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Government of Madras.

DEPARTMENT.

G.O. No.

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Read the following papers:—

No. 84. From W. MACKENZIE, Esq., M.D., Inspector-General, Indian Medical Department, to the Chief Secretary to Government, Fort St. George, dated Fort St. George, 11th March 1871; No. 81.

I have the honour, with reference to G. O., No. 1681, of 30th December 1870, directing Assistant Surgeon Wright to investigate the causes, &c., of the fever prevailing in the Godavery District, to state, for the information of Government, that he has submitted an elaborate report on the subject, which I have forwarded to the Sanitary Commissioner with a request that he will be good enough to bring to the notice of Government any points in it that demand special attention.

2. In the meantime, as the epidemic is stated to have subsided, I would recommend that Mr. Wright may be re-called for other duty. I would also beg to remark that there does not now appear to be any immediate necessity for the Sanitary Commissioner to visit the locality as was originally proposed; but on this point he will himself, of course, advise Government. (Mr. Wright considers the fever to be of a bilious remittent type, and reports that, when seen at an early stage, it readily yields to the usual febrifuges; but that, if neglected or improperly treated, it speedily assumes a fatal typhoid form.)

3. (The native treatment consists in continued abstinence from food, and the occasional administration of violent preparations of mercury to which Mr. Wright ascribes much of the immediate mortality, as well as a considerable amount of organic disease, which ultimately proves fatal in those who may recover, in the first instance, from the attack.)

4. (From the appended table it will be observed that the disease is most prevalent immediately after the rains in November, December, and January, and that during the hotter and drier months of the year the mortality is at a minimum and pretty uniform.) Mr. Wright states that "until late years the Godavery delta was considered one of the healthiest parts on the coast; but during the last few years fever has been much on the increase and the district losing its character for salubrity."

5. (In the belief of some of the inhabitants this change has been contemporaneous with the extension of irrigation, which they consider a chief cause of these periodical outbreaks of the disease.) The evidence on this point is, however, conflicting. Mr. Wright remarks that the deaths in the irrigated taluqs, taken as a whole, were much fewer than in the non-irrigated, while in the most highly irrigated taluq in the district, taken alone, the mortality was greater than in any of the others.

6. Another popular opinion as to the cause of the fever is that the water of the Godavery has become unwholesome of late years, and thus liable to induce an attack in those who are obliged to use it for drinking purposes.

7. In considering how far the habits and circumstances of the people may have had an influence in increasing their susceptibility to this disease, Mr. Wright states that the inferior or scanty food and insufficient clothing of the poorer classes

coupled with other hardships, render them at once more subject to fever, and more liable to succumb when attacked. He was informed that the wealthier classes, who can afford better food and clothing, are by no means so apt to suffer, and that the flesh-eating castes are less obnoxious to the disease than vegetarians. According to his own observation, exposure, or sleeping in the open air with no other protection than a thin cotton cloth during cold and dewy nights, is one of the most common exciting causes of an attack.

8. A return of deaths from fever in the district during 1870-71 was not available when Mr. Wright drew up his report; but the annexed table, kindly furnished by the Collector, exhibits the recorded mortality from this cause in the different taluqs during 1869-70. The total number of deaths amounted to 19,810, and, as the population is put down at 4,427,472, this gives a mortality of 13·87 per mille. Large as this death-rate is, it affords, however, but a very inadequate idea of the suffering occasioned by outbreaks like those of the past two years. The alleged causes of the fever will doubtless be duly commented on by the Sanitary Commissioner; but with the view of obviating, as far as possible, so great and lamentable a loss of life as has now been brought to notice, I would beg to suggest that in future years extra medical aid and supplies of medicines should be sent into the district during the feverish season. Such an arrangement, there is reason to hope, would not only be of great immediate and direct benefit, but might also be the means of inducing the people to abandon their present pernicious system of treating the disease.

9. In conclusion, I have much pleasure in stating that Mr. Wright has conducted the duty entrusted to him to my entire satisfaction, and I beg to bring the zeal and ability which he has displayed on this occasion to the favourable notice of Government.

No. 85. From Surgeon W. R. CORNISH, F.R.C.S., Sanitary Commissioner for Madras, to the Chief Secretary to Government, Fort St. George, dated Madras, 10th April 1871, No. 454.

I have the honour to state, for the information of Government, that the Inspector-General, Indian Medical Department, has been so good as to favour me with a perusal of the report of Assistant Surgeon Wright on the late prevalence of fever in the Godavery District, and has requested me to submit any observations I may have to make on the subject in forwarding the report to Government.

2. It will be within the recollection of Government that in my letter, No. 607, of the 31st May 1870, I drew attention to the fact that the Godavery District was annually subjected to a season of fever prevalence, and that I attributed this periodical fever to "some general cause connected with the season of the year" rather than to the increase of irrigation in the district. I showed that, whereas the district is extensively irrigated from July to October, there is never any marked increase of fever in the district until the wind has changed to the north-east, and that the fever season in the Godavery is coincident with the continuance of the north-east monsoon.

3. In a letter to the Board of Revenue, dated 11th September (*vide* Proceedings, page 474), I took occasion to warn the Revenue Authorities that the facts recorded in connexion with the periodical fever of the Godavery and Kistna Districts made it only too probable that a heavy rainfall in the north-east monsoon would be followed by a large development of fever in the three or four succeeding months, and that special assistance in the way of fever medicines would probably be needed.

4. The spread of malarious fevers began precisely as was anticipated, and the report of Assistant Surgeon Wright shows clearly the nature of the fever and the aggravated mortality caused, in a measure, by its improper treatment.

5. It has seemed to me to be a point of the very greatest importance to determine whether the periodical outbreaks of fever in this district have increased in severity since the Godavery Irrigation Works have been completed. Practically there are no data to show what the health condition of the present irrigated districts was before the anicut was built. Mr. Wright, in paragraph 3 of his report, implies that the tracts now unhealthy formerly bore the repute of being salubrious; but mere native opinion on such a subject as the progressive insalubrity of a locality, without facts or figures in support of it, is of little value, and I am not inclined to attach any importance to it in the face of the actual facts of the last five years, viz., that the fever death-rate has been considerably higher in the non-irrigated than in the irrigated taluqs of the district.

6. In the Administration Report for 1870, now in preparation, I have gone into this question at some length, and it is only necessary in this place to compare the fever statistics of the irrigated and non-irrigated taluqs of the Godavery District. I have examined the data for the five years ending December 1870, and, as the results for a lengthened period are more likely to be accurate than when taken for a single year, as Mr. Wright has done, I think the following figures represent the nearest approximation to the truth:—

In the irrigated taluqs of the district the mean annual death-rate from fever for the five years (1866—70) was...	8·12 per mille.
In Zemindary Estates, mostly on the seaboard and irrigated.	8·5 „
In taluqs above the delta and not irrigated from the river	
Godavery	11·05 „

From these figures it will be apparent at a glance that the intensity of fever in the district is most marked in the taluqs which cannot possibly have been influenced by the system of irrigation works constructed under Sir A. Cotton's superintendence, inasmuch as these taluqs are altogether above, or outside of, the irrigated area.

7. In the letter previously quoted I have expressed my conviction that the periodical accessions of fever in the Godavery District are due to the geographical position of that district in respect to malarious lands to the north and west, and that the fever is due to the northerly winds of the north-east monsoon sweeping over the malarious jungles of the Hill tracts of the Northern Circars before they reach the Godavery District. In respect to individual taluqs and estates Mr. Wright has shown the correctness of the observation, and that the taluqs which are the most open to influences from the sea have the least fever, while those parts of the district which are exposed most to the winds which have blown across unhealthy

jungles have had the highest ratios of fever prevalence and mortality. [Mr. Wright's figures relate only to a single year, but the results of five years' registration demonstrate in a very clear manner that the intensity of fever in any taluq has no relation to the extent of irrigation of the land, but is solely due to the geographical position of the taluq and its exposure to malarious winds during the north-east monsoon season.]

The irrigated districts do not all suffer in the same degree from fever. Thus, for five years the death-rate in the Ramachendrapur Taluq was 11.9 per thousand, while in Amalapur and Nursapur the rates were 6.5 and 4.6 per mille only. The difference I attribute entirely to the position of the taluqs, the former being exposed to the malarious winds from the north, while the latter are exposed mainly to sea breezes.

8. While the yearly occurrence of fever in November, December, and January seems to me to be dependent on causes unconnected with the district itself, I am by no means sure that a heavy north-east monsoon in the district does not increase the amount of fever.

In 1868, when this monsoon failed, there was a remarkable absence of fever in the district, and in other years of normal or excessive rainfall the fever has regularly appeared. I infer, therefore, that local moisture is needed for the development of the fever; but, whether the malaria is extricated in greater abundance from the Hill jungles to the north after rainfall and the winds blowing over these tracts are thus rendered more poisonous than usual, or whether the malaria wafted down from the Hill tracts becomes more active while the air and soil of the district are saturated with moisture, I cannot say. Practically, so long as wild jungle tracts exist to the north of the district, so long will it be liable to suffer from fever at the season of the year when the winds blowing over the malarious tracts traverse the district.)

9. While giving this opinion I by no means wish it to be understood that I undertake the importance of attending to the drainage of the irrigated districts. Neglected drainage of irrigated lands may at any time produce swampy spots, which may become local centres of malaria, and any such neglect should be promptly remedied.)

But, when we find taluqs like Peddapur, Ernagudiem, Rajahmundry, and Ellore yielding persistently higher death-rates from fever than the moist and well-watered area of the delta, it is plain that the irrigated tracts *per se* have but little to do with the generation of the malaria which year after year sweeps over the district and destroys so many of the people.

10. While, therefore, the remote causes of the fever appear to be beyond control, every effort might reasonably be made to induce the people to adopt measures for their individual protection from its effects. The season of fever prevalence can in most years be calculated with accuracy, and so far this is an advantage, as special measures of medical relief may be organized to meet the seasonal emergency. But after all medical aid can do but little in comparison with hygienic precautions.

In my letter to the Board of Revenue of 11th September I mentioned the more important measures of prevention and treatment as follow:—

“As fever increases periodically in the Northern Districts in November and begins to be most fatal in December and January, the people should be warned to take due precautions for the preservation of their health during these times. Sleeping out of doors, exposed, to heavy night dews, should be avoided. The common charpoy should be used by all who can afford it, and, when this is impracticable, the flooring of the huts should be dry and raised above the ground-level.

“The system of prolonged fasting as a cure of fever undoubtedly tends to bring about a fatal termination of the disease, and it would be well if the people could be dissuaded from resorting to such a practice. The general use of quinine in the affected villages should be encouraged, and, as the people have now the opportunity of purchasing this drug in the Revenue Department, some arrangement might possibly be made by the Board of Revenue for placing so valuable a medicine within the reach of the inhabitants of the villages of the Godavery and Kistna Districts during the seasons of special fever prevalence.”

11. Assistant Surgeon Wright has entered into this subject fully, and has pointed out the extreme danger attendant on the practice of prolonged fasting, which he would have prohibited by law.

It seems to me, however, very doubtful whether any compulsory measures to abate the evil could be practically followed. I should prefer to call attention to the subject by notifications in the District Gazettes, or by circular instructions to heads of villages. As education spreads many of the difficulties of dealing with the ignorance and prejudices of the people in regard to the care of their health may possibly disappear.

Progress in this direction would be materially assisted by the location of a body of trained native practitioners in the district; but unfortunately State provision for the medical relief of the sick poor of the country generally is still a question for future consideration.

12. In consultation with Dr. Mackenzie, Inspector-General, Indian Medical Department (after hearing from Assistant Surgeon Wright of the decline of the late outbreak), I decided to postpone my visit to the Godavery District until the next season of fever prevalence commences, and I purpose to visit the Northern Districts, therefore, at the end of the present year, with the view principally of seeing the condition of the people and of the country during the prevalence of fever.

13. Assistant Surgeon Wright's report is forwarded herewith. I would venture to suggest that extracts from it might be printed in the District Gazette, and especially his remarks on the treatment of the fever. I think also that the District Authorities should be supplied with a stock of fever medicines, for sale and gratuitous distribution, some time before the fever season becomes due.

From Assistant Surgeon W. E. WRIGHT, to the Secretary to the Inspector-General, Indian Medical Department, dated Rajahmundry, 30th January 1871, No. 9.

I have the honour, herewith, to forward my report upon the fever of the Godavery District. It is not so satisfactory as I could have wished, for I came too late into the field, and arrived after

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the epidemic was over; but I have, nevertheless, done my best to inquire about it, and to ascertain the conditions under which it has appeared year after year.

2. If, in this report, Dr. Mackenzie thinks I have dwelt too long on some points, or not enough on others, I shall be happy to re-write portions, or alter it before he submits it to Government.

3. There is now very little fever about the delta, and I don't think my services are required here any longer; but I believe there is always more or less fever in the hills and jungles in the north of the district. If it is considered advisable for me to proceed there, I shall have much pleasure in going and sending in any further remarks that the circumstances may suggest. If, however, I am required to do so, I would ask to be allowed a Dresser for the purpose of compounding medicines and rendering other assistance. In the case of leaving the district, I should be obliged if you would inform me what to do with the medicines which are in my possession, and of which a small quantity only has been used.

4. If it is intended to carry on this inquiry during another season, I would suggest that a Medical Officer should be in the district by the middle of October, as it is in November generally that the fever shows an increase. He would then have a better opportunity for investigation.

5. In the meantime I have the honour to await instructions as to my next movement.

Report on Fever in the Godavery District.

Object of the present report.—It is my intention in the present report to examine into the causes of a fever which of late years has caused great mortality in the Godavery District, and to discuss the question how far these causes are within human control. I shall also suggest means for its prevention, and consider how the District Authorities may be best able to grapple with the epidemic in future years.

2. *Importance of the subject.*—The importance of a subject of this kind can hardly be over-rated. On examining the death returns for the official year 1869-70 I find that in a population of 1,427,472 the deaths from fever alone amounted in this district to nearly 20,000, surpassing the deaths from cholera and nearly all other causes put together. Now, I trust to be able to show that the majority of these deaths are due to causes which are preventible, for I believe that, by taking proper precautions, this mortality can be reduced; and also a large and remote mortality resulting from the subsequent ill-health induced by repeated attacks of the disease. An outbreak of cholera terrifies by its sudden invasion and fatality, and the epidemic ensures speedy investigation and the adoption of means for its suppression; but until recent years a fever which prevails year after year, and has been far more fatal in its effects, has attracted comparatively little attention. I, therefore, cannot but think that any measures which succeed in staying the ravages of malarial fever will be fraught with even a greater benefit to the people of this country.

3. *The Godavery Delta at one time considered healthy.*—From time immemorial fever has prevailed in the upland and jungle tracts of the district; but until late years the Godavery delta was considered one of the healthiest parts on the coast, but during the last few years the fever has been much on the increase, and it has been losing this character for salubrity.

4. *Short geographical description of the District.*—The Godavery District is irregular in shape; but, allowing for the irregularity of its boundaries, is for the most part situated between the parallels 16° 20' and 17° 30' of north latitude, and between 80° and 82° 30' of east longitude. The northern and western boundaries consist of hills and jungles in part unsurveyed. On the east the sea coast runs chiefly in a north-easterly direction. The southern part of the district adjoins the Kistna, where the separation is arbitrary and not depending upon natural causes. The district is traversed by the river, which enters it at its north-west corner and flows southward and slightly to the east. A little below Rajahmundry the river divides forming the delta, one mouth going to the south and the other eastward towards the sea. At Dowlaishweram, which is a few miles below Rajahmundry, is the anicut, where the natural level of the river is raised, and from which part the channels come off to irrigate the adjoining country.

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5. *Sub-Divisions of the District.*—The district is divided into nine taluqs, four zemindaries, and three municipalities. They are as follow:—

Taluqs.	
Ramachendrapur. Amalapur. Nursapur. Bhimaveram. Tanaku. Ellore. Yernagudem. Rajahmundry. Peddapur.	Irrigated, and under the influence of the anicut channels.
	Non delta taluqs.
Zemindaries.	Municipalities.
Cocanada. Coringa. Pittapur. Tuny.	Cocanada. Rajahmundry. Ellore.

6. In discussing the etiology of the disease under consideration, I think it perhaps best to take one year in which the fever was very prevalent, and to consider the conditions under which it appeared. As the returns for the last Calendar year are not yet available, I propose to select the Official year 1869-70, a year of very large mortality, and for which the returns are complete. The following is a statement showing the mortality from fever in the various taluqs of the district during that year. For this table I am indebted to Mr. Fraser, the Collector of the district:—

Population.	184,110.	189,223.	161,587.	88,886.	152,652.	118,736.	130,883.	109,924.	101,559.	61,106.	25,401.	74,392.	44,384.	1,427,472.	
Month and Year.	Ramachendrapur.	Amalapur.	Nursapur.	Bhimaveram.	Tanaku.	Ellore.	Yernagudem.	Rajahmundry.	Peddapur.	Cocanada.	Coringa.	Pittapur.	Tuny.	Total.	Deaths per 1,000 from fever for each month.
April 1869...	49	81	11	63	53	159	47	30	34	22	4	38	18	608	42
May ..	64	52	16	30	63	167	47	47	46	30	1	35	20	597	41
June ..	43	79	15	16	45	66	46	63	38	40	3	48	13	515	33
July ..	57	62	32	15	68	52	54	46	53	29	...	46	16	531	37
August ..	55	67	21	27	57	47	55	87	51	38	...	47	9	561	38
September ..	63	61	25	49	68	60	48	63	78	50	4	53	25	642	45
October ..	63	56	20	20	66	56	33	42	86	46	7	53	14	564	36
November ..	2,467	749	731	268	1,150	469	556	448	628	409	57	304	100	8,336	523
December ..	638	264	146	133	374	309	312	285	435	184	33	217	71	3,401	227
January 1870 ..	399	112	82	67	201	187	145	161	260	171	5	174	76	2,040	143
February ..	192	97	43	48	155	109	56	84	113	84	7	82	28	1,098	76
March ..	151	56	60	68	91	108	68	58	110	73	7	50	38	922	64
Total...	4,241	1,736	1,201	805	2,893	1,769	1,462	1,409	1,982	1,175	128	1,147	412	19,810	
Deaths per 1,000 for the whole year ..	23.03	9.17	7.43	9.60	15.78	14.69	11.28	13.66	19.12	19.22	5.68	16.76	9.29	18.67	

In this table the returns from the Municipalities are included under the heads of the two taluqs and zemindary of the same name.

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7. *Period of greatest prevalence.*—Granting the above numbers are approximately correct, it will be seen, on examination, that during the six months ending October 1869 the mortality shows a great uniformity, but that in November it makes a sudden rise and then less rapidly declines during the months of December, January, and February.

8. *Rise of fever coincident with certain winds.*—The fever has always been observed to increase at the end of the rainy and beginning of the cold season, and it is worse when the cold north winds from the hills and jungles set in; and as the weather gets warmer the number of cases diminish. Towards the north and north-west are hills and jungle tracts, where fevers prevail with the greatest intensity, and it is when winds blow from these quarters that fever appears in the delta. Major Fischer, Superintending Engineer of the district, has told me that the fever seems to be worse during the prevalence of the north-westerly winds.

9. *Agricultural conditions during its prevalence.*—At this time of the year the lands are drying from the rains and the crops are ripening, and it is now also that the greatest evaporation takes place from the soil.

10. *How far artificial irrigation has caused an increase of fever.*—It is a general impression among the natives and others that the delta has been more subject to fever since the opening of the irrigation channels, and that the fever is in some way due to the increased dampness of the climate. A large quantity of silt is yearly brought down by the Godavery and deposited on the land; but the old drainages of the delta have not, in the meantime, been improved to carry off the additional quantities of water now provided for by the anicut at Dowlaishweram. These drainages have, in the meantime, become choked up with mud and silt, and some think that the fever may be due to this circumstance. The irrigated taluqs, on the whole, show a slightly lower rate of mortality than the non-irrigated. From the statistics already given I gather that the total number of deaths in the irrigated taluqs amounted to 12.99 per 1,000 of the population, while in the non-irrigated parts of the district the mortality reached 13.34 per 1,000.

Myself I cannot think that irrigation *per se* has been productive of fever. If such an opinion be held, it is difficult to account for the fact that one taluq should show a mortality three times as high as another which is similarly irrigated; but still it must be borne in mind that irrigation may act injuriously in some cases by introducing some factor which is necessary to the production or propagation of the disease. Notwithstanding the irrigated taluqs show a slightly lower rate of mortality than the non-irrigated, it must be recollected that the one in which the greatest number of deaths took place, viz., Ramachendrapur, is the most highly irrigated part of the district, and canals and irrigation channels traverse it in all directions.

11. *General causes of malarial fever.*—Malarial fevers prevail with the greatest severity in the jungles and unreclaimed parts of the country, and nearly all Medical Authorities agree that they in some way originate from the poisonous miasms given off from decaying vegetable matter; but in the plains which are brought under cultivation the cause of these fevers is not quite so clear. In the plains at least it appears that two or three factors are engaged in their production. I consider there must first be the presence of a poison either generated on the spot or brought from a distance; secondly, an exciting cause; and thirdly, some peculiar susceptibility of the recipients.

12. *Water necessary for their production.*—As these fevers prevail most when the soil is drying after the rains, it is considered that water is essential to their production. If the height of the sub-soil water has anything to do with the appearance of these epidemics, it would be interesting to ascertain by Pettenköfer's method how far it has an influence in the matter. The experiments that are being carried out for testing the theory as regards cholera would also be available for this purpose.

13. *Influence of rainfall.*—I have carefully examined the rain registers of the different taluqs for several months past, and I am unable to see that the fever is in any way influenced by the previous rainfall. For instance, Ramachendrapur, where such an excessive mortality took place in November 1869, the returns show no unusual amount of rainfall in the months preceding it. The rainfall, on the contrary, was slightly less than in Coringa, where the mortality was lowest. But there is one thing to be said on the other side. In 1868 the rainfall was less than usual, and this year showed a small fever mortality.

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14. *Habits of the native inimical to health.*—It is of importance to consider how far the habits of the natives render them susceptible to disease. Of naturally weak constitutions, and their health still further undermined by poverty and hardship, destitute, too, of all proper clothing and of what to our idea would be the necessities of life, they haven't strength to resist disease, and they frequently die where Europeans would recover, or if they do recover it is frequently with ruined constitutions and with the seeds of illness sown to break out only too surely in future years.

15. *Influence of diet.*—The influence of diet in causing susceptibility to the disease is, I believe, very considerable. I have been informed that the attacks of fever are much less frequent among the wealthier and well-to-do natives who can afford to buy better food and provide themselves with more suitable clothing than their poorer neighbours, and I hear that those castes who eat meat as a rule are less obnoxious to the disease than the flesh-abstaining Brahmins and others who are too poor to buy animal food.

16. *Exposure to cold.*—One of the commonest causes, or perhaps exciting causes, of this fever is exposure to cold, and particularly to the cold night winds blowing from the hills and jungles. During several months of the year the skin of the native is a freely excreting organ, and, when exposed to sudden changes of temperature, its functions are checked, internal organs become congested, and disease results. It is wonderful how the native exposes himself to cold. Travelling along the canals at night in this and in the Kistna District I have seen them sleeping outside the boat with one miserable thin cloth round them, and sometimes in a heavy dew. It is astonishing to my mind that any escape. In the morning they will perhaps bask in a hot sun to get back a little of the heat they have lost during the night.

17. *Influence of foul-drinking water.*—It is a common expression among natives that the water of such and such a place does not agree with them, and it is a common idea among the natives of this district that the fever is due to drinking foul water, and some say that this year and last year the fever was owing to bad water from the Godavery. There is very likely some truth in this, as we have every reason to believe that water is capable of absorbing the malarial poison. It is possible that in some cases the disease may be introduced into the system in this way.

18. *The effect of sea breezes on malaria.*—In the Proceedings marginally noted the Sanitary Commissioner has shown that, in Southern India at least, the irrigated districts do not show any increased mortality over the high and drier parts of the Peninsula. He considers that the sea air is antagonistic to malaria. Mr. Cornish has here examined the subject with respect to the geographical positions of the various districts of the Presidency, and has, I think, clearly shown the influence of the sea breezes in diminishing the prevalence of malarial fevers. The same, I think, will to a certain extent hold good for the different taluqs of the Godavery District.

19. *Different localities variously affected.*—It will be seen, on referring to the table in paragraph 6, that different parts of the district exhibit very varying returns of mortality. I will here arrange the different taluqs in their order of insalubrity:—

Taluqs, &c.	Deaths per 1,000 from fever.
Ramachendrapur	23.03
Cocanada	19.22
Peddapur	19.12
Pittapur	16.76
Tanuku	15.73
Ellore	14.89
Rajahmundry	13.86
Yernagudem	11.28
Bhimavaram	9.60
Tuny	9.29
Amalapur	9.17
Nursapur	7.42
Coringa	5.03

20. I shall now briefly notice the geographical positions of these taluqs and offer a few remarks to account for these different rates of mortality.

(1.) Ramachendrapur.—This is a large and highly irrigated taluq and forms the eastern delta, and has always exhibited the greatest number of deaths from fever. It is scantily supplied with trees and topes, and is most fully exposed to the cold north and north-westerly winds, which come down from the Rumpa Hills and other jungly and feverish tracts. Though part of this taluq is not far removed from the coast, yet it is unfavourably situated as regards the influence of sea winds. A wide extent of marsh and salt-water swamp intervenes between it and the sea. They give rise to noxious emanations, and very probably deprive the sea air of its beneficial influence.

(2.) Cocanada.—This zemindary comes next in insalubrity, and shows a mortality of 19.23 per 1,000. It adjoins Ramachendrapur and is exposed to the same influences, but is on the coast.

(3.) Peddapur.—The mortality in this taluq is very similar to that of Cocanada. It is a large taluq, and is situated in the northern part of the district. Its northern portion is hilly and jungly, and it is unfavourably situated as regards winds from the sea.

(4.) Pittapur shows a mortality of 16.76 per 1,000. It lies chiefly to the east of Peddapur, and consequently nearer the sea. Owing to the direction of the line of coast, the north and north-east winds come in as land-winds rather than sea-breezes.

(5.) Tanuku lies to the south-west of Ramachendrapur, and is further removed from the injurious influences that affect the latter. It is irrigated by the anicut channels, but is free from hills and jungles.

(6.) Ellore is still further removed, but in its west are hills and jungle tracts. I hear that in the more inland portion of the taluq the mortality was considerable, and more particularly in that part which is drained, but not irrigated, by the Ellore Canal.

(7.) Rajahmundry shows a medium rate of mortality. It is not irrigated, but has a large quantity of jungle and unreclaimed land which is unhealthy. These parts, however, are thinly populated. It is free from excessive dampness of soil.

(8.) Yernagudem is generally considered a very unhealthy part of the country, but for some reason which I cannot account for it does not show such a very high rate of mortality. The same remarks apply to it as to Rajahmundry.

(9.) Bhimavaram is an irrigated taluq south of Tanuku. The winds from the north which reach these two taluqs are probably deprived of some of their injurious qualities by having to pass over the Godavary river.

(10.) Tuny is a zemindary in the north of the district. Though much of it is jungly, yet the climate is somewhat drier than in other parts, and it does not show a very high rate of mortality.

(11.) Amalapur is a large piece of the district, and forms the middle delta. It is situated between the mouths of the Godavary, and is fairly exposed to the sea-breezes. From the direction of the line of coast the wind known at Madras as "the alongshore wind" comes in as a sea-wind.

(12.) Nursapur lies to the south and south-west of Amalapur, and is far removed from hills and jungles. It exhibits a comparatively small mortality.

(13.) Coringa.—This small zemindary is the most healthful part of the whole district. It is most favourably situated as regards the sea winds, and in the year of the epidemic exhibited a mortality of only 5.03 per 1,000.

21. *Etiology continued—Theories of Disease.*—It has sometimes occurred to me that the causes of fever, cholera, and other endemic diseases are always present in certain localities, but kept in abeyance by some of the forces of Nature, and only brought into development from time to time by a certain state of the atmosphere, or under conditions with which we are unacquainted. These germs may lie latent for a long time; but, when one or more of the controlling forces fail, they may suddenly burst forth into active existence. Something of this kind may perhaps account for those cycles of disease or disease waves which pass over countries. We meet with a sort of analogy in the animal and vegetable kingdoms. In some seasons a blight traverses a country, or a certain tract of country, and destroys certain crops. On some days a peculiar condition of atmosphere brings to life myriads of one kind of insect. Unless we accept the theory of sponta-

neous generation there can be little doubt that they are developed from ova already in existence but which are lying latent, awaiting only their own proper stimulus to develop them into active life.

22. *Malaria may generally be destroyed as soon as generated.*—Granting the general supposition that the first cause of malarial fever is some product of the drying soil it may always be present under these conditions, but its noxious properties destroyed as soon as generated either by oxidation or by some unknown means, so that it becomes innocuous to the majority of people, or it may be that some, through an induced peculiarity of constitution, become susceptible to the influence of the poison.

23. *Mortality among those attacked.*—I have no means whatever of giving an opinion on this point; but the Medical Officers and Dressers stationed in the district, and with whom I have had conversations on the subject, tell me that the cases when seen early are very amenable to treatment.

Mr. Cornish is of opinion that for every individual who dies of fever some fifty or sixty, or even a larger proportion, suffer from a non-fatal attack of the disease. If this be really the case, the number of persons attacked in some years must be almost incredible. In the year 1869-70, when nearly 20,000 succumbed to the disease, over a million persons must have suffered in a total population of less than a million and a half. We can thus see of what incalculable benefit to the people any measures will be which successfully prevent the ravages of this disease.

24. *Baneful effects of starvation.*—Much of the mortality among those attacked results from their not applying in time for proper medical aid. Moreover, the native treatment of the disease is by starvation, and I have no doubt that many more die from want of proper nourishment than from the disease itself. In the Medical Report for the Rajahmundry Civil Dispensary for 1867 Dr. W. Aitken writes so strongly on this point that I cannot do better than quote him here:—

"The satisfactory results of the remedies in what might have been considered bad or aggravated cases surprised me very much after what I had heard of the fatality attending the fever, and led me to make some inquiries regarding the kind of treatment adopted by the people themselves, and also that to which they are subjected by the native doctors.

"The information I thus obtained affords, I think, a sufficient explanation of the extraordinary mortality, and the wonder, I think, is not that so many have died, but rather that any have survived, and that, even amongst so credulous a people as the natives generally are, victims on so large a scale could be found to submit to such gross maltreatment.

"The remedy recommended by the native doctors in all cases, and apparently confidently relied on by the people themselves, is what is called 'Lunganum'. This means a rigid and enforced privation of food, drink, and sleep for the number of days enjoined, a very limited amount of water being allowed in only a few exceptional cases. The only medicinal adjunct employed is the native bichloride (Raskapooram), which is given so liberally in this as in almost all other diseases that it produces dreadful mercurialization, accompanied, in some cases, by gangrene and sloughing."

The remote effects of fever cause a certain number of deaths which do not appear under the head of "Fever." Many of the deaths from dropsy are due to this cause, but I have no means of knowing what is the proportion of remote mortality.

25. *Types of fever—Leading symptoms.*—All types of malarial fever are met with in the district; but I gather from the Range Officers and others who have had an opportunity of observing the disease that the fever which has caused the greatest mortality in the delta is of a somewhat different type to that prevailing in the jungles and non-irrigated districts. It is more of a remittent fever than an ague, and has the cold stage but slightly developed. It is attended with much gastric disturbance and prostration of mind and body. The fever is more continued than is ague, and the remission short. There is nausea and vomiting, and the patient suffers from racking pains in the head and legs, and complains of restlessness and want of sleep. As all food is usually withheld the

victim becomes weaker and weaker, falls into a low typhoid condition, in which he sinks. If he is fortunate enough to survive the disease and remedy, his recovery is often by no means complete. He is still likely to suffer from the effects of a permanently injured liver and kidneys, and chronic disease of these organs gives rise to remote effects which, though slowly but not the less surely, prove fatal in the end.

26. *Treatment.*—As severe nausea and other gastric disturbance is found in the early stages of this disease, it is of first importance to relieve the congestion of the stomach and other organs which these symptoms indicate. An emetic of thirty grains of ipecacuanah answers for this purpose very well, and often brings off the stomach a large quantity of bilious matter with immediate relief to the patient. A purgative, too, is often beneficial, and I have found none more efficacious than a powder consisting of half a dram of compound jalap powder with three or four grains of calomel. This also clears the bowels from the excess of bile which is generally present. It may be sometimes followed by a dose of castor oil.

But one of the chief indications of treatment is to promote the action of the skin, the suppression of the functions of which have been so instrumental in causing the disease. The patient should be at once warmly clad and removed from all draughts of cold air. The medicine I usually give with this view is a powder containing ten or fifteen grains of James' powder with half a grain of acetate of morphia. This is generally retained by the stomach if given after the nausea has been relieved by an emetic. It induces sleep and generally a profuse perspiration. If the stomach is so irritable as to be unable to retain medicine of any kind I generally give a subcutaneous injection of morphia, which I have always found to give relief. A large dose of chlorodyne often answers well for this purpose.

Opium I believe to be a remedy of great value in fever. It not only relieves the pains in the head and bones which fever patients so commonly complain of, but it also acts as a sudorific and promotes the natural cure of the disease. I believe, too, it is something more, and acts as a controller of tissue change, the excess of which is one of the conditions of the febrile state.

Quinine should be given in large doses as soon as the remission sets in. Fifteen or twenty grains should be then given, and the dose repeated in a few hours. It is best given in solution, and may be dissolved by means of limejuice. If the remission is considerable and the periodicity well marked, a subcutaneous injection of it is most efficient and economical, a much smaller quantity being required; but this mode of administration is not one that can be generally resorted to. In bad cases of remittent fever, the fever is continued and the remission slight, and, in some cases, barely noticeable; but this is no valid reason for withholding the remedy. Quinine may then be given at any time, and in these cases I have found that it acts to the best advantage when combined with opium. The use of quinine in smaller doses should be continued for a few days after all symptoms have disappeared; but this is more necessary after recovery from ague than from the remittent or more continued form of the fever. But any and all remedies are likely to fail if proper nourishment is withheld and the patient imperfectly clad or exposed during the illness.

In the cachexial condition resulting from frequent attacks of fever, quinine as a special remedy is not of much use. Such cases are but met by a course of tonics and by removal to another locality. There is, however, no objection to quinine being given in small doses and as a general tonic.

27. *Prevention of malarial fever.*—In the sanitary history of our own and other temperate climates we find that, as jungles have been cut down and swamps and marshes reclaimed and brought under cultivation, malaria has almost disappeared; but in India the conditions are different. For four or five months we have an almost continuous rainfall and an atmosphere saturated with moisture, and then for seven or eight months continued drought. Climatic conditions like these are beyond the control of man. Under these circumstances, our efforts to prevent the ravages of this disease must, I opine, be directed against some of the other factors which predispose the body to its influence rather than attempt to eradicate malaria from the land. In the irrigated districts, where, to a certain extent, man has rendered the land independent of local rainfall, it is possible that some of the evils resulting from this system may be remedied, or, at all events, their injurious effects may be

diminished. It appears to me that no more water than is absolutely necessary for the growth of the crops should be allowed, and that some means of drainage should be available to remove the surplus quantity of water now distributed to the land. For this purpose some of the old natural drainages of the delta might be cleared out and deepened. The practicability of such a scheme would no doubt depend upon the height of the land above the sea-level, but this is an engineering matter and not one that I am able to discuss.

There has also been a suggestion that trees should be liberally planted along the course of the canals, as belts of trees are supposed to have some special power to intercept malaria. Even if this is not the case, they are picturesque, and probably beneficial to the country in other respects.

The preventive measures which are more likely to be rewarded with success are those which concern individual hygiene. Anything that improves the health and constitution of the people will lessen the fatality of the disease. All Medical Authorities are unanimous that those who are well-fed and well-clothed are far less liable to fever than their half-starved and poverty-stricken neighbours. As the attacks of fever seem generally to result from exposure to cold and damp, people should provide themselves, as far as possible, with warm clothing for the rainy and cold seasons, and they should more generally resort to clothing about the lower extremities, and they should particularly avoid sleeping out in the heavy dews and cold night winds. The natives, or poorer classes at all events, are given to another custom, which I am satisfied must be injurious. Before going out in the morning they take a wretched meal of watery and cold rice, the remains of the last night's food. This is perhaps of not much importance in the hot weather; but in the cold season, if they cannot afford anything better, this meal should certainly be made hot.

28. *Practical application of the foregoing principles.*—It is hopeless to expect that the native will be induced to suddenly alter any of his long-cherished customs. On the contrary, he is more likely to resent anything new which is suggested to him, and which is contrary to time-honoured custom. But still I think we can do something, and, at all events, make a beginning, though it will be a work of time. I would suggest that during the next hot season, and before the feverish time of year recurs, that simple and short circulars of instruction and advice upon the points above inculcated be prepared and most widely distributed. Advertisements in the District Gazette are totally inadequate to give the matter sufficient publicity. A few of these circulars should be given to the headman of every village in the affected localities with orders to distribute copies to the chief inhabitants who are able to read, and he should also be required to make their contents known to the people of the village generally. A supply of prepared medicines should be ready in the district, and on the first appearance of the disease a certain quantity should be placed at the disposal of the Moonsiffs or headmen, with orders to sell them or give them to the sufferers as occasion required.

29. It must be borne in mind that many of the remedies which are used and are available in a large hospital cannot be applied to meet the peculiar cases of individuals. All that can reasonably be expected is that medicines with simple directions for use should be placed within reach of the people, and that these medicines should be such as are found to meet the requirements of the majority of such cases. I have thought over this subject a great deal, and it appears to me that packets of medicine containing a purgative and a few quinine pills or powders would be all that is required. The purgative might consist of the following:—

Compound Jalap Powder		½ dram.
Calomel		3 grains.
Powdered Ginger		10 ..

The quinine pills should consist of five grains each, and I think each pill might have combined with it half a grain or a grain of ipecacuanah. Ten or a dozen of these pills would probably be sufficient for any ordinary case of fever. Two should be taken at a dose after the remission has set in and after the bowels have been cleared by the purgative, and repeated after a few hours. The quinine pills are likely to act more efficiently if pounded up and dissolved in water by means of limejuice. I haven't enough experience in the use of the other cinchona alkaloids to be able

14th June 1871.

to recommend their adoption, but they are cheaper, and possibly might be found equally efficacious. The directions for the use of these medicines should also give advice as to the general management of fever cases.

Although I generally prescribe an emetic in the early stage of remittent fever, I have not recommended the distribution of any, for a plan of treatment which is to become general amongst ignorant people should be simple and such as to gain their confidence, and I don't think that an emetic would find favour with the majority. Again, I have not recommended the distribution of opium, although I believe it to be a remedy second only, and, in some cases, superior, to quinine. It is true it is a medicine which the native would take to very kindly, but still it is a poison, and might be taken in excess of combined with the quinine, and, in the case of children particularly, might prove dangerous in the extreme.

30. *Starvation should be prohibited by law.*—I have already alluded to the baneful effects of starvation, which is the usual native treatment. If this could be prohibited by law, I feel satisfied the deaths from fever in this country would be less numerous. It might be objected that a law of this kind would be despotic and an interference with the liberty of the subject; but, as there are laws already in existence against inoculation for small-pox and for the suppression of venereal disorders, I am of opinion that some law might be enacted to put a stop to a system of treatment which is admitted by all to be injurious, and which is a remedy more dangerous than the disease.

31. *General summary.*—The fever in question is a malarious fever, and of the type bilious remittent. It prevails to a small extent throughout the year but chiefly after the rains and at the commencement of the cold season, and its increase is coincident with the setting in of the cold winds from the hills and jungles. It subsides as the weather becomes warmer.

The eastern delta is the part of the district which has been most affected; but from the statistics I have examined it does not seem that the delta, as a whole, shows any increased rate of mortality over the inland and drier taluqs. The exciting cause of the fever is usually exposure to damp and cold and night dews.

The cases when seen early are manageable and amenable to proper remedies; but the native mode of treating the disease increases the number of deaths, and, like other dangerous practices, should be rendered illegal.

The means for its prevention I consider depend for their success more upon the exertions of the inhabitants themselves and upon an improvement in their condition than upon anything the authorities can do for them; but in the meantime they may be instructed on these points by circulars in the vernacular, and, when the epidemic re-appears, assistance may be rendered to them in the shape of medicine and advice.

32. *Concluding remarks.*—The same causes which gave rise to the epidemic in 1869 will without doubt recur, but in the most affected localities a more careful attention to individual hygiene and proper treatment can reduce the mortality. We may not be able to banish malaria from the land, but we can teach the people how they may best resist its influence, and show them that there is a mode of dealing with the disease which is more effectual than that to which they have been subjected for ages; but we shall have a mass of ignorance and prejudice to contend against, and I fear the process of enlightenment will be slow and no easy task.

28th January 1871.

(Signed) W. E. WRIGHT,
Assistant Surgeon.

Referred, with the enclosure, to the Acting Inspector-General, Indian Medical Department, for any remarks he may desire to offer.

FORT ST. GEORGE,
3rd May 1871.

(Signed) W. HUDLESTON,
Acting Chief Secretary.

14th June 1871.

No. 86. From Deputy Inspector-General EDWARD BALFOUR, Acting Inspector-General, Indian Medical Department, to the Acting Chief Secretary to Government, Fort St. George, dated Fort St. George, 18th May 1871, No. 159.

I have the honour to acknowledge receipt of the documents marginally noted, referred for remarks under your docket memorandum of the 3rd instant, and beg to mention that the chief topics noticed in Assistant Surgeon Wright's report on the outbreaks of fever in the Godavery District have been already commented on in his office letter, No. 81, of 11th March 1871.

2. The Sanitary Commissioner is of opinion that the epidemics are not, as supposed by some of the inhabitants, the result of increased irrigation in the district. In this view he is apparently supported by the available death statistics of the population; but the subject is one requiring more extensive data and observation for its satisfactory elucidation.

3. In paragraph 7 of his letter the Sanitary Commissioner expresses his conviction "that the periodical accessions of fever in the Godavery District are due to the geographical position of that district in respect to malarious lands to the north and west, and that the fever is due to the northerly winds of the north-east monsoon sweeping over the malarious jungles of the Hill tracts of the Northern Circars before they reach the Godavery District." This explanation is not altogether in accordance with the belief of other Sanitary Authorities as to the horizontal diffusion of malaria; but Surgeon Cornish will doubtless specially investigate this point when he visits, as he proposes, the district at the end of the year.

4. In my letter marginally noted I suggested that extra medical aid and supplies of medicines should be sent into the district during the feverish season, and a portion of the medicines might be sent to the Civil Authorities for distribution amongst the people, and I agree with the Sanitary Commissioner in thinking it desirable that the attention of the inhabitants should be called, by circulars and notifications in the District Gazette, to the necessity for using due precautions of their health during the period at which the fever prevails. At the same time a memorandum containing brief instructions as to the treatment of the disease might be circulated with advantage. I will prepare a brief memorandum of the kind to be forwarded to the Collectors of the districts.

No. 87. ORDER THEREON, 14th June 1871, No. 828.

His Excellency the Governor in Council has read with much interest the report furnished by Assistant Surgeon W. E. Wright on the causes of the outbreak of fever in the District of Godavery and on the means to be adopted for its prevention, and appreciates the zeal and ability with which Mr. Wright has conducted the duty entrusted to him.

2. The causes of the outbreak of fever are ascribed by the inhabitants to the extension of irrigation in the Godavery delta, and to the water of the river Godavery having of late years become unwholesome.

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14th June 1871.

3. Assistant Surgeon Wright comments on these points at some length. Briefly stated, he does not consider that irrigation *per se* has been productive of fever, while he thinks that there is likely to be some truth in the bad water from the Godavery being the cause of fever.

4. The Sanitary Commissioner, who has submitted his observations on Mr. Wright's report, is impressed with the conviction "that the periodical accessions of fever in the Godavery District are due to the geographical position of that district in respect to malarious lands to the north and west, and that the fever is due to the northerly winds of the north-east monsoon sweeping over the malarious jungles of the Hill tracts of the Northern Circars before they reach the Godavery District;" and he adds—

"In respect to individual taluqs and estates Mr. Wright has shown the correctness of the observation, and that the taluqs which are the most open to influences from the sea have the least fever, while those parts of the district which are exposed most to the winds which have blown across unhealthy jungles have had the highest ratios of fever prevalence and mortality. Mr. Wright's figures relate only to a single year; but the results of five years' registration demonstrate in a very clear manner that the intensity of fever in any taluq has no relation to extent of irrigation of the land, but is solely due to the geographical position of the taluq and its exposure to malarious winds during the north-east monsoon season."

5. Dr. Balfour considers the subject to be one requiring more extensive data and observation for its satisfactory elucidation, and remarks that Dr. Cornish's "explanation is not altogether in accordance with the belief of other Sanitary Authorities as to the horizontal diffusion of malaria."

6. Assistant Surgeon Wright attributes much of the mortality among those attacked with fever to their not applying in time for proper medical aid; to the native treatment of the disease by starvation; to the want of nourishment; to exposure to cold and damp, and to the want of proper clothing; and under the heads of "Treatment," "Prevention of malarial fever," "Practical application of the foregoing principles," he describes the course to be followed in dealing with the disease. He also suggests, and Drs. Balfour and Cornish concur with him, that simple and short circulars of instructions and advice should, during the hot season, be widely circulated.

7. Dr. Mackenzie recommends that extra medical aid and supplies of medicines should be sent into the district during the feverish season, and Drs. Balfour and Cornish suggest that a portion of the medicines should be sent to the Civil Authorities for sale and for distribution amongst the people some time before the fever season.

8. His Excellency the Governor in Council approves and sanctions these suggestions and recommendation, and directs that extracts from Assistant Surgeon Wright's report, respecting the prevention and treatment of fever, be translated into the vernacular of the district for publication in the District Gazette and for distribution to the inhabitants of the taluqs where the fever is generally most prevalent.

9. Dr. Cornish's proposal to visit the Northern Districts at the close of the present year is approved.

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10. Copy of paragraph 27 of Assistant Surgeon Wright's report will be furnished to the Public Works Department.

11. Dr. Balfour will be requested to expedite the preparation of the memorandum of instructions for transmission to the Collectors of the Northern Districts.

12. The Government assume that Assistant Surgeon Wright was duly re-called for other duty.

13. As Dr. Cornish, during his proposed visit to the Northern Districts, cannot be expected to devote much time to the inquiry into the causes of fever, the Government deem it advisable that Assistant Surgeon Wright should be again deputed this year to continue his inquiries, and to superintend the preparation and dissemination of medicines in correspondence with the Collector of the Godavery District.

14. Assistant Surgeon Wright will be instructed to include in his next report the range of the thermometer in each taluq, so far as ascertainable, just before and during the fever months, the statistics of rainfall, &c., the number of deaths from fever, the number of persons attacked and recovered, and will state whether many of the latter show signs of enlarged spleen, &c.

15. There are probably many other points needing elucidation regarding which Drs. Balfour and Cornish will draw up specific instructions for Assistant Surgeon Wright's guidance.

16. They will also report whether the employment of more than one officer on the inquiry is desirable.

17. Dr. Balfour will state explicitly the number of extra Apothecaries which should be appointed and be held in readiness to afford medical aid during the feverish season.

(True Extract.)

Acting Chief Secretary.

To the Acting Inspector-General, Indian Medical Department.

- .. Sanitary Commissioner.
- .. Collector of
- .. Revenue Department.
- .. Public Works Department.
- .. Board of Revenue.

Exd. A. S. Rodgers.

N^o 81.

19

Office of Inspector General. M.M.

Fort Saint George 11th March 1871

From

The Inspector General.

Indian Medical Department

Fort Saint George

To

The Chief Secretary to Government

Public Department

Sir,

I have the honour with reference to G.O. N^o 1681 of 30th December 1870, directing Assistant Surgeon Wright to investigate the causes ~~of~~ of the Fever prevailing in the Godavery District, to state for the information of Government that he has submitted an Elaborate report on the subject which I have forwarded to the Sanitary Commissioner, with a request that he will be good enough to bring to the notice of Government any

points

GOVT. OF 1871 MADRAS.

PUBLIC.

To

THE ACTING INSPECTOR-GENERAL,
INDIAN MEDICAL DEPARTMENT.

AC.

AC.

AC.

Dated June, 14th.

Recd.

Recd.

G. O., 14th June 1871, No. 828.

JUNE.

Nos. 84-87.

Passing orders with reference to the report furnished by Assistant Surgeon W. E. Wright on the causes of the outbreak of fever in the Godavery District and on the means to be adopted for its prevention.

points in it that demand special attention.

2. In the meantime as the epidemic is stated to have subsided, I would recommend that Mr. Wright may be recalled for other duty. I would also beg to remark that there does not now appear to be any immediate necessity for the Sanitary Commissioner to visit the locality as was originally proposed, but on this point he will himself of course advise Government.

Mr. Wright considers the fever to be of a bilious remittent type, and reports that when seen at an early stage it readily yields to the usual febrifuges, but that if neglected, or improperly treated, it speedily assumes a fatal typhoid form.

3. The native treatment consists in continued abstinence from food, and the occasional administration of violent preparations of mercury to which Mr. Wright ascribes much of

the immediate mortality, as well as a considerable amount of organic disease which ultimately proves fatal in those who may recover in the first instance from the attack.

4. From the Appended table it will be observed that the disease is most prevalent immediately after the rains in November, December and January, and that during the hotter and drier months of the year the mortality is at a minimum and pretty uniform. Mr. Wright states that "until late years the Godavery delta was considered one of the healthiest parts on the coast, but during the last few years fever has been much on the increase, and the district losing its character for salubrity."

5. In the belief of some of the inhabitants this change has been contemporaneous with the extension of irrigation, which they consider a chief cause of these periodical outbreaks

of the disease. The evidence on this point is however conflicting. Mr. Wright remarks that the deaths in the irrigated talooks, taken as a whole, - were much fewer than in the non-irrigated, while in the most highly irrigated talook in the district, - taken alone, - the mortality was greater than in any of the others.

6. Another popular opinion as to the cause of the fever is, that the water of the Godavery has become unwholesome of late years, and thus liable to induce an attack in those who are obliged to use it for drinking purposes.

7. In considering how far the habits and circumstances of the people may have had an influence in increasing their susceptibility to this disease Mr. Wright states, that the inferior or scanty food and insufficient clothing of the poorer

poorer classes, coupled with other hardships, render them at once more subject to fever, and more liable to succumb when attacked. He was informed that the wealthier classes who can afford better food and clothing are by no means so apt to suffer, and that the flesh-eating Castes are less obnoxious to the disease than Vegetarians. According to his own observation, exposure, or sleeping in the open air with no other protection than a thin cotton cloth during cold and dewy nights is one of the most common exciting causes of an attack.

8. A return of deaths from fever in the district during 1870-71 was not available when Mr. Wright drew up his report, but the annexed table, kindly furnished by the collector, exhibits the recorded mortality from this cause in the different talooks during 1869-70. The total number

number of deaths amounted to 19,810, and
as the population is put down at 4,427,472,
this gives a mortality of 13.87 per mille. —
Large as this death rate is it affords however
but a very inadequate idea of the suffering
occasioned by outbreaks like those of the
past two years. The alleged causes of
the fever will doubtless be duly commented
on by the sanitary commissioner, but with
the view of obviating as far as possible so
great and lamentable a loss of life, as
has now been brought to notice, I would
beg to suggest that in future years extra
medical aid and supplies of medicines
should be sent into the district during the
feverish season. Such an arrangement,
there is reason to hope would not only be of
great immediate and direct benefit, but

might also be the means of inducing the
people to abandon their present pernicious
system of treating the disease.

9. In conclusion I have much
pleasure in stating that Mr. Wright has
conducted the duty entrusted to him to my
entire satisfaction, and I beg to bring the
zeal and ability which he has displayed
on this occasion to the favorable notice of
Government.

I have the honor to be

Sir

Your most Obedient Servant

H. Macleod Esq

Inspector General
Indian Medical Department.

omit

27

Population	18410	189233	161537	83826	152052	118735	130383	100924	106539	61106	25401	74392	44234	1427472	
Deaths	Ramachandrapoor	Amalapur	Purapur	Bhimavarani	Tanaku	Elluru	Yemagudem	Rajahmundry	Peddapur	Cocanada	Coringa	Pittapur	Tany	Total	Deaths per 10 from fever for Each month
April	49	81	11	63	53	159	47	30	34	22	4	38	12	603	42
May	64	52	15	30	63	147	47	47	46	30	1	35	20	597	41
June	43	79	15	16	45	66	46	63	38	40	3	48	13	575	33
July	57	62	32	16	68	52	54	46	53	29	4	46	16	531	37
August	55	67	21	27	57	47	55	87	57	38	4	47	9	561	38
September	63	61	25	49	68	60	43	63	78	50	4	53	25	642	45
October	63	56	20	20	68	56	33	42	86	46	7	53	14	564	38
November	2467	749	731	268	1150	469	556	448	628	409	57	304	100	8336	5.83
December	638	264	146	133	374	309	312	285	435	184	33	217	71	3401	2.37
January	70399	112	82	67	201	187	145	161	260	171	5	174	76	2040	1.43
February	192	97	43	48	155	109	56	84	113	84	7	82	28	1098	76
March	151	56	60	68	91	108	68	53	110	72	7	50	28	922	64
Total	4241	1736	1201	805	2393	1769	1462	1449	1932	1175	128	1147	412	19810	
Deaths per 1000 for the whole year	23.03	9.77	7.43	9.60	15.73	14.89	11.28	13.86	19.12	19.22	5.03	16.76	9.29	13.87	

H. MacKenzie Esq
Inspector General
Indian Medical Department

95'

No. 454.

OFFICE OF SANITARY COMMISSIONER,

Matrus, 10th April

187.

From

To

Sanitary Commissioner for Madras,

The Chief Secretary to Government.
Public Department.

Enclosure.

I have the honor to state for the information of Government that the Inspector General Indian Medical Department has been so good as to favor me with a perusal of the report of Assistant Surgeon Wright on the late prevalence of fever in the Godavery district and has requested me to submit any observations I may have to make on the subject in forwarding the report to Government.

2. It will be seen from the collection of Government
transferred that in my letter of 30th May 1890, I drew
to the P.W.S. attention to the fact that the Godavari district
16th June/90 was annually subjected to a season of fever, pre-
valent, and that I attributed this periodical
fever to "Some general cause connected with the
season of the year" rather than to the increase
of irrigation in the district. I showed ^{that} whereas
the district is extensively irrigated from July
to October, there is never any marked increase
of fever in the district until the wind has
changed

Transferred
to the P. W. S.
16th June/70

and goes to the North East, and that the fever season in the Godavary is coincident with the onset of the North East monsoon.

3. In a letter to the Board of Revenue dated 11th Sept. last vide Proceedings p 49 & 50, looking as it were, to the revenue authorities that the facts would show a connection with the seasonal fever of the Godavary and Krishna districts, and it is only too probable that a severe fall in the North East monsoon, would be followed by a large development of fever in the three or four succeeding months, and that special assistance in the way of funds would probably be needed.

4. The spread of malarious fevers began for itself as was indicated, and the report of Assistant Surgeon Wright shows clearly the extent of the fever, and the aggravated mortality caused by its improper treatment.

5. It is so important to be a point of the very greatest importance to determine whether the spread of fever in this district has increased in severity since the Godavary irrigation works have been completed. Unfortunately there are no data to show what the health condition of the present irrigated districts was before the ancient was built at Wright in para 3 of his report implies that the tracts now unhealthy, formerly bore the

repute of being salubrious, but mere native opinion on such a subject as the progressive salubrity of a locality without facts or figures in support of it, is of little value, and I am not inclined to attach any importance to it in the face of the actual facts of the last five years viz: that the fever death rate has been considerably higher in the non-irrigated than in the irrigated taluqs of the district.

6. In the administration report for 1890, now in preparation I have gone into this question at some length, and it is only necessary in this place to compare the statistics of the irrigated and non-irrigated taluqs of the Godavary district. I have examined the data for the five years ending December 31st 1889, and as the results for a long period are more likely to be accurate than when taken for a single year, as Mr. Wright has done, I think the following figures represent the nearest approximation to the truth.

In the irrigated taluqs of the district the mean annual death rate from fever for the five years 1866-70 was 8.12 per mille

In Zemindary Estates mostly on the seaboard & irrigated } 8.5

In taluqs above the delta and not irrigated from the river Godavary } 11.05

From

From these figures it will be apparent at a glance that the intensity of fever in the district, is most marked in the taluqs which cannot possibly have been influenced by the system of irrigation works constructed under Mr Cotton's Superintendence, inasmuch as these taluqs are altogether above, or outside of, the irrigated area.

7. In the letter previously quoted, I have expressed my conviction that the periodical accessions of fever in the Godavery district are due to the geographical position of that district in respect to malarious lands to the north and west, and that the fever is due to the northerly winds of the North East monsoon sweeping over the malarious jungles of the Hill tracts of the northern Arcans, before they reach the Godavery district. In respect to individual taluqs and estates Mr Wright has shown the correctness of the observation, and that the taluqs which are the most open to influences from the sea have the least fever, while those parts of the district which are exposed most to the winds which have blown across the alluvial jungles, have had the highest ratios of fever prevalence and mortality. Mr Wright's figures relate only to a single year, but the results of five years registration, demonstrate in

a very clear manner that the intensity of fever in any taluq has no relation to the extent of irrigation of the land, but is solely due to the geographical position of the taluq, and its exposure to malarious winds during the North East monsoon season.

The irrigated districts do not all suffer in the same degree from fever. Thus for five years the death rate in the Ramachendrapur taluq was 11.9 per thousand, while in Amalpur and Narsapur the rates were 6.5 and 4.6 per mille only. The difference I attribute entirely to the position of the taluqs, the former being exposed to the malarious winds from the north, while the latter are exposed mainly to sea breezes.

8. While the yearly occurrence of fever in November, December and January seems to me to be dependent on causes unconnected with the district itself, I am by no means sure that a heavy North East monsoon in the district does not increase the amount of fever.

In 1868 when this monsoon failed, there was a remarkable absence of fever in the district, and in other years of normal or excessive rainfalls, the fever has regularly appeared. I infer

therefore that local moisture is needed for the development of the fever, but whether the malaria is extricated in greater abundance from the hills jungles to the north after rain falls, and the winds blowing over these tracts are thus rendered more poisonous than usual, or whether the malaria wafted down from the hills tracts becomes more active while the air and soil of the district are saturated with moisture, I cannot say. Practically, so long as wild jungle tracts exist to the north of the district, so long will it be liable to suffer from fever at the season of the year when the winds blowing over the malarious tracts traverse the district.

G. While giving this opinion, I by no means wish it to be understood that I undervalue the importance of attending to the drainage of the irrigated districts. Neglected drainage of irrigated lands may at any time produce swampy spots, which may become local centres of malaria, and any such neglect should be promptly remedied.

But when we find taluqs like Tedapoor, Emagudim, Rayahmundry and Ellore, yielding persistently higher death rates from fever than the moist

and well watered area of the delta, it is plain that the irrigated tracts per se have but little to do with the generation of the malaria, which year after year sweep over the district and destroy so many of the people.

10. While therefore the remote causes of the fever, appear to be beyond control every effort might reasonably be made to induce the people to adopt measures for their individual protection from its effects. The season of fever prevalence can, in most years be calculated with accuracy and so far this is an advantage, as special measures of medical relief may be organised, to meet the seasonal emergency. But after all medical aid can do but little in comparison with hygienic precautions.

In my letter to the Board of Revenue of 11th September I mentioned the more important measures of prevention and treatment as follows.

"As fever increases periodically in the Northern Districts in November and begins to be most fatal in December and January the people should be warned to take due precautions for the preservation of their health during these times."

Sleeping out of doors exposed to heavy night dews should be avoided. The common charpoy should be used by all who can afford it, and when this is impracticable the flooring of the huts should be dry, and raised above the ground level."

"The system of prolonged fasting as a cure of fever, undoubtedly tends to bring about a fatal termination of the disease, and it would be well if the people could be dissuaded from resorting to such a practice. The general use of quinine in the affected villages should be encouraged, and as the people have now the opportunity of purchasing this drug in the Revenue Department, some arrangement might possibly be made by the Board of Revenue for placing so valuable a medicine within the reach of the inhabitants of the villages of the Godavery and Kistnah districts during the seasons of special fever prevalence."

11. Assistant Surgeon Wright has entered into this subject fully, and has pointed out the extreme danger attendant on the practice of prolonged fasting, which he would have prohibited by law. It seems to me however very doubtful

whether any compulsory measures to abate the evil could be practically followed. I should prefer to call attention to the subject, by notifications in the district Gazettes or by Circular instructions to heads of villages. As education spreads, many of the difficulties of dealing with the ignorance and prejudices of the people in regard to the care of their health may possibly disappear.

Progress in this direction would be materially assisted by the location of a body of trained native practitioners in the district, but unfortunately state provision for the medical relief of the sick poor of the country generally is still a question for future consideration.

12. In consultation with Dr. Macdonald, Inspector General Indian Medical Department (after hearing from Assistant Surgeon Wright of the decline of the late outbreak), I decided to postpone my visit to the Godavery district until the next season of fever prevalence commences and I purpose to visit the northern districts therefore at the end of the present year with the view principally of seeing the condition of the people and of the country during the prevalence of fever.

13. Assistant Surgeon's report
is forwarded herewith. I would venture
to suggest, that extracts from it might
be printed in the district Gazette and
especially his remarks on the treatment
of the fever. I think also that the district
authorities should be supplied with a
stock of fever medicines for sale and
gratuitous distribution, some time
before the fever season becomes due.

I have the honor to be

Sir

Your most obed^t Serv^t

W. Morritt, Esq.
Sanitary Commissioner
for Madras

13. Assistant Surgeon Wright
is forwarded herewith, I would
to suggest, that extracts from
be printed in the district

Report of the
Enclosure & the
of Surg. Gen. Indian
Res. Dept. for any
enclosure may
be made.

A. K. H. S. S. S.
A. K. H. S. S. S.
3. May 1871.

85.

No 261
Public Health Department
From 1 Recd 5 May
The Sanitary Commr.
Madras

The Chief Secretary
to Government
Hobart House

Dated 10th April 71
Despatches 11
No. 454
Enclosures - 2
Submits remarks
on the Report of the
Assistant Surgeon
Wright on the Fever
in the Godavery
District.

No 9

From
Asst Surg. W. E. Wright
To The Secretary to the
Inspector General
January 30th 1871

Sir
I have the honor herewith to
forward my report upon the
fever of the Godavery District.
It is not so satisfactory as I
could have wished for I came
too late into the field and
arrived after the epidemic
was over, but I have nevertheless
done my best to enquire about
it and to ascertain the conditions
under which it has appeared
year after year.
If in this report Dr. Mackenzie
thinks I have dwelt too long
on some points or not enough
on others I shall be happy to
rewrite portions or alter it

before he submits it to Government.
mint.

There is now very little fever about the delta and I don't think my services are required here any longer but I believe there is always some or less fever in the hills and jungles in the north of the district. If it is considered advisable for me to proceed there I shall have much pleasure in going and sending on any further remarks that the circumstances may suggest. If however I am required to do so I would ask to be allowed a duff for the purpose of carrying my medicines and rendering other assistance. In the case of leaving the district I should be obliged if you would inform me what to do with the medicines which

172
are in my possession and of which a small quantity only has been used.

If it is intended to carry on this enquiry during another season I would suggest that a medical officer should be in the district by the middle of October as it is in November generally that the fever shows an increase. He would then have a better opportunity for investigation.

In the mean time I have the honor to await instructions as to my next movement.

I have the honor to be
Sir

Your most obedient servant

N E Wright

Asst Surgeon

Rajahmundry
January 30th 1871.

13-1
45

Object of the
present report.

1 — It is my intention in the present report to examine into the causes of a fever which of late years has caused great mortality in the Godavery district and to discuss the question how far these causes are within human control. I shall also suggest means for its prevention and consider how the district authorities may be best able to grapple with the epidemic in future years —

Importance of
the subject -

2 — The importance of a subject of this kind can hardly be over-estimated - On examining the death returns for the official year 1869-70 I find that in a population of 1,427,472 the deaths from fever alone amounted in this district to nearly 20,000, surpassing the deaths from cholera and nearly all other causes put together - Now I must be able to show that the majority

15871

20

Edmund Dickins

Wm Lloyd Garrison

The Secretary to the
Institution General
and Mr. D. J.

Enclaves 1 - Report
- the Enclaves
District -

*MS. B. 1. 14 June 71.
J. G. Smith*

Keypoints instructions
is to the further more
improve and also in 6

The defense team
proceedings.

Elizabeth

In order 1084/198.

of these deaths are due to causes which are preventable for I believe that by taking proper precautions this mortality can be reduced and also a large and remote mortality resulting from the subsequent ill health induced by repeated attacks of the disease. An outbreak of cholera testifies to its sudden invasion and fatality and the epidemic causes speedy investigation and the adoption of means for its suppression but until recent years a fever which prevails year after year and has been far more fatal in its effects has attracted comparatively little attention. I therefore cannot but think that any measures which succeed in staying the ravages of malarial fever will be fraught with even a greater benefit to the people of this country.

3 — From time immemorial fever has prevailed in the upland and jungle tracts of the district

The Godavery Delta at one time considered healthy —

Short geographical description of the district —

but until late years the Godavery delta was considered one of the healthiest parts on the coast, but during the last few years the fever has been much on the increase and it has been losing this character for salubrity.

4 — The Godavery district is irregular in shape but allowing for the irregularity of its boundaries is for the most part situated between the parallels $16^{\circ}20'$ and $17^{\circ}30'$ of north latitude and between 80° and $82^{\circ}30'$ of east longitude. The northern and western boundaries consist of hills and jungles in part untraversed. On the east the sea. Coast runs chiefly in a north easterly direction. The southern part of the district adjoins the Krishna where the separation is arbitrary and not depending upon natural causes. The district is traversed by the river which enters it at its north west corner and flows southward and slightly to the east. A little below Rajahmundry the river

divides forming the delta, one mouth going to the south and the other eastward towards the sea.

At Dowlaishweram which is a few miles below Rajahmundry is the annicut where the natural level of the river is raised and from which part the channels come off to irrigate the adjoining country.

5 — The district is divided into ^{sub divisions of the district} nine talooks, four zemindaries and three municipalities.

They are as follows;

^{Talooks}	
Ramachandrapoor.	} Irrigated and under the influence of the annicut channels —
Amalapur	
Mursapur	
Bhimavaram	
Tanakuru.	

Ellore	} Non delta talooks —
Yerragudem	
Rajahmundry	
Peddapur	

Zemindaries
 Cocanada
 Coringa
 Pittapur
 Turvy

Municipalities

Cocanada
 Rajahmundry
 Ellore.

In discussing the etiology of the disease under consideration I think it perhaps best to take one year in which the fever was very prevalent and to consider the conditions under which it appeared. As the returns for the last calendar year are not yet available I propose to select the official year 1869-70, a year of very large mortality and for which the returns are complete. The following is a statement showing the mortality from fever in the various talooks of the district during that year. For this table I am indebted to Mr. Fraser the Collector of the District.

Population	184110	189283	161557	83826	153052	119738	139388	100926	101539	61106	25401	74392	194234	297978	
Months	Mumbai	Mumbai	Mumbai	Mumbai	Mumbai	Mumbai	Mumbai	Mumbai	Mumbai	Mumbai	Mumbai	Mumbai	Mumbai	Mumbai	Deaths per 1000 from fever for each month.
April	49	81	11	63	53	159	47	30	39	22	4	38	12	608	.42
May	64	52	15	30	63	147	47	47	46	30	7	35	20	597	.41
June	43	79	15	16	48	66	46	63	38	40	3	48	18	515	.33
July	57	62	32	16	68	52	57	46	53	29	4	46	16	531	.37
August	55	67	21	27	57	47	55	87	51	38	4	47	9	561	.38
September	63	61	25	49	68	60	43	63	70	50	4	53	23	642	.45
October	63	56	20	20	68	56	33	42	86	46	7	53	14	564	.38
November	2467	749	731	268	1150	449	556	448	628	409	57	304	100	8336	5.88
December	630	264	146	133	374	309	312	285	435	154	33	217	71	3401	3.87
January	399	112	82	87	201	187	145	161	260	171	5	174	75	2040	1.43
February	192	97	43	48	153	109	58	84	118	84	7	82	28	1098	.76
March	151	56	60	63	91	108	68	53	110	72	7	50	28	922	.64
Total	4248	1736	1201	805	2340	7749	4662	4009	1982	1175	128	1147	412	19810	
Deaths per 1000 for the whole year	23.03	9.17	7.45	9.60	15.78	14.87	11.28	13.66	19.08	19.23	5.03	16.71	9.29	13.57	

In this table the returns from the municipalities are included under the heads of the two talukas and Zaminidars of the same name.

7 - Examining the above numbers are approximately correct it will be seen on examination that during the six months ending October 1869 the mortality shows a great uniformity but that in November it makes a sudden rise and then

Period of greatest prevalence -

Time of fever coincident with certain winds

Agricultural conditions during its prevalence -

How far artificial irrigation has caused an increase of fever.

less rapidly declines during the months of December January and February -

8 - The fever has always been observed to ^{increase} commence at the end of the rainy and beginning of the cold season and it is worse when the cold north winds from the hills and jungles set in and as the weather gets warmer the number of cases diminish. Towards the north and north west are hills and jungle tracts where fevers prevail with the greatest intensity and it is when winds blow from these quarters that fever appears in the delta - Major Fischer Superintendent Engineer of the district has told me that the fever seems to be worse during the prevalence of north westerly winds -

9 - At this time of the year the lands are drying from the rains and the crops are ripening, and it is now also that the greatest evaporation takes place from the soil.

10 - It is a general impression among the natives and others that the delta has been more subject to fever since the opening of the

irrigation channels and that the fever is in some way due to the increased dampness of the climate. A large quantity of silt is yearly brought down by the Godavari and deposited on the land but the old drainages of the delta have not in the mean time been improved to carry off the additional quantities of water now provided for by the amins at Dowlaishwaram. These drainages have in the mean time become choked up with mud and silt and some think that the fever may be due to this circumstance. The irrigated talooks on the whole show a slightly lower rate of mortality than the non irrigated. From the statistics already given I gather that the total number of deaths in the irrigated talooks amounted to 12.99 per 1000 of the population while in the non irrigated parts of the district the mortality reached 13.24 per 1000. -
 Myself I cannot think that irrigation per se has been productive

of fever. If such an opinion be held it is difficult to account for the fact that one talook should show a mortality three times as high as another which is similarly irrigated but still it must be borne in mind that irrigation may act injuriously in some cases by introducing some factor which is necessary to the production or propagation of the disease. - Notwithstanding the irrigated talooks show a slightly lower rate of mortality than the non irrigated it must be recollected that the one in which the greatest number of deaths took place viz Ramachandrapoor is the most highly irrigated part of the district and canals and irrigation channels traverse it in all directions.

General causes
 of malarial fever.

11 - Malarial fevers prevail with the greatest severity in the jungles and unclaimed parts of the country and nearly all medical authorities agree that they in some way originate from the poisonous miasms given off from decaying vegetable matter

but in the plains which are brought under cultivation the cause of these fevers is not quite so clear. In the plains at least it appears that two or three factors are engaged in their production. I consider there must first be the presence of a person either generated on the spot or brought from a distance, secondly an exciting cause and thirdly some peculiar susceptibility of the recipients.

12 — As these fevers prevail most when the soil is drying after the rains it is considered that water is essential to their production. If the height of the subsoil water has anything to do with the appearance of these epidemics it would be interesting to ascertain by Peterson's method how far it has an influence in the matter. The experiments that are being carried out for testing the theory as regards cholera would also be available for this purpose.

13 — I have carefully examined the rain registers of the different

Water necessary
for their production.

Influence of
rainfall.

belooks for several months past and I am unable to see that the fever is in any way influenced by the previous rainfall. For instance — Ramanachandrapoor where such an excessive mortality took place in November 1869 the returns show no unusual amount of rainfall in the months preceding it. The rainfall on the contrary was slightly less than in Caringa where the mortality was lowest. But there is one thing to be said on the other side. In 1868 the rainfall was less than usual and this year showed a small fever mortality.

Habits of the
native inimical
to health.

14 — It is of importance to consider how far the habits of the natives render them susceptible to disease. Of naturally weak constitutions and their health still further undermined by poverty and hardship, destitute too of all proper clothing and shelter to our eyes would be the recipients of life they have no strength to resist disease and they frequently die where Europeans would recover or if they do recover it is frequently with ruined constitutions and

72) with
and the seeds of ill-health soon to
break out only too surely in future
years -
15 - The influence of diet in causing
susceptibility to the disease is I believe
very considerable. I have been inform-
ed that the attacks of fever are
much less frequent among the
wealthier and well to do natives
who can afford to buy better food
and provide themselves with more
suitable clothing than their poorer
neighbours and I think that those
castes who eat meat or a milk
are less obnoxious to the disease
than the flesh abstaining Brahmins
and others who are too poor to buy
animal food -

Influence
of diet.

16 - One of the commonest causes
or perhaps exciting causes of this
fever is exposure to cold and
particularly to the cold night
winds blowing from the hills and
jungles. During several months
of the year the skin of the native
a freely excreting organ and
is exposed to sudden changes

Exposure to
cold -

18 19
of temperature its functions are
checked, internal organs become
congested and disease results. It
is wonderful how the native ex-
poses himself to cold - Travelling
along the canals at night in this
and in the Krishna district I have
seen them sleeping outside the boat
with one miserable thin cloth round
them and sometimes in a heavy dew.
It is astonishing to my mind that
any escape - In the morning
they will perhaps bask in the hot
sun to get back a little of the heat
they have lost during the night -

Influence of
fast drinking
&c.

17 - It is a common explanation
among natives that the water of
such and such a place does not
agree with them and it is a common
idea among the natives of this district
that the fever is due to drinking
fast water, and some say that
this year and last year the fever
was owing to bad water from
the Godavary. There is very likely
some truth in this as we have

every reason to believe that water is capable of absorbing the malarial poison - It is possible that in some cases the disease may be introduced into the system in this way -

18 - In the proceedings generally ^{the effect of sea breezes - malarial} noticed the Sanitary Commissioner has shown that in Southern India at least the un- ^{Proceedings of the Sanitary Com. Commission for June 1870 -}

gated districts do not show any increased mortality over the high and drier parts of the peninsula. He considers that the sea air is antagonistic to malaria. Mr. Curish has here examined the subject with respect to the geographical positions of the various districts of ^{the Presidency} Southern India and has I think clearly shown the influence of this sea breeze in diminishing the prevalence of malarial fevers. The same I think will to a certain extent hold good in the different talooks of the

Erdanary district -

different talooks 19 - It will be seen from the table in para 6 that different parts of the district exhibit very varying returns of mortality.

I will here arrange the different talooks in their order of mortality.

Talooks &c -	Deaths per 1000 per annum
Ramachandrapur	23.03
Losomada	19.22
Peddapur	19.12
Pittapur	16.76
Tanukur	15.73
Udore	14.89
Rajahmundry	13.86
Geringuduru	11.28
Bhimavaram	9.60
Tungu	9.29
Amalapur	9.17
Nursapur	7.42
Caringa	5.03

20 - I shall now briefly notice the geographical positions of these talooks and offer a few remarks to account for these different rates

16)

of mortality -

1) - Ramachandrapur - This is a large and highly irrigated talook and forms the eastern delta and has always exhibited the greatest number of deaths from fever - It is scantily supplied with trees and trees and is most fully exposed to the cold north and north westerly winds which come down from the Pampas hills and then through the forest tracts - Though part of this talook is not far removed from the coast, yet it is unfavourably situated as regards the influence of sea winds - A wide extent of marsh and salt water swamp intervenes between it and the sea - This gives rise to noxious emanations and being probably deprive the sea air of its beneficial influence -

2) - Cocanada - This is a large town next to the coast and has a mortality of 19.22 per 1000 - It adjoins Ramachandrapur and

20 (17)

and is exposed to the same influences but is on the coast -

(3) Peddapoor - The mortality in this talook is very similar to that of Cocanada - It is a large talook and is situated in the northern part of the district - Its northern portion is hilly and jungly and it is unfavourably situated as regards being from the sea -

(4) Pittapur shows a mortality of 16.76 per 1000 - It lies chiefly to the east of Peddapoor and consequently nearer the sea - Owing to the direction of the line of coast the north and north east winds come in as land winds rather than sea breezes -

(5) Tanuku lies to the southwest of Ramachandrapur and is further removed from the noxious influences that affect the latter - It is irrigated by the ancient channels but is free from hills and jungles -

(6) Ellore is still further removed

but in its west are hills and jungle tracts - I hear that in the more inland portion of the talook the mortality was considerable and more particularly in that part which is drained but not irrigated by the Ellore canal -

(7) Rajahmundry shows a medium rate of mortality - It is not irrigated but has a large quantity of jungle and unreclaimed land which is unhealthy - These parts however are thinly populated. It is free from excessive dampness of soil -

(8) Yerragudem is generally considered a very unhealthy part of the country, but for some reason which I cannot account for, it does not show such a very high rate of mortality. The same remarks apply to it as to Rajahmundry.

(9) Bhimavaram is an irrigated talook south of Tanuku. The winds from the north which reach these

two talooks are probably deprived of some of their injurious qualities by having to pass over the Godavary river -

(10) Tury is a zemindary in the north of the district. Though much of it is jungle, yet the climate is somewhat drier than in other parts and it does not show a very high rate of mortality -

(11) Anulapoor is a large piece of the district and forms the middle delta - It is situated between the mouths of the Godavary and is fairly exposed to the sea breezes - From the direction of the line of coast the wind known at Madras as the "strong shore wind" comes in as a sea wind -

(12) Musapoor lies to the south and south west of Anulapoor and is far removed from hills and jungles. It exhibits a comparatively small mortality -

(13) This small zemindary is the most healthful part of the whole district -

it is most favourably situated as regards the sea winds and in the year of the epidemic exhibited a mortality of only 5.03 per 1000 -

21 - It has sometimes occurred ^{to me} that the causes of fever ^{Theories of disease} Cholera and other endemic diseases are always present in certain localities but kept in abeyance by some of the forces of nature ^{and only} brought into development from time to time by a certain state of the atmosphere or ~~under~~ conditions with which we are unacquainted. These germs may lie latent for a long time but when one or more of the controlling forces fail they may suddenly burst forth into active existence - Something of this kind may perhaps account for those cycles of disease or disease waves which pass over countries. We meet with a sort of analogy in the animal and vegetable kingdoms - In some seasons a blight

ravages a country or a certain part of country and destroys certain crops - On some days a peculiar condition of atmosphere brings to life myriads of one kind of insect. Unless we accept the theory of spontaneous generation, there can be little doubt that they are developed from one already in existence but which are lying latent, awaiting only their own proper stimulus to develop them into active life -

Malaria may generally be destroyed as soon as generated -

22 - Granting the general supposition that the first cause of malarial fever is some product of the drying soil it may always be present under these conditions but its noxious properties destroyed as soon as generated either by oxidation or by some unknown means so that it becomes innocuous to the majority of people or it may be that some through an induced peculiarity of constitution may become susceptible to the influence of the poison -

23 - I have no means whatever of giving an opinion on this point but the medical officers and surgeons stationed in the district and with whom I have had conversations on the subject tell me that the cases where death early are very amenable to treatment. Mr. Cornish is of opinion that in every individual who dies of fever some fifty or sixty or even a larger proportion suffer from a non-fatal attack of the disease - If this be really the case the number of persons attacked in some years must be almost incredible - In the year 1869-70 when nearly 20,000 succumbed to the disease over a million persons must have suffered in a total population of less than a million and a half. We can thus see of what incalculable benefit to the people will be any measures which successfully

Mortality among those attacked -

Proceedings above cited.

He who believes that 2 out of 3 are killed by fever?

Beneficial effects of starvation -

prevent the ravages of his disease - 24 - Much of the mortality among those attacked results from their not applying in time for proper medical aid - Moreover the active treatment of the disease is by starvation and I have no doubt that many more die from want of proper nourishment than from the disease itself - In the Medical Report for the Rajahmundry Civil Dispensary for 1867 Dr. W. Atken writes so strongly on this point that I cannot do better than quote him here -

"The satisfactory results of the remedies in what might have been considered bad or aggravated cases surprised me very much after what I had heard of the fatality attending the fever and led me to make some enquiries regarding the kind of treatment adopted by the people themselves and also that to which they are subjected by the actual doctors -

The information I thus obtained

affords I think a sufficient explanation of the extraordinary mortality and the wonder I think is not that so many have died but rather that any have survived and that even amongst so credulous a people as the natives generally are victims on so large a scale could be found to submit to such gross mistreatment.

The remedy recommended by the native doctors in all cases and apparently confidently relied on by the people themselves is what is called *Lungamun*. This means a rigid and enforced privation of food drink and sleep for the number of days enjoined a very limited amount of water being allowed in only a few exceptional cases. The only medicinal adjunct employed is the native bichloride (*Raskipora*) which is given ^{or liberally} in this as in almost all other diseases that it produces dreadful mercurialization as-

complicated in some cases by gangrene and sloughing -

The remote effects of fever cause a certain number of deaths which do not appear under the head of fever - Many of the deaths from dysentery are due to this cause but I have no means of knowing what is the proportion of remote mortality.

Types of fever.
Leading
symptoms.

25 - All types of malarial fever are met with in the district but I gather from the camp officers and others who have had an opportunity of observing the disease that the fever which has caused the greatest mortality in the district is of a somewhat different type to that prevailing in the jungles and non irrigated districts. It is more of a remittent fever than an ague and has the old stage but slightly developed - It is attended with much gastric disturbance and prostration of mind and body. The fever is more continued than in ague and the remission short.

There is nausea and vomiting and the patient suffers from aching pains in the head and legs and complains of restlessness and want of sleep. As all food is usually withheld the victim becomes weaker and weaker, falls into a low typhoid condition in which he sinks.

If he is fortunate enough to survive the disease and remedy his recovery is often by no means complete. He is still likely to suffer from the effects of a permanently injured liver and kidneys and chronic disease of these organs gives rise to remote effects which though slowly but not the less surely prove fatal in the end.

26 - As soon as nausea and other treatment gastric disturbance is found in the early stages of this disease it is of first importance to relieve the congestion of the stomach and other organs which these symptoms

indicate. An emetic of thirty grains of ipecacuanha answers for this purpose very well and often brings off the stomach a large quantity of bilious matter with immediate relief to the patient. A purgative too is often beneficial and I have found none more efficacious than a powder consisting of half a drachm of compound jalap powder with 3 or 4 grains of calomel. This also clears the bowels from the excess of bile which is usually present. It may be sometimes followed by a dose of castor oil.

But one of the chief indications of treatment is to promote the action of the skin, the suppression of the functions of which have been so instrumental in causing the disease. The patient should be at once warmly clad and removed from all draughts of cold air. The medicine I usually give with this view is a powder containing 10 or 15 grains of ipecacuanha.

powder with $\frac{1}{2}$ grain of acetate of morphia - This is generally retained by the stomach if given after the nausea has been relieved by an emetic. It induces sleep and generally a profuse perspiration. If the stomach is so irritable as to be unable to retain medicine of any kind I generally give a subcutaneous injection of morphia which I have always found to give relief. A large dose of chloroform often answers well for this purpose -

Opium I believe to be a remedy of great value in fever. It not only relieves the pains in the head and bones which fever patients so commonly complain of, but it also acts as an anodyne and promotes the natural cure of the disease. I believe too it is something more and acts as a controller of tissue change, the excess of which is one of the conditions of the

febrile state -

Quinine should be given in large doses as soon as the remission sets in - 15 or 20 grains should be then given and the dose repeated in a few hours - It is best given in solution and may be dissolved by means of lime juice. If the remission is considerable and the periodicity well marked a subcutaneous injection of it is most efficient and economical, a much smaller quantity being required, but this mode of administration is not one that can be generally resorted to - In bad cases of remittent fever, where the fever is continued and the remission slight and in some cases barely noticeable by this is no valid reason for withholding the remedy - Quinine may then be given at any time and in these cases I have found that it acts to the best advantage when continued with opium - The use of quinine in

smaller doses should be continued for a few days after all symptoms have disappeared but this is more necessary after recovery from ague than from the remittent or more continued form of the fever. But any and all remedies are likely to fail if proper nourishment is withheld and the patient imperfectly clad or exposed during the illness.

In the cachectic condition resulting from frequent attacks of fever quinine as a special remedy is not of much use. Such cases are best met by a course of tonics and by removal to another locality. There is however no objection to quinine being given in small doses and as a general tonic.

27— In the sanitary history of our own and other temperate climates we find that as fens have been cut down and swamps and marshes

Prevention of
malaria fever

31
reclaimed and brought under cultivation malaria has almost disappeared but in India the conditions are different. For four or five months we ^{have} an almost continuous rainfall and an atmosphere saturated with moisture and then for seven or eight months continued drought. Climatic conditions like these are beyond the control of man. Under these circumstances our efforts to prevent the ravages of this disease must I think be directed against some of the other factors which predispose the body to its influence rather than attempt to eradicate malarial from the land. In the irrigated districts where to a certain extent ~~man~~ has rendered the land independent of local rainfall it is possible that some of the evils resulting from this system may be remedied or at all events their injurious effects may be diminished. It appears to me that no more water

There is absolutely necessary for the growth of the crops should be allowed and that some means of drainage should be available to remove the surplus quantity of water now distributed to the land. For this purpose some of the old natural drainages of the delta might be cleared out and deepened - The practicability of such a scheme would no doubt depend upon the height of the land above the sea level but this is an engineering matter and not one that I am able to discuss -

There has also been a suggestion that trees should be liberally planted along the course of the canals, as belts of trees are supposed to have some special power to intercept malaria - Even if this is not the case they are picturesque and probably beneficial to the country in other respects.

The preventive measures which

are more likely to be rewarded with success are those which concern individual hygiene - Anything that improves the health and constitution of the people will lessen the fatality of the disease - All medical authorities are unanimous that those who are well fed and well clothed are far less liable to fever than their half starved and poverty stricken neighbours - As the attacks of fever seem generally to result from exposure to cold and damp people should provide themselves as far as possible with warm clothing for the rainy and cold seasons and they should more generally resort to clothing about the lower extremities and they should particularly avoid sleeping out in the heavy dews and cold night winds - The natives or poorer classes at all events

are given to another custom which I am satisfied must be injurious. Before going out in the morning they take a cooked meal of watery and cold rice, the remains of the last night's food - This is perhaps of not much importance in the hot weather, but in the cold season if they cannot afford anything better this meal should certainly be made hot.

28 - It is hopeless to expect that the native will be induced to suddenly alter any of his long cherished customs - On the contrary he is more likely to resist any thing new which is suggested to him and which is contrary to his honoured marmol. But still I think we can do something and at all events make a beginning though it will be a work of time. I would suggest that during the next hot season and before the feverish time of year recurs

Practical application of the foregoing principles -

that simple and short circulars of instruction and advice upon the points above inculcated be prepared and most widely distributed. Advertisements in the district gazette are totally inadequate to give the matter sufficient publicity - A few of these circulars should be given to the head man of every village in the affected localities with orders to distribute copies to the chief inhabitants who are able to read and he should also be required to make their contents known to the people of the village generally. A supply of prepared medicines should be ready in the district and on the first appearance of the disease a certain quantity should be placed at the disposal of the mooniffs or headmen with orders to sell them or give them to the sufferers as occasion required -

29 - It must be borne in mind that many of the remedies which are used and are available in

a large hospital cannot be applied to meet the peculiar cases of individuals - All that can reasonably be expected is that medicines with simple directions for use should be placed within reach of the people and that these medicines should be such as are found to meet the requirements of the majority of such cases. I have thought over this subject a great deal and it appears to me that packets of medicine containing a purgative and a few quinine pills or powders would be all that is required. The purgative might consist of the following.

Compound jalap powder $\frac{1}{2}$ dram
 Calomel 3 grains
 Powdered ginger 10 grains.

The quinine pills should consist of 5 grs each and I think each pill might have combined with it $\frac{1}{2}$ grain or a grain of ipecacuan. Ten or a dozen of these pills would

probably be sufficient for any ordinary case of fever. Two should be taken ~~at~~ ^{at} dose. After the remission has set in and after the bowels have been cleared by the purgative, and repeated after a few hours. The quinine pills are likely to act more efficiently if powdered up and dissolved in water by means of lime juice. I haven't enough experience in the use of the other cinchona alkaloids to be able to recommend their adoption but they are cheaper and possibly might be found equally efficacious. The directions for the use of these medicines should also give advice as to the general management of the fever cases.

Although I generally prescribe antiseptic in the early stage of remittent fever I have not recommended the distribution of any, for a plan of treatment which is to become general amongst you.

people should be simple and such as to gain their confidence and I don't think that an opium would find favour with the majority. Again I have not recommended the distribution of opium although I believe it to be a remedy second only and in some cases superior to quinine. It is true it is a medicine which the natives would take to very kindly, but still it is a poison and might be taken in excess if combined with the quinine and in the case of children particularly might prove dangerous in the extreme.

30 — I have already alluded to the baneful effects of opium which is the usual native treatment. If this could be prohibited by law I feel satisfied the deaths from fever in this country would be less numerous.

Starvation
shd be prohi-
bited by law

General Summary.

31 — It might be objected that a law of this kind would be despotic and an interference with the liberty of the subject, but as there are laws already in existence against inoculation for small pox and for the suppression of venereal disorders I am of opinion that some law might be enacted to put a stop to a system of treatment which is admitted by all to be injurious and which is a remedy more dangerous than the disease.

31 — The fever in question is a malarious fever and of the type bilious remittent. It prevails to a small extent throughout the year but chiefly after the rains and at the commencement of the cold season and its increase is coincident with the setting in of the cold winds from the hills and jungles. It subsides as the weather becomes warmer.

The eastern delta is the part of the district which has been most

affected but from the statistics I have examined it does not seem that the delta as a whole shows any increased rate of mortality over the inland and drier tracts. The exciting cause of the fever is usually exposure to damp and cold and night dews.

The cases when seen early are manageable and amenable to proper remedies but the active mode of treating the disease increases the number of deaths and like other dangerous practices should be rendered illegal.

The means for its prevention I consider depend for their success more upon the exertions of the inhabitants themselves and upon an improvement in their condition than upon anything the authorities can do for them, but in the meantime they may be instructed on these points by circulars in the

conclusion and then the epidemic reappears assistance may be rendered to them in the shape of medicine and advice.

Concluding
remarks

32

The same causes which gave rise to the epidemic in 1869 will without doubt recur but in the most affected localities a more careful attention to individual hygiene and proper treatment can reduce the mortality. We may not be able to banish malaria from the land but we can teach the people how they may best resist its influence, and show them that there is a mode of dealing with the disease which is more effectual than that to which they have been subjected for ages, but we shall have a mass of ignorance and

42/

prejudice to contend against
and I fear the process of
enlightenment will be slow
and no easy task -

W E Wright

Against Slavery

Godavery District

January 28th 1871.

In 568

May

1871

Report
on
fever in the
Godavery District.

Des^d
Received -

P.G. 7/14 June/71
In B. N: 85.

In Pub. 684/71

40

No. 159

34

OFFICE OF INSPECTOR GENERAL, INDIAN MEDICAL DEPARTMENT,

Fort Saint George, 18th May

1871

From

The acting Inspector General, Indian Medical Department,
Fort Saint George;

To

The Chief Secretary to Government
Public Department,
Fort Saint George.

SIR,

Letter No 454
of 10th April from
Sanitary Comm.
missioner to the
Chief Secretary
to Government
+ Enclosures.

I have the honor to acknowledge receipt of the documents marginally noted referred for remarks under your despatch memo of the 3rd instant, and beg to mention that the Chief topics noticed in Assistant Surgeon Wright's report on the outbreaks of fever in the Godavery district have been already commented on in this Office letter No 81 of 11th March 1871.

2. The Sanitary Commissioner is of opinion that the epidemics are not, as supposed by some of the inhabitants, the result of increased irrigation in the district. On this view he is apparently supported by the available death statistics of the population, but the subject is one requiring more extensive data and observation for its satisfactory elucidation.

3

In para. 7 of his letter the

Sanitary Commissioner expresses his conviction that the periodical accessions of fever in the Godavary district, are due to the geographical position of that district in respect to malarious lands to the north and west and that the fever is due to the northerly winds of the N.E. monsoon sweeping over the malarious jungles of the hill tracts of the Northern Circars, before they reach the Godavary district. This explanation is not altogether in accordance with the belief of other sanitary authorities as to the horizontal diffusion of malaria but Surgeon Cornish will doubtless specially investigate this point when he visits, as he proposes, the district at the end of the year.

4 In my letter marginally noted Letter No 81 of I suggested that extra medical aid 11 March 1871 and supplies of medicines should be sent into the district, during the feverish season, and a portion of the medicines might be sent to the Civil authorities for distribution amongst the people, and I agree with the Sanitary Commissioner in thinking it desirable that the attention of the inhabitants should

35
should be called by Circulars, and notifications in the District Gazette, to the necessity for using due precautions of their health during the period at which the fever prevails. At the same time a memorandum containing brief instructions as to the treatment of the disease, might be circulated with advantage. I will prepare a brief memorandum of the kind to be forwarded to the Collectors of the districts.

I have the honor to be
Sir
Your most obedient servant
Edw. M. A. P. H. G. H. C.
Acting Inspector General
Indian Medical Department

Public Department.

PROCEEDINGS of the MARDAS GOVERNMENT.

Read the following letter from

The Inspector General Indian Medical Department } dated 11th March 1871, No 81
 The Sanitary Commissioner, Madras, dated 10th April 1871, No 46
 The Inspector General Indian Medical Department } dated 18th May 1871, No 159

Order - 14 June 1871 No 828.

His Excellency the Governor in Council has read with much interest the report furnished by Assistant Surgeon W. C. Wright on the causes of the outbreak of fever in the District of Godavery, and on the means to be adopted for its prevention, and appreciated the zeal and ability with which Mr Wright has conducted the duty entrusted to him.

Sho.

I would send Dr Wright back this year over. I would like to see him in person at the close of the year. I would like to see him in person.

Ref: 1450 & 654
 Put: 10 Dec 1871
 Sent: 10 Dec 1871
 1871. Dec 11

To: 14 June 1871
 From: 14 June 1871
 Inspector General,
 Indian Medical Department,
 Fort Saint George.

Dated 14 June 1871.

No 953 No 107

Inform that the chief topics noticed in the report are the outbreak of fever in the Godavery district. I have been already informed of this in letter No 819, 11.

2. The causes of the outbreak of fever are ascribed by the inhabitants to the extension of irrigation in the Godavary delta, and to the water of the River Godavary being of late years become unwholesome.

3. Assistant Surgeon Wright comments on these points at some length. Briefly stated, he does not consider that irrigation per se has been productive of fever, while he thinks that there is likely to be some truth in the bad water from the Godavary being the cause of fever.

4. The Sanitary Commissioner, who has submitted his observations on Mr Wright's Report.

has been the Dr. Cornish cannot I am afraid, state 2 or 3 cases the other as instances and, as Dr Wright has had one year experience his further enquiries will be closer and more reliable. I have mentioned the range of the thermometer in each block, first before & during the fever and then - he should have the statistics of rainfall. Again of 20000 people he has 10000 of fever & the balance 10000 put it down as - & that shows

signs of it in enlarged spleen &c &c. There are many other points bearing the evidence and if Dr W. is now assigned to the duty Dr Bal four Harish king to draw up before instructions for him showing the points to which he is a then time should be directed. The same enquiries are reached, I would like them, or as to acquire our knowledge as far as possible. The observations are the most correct should be seen. Trust to the agency &

Report, is impressed with the conviction "that the periodical accessions of fever in the Godavary District are due to the geographical position of that District in respect to malarious lands to the north and west, and that the fever is due to the North-east winds of the North East monsoon sweeping over the malarious jungles of the Hill tracts of the Northern before they reach the Godavary District"; and he adds -

"In respect to individual Taluqs and Estates Mr Wright acquiesces our knowledge has shown the correctness of our own as before. The observation, and that the Taluqs which are the most correct should be seen open trust to the agency &

East Mission Season

5. Dr. Balfour considers the subject to be one requiring more extensive data and observation for its satisfactory elucidation, and remarks that Dr. Cornish's explanation is not altogether in accordance with the beliefs of other sanitary authorities as to the horizontal diffusion of Malaria.

6. Assistant Surgeon Wright attributes much of the mortality among those attacked with fever, to their not applying in time for proper medical aid; to the native treatment of the disease by starvation; to the want of nourishment; to exposure to cold and damp, and to the want

2. The open. to influences from the break of sea have the least fever by the int while those parts of the District which are exposed most to the winds which have blown across unhealthy jungles, have had the highest ratios of fever prevalence and mortality. Mr Wright's figures relate only to a single year, but the results of five years registration, demonstrate in

very clear manner that the ratio of fever in any tating is in relation to extent of exposure of the land, but solely due to the geographical position of the tating its exposure to malaric winds during the North East

I would ask Dr. Balfour for some thing to be said in this connection. He is ready in time. The Local Board can say for time to time. It is a fact that the current and we can try in another line. L. O. S.

Rain a decided factor in 69/70 was a marked exception.

I agree in the suggestion of Mr. Balfour. Dr. Wright should return & superintend the preparation & dispensing of medicines in cooperation with the collector against the next unhealthy season.

want of proper clothing; and
under the heads of "Treatment";
"Prevention of malarial fever";
"Practical application of the
"foregoing principles", he de-
scribes the course to be
followed in dealing with
the disease. He also suggests,
and Dr Balfour and Cornish
concur with that simple
and short circulars of instruc-
tions and advice should, during
the hot season, be widely
circulated.

7. Dr Mackenzie recom-
mends that extra medical
aid and supplies of medicines
should be sent into the Dis-
trict during the feverish
Season, and Dr Balfour and
Cornish

3999.
Cornish suggests that a portion
of the medicines should be sent
to the Civil authorities for sale
and for distribution amongst
the people some time before
the fever season.

8. His Excellency the
Governor in Council approves
and sanctions these sugges-
tions and recommendations
and directs that extracts
from Assistant Surgeon Whelan's
report, respecting the prevention
and treatment of fever, be
translated into the vernacular
of the district for publica-
tion in the District Gazette
and for distribution to the
inhabitants of the taluqs
where the fever is generally
most

other duty

L.N.

North

13. As Dr. Cornish during his office
 proposed visit to the Northern
 Districts cannot be expected
 to devote much time to the all state
 inquiry into the causes of
 fever the Government deem it
 advisable that Assistant and
 Surgeon Wright should be
 again deputed this year to
 to continue his enquiries,
 and to superintend the pre-
 paration and dissemination

- To
 The Inspector General Indian Medical Department
 Sanitary Commissioner
 all Collectors of all Districts
 Revenue Department
 Public Works Department
 Board of Revenue.

29/6

29/6

28/6

150

32410
150 L

CONF. OF 1871

To Public

The Sup. Court of the State

Dated 1/16/71 } 1871, No. 826

Recd. } Nos. 826, 827.

Having been with reference
to the report furnished by
the Judges to the Court at
the session of the Court at
Harrisburg in the Spring of 1871
and on the motion of the
Attorney General, the Court
has decided to grant a writ of
habeas corpus to the said
prisoner.