilis—James
A. varuna—Iyengar
A. minimus—Theobald
A. aconitus—Donitz
A. jeyporiensis—James
A. moghulensis—Christophers
A. maculatus—Theobald
A. theobaldi—Giles
A. karwari—James
A. majidi—McCombe Young and Majid
A. splendidus—Koidzumi
A. stephensi—Liston
A. tessellatus—Theobald
A. jamesi—Theobald
A. annularis v.d.—Wulp
A. philippinensis—Ludlow
A. pallidus—Theobald

Formidable though this list appears, only the three closely related species *fluviatilis*, *varuna* and *minimus* appear to play any considerable part locally in the transmission of malaria.

* The Panama Canal, the largest engineering work on which anti-mosquito measures had been taken before, is only 46 miles in length.

The elsewhere notorious *A. culicifacies* is the preponderating species of the Anopheline fauna, but has recently, as the result of extended researches, been shown to play little or no part in the etiology of malaria in these hills. The cause of this exceptional phenomenon is not yet known. However the three definitely incriminated species swarm, as larvae, in every small stream and seepage trickle, and in rice fields wherever springs and seepages keep the water cool and in the slightest degree in motion. Rice fields of this nature are general throughout the district. Not only is the numerical output of the vector species very large, but their infective rate is also extremely high, averaging 8.6 per cent over the year in the Bissamkatak taluk.

It was therefore obvious that unless malaria could be controlled the massing of imported, non-immune labour for building the railway was going to result in a disaster of the first magnitude. Such labour is housed in temporary brushwood huts, is quite undisciplined and incapable of being treated with quinine as a routine measure, and must be protected in spite of itself from all forms of epidemic disease. It was thus certain that malaria protection could only be achieved by attacking the disease in the mosquito, and not in man.

tractors to locate their labour camps on pre-selected sites arranged between the engineering and the medical departments, instead of allowing their labour to camp at will all along the route. Two camp sites to every three miles was the standard aimed at, though this naturally varied in practice according to the amount of work involved on each length. After making the necessary concessions in regard to convenience for work and

The problem was solved by compelling the earthwork con-availability of drinking water, the sites were chosen primarily to minimize the amount of water needing treatment within a circle centred on the camp and with a radius of half a mile, the effective flight range of most Anopheline mosquitoes. All dangerous water within each protected circle was then oiled weekly so long as the camp was occupied, whilst new sites could not be occupied until certified safe by the Malariologist, as when taken up for treatment they were naturally full of the winged forms, though sites were chosen as far from villages as possible to minimize the number of the latter likely to be infected by feeding on the local inhabitants.

In practice, it was far from simple to arrange and supervise such an organization. The Sanitary Inspectors had absolutely no practical experience of mosquito control. Owing to bad roads and long distances, these men had perforce to be left unsupervised for days at a time. The work involved was very hard physically, and when it is borne in mind that a week's neglect of some breeding place always leads to the emergence of a brood of mosquitoes it is difficult to give too much credit to the two Chief Malaria Inspectors who were so successful in keeping the ordinary Inspectors up to their work. Much weeding out of unsuitable Inspectors was necessary, but towards the close of the construction a quite reliable force was achieved.

By these means malaria was kept down to a daily sick rate of under two per cent (though the figures could never be collected with any real accuracy), and there was a very little bolting of gangs. The Sub-Assistant Surgeons in charge of clinical measures were constantly on patrol over their twenty-mile lengths, and reported to the malaria staff any camp in which their inspections showed any abnormal malaria incidence. What would have happened without such measures was well revealed when, for any reason, a protection went wrong. Two bad instances of such a happening occurred, one at Solawa village, south of Jimidapeta Station, the other at the crossing of the Vamsadhara river, near Ambodala. General sickness and incapacitation, accompanied by deaths in spite of quinine treatment, at once appeared.

The cost of this organization was, in comparison with the total amount expended on the construction, small. Very small in comparison with what the railway had spent in excess of estimates for enhanced rates in a previous construction where malaria had played havoc with the work. The amount expended on purely anti-malarial operations cannot be disentangled in the accounts from the total expenditure on medical services, which included a base hospital and a District Medical Officer, but the entire medical expenditure only amounted to 0.8 per cent of the total cost of the whole 242 miles constructed.

When construction works were completed, the question of how to maintain the open line had to be considered. It was obvious that non-local staff could not be maintained in health without measures at least as effective as those used for guarding the health of the construction force, yet an expenditure which for such a force was *per capita* reasonable, became on the same basis very high where the staff of a small roadside station only is involved, yet the area to be controlled to protect a staff of two station-masters and six pointsmen is no smaller than to protect five hundred coolies camped at the same spot. In fact, for a small staff, such measures must be of even higher efficiency, for sickness at small stations may involve continuous duty for some man until relief can arrive. Anti-larval measures were therefore continued around the following stations in this district: Jimadipeta, Rayaghada, Singapur Road, Theruvali, Satikona summit (since renamed Bissankatak), Muniguda and Ambodala. In addition Langighar Road, just over the district frontier in Kalahandi State, had also to be protected.

Anti-larval measures by oiling, and by Paris-green dusting after this larvicide became available in 1928, have continued, and must continue, indefinitely, if this length of the railway is to be kept open for traffic. Yet they are unsatisfactory as routine, in that they depend so greatly on the intensely fallible human factor, and the never-ending annual expenditure leaves no permanent results behind it, so that, if such measures are withdrawn, malarial conditions return almost immediately to the *status quo ante*, and, if they have been in force long enough to result in the growth of a child population not immunized by

exposure to infection from birth, cessation must lead to a devastating epidemic among the children. The policy of the railway is, therefore, as far as possible gradually to change over to permanent anti-larval measures, filling in of burrow pits and sub-soil drainage principally. In this district the best examples of sub-soil drainage are in the *dhobi* ravine at Rayaghada, though there are lengths at other stations. Nonetheless there remain vast areas of breeding grounds quite unsusceptible to such works, which must remain under regular larvicidal treatment until further research into biological methods of control yields a solution for such problems. Then, and not until then, will it be possible to do anything for the malaria of the district generally, for sums that can be economically justified by an industrial concern to protect key-men cannot possibly be contemplated when village economics are under consideration. A biological method of control, after the rains are over, for small volume streams which, during the rains, run in such force as to wash out sub-soil drainage, has been evolved but for larger streams and main irrigation channels, and above all for the immense seeping rice areas that occur everywhere, such methods are still to seek. Until such are found, these eight railway stations must remain islets of safety in the vast sea of malaria which is this district.

To illustrate what has been accomplished by the railway for its own staff, the combined annual dispensary figures for the eight stations mentioned above, averaged for the two calendar years 1934 and 1935, are as under:—

Railway population (including dependants)	...	...	1,015
Cases treated, all diseases	...	...	4,128
Cases treated, malaria only	...	...	116
Percentage of malaria to all diseases	...	...	2.8
Percentage of population attacked with malaria annually.			11.4

Whilst these figures show that even with such measures the stations are not entirely malaria-free, they do indicate that imported plains staff can carry on their duties under tolerable conditions of health.

It is only at Rayaghada that a large non-railway population shares in the benefits of the railway's anti-malaria work, a population sufficiently large to enable the effect of these measures to be estimated in terms of reduction of splenic index. The figures* for the children of this town are eloquent of what has been accomplished.

Child Splenic Index, Rayaghada School

1925	...	...	...	39.3
1929	...	...	...	22.6
1930	...	...	...	19.4
1932	...	...	...	9.2
1934	...	...	...	10.2
1935	...	...	...	8.7

* By 1939 the splenic rate at Rayaghada had fallen to 3.6

Indices of under ten per cent are classed as 'healthy' in the classification of the Malaria Survey of India. The rest of the district is, almost without exception, in their class 'hyper-endemic'.

The problem of malaria in the district is one of increasing difficulty. Before the railway came the villagers grew rice enough for their own needs. Now they grow for export. Where perennial irrigation is available, fields are now cropped continuously, and new fields are always being levelled up. All this means more Anopheline production, and further, in the Bissamkatak taluk at least, the provision of perennial irrigation means continuous malaria transmission, whereas without this, in the months of March to June, humidity falls below the point where transmission of the disease occurs. The perennial irrigation at Satikona summit makes this station so exposed to attack that eight years' work have made not the smallest impression on the 96 per cent splenic index of the village behind the station, where the staff are only maintained by supplementing anti-larval measures by daily spraying of their quarters with insecticides to kill off such adult mosquitoes as have escaped destruction in treating the 239 acres of rice land lying within the protection circle, or have infiltrated from beyond it, and by bi-weekly quinization. Yet adequate usage of the district's large water-supplies to make use of its high soil fertility must be the object of every administrator. A rice experiment station, to investigate how to grow this crop locally without at the same time creating further malaria, is a great *desideratum*.