

Day.	1	2	3	4	5	6	7	8	9	10
	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.
105	150.7									
104		104.6								
103										
102										
101						101°·9				
100		100.5	100.1			10°·2	100°·6	100°·2		
99			99.7 99.2	99°·6	99°·4					
98				98°·4	98°·1	98°·4		98°·		

Range of temperature during an attack of dengue in the case of a Hindustani Brahmin, aged 16. The terminal rash appeared on the sixth day, one hundred and eighteen hours after first seizure.

Day.	1	2	3	4	5	6	7	8	9	10	11	12	13
		M. E.	M. F.	M. E.									
103	103.7												
102					102.6		102.8						
101	101.2	101.6		101.6	101.6	101.°	101.5						
100		100.7	100.5	100.2				100.2					
99							99.8	99.5	99.4	99.6	99.7	99.2	
98								98.9	98.3	98.8	98.°	98.4	

Range of temperature during an attack of dengue in a Mahomedan, aged 35. On the sixth day the terminal rash appeared, and on the seventh inflammation at the base of the left lung was detected.

Dacca: October 10th, 1872.

CHOLERA IN CALCUTTA DURING THE YEAR 1872.

By C. MACNAMARA.

(Continued from page 35.)

THE number of deaths from cholera recorded in the hospitals of Calcutta during the past year, as contrasted with previous seasons, bears a definite proportion to the deaths reported from this disease by our Municipal authorities. I showed, however, that during the year 1871 no less than one-fourth of the cholera patients dying in our hospitals, were persons who had contracted the disease beyond the limits of the town, and been brought into the place often in a dying state; the number of these outside cases has increased considerably during the year 1872, amounting in the hospital under my care, and also in the Municipal and Police Hospitals, to no less than one-half of the patients suffering from the disease. It was this fact which led me to remark, that the deaths from cholera returned by our Municipal authorities, by no means indicate the actual mortality from the disease, occurring among the inhabitants of the town; for it is the importance of these cases of cholera brought into the place from beyond the confines of the Municipal water-supply (including the river population) which so materially complicates the question we are considering, as to the influence which a supply of pure water has had in diminishing cholera among the inhabitants of the town. Beyond this, it would have been desirable to know if in particular cases of the disease, the river or well water had

been consumed, in place of that distributed by our Municipal authorities.

Although the deaths from cholera among our hospital patients have generally risen and fallen, in proportion to the deaths reported by our Health Officer as occurring in Calcutta, nevertheless there have been marked exceptions to this rule during certain months of the year: for instance, in November 1872, the deaths from cholera according to the Municipal Returns amounted to 178, and in December to 261; but in our hospitals the number of deaths from cholera were 67 for November, and only 50 in December, the mortality from the disease decreasing among our hospital patients as it increased among the inhabitants of the city. This seemed to me rather remarkable, and I accordingly wrote to the Health Officer of Calcutta, asking him if he could kindly enlighten me on the subject. In his reply that officer remarks (20th January 1873):—"I do not think that the rate of mortality in the hospitals of Calcutta can in any way rule the statistics of the town. You must remember that the police officers who register the deaths are illiterate and unacquainted with the vernacular language; therefore many cases reported by them as cholera must be attributed to other causes. I publish the causes of death as I receive them from the Police, but I do not vouch for their accuracy" It is impossible that a more unsatisfactory answer could have been returned (considering the importance of the interests involved) from an officer holding a similar position in any other part of the world, and hardly from any other town, even in British India.

Although our Municipal returns are evidently little more than guess work, I may observe that medical practitioners engaged among the natives of this city, are convinced that there has been a great and decided decline, in the number of cases of cholera among the inhabitants of the town, since the introduction of our improved water-supply.

I would also invite those interested in this subject to examine into the circumstances of the European troops residing in Fort William, Calcutta, with reference to

the influence which a pure water-supply has had in reducing cholera among our soldiers. The rise and fall of the ground water, and the condition of the weather, cannot materially have differed during the past fifteen years; the barracks in which the men live, and the food they consume, have undergone no great changes since 1866. If we refer, however, to the medical reports of the British troops in India, we find that for ten years prior to 1866 the death-rate from cholera among the men in the Fort amounted on an average to no less than 26 per annum. In 1866, the old wells in Fort William were closed, the troops were no longer supplied with drinking water through the medium of a bheestee's *mussack* filled from the wells in the place; all this was changed, and the soldiers were "entirely supplied with water for all purposes from the two tanks at the foot of the glacis. The tanks are large, and well kept and guarded. Between the tanks is a masonry cistern, which is opened with sluice gates and can be connected with both, or either tank; but before entering the cistern, the water has to pass through a considerable thickness of sand and broken bricks. From this cistern the water is raised by means of a pump worked by a steam engine to a cistern on the ramparts, and thence it is distributed to stand pipes placed about the fort."* This supply of pure water was introduced into the fort in 1866. During the year 1867 two men died of cholera in Fort William; in 1868 there were five deaths from this disease; in 1869 no deaths at all took place among the European troops from cholera; in 1870 two deaths were reported; in 1871 there were no deaths from cholera; and in 1872 one

* Report on the Analysis of Portable Water of Cantonments, by F. Macnamara, Calcutta, 1867, p. 22.

death from this disease occurred: so that, as I have above stated, prior to the introduction of the improved water-supply into Fort William, the regiment living there lost on an average 26 men every year from cholera; but subsequently to the pure supply of water being introduced into the fort, they have only lost two men per annum from this disease.

Lastly, we may refer to the influence which a pure supply of water has had in protecting emigrants proceeding from this port. Dr. J. G. Grant has very kindly supplied me with the following information on the subject:—It seems that during the past twenty years, cholera has appeared year after year among the coolies on emigrant ships proceeding from this to the Mauritius. The same remark applies to emigrants sailing from Calcutta for the West Indies: as many as 25 to 30 deaths from cholera not unfrequently being reported among a batch of some 300 emigrants during the voyage. In August 1870, strict orders were issued by Government that emigrant vessels were to be supplied with no other water than that drawn from the Calcutta Municipal works, and from that time to the end of 1871, out of 17 emigrant ships leaving this Port, in one vessel only has cholera occurred.

SUGGESTIONS AS TO THE CAUSE OF UNHEALTHINESS OF LOWER BENGAL AND THE RECENT OUTBREAK OF EPIDEMIC FEVER.

By Assistant Surgeon GOPAUL CHUNDER ROY, M.D., F.R.C.S.,
Inspecting Medical Officer of Endemic Dispensaries.

ALTHOUGH the following observations are the result of limited experience, yet, as facts, they may be made use of for the solution of the problem stated in the title of these remarks. With this view I shall dwell on the peculiar insanitary condition of their villages and on those habits of the people which tend to bring about unhealthiness of a locality. The villages in Bengal consist of an aggregation of huts, with narrow lanes and by-lanes. The mud for plastering the wall is generally dug out of a portion of land facing the intended dwelling. The economical idea of a Hindu generally prompts him to leave the pit thus formed unfilled up; and the percolation of sub-soil and the drainage of surface water soon convert it into a tank or reservoir of water for all household purposes. Here are bred fishes for ordinary consumption; here are washed and emptied plates containing the refuse of meals; here are thrown the excreta of the house; here is formed a convenient tank for the bathing of the zenanas, and from this polluted source water for cooking, if not for drinking, is in most cases supplied. This tank itself gets replenished by the surface washings after heavy rain-falls, which carry with them such an amount of sediment that the bed gets silted up with a stinking mud. The water itself becomes impregnated with a nauseous odour, and is overgrown with vegetation. If we picture to ourselves the number of such tanks increasing with the increase of population and dwellings in a village, we can well understand how in time they will form one of the most fruitful causes of unhealthiness. The pool of water affects the hygrometric state of the atmosphere and sub-soil moisture, and forms in itself a nidus of decomposition of all vegetable matter with which the banks abound. The entrance to a village generally is known by the proximity of water tanks, which sometimes present themselves in such close series that it is no exaggeration to say that for one house you often pass two tanks. The deterioration of these ponds will in time establish ill-health and disease.

I pass over the peculiar insanitary construction of huts; for, being of the same type from time beyond memory, they cannot be said to afford any particular recent causation of the outbreak of the epidemic now raging, although no doubt they render the body more susceptible to its influence.

To justify overcrowding being assigned as a principal cause of unhealthiness, would require a comparative census of the district embodying a period of, say, twenty years. Nevertheless it seems a reasonable deduction, in accordance with the laws of political economy, to infer increase of population in a district

where multiplication of the species has gone on for years without any destructive agency. But this cause does not seem sufficient of itself to give rise to the widespread desolation of the epidemic fever. It may be a predisposing, but not the immediate exciting, cause.

Unnecessary though clothing may seem in hot weather, in winter there is such a lowering of temperature morning and evening, with such a wide range of variation, that the preservation of the body in an equable state forms an indispensable condition of health. In the early part of winter fever is endemic all over India, simply because exposure and insufficient clothing render the body prone to disease. This prevalence of fever in October and November is seen even in those healthy districts where enlargement of spleen forms a medical curiosity. In Bengal this is the period when the rice crops are reaped; and as the majority of persons live by husbandry, they resort to the field early in the morning with scarcely any clothing on their backs, and work out the whole day in a cold, depressing atmosphere, whilst wading ankle deep in mud.

The habits of the people have mostly remained unaltered, excepting perhaps that the price of labour has not increased in corresponding ratio with that of all domestic necessaries. It is a fact well known in Hindu families that the income which used to afford a surplus scarcely suffices now for their daily wants. Besides, the superseding of some native manufactures by foreign supply has greatly pauperized the working classes. Insufficient nourishment from increased pauperism leaves the body in a condition in which it can ill withstand the violation of nature's sanitary laws.

When we add to these circumstances the profuse unchecked growth of vegetation, the heaps of cowdung adjoining the cowsheds, and the want of surface drainage, we include all that may be said with reference to causes that operate within the village to bring about the corruption of the air. But something more than these conditions should be sought for to explain the general state of perversion of health; for, from the operation of most or all of the causes before mentioned, the well-to-do classes and the European community are exempt, and yet there is not one who enjoys absolute immunity from this pestilence. One feature presents itself to our notice. Every village stands in the centre of an extensive plain of rice field, which for six months in the year must remain under water before a good crop is expected. The increase of population has created a greater demand for food, and the consequence has been an increase of rice cultivation, which has been still more encouraged by the ready sale it has met with in the market on account of foreign exportation. Besides, the economical policy of a Hindu leads him to employ his labor for a produce which, even in the event of its not meeting with a ready sale, may yet enable him to ward off starvation and beggary. Thus every bit of land that some twenty years ago remained fallow, has been brought under the plough for the purpose of yielding a rice harvest and the result has been the conversion of the country into a marsh pregnant with malarious poison. This seems to me to have some bearing on the causation of fever. The prolonged submerged condition of an extensive plain, with inevitable vegetable decomposition, has produced an ill condition of the atmosphere which has manifested itself in an explosive outburst of disease. That the rice cultivation had increased considerably before the epidemic compared with what it was some ten years previously, is palpable to a superficial observer. Yet the confirmation of the point requires facts and statistics, which can alone be furnished by the different Commissioners of the districts, and which I am not now in a position to secure.

Different local conditions aggravate or modify the effects of the poison so generated, and amongst them are the predisposing causes to which I have alluded before; those villages suffering most that are most jungly, and where sanitation is least observed.

23rd December, 1872.