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General Secretary for India and the East,
CALCUTTA.

Original Communications.

NOTES ON AN EPIDEMIC OF CHOLERA IN PURNIA DISTRICT.

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THE district of Purnia, in which took place the epidemic about to be described, is the most easterly district of the province of Behar, in the Lieutenant-Governorship of Bengal. It lies between $25^{\circ} 15'$ and $26^{\circ} 35'$ north latitude, and between $87^{\circ} 02'$ and $88^{\circ} 35'$ east longitude. Its total area consists of 4,965 square miles. The population, according to the census of 1881, was 1,848,687, and, according to that of 1891, some five per cent. more. It is bounded on the north by Nipal, and in the extreme north-eastern corner by the hill district of Darjiling; on the east by the districts of Jalpiguri, Dinajpur, and Malda; on the south by the River Ganges, beyond which lies the districts of Bhagulpur and the Sonthal Parganas; and on the west by the Great Kusi River, which separates it from North Bhagulpur and falls into the Ganges at the south-western corner of the district.

The eastern and western halves of the district are physically of very different character, the dividing line corresponding roughly with the Panar River, which is in part an offshoot from the Great Kusi River, from which it takes off in Nipal, flows down through the district from N.-W. to S.-E., dividing it into two almost equal lateral halves; and finally enters the Ganges at the S.-E. corner of the district. The eastern half is low-lying, mostly highly cultivated, alluvial land, watered by a network of inosculating rivers, and containing numerous marshes. The water-supply is chiefly derived from these rivers. The western half is more high-lying, and thickly overlaid with sand deposited by the Kusi River in its gradual westward movements. Less than two centuries ago this river passed southwards near, possibly, to the east of the town of Purnia, but has gradually worked its way westwards till now it forms the western boundary of the district, fully thirty miles west of Purnia town. (Even since the current survey map of the district was planned, between 1840 and 1850, the river has worked

several miles westwards). The greater part of this western half is open pasture land, being so sterile as not to be worth cultivating, crops being grown for the most part only near the rivers, and in irrigated plots close to villages. Two large rivers pass through this part of the district, the Little or Damdaha Kosi, about 18 miles west of Purnia town; and the Kala Kosi, some three miles west of the town; the former is much the larger. Both are offshoots from the Great Kusi. In the north-western part of the district there is considerable inosculation of water-channels between the three branches of the Kusi, and the whole western half of the district is more or less cut up by hollows, dry in the hot weather, swampy in the cold, and full of water in the rains, which are the remains of old channels of the Great Kusi River. Several of these are to be seen in and near the civil station itself. The water-supply of this western half of the district is chiefly from wells, except actually on the banks of the rivers. The population of the eastern half of the district consists chiefly of low caste (Rajbansi) Hindus and of Mussalmans, all semi-aboriginal, that of the western half consists mainly of Bihari Hindus.

The Ganges-Darjiling Road, which, before the opening of the Northern Bengal Railway, formed the chief means of communication between Calcutta and Darjiling, runs through Purnia district in almost the whole of its length in the plains from Karagola on the Ganges, near the S.-W. corner of the district to Titalya in the extreme N.-E. corner, 106 miles, on its way passing through the civil station of Purnia. The Assam Behar Railway opened some three years ago, also runs through the district in two different directions, commencing at Manihari, on the Ganges it runs almost due north for some 20 miles to Katihar, an important junction, there it divides in two: one branch running eastwards past Dinajpur to join the N. B. R. at Parbati-pur; the other passing to the N.-W. to Achra Ghat, on the Great Kusi River, in the N.-W. corner of the district. The Tirhoot State Railway meets this branch on the opposite side of the river. This road and railway form the chief means of communication in the district.

Administratively, the district is divided into three sub-divisions, and thirteen thanas or police stations. The sadr or head-quarters sub-division comprises seven thanas, Purnia, Gondwara, Damdaha, Manihari, Kadwa, Amur Kasba, and Balrampur. Araria sub-division, in the N.-W. of the district, has three thanas, Araria, Matiari, and Raniganj, and Kishanganj sub-division, in the N.-E. of the district, includes three thanas, Kishanganj, Kaliaganj, and Bahadurganj. Of these divisions, the whole of Araria sub-division, and the first three thanas of the sadr sub-division, form the western half of the district; the other four thanas of the

sadr sub-division, and the whole of Kishanganj sub-division, form the eastern half. This division is almost exact; except that part of Araria thana, in the western half, lies east of the Panar River, and part of Kadwa and Manihari thanas, in the eastern half, lie west of it, it is quite so. The respective areas and populations (1881 census) of the two halves are as follows: west, 2,403 square miles; 788,735; east, 2,553 square miles; 1,059,952.

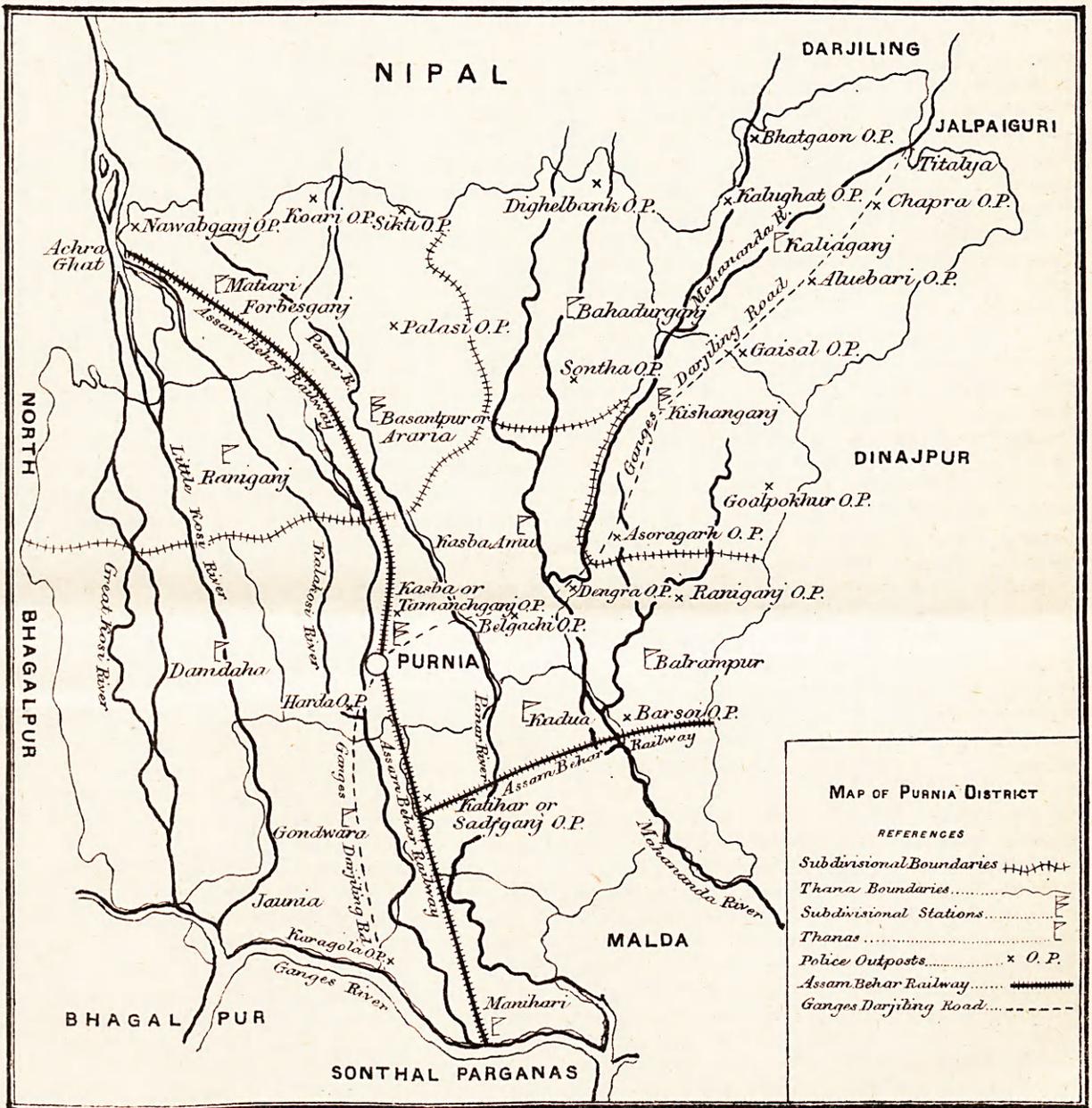
The district of Purnia, though in its general physical characteristics much more akin to Behar than to Bengal, lies within the endemic area of cholera, and has always been a district notorious for cholera prevalence. It is one of those districts in which cholera is known to have existed prior to the historic epidemic of 1817, and also suffered severely from the disease in that year. The earliest cholera statistics available refer to the jail. In May 1859 out of 310 prisoners in jail 109 were attacked by cholera, and 60 died. In March 1863 out of 551 prisoners, in twelve days 211 were attacked, of whom 124 died. In April and May 1867 there were 69 cases with 43 deaths. Since 1859 cholera has been epidemic in the district, almost regularly, every second year, the odd years showing a very much heavier cholera mortality than the even ones. The chief exceptions are little cholera in 1865 and 1883, odd years; and severe cholera in 1878, 1882, 1886, and 1890, even years. The same total of cholera mortality, however, which fifteen years ago would have been considered a severe epidemic would now be considered small, in comparison with the enormous totals registered during the past few years. Part of this increase in the number of deaths registered, no doubt, may be due to better registration; still it is difficult to resist the conclusion that the epidemics of recent years have really been more fatal than those recorded in the earlier years. Registration is still imperfect enough; indeed, it is impossible to hope for anything like complete registration until it is as difficult in India, as it is now in England, to dispose of a dead body without registering the cause of death. Such a state of affairs, of course, is still in the dim distance. But registration is much less defective now than it was fifteen years ago.

Several epidemics, those of 1869, 1875, 1882, and 1889 were attributed to outbreaks at Karagola mela or fair. This fair is a very large one, held at Karagola, in the S. - W. of the district, where the Ganges-Darjiling Road begins. It is usually attended by thirty thousand people or more. A considerable number of these people are hillmen, Nipalies, Bhutias, &c., who go to the fair and return from it by road traversing the entire length of the district. They always live under most insanitary conditions, and fall ready victims to cholera when it breaks out amongst them. The fair used formerly to be

held without any sanitary precaution, but great improvement in this respect has been effected of late years. The Civil Medical Officer of Purnia in his special report on the cholera epidemic of 1889, attributed the spread of the disease to the crowds returning home on the break up of the fair of that year. The Deputy Sanitary Commissioner of Darjiling Circle, however, who also reported specially on that epidemic, seemed doubtful as to whether any blame really attached to the fair. This year, 1891, the fair was later than usual, from 23rd February to 8th March, and it was attended by a comparatively small number of people. And this year's epidemic had broken out before the beginning of this year's fair.

The epidemic of 1889, whether originating at Karagola fair or not, began in February, the month in which the fair is usually held, but did not attain epidemic proportions until March. In April it reached its maximum, a very rapid fall followed in May, and in June there were hardly any deaths. In January 1889 only 24 deaths from cholera occurred, 9 in the western and 15 in the eastern half of the district. In February there were 125 deaths, 107 in the western, and only 18 in the eastern half. In March 6,198 deaths from cholera were registered, of which 5,572 took place in the western, and 626 in the eastern half. In April 10,232 deaths occurred, the western half contributing 8,150, and the eastern 2,082. In May the number sank to 625, of which 400 occurred in the western half and 225 in the eastern. In June 65 deaths occurred, 15 in the west, and 50 in the east. From July, the west of the district, remained free from cholera, only 11 deaths being registered during the six months, but a few cases continued to occur in the eastern throughout the second half of the year. On the whole, the entire western half of the district suffered very severely from cholera during March and April, but of the eastern only Kadwa, Amur, Kasba, and Manihari thanas showed any great mortality. Kishanganj sub-division and Balrampur thana, in other words, the whole of the east of the district, almost entirely escaped. The meteorological returns of the year show nothing special, the rainfall from February to April inclusive was under half an inch.

There was comparative freedom from cholera in 1890. In January and February, and from July to November, the district was almost free from cholera. From March to June there was a limited outbreak almost confined to Araria sub-division and Damdaha thana, *i. e.*, to the W. and N.-W. of the district. In all, 3,165 deaths were registered, of which 1,244 took place in Damdaha thana, and 1,214 in Araria sub-division. The chief meteorological feature of the year was a long drought. From 12th October 1889 to 13th May 1890 (seven months), the only rain-



NIPAL

DARJILING

JALPAIGURI

NORTH
BHAGALPUR

DINAJPUR

MALDA

BHAGALPUR

SONTHAL PARGANAS

MAP OF PURNIA DISTRICT

REFERENCES

- Subdivisional Boundaries + + + + +
- Thana Boundaries - - - - -
- Subdivisional Stations [Symbol]
- Thanas [Symbol]
- Police Outposts x O.P.
- Assam Behar Railway [Symbol]
- Ganges Darjiling Road - - - - -

fall was 0·05 inches on 5th March, and 0·30 inches between 19th and 20th April.

During the month of January 1891 only 88 deaths from cholera were registered in the district. There was a little sporadic cholera throughout the whole eastern half of the district, except in Manihari thana, and also in Araria thana; while the whole western half of the district, except Araria, was free from the disease. In particular, it is noticeable that both the riverside thanas, Manihari and Gondwara, with its outpost Karagola, were quite free from the disease. In neither, moreover, was any death from cholera registered during the first week of February.

On the 8th of February 1891 a great bathing festival took place on the banks of the Ganges, the "Ardhodaya Jog," or "Snan." This is a festival which is said to occur only once in thirty years, and it is also alleged that this was the last time it will be held on the banks of the Ganges, for, after the close of the present century, the Ganges will no longer be the peculiarly sacred river of the Hindu religion, but this character will then be assumed by the Narbada. This bathing festival seems more or less to have taken everybody by surprise. The railway authorities appear to have been unprepared for the enormous quantity of passenger traffic suddenly thrown upon their hands, and were unable to concentrate sufficient rolling-stock to carry the number of pilgrims applying for transport, specially as this sudden and unexpected demand for transport was made in more directions than one at the same time, crowds of pilgrims pouring down the N. B. R. line to Sara, as well as along the Assam-Bihar Railway to Manihari. Nor were any preparations made in this district at least for dealing with the sickness that might be expected to occur among the assembled masses. Personally, I never heard of this general pilgrimage to the banks of the Ganges, until informed that cholera had broken out at Manihari among the pilgrims assembled there; though I had seen from the crowds of pilgrims marching down the Ganges-Darjiling Road, that a pilgrimage to Karagola was going on. A Civil Hospital Assistant is always deputed on special duty to Karagola fair, and this year the officer deputed was sent there a fortnight before the fair began, that he might be present there on the day of the bathing festival.

On 12th February I received intimation through the Magistrate, that cholera had broken out among the pilgrims at Manihari station on the Ganges. Luckily there happened to be a C. H. A. on supernumerary duty at Purnia at the time, and I at once despatched him with medicines to Manihari. He left on the 13th, and on the same day I went to Katihar Junction. There I heard that the railway authorities had been unable, until after considerable delay, to

remove the crowds of pilgrims who had come to Manihari for the bathing festival on 8th February, and who would naturally be desirous of leaving the place as soon as they had performed their ablutions. The great majority of these pilgrims came from the East, from Dinajpur, and from Rangpur, Jalpaiguri, and even Assam, *viâ* Parbatipur. The last of them, however, had been despatched by the night of 12th February. The total number carried by the railway, I heard, variously estimated at from sixty thousand up to a lakh. Not being able to get away by train, some 5,000 or more had walked up from the river to Katihar, about twenty miles, and had been assembled on and near the platform. There had been altogether forty cases of cholera at Katihar, besides six or seven dead bodies taken out of the train. Of these forty, thirty-seven were taken out of the train sick, two were friends remaining with the sick at Katihar, and one was a child whose parents lived at Katihar, and had taken it to the river, where it was attacked. This child recovered, and no other cases took place among the residents at that time. Of the other thirty-nine cases, five recovered, and thirty-four died, the great mortality being due probably to the fact that almost all were advanced cases when first they came under notice. The passengers would not complain of sickness, nor ask for treatment, being only anxious to get back to their homes; they would not even inform the railway servants of the presence of a corpse in the carriage. Consequently it was only those who could be detected as sick by the railway staff who came under treatment. The same happened at Dinajpur, I was informed, and all the way up the line to Parbatipur.

On the 14th March I went into Manihari station. There I found that five pilgrims had died, and one case had been attacked on the preceding night, the child of a railway servant (died). At Manihari Ghat station, five miles further on, sixteen deaths had occurred among the pilgrims, seven on the 11th, eight on the 12th, and one on the 13th, none now remained sick. There had been no cases there except among the pilgrims. I then visited Manihari thana, near the first station. The Sub-Inspector informed me that twenty-eights deaths were known to have taken place among the pilgrims outside the railway premises, but added that he considered there was no true cholera, but simply bowel-complaint, owing to cold, want, and exposure. This seems probable enough, but, however, this may be, whether the first cases were or were not true cholera, the cases at Katihar were certainly true cholera, and they were the beginning of a most fatal epidemic, not only in this district, but also in the districts to the east, through which the pilgrims passed on their return journey, Dinajpur, Jalpaiguri, and Rangpur. The

pilgrims certainly suffered from cold, want, exposure, and over-crowding. Some of them were detained at Manihari nearly a week, instead of a day or so, as they probably expected. If they had food or money with them, the majority would not have enough to last them the whole of their stay, such food as they had was probably *chura* (parched rice), the most likely of all foods to set up bowel-complaints. Food was selling at famine prices at Manihari, rice at four annas a seer, flour fourteen annas a seer, mustard oil a rupee a seer, earthen dishes four annas each. The nights of the 6th and 7th February were the coldest known for a long time, the dry thermometer going down to a minimum of 34°, the wet to a minimum of 30°, or below freezing point; and though the night of the 8th was not so cold, the minimum was still only 43°. On the river bank it would probably be colder than in Purnia, and many probably spent the night in wet clothes after bathing.

At Karagola large crowds also assembled on the 6th February for the bathing festival. How many pilgrims marched down the Ganges-Darjiling Road to Karagola there is no record, nor can the number be computed in any other way than by the roughest of guesses. The police officer in charge of Karagola outpost, however, informed me that the river bank was covered for miles with the bathers, and I saw the road through Purnia occupied for days by a continuous stream of pilgrims marching down to Karagola before the 8th, and returning after the 8th. A great number of these pilgrims were hill men, and these men, coming from the north, mostly came into the high road at Purnia. Large numbers also, I believe, came down by train from Forbesganj, in the north of the district to Purnia, and marched from Purnia to Karagola by road (thirty miles), in preference to going by train to Manihari, and either bathing there, or walking across from there to Karagola some ten miles. Some also came from the north-east, marching down the road for its whole length of 106 miles. Among these pilgrims, however, no cholera was reported at the time.

I visited Karagola mela on the 16th February, and was then informed both by the police officer and by the Civil Hospital Assistant on duty at the fair, that they had not heard of any cholera among the bathers on the 8th. This fair has often been blamed in previous years for starting epidemics of cholera. This year, however, there does not appear to be any probability that the fair was to blame as the cause or as the starting point of the epidemic. The sanitary arrangements of the fair were good, latrines for men and women having been provided; and orders having been passed, and, as far as possible, enforced, that the site of the fair and the river bank should not be resorted to for purposes of nature; a temporary hospital, with a competent Hospital

Assistant, and a sufficient stock of drugs had been provided; and, above all, the number of persons resorting to the fair was very small in comparison with recent years. In 1890 the largest number present on any one day was 34,000; in 1889, 39,000; and, as there is a constant coming and going of people during the whole of the two weeks that the fair lasts, the total number attending would be much greater. This year, when the census was taken on the night of 26th February, the number present at the fair was found to be 5,372. And though, no doubt, the total number of persons attending the fair between 23rd February and 8th March was much larger than this, it is certain that the fair was a very small one, as compared to recent years. This was due to the fact that large numbers of persons who would otherwise have attended the fair had come to Karagola for the bathing festival on the 8th February, and did not care either to remain there until the fair opened two weeks later, or to return from their distant homes when the fair was open. In particular, I believe that the number of hill men at the fair this year was very small; as most of those, who would otherwise have been present at the fair, had bathed in the Ganges on the 8th, and had returned home. One case of cholera occurred at the fair, and proved fatal; but the total number of cholera deaths registered at Karagola outpost was only 9 in February and 20 in March, so it is evident that there was no serious outbreak in this part of the district until fully a month after the breaking up of the fair.

(To be continued.)

JAMBUL IN DIABETES MELLITUS.

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THE seed of the Jambul (*Engenia Jambolana*) lies enclosed in a papery shell within the berry. The berry is succulent and has an astringent subacid taste.

From the seed the chief preparation of the drug is prepared; great stress being laid upon the necessity of employing only fresh carefully dried seeds.

For long Jambul has been used by native physicians in the treatment of diarrhoea; but about forty or fifty years ago Dr. Blane drew attention to its effects in diabetes.

Within the last few years many experiments have been made with this drug, and the general conclusion arrived at is that apart from its astringent properties, it not only prevents or retards the conversion of starch into sugar in diabetes, but also diminishes the volume of the urine.

To test its action, very careful observations were made in a case of diabetes recently under treatment.