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Not to be folded or roughly handled

Proceedings of the Madras Government, Public Department,
30th December 1872.

Read the following papers:—

No. 59. From E. G. BALFOUR, Esq., Inspector-General of Hospitals, Indian Medical Department, to the Secretary to Government, Fort St. George, dated Fort St. George, 15th April 1872, No. 115.

I have the honour to acknowledge receipt of the Proceedings of Government, No. 828, of 14th June, and No. 1066, of 15th July 1871, and have now to submit to the Honourable the Governor in Council a report by Assistant-Surgeon Wright, regarding the fever which has prevailed in the Godavery District during the year 1871-72.

2. On this occasion, Assistant-Surgeon Wright was aided by four warrant medical officers, viz., two Apothecaries and two Assistant Apothecaries, and he entered on his duties in the latter end of October 1871, and was withdrawn early in February 1872. He received special instructions as to the manner in which his work was to be conducted, and was particularly directed to itinerate in the district so as to give himself and his assistants every opportunity for investigation, and for relieving as many of the sick as possible. In carrying out this portion of his orders, he placed two of his subordinates under the orders of the Collector, and two of them under the Head Assistant Collector, so that, in the event of a sudden outbreak of fever in any villages, he might instantly depute for its relief one or two of the warrant medical officers who were instructed to keep him acquainted with all their movements, and furnish him with a weekly report of operations. These instructions were duly carried out.

3. Assistant-Surgeon Wright reports that, while engaged on this duty, he received much valuable aid from the Civil authorities and from the Superintending Engineer of the District, and he mentions that, during the feverish season, the Collector freely distributed quinine with copies of printed instructions as to its use.

4. A statement which Assistant-Surgeon Wright furnished in paragraph 4 of the report shows that the mortality from fever during 1871 was below the average of the previous six years, and lower than in the two years 1869-70. Nevertheless, the loss from fever has been great, for out of a total death rate from all causes, amounting to 14·906 per 1000 inhabitants, about one-half or 7·92 deaths per 1000 are recorded as due to fever. Assistant-Surgeon Wright also correctly points out that the latter rate only represents the deaths resulting directly from fever, and that there must have been a considerable mortality from secondary diseases induced by fever, which are shown under other heads in the register of deaths.

5. The character of the fever, as observed during the past season, was ague of a simple and uncomplicated kind, but Assistant-Surgeon Wright thinks that the type of the disease may vary in different years, and that he "was wrong last year in stating that the fever which caused the greatest mortality was a remittent fever." He appears to have adopted his former opinion from having seen some cases in which, owing to neglect and bad treatment, the disease, originally a simple intermittent fever, had assumed a continuous form, and been accompanied with great prostration. And the present report leaves no doubt that when suitable remedies are used the fever, as now seen, readily yields to treatment. Assistant-Surgeon Wright did not hear of a single death where the

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European system of treatment had been adopted. He further states, as his belief, that if due care be paid to the ordinary bodily wants of the sufferers but few cases would prove fatal, even although no medicines were administered. These observations distinctly show that the type of the fever is neither so severe nor so fatal as was formerly supposed, and that the mortality from it may be very greatly reduced if the people can only be induced to follow a rational system of treatment.

6. Notwithstanding, however, the efforts made to inspire them with faith in European medicines and treatment, the inhabitants of that district still follow the dangerous practice of abstaining from food when seized with fever, and Assistant-Surgeon Wright very forcibly describes the evil effects that result from prolonged starvation during the course of so debilitating a disease. His final conclusions on this point of the inquiry are "that the mortality in this district, which is put down to fever, is not due to fever, but to the treatment of it;" and from facts which he brings forward, the statement seems to be in a great measure correct. Entertaining this view, he advocates the putting down of the starvation system of treatment by legislation, but it is unnecessary to say that such a form of interference would be as impolitic as impracticable. But something may be done to teach the people a more rational practice.

7. Deputy Inspector-General Blacklock is at present on a tour in the Northern Division, and his Inspection Report on the Police Lines, Station House, and Hospital at Ellore, contains the following remarks:—"There is no dispensary. The people are almost entirely dependant for medical treatment on native practitioners, who charge three Pies and upwards for each visit. These native doctors appear to be very ignorant, for the Hospital Assistant here informs me that they insist upon their patients abstaining entirely from food and water during the course of fevers and other diseases. There is less of this extreme malpractice in Ellore than in the surrounding villages, as the present and former well-educated Hospital Assistants have inculcated, and, to some extent, induced a more sensible and more humane treatment." I think that the idea here shadowed forth indicates the course which may be taken in future with more benefit to the communities who are now adopting the starvation treatment, and at a much smaller cost to Government, than has been incurred in the past two years; and I think that an intelligent, conciliatory, warrant medical officer might now commence to itinerate in that tract of country, and converse with and instruct the village medical men and the villagers, inculcating a more rational dietetic treatment than they now pursue, and indicating the vegetable medicines of the district to which, if unwilling to use quinine or other European drugs, they might have recourse. If this plan be approved of, I will detail a medical warrant officer for the duty. This idea occurred to me from learning the success which had followed Assistant-Apothecary Fonceca's tours amongst the people in Ganjam, and the remarks of Deputy Inspector-General Blacklock show reasonable prospect of its utility. It may be assumed that in the district there are Mahomedan as well as Hindoo medical men following different lines of treatment, and their differences would lead to discussion and inquiry, and facilitate the duty of the warrant medical officer who may be appointed to carry out this scheme.

8. Notwithstanding the undoubted prevalence of fever, Assistant-Surgeon Wright remarks that "the people look strong and well, and in no way as if their constitutions were undermined by fever." He adds that enlargement of the spleen is not a very common result of Godavery Fever, and that enlargement of the spleen and liver "is chiefly met with in persons who have suffered repeatedly from the disease, and is more common in the neighbourhood of the hills than in the delta." The other *sequelæ* of the disease observed were "anæmia, or a poor state of the blood with loss of strength, ear-ache, and nervous affections, and in some few cases paralysis and disease of the kidneys, and such secondary affections "are generally met with in cases which have been mismanaged from the first, and in which the disease has continued off and on for weeks or even for months." And all these facts indicate that the fevers which occur in that district are of a mild and tractable form.

9. In reporting as to the probable causes of the fever of this district, Assistant-Surgeon Wright gives as his opinion that, before this question can be satisfactorily disposed of, it will be necessary to be in possession of accurate returns of mortality for a number of years in this and adjoining districts, accurate meteorological returns from different parts of the district for a series of years, and a description of the geological features of the district.

10. With regard to these desiderata, there can be no doubt that the possession of such information would be of value. The geological structure of the country has already been largely described by Drs. Heyne, Voysey, and Benza; the returns of mortality may be expected to become more and more reliable, but accurate meteorological data can only be obtained by establishing stations under the Government Astronomer.

11. In inquiring into the causes of the fever, Assistant-Surgeon Wright did not observe any relation between the insanitary condition of villages and the prevalence of fever; on the contrary, some of the villages in which fever was most prevalent were on the whole clean and favourably situated as regards elevation and facilities for drainage, while some dirty villages escaped the epidemic. In most of the villages which were visited the water supply was found to be naturally good, but the surroundings of the wells required attention and all the tanks need to be strictly conserved, as in many instances clothing is washed and buffaloes allowed to lie in the tanks from which the supplies of the drinking water are drawn. No satisfactory evidence was obtained that an impure water supply had been the cause of fever, but tanks and wells so exposed to pollution can only be regarded as proving a constant source of danger to the public health. It seems desirable, therefore, that the local authorities be directed to maintain a more perfect conservancy over all sources of water supply.

12. In paragraph 23 of the report, Assistant-Surgeon Wright discusses, as to the cause of the fever, the theory which was last year brought forward by the Sanitary Commissioner,* and agrees with Surgeon Cornish in thinking "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

* In paragraph 7 of his letter recorded in Proceedings of Government, No. 828, of 14th June 1871.

the Godavery District." I have already stated that this opinion as to the horizontal diffusion or transportation of malaria is not altogether in accordance with the belief of other sanitary authorities, and a further consideration of the subject has not induced me to adopt this view. The only point of any importance brought forward in support of the theory is the fact that the population of those taluqs in the Godavery District which jut out to the east and, therefore, receive the north-east monsoon as an ocean wind, do not suffer so much from fever as those inhabiting the more inland parts where the north-east monsoon is more of a land wind. But were malaria capable of being transported to such distances by the winds as is, in this instance, suggested, not only the Godavery District but other parts of the country must long since have been depopulated. It must also be borne in mind that, while these northerly winds must have been traversing the district ever since the world assumed its present form, it is only in the last few years that fever epidemics have been prevailing in the Collectorate. These facts seem to militate against the theory of the winds being the carrying agents of the fever, the causes of which are, as with most epidemics, very obscure. But in this instance they are perhaps of a local nature, and may have been brought into activity by recent changes in the district.

13. Assistant-Surgeon Wright, with the view of ascertaining whether the rainfall and temperature have had any influence on the prevalence of the fever, has prepared a series of diagrams, which will be found appended to his report. These embrace observations extending over the past four years, but they do not show any very definite relation between either the rainfall or the temperature and fever mortality. And the only points that they appear to bring out, and even on these further observation is needed, are that a light north-east monsoon is less likely to be followed by great prevalence of fever than an ordinary or heavy monsoon, and that the mortality from the disease is highest when there is a low nocturnal temperature and a great daily range of temperature. But the data from four years' observations are not sufficient to warrant deductions.

14. The cases treated by Assistant-Surgeon Wright and his four assistants during their tours in the district have been 1370, as under:—

Remittent Fever.	Ague.	Other Diseases.	Died.	Total.
93	1,037	240	5	1,370

But with the prejudices existing as to the medical or dietetic treatment of the medical officers, all found difficulty in making themselves as useful to the sick as they desired to be. In some cases the sufferers refused to submit to treatment, having no confidence in European medicine; in others, when a village in which fever was said to prevail was visited, the existence of fever cases was concealed; and in other instances, patients who had got one dose of quinine, and found that it produced slight uneasy sensations, or that it did not entirely check the fever, refused to take any more. All through the district, indeed, the people seem to be more or less prejudiced against the European mode of treatment, and the

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sending of relief to their doors appears to have excited something akin to fear. "Perhaps it is not fear exactly, but it is a new thing that they have never seen before, and they are dubious."

15. In finally reviewing the results of the labours of Assistant-Surgeon Wright and his assistants, I have the honour to observe that, although no additional light has been thrown on the cause of the fever in this district by the investigation of the past year, it has been clearly established that, according to the evidence of the past two years at least, the disease has not been of so malignant a type as was formerly reported, but has, on the contrary, been very amenable to rational treatment. The removal of the prejudices which now exist against the European mode of treatment may perhaps be a work of time, but I am satisfied that the attainment of this desirable object may be greatly promoted by the arrangement proposed in paragraph 7, and regarding it I have the honour to ask the orders of Government. The presence there of an intelligent medical man and the success that attends his treatment must convince the people that he has been sent purely for their benefit, while the value of quinine as a remedy will also be brought home to them, and its reputation as a febrifuge be ultimately secured. At the same time it seems desirable that small Dispensaries, under Municipalities or Local Fund Boards, should be established at certain central localities. These would be of immense benefit at all times, and more especially in feverish years, and would help to induce the popular mind to regard European medicine and its agents with greater favour.

16. I have further to recommend that the Civil authorities continue to distribute and sell quinine throughout the district, and to circulate, annually, copies, in the vernacular, of the Memorandum on the treatment of fever and the hygienic measures to be observed, which was prepared in this office under the orders of Government.

17. In conclusion, I beg to bring to the notice of Government the zeal and ability with which Assistant-Surgeon Wright and the Warrant Medical Officers Hardaker, Falloon, Gillson, and Sungeevee conducted the important duties entrusted to them.

From Assistant-Surgeon W. E. WRIGHT, to the Secretary to the Inspector-General, Indian Medical Department, dated Cocanada, 7th February 1872, No. 17.

I have the honour, herewith, to forward my second report upon the causes and nature of the fever of the Godavery District.

2. In paragraph 6 of this report will be found a table showing the number of sick treated by myself and assistants up to the end of January. The number of deaths that have occurred appear incredibly small, but I have only inserted the deaths that have actually been known to occur during treatment, but as to the deaths that have occurred among persons whom we may have treated, after we have left a village, I am unable to speak. Many of the figures in this return, at least in my own practice, represent merely a single short examination and a few doses of quinine given. From the nature of the work the cases seen throughout the illness are not many, but, from the reports I have had from villages visited, I have heard that the remedies given have been attended with the best results.

3. If the Inspector-General would like to be informed upon any points that are unnoticed in this report, I shall be happy to supply the information to the best of my ability. I have

endeavoured to treat the subject in a general manner, as it is a question of State medicine, and I have purposely avoided entering into minute details of treatment or pathology, as I consider such discussions are more suited to the pages of a Medical Journal.

4. Fever has now in a great measure subsided, and I do not think our services are required any longer for this special duty, and I, therefore, suggest that the remaining Apothecaries* may be recalled.

* Apothecaries Falloon and Sungeevee.

5. I have much pleasure in stating that my assistants, in the face of many difficulties, have performed their work to my entire satisfaction. From the remarks in their weekly reports, some of which I have quoted, it will be seen that they have taken much interest in the inquiry, and I would bring them to the favourable notice of the Inspector-General.

REPORT ON FEVER IN THE GODAVERY DISTRICT, No. 2.

In the early part of last year I had the honour to report, for the information of Government, upon the causes and nature of the fever that year by year prevails in the Godavery District, and which in the year 1869 caused such an alarming mortality as to render it imperative that some special assistance should be afforded to the inhabitants in the event of a recurrence of the epidemic. In the present report I shall first refer to the steps that were taken for this purpose, and then offer such observations on the subject as a further study of the question may appear to call for.

2. The four warrant medical officers marginally noted were placed under my orders, and we were directed to itinerate in the district during the period of fever prevalence, and to afford medical aid to the inhabitants of the affected localities. After consultation with the Collector of the District, I disposed my assistants as follows :—Apothecaries Hardaker and Falloon were to do duty in the taluqs belonging to the Collector's Division, and Assistant-Apothecaries Gillson and Sungeevee in the divisions of the Sub-Collector and Head Assistant Collector, respectively. My object in thus placing them temporarily under the orders of the Civil authorities was simply to save time, as, in the event of an outbreak of fever in any part of the district, much valuable time might be lost by referring to me for orders when I might be perhaps in some out-of-the way part of the district, and away from ordinary lines of communication. I, however, directed them to keep me acquainted with their movements, and they sent me a weekly account of their operations. We commenced our work in the latter part of October.

Apothecary Hardaker.
Do. Falloon.
Assistant-Apothecary Gillson.
Do. do. Sungeevee.

3. The Collector also acted energetically in the matter, for a large quantity of quinine was procured and distributed throughout the district to the different Tahsildars, and Dr. Balfour's Memorandum of instructions about the treatment of fever was translated into the vernacular and widely circulated.

4. The following is a table showing the mortality from fever during the past few years :—

——	1866.	1867.	1868.	1869.	1870.	1871.
Deaths from Fever ...	9,562	13,882	8,262	17,180	12,654	11,309

The population of the district is stated to be 1,427,464.

Though the number of deaths are not so numerous as in some former years, it will be observed that the mortality from this cause is still very great. During the past year 7·92 persons out of every 1000 have died from fever, while the total number of deaths from all causes have been 14·906 per 1000. No doubt many deaths are erroneously attributed to fever which are due to other causes, but this is an error which is probably constant, and does not consequently affect the general relation of the above figures.

5. Ramachendrapoor and Yernagoodem Taluqs suffered most, and fever prevailed more or less in most parts of the district, yet there was no regular localized epidemic of it. The period of its greatest prevalence was as usual the latter end of November and beginning of December, after which time it declined.

6. The following is the number of cases treated by myself and assistants up to the end of January :—

Cases treated.

Medical Officer.	Remittent Fever.	Ague.	Other cases.	Died.	Total.
Assistant-Surgeon W. E. Wright	56	256	56	...	368
Apothecary Hardaker*	3	83	6	...	92
Do. Falloon	28	163	51	5	242
Assistant-Apothecary Gillson	...	350	118	...	468
Do. do. Sungeevee...	6	185	9	...	200
Total ...	93	1,037	240	5	1,370

7. I am afraid the above figures will appear small compared with the above mortality and apparent scope for work, but I would ask it to be borne in mind that the effect of four or five men in a district containing between five and six thousand square miles and a million and a half of inhabitants must necessarily be limited in the extreme. Had the epidemic been confined to certain villages or to one particular locality, the case would have been otherwise, but we have had many difficulties to contend with on the present occasion. One difficulty we have met with when out in the district was to find out where fever was prevalent and where it was not. I have visited some villages from which fever was reported, but owing to the slowness of communication the news arrived too late, and I got there after the fever was over, or at the most saw only two or three cases. At some places the ignorance and prejudice of the inhabitants have been an obstacle in the way of our operations. In some cases they have refused to come for treatment, not having any confidence in European medicine.

Referring to Kotrampilly, a populous village in the Peddapoor Taluq, Apothecary Hardaker writes in one of his weekly reports :—

"I had a great deal of trouble in this village to find out where the cases were. The Naidoo and Curnam of the village were some hours previously warned of my coming, and the people were to be made aware of it by beat of tom-tom. After going about for nearly an hour three cases of fever were shown to me and the necessary medicines were given with instructions. My impression is that there were more than three sick people here judging from the number of deaths that occurred previously."

Assistant-Apothecary Sungeevee also reports :—

"Almost all the cases at Nursapooram were of a very mild character, and yielded readily to treatment. It is the poorer class of people who are obliged to go about every day, and who live upon unwholesome and indigestible food, that suffered chiefly from fever. Some of them when free from fever for twenty-four hours refuse to take medicine after that fearing it will poison them although they have been told to the contrary, and so thinking themselves altogether exempt from a recurrence of the attack go about their usual avocations with scarcely any warm clothing upon them and expose themselves to cold. Others there are who, if they find that the first dose of quinine produces slight uneasy sensations, or does not check the fever, lose their confidence in the

* Mr. Hardaker left the district early in December.

efficacy of the medicine, and will not be persuaded to take another dose, but have recourse to their favourite treatment by starvation, which, they say, agrees better with their constitutions in this climate than medicine."

Apothecary Gillson in one of his reports says :—

"Some of the castes in the village are prejudiced, but from mere curiosity come for medicine. I have seen one spitting out the medicine I had made him take in my presence after he had gone a few yards away. I am trying my best by kind means to entice them to come for medicine. I hear there are a lot of sick starving themselves ; they will rather the follow the latter system than take medicine. Many of the cases of fever are chronic ; few have had fever on them when seen by me. I have only got their word that they are getting fever."

From another place he says :—

"The natives seem to be afraid and do not come for medicine. Perhaps it is not fear exactly, but it is a new thing that they have never seen before, and they are dubious."

Apothecary Falloon has also reported that in some places he found the people loth to come forward for treatment, and I have occasionally found it the same myself.

8. Though the number of cases treated has been comparatively small, yet I have seen many more cases than I did on the first occasion when I came into the district for this duty, and I have had full opportunities of observing the nature of the disease. This year the prevailing type of fever has been ague of a simple and uncomplicated kind. It is possible that the type of fever may vary in different years, but I now suspect that I was wrong last year in stating that the fever which caused the greatest mortality was a remittent fever. I was led into this error from having seen some cases in which the fever was continuous and the prostration extreme, but which, I believe, now to have been originally simple cases of ague in which the fever from neglect and pernicious treatment had become continuous.

9. The ordinary course of fever in a native is something like the following :—A native from some cause or other is attacked with fever. It generally begins with a feeling of illness, he vomits and his head aches, and he is unable to take his ordinary food. Next comes a shivering fit, not as a rule severe ; this is followed by fever during which time he suffers from great pain in the back and limbs, and more particularly the shin bones. The fever continues on him more or less for two or three days, with occasional remissions when he sweats slightly. He then gets better and the fever recurs every day. On the first accession of the disease he does not as a rule lie up, but endeavours to follow his occupation, but at last he has to give in and takes to his house and lies with nothing over him but a thin cloth. His friends seeing him in this condition send for a native doctor, or else proceed to doctor him themselves. They will prescribe abstinence from food for a certain number of days. Fasting will be recommended not only in severe cases of fever when a man has really little or no appetite, but also in mild cases of quotidian or tertian ague where a man might be able to do his work perfectly well in the interval between the attacks. If the patient is fortunate enough to survive the number of days prescribed for abstinence, he is then allowed to take a little food, but if in the meantime the fever has been recurring an additional period of starvation will probably be recommended. Perhaps during the treatment the fever ceases spontaneously ; even then as a preventive measure he has to continue starving the allotted number of days. It frequently happens that, on attempting to resume his ordinary diet, his stomach from such a lengthened abstinence is unable to retain food, and he suffers again from vomiting. This feature of the case sometimes leads them to suppose that he has resumed taking food too soon, and he is indeed fortunate if another period of starvation is not prescribed. Many recover in spite of this treatment and their recovery is attributed to it, but a common result is that they get weaker and weaker and die from pure starvation, and their death is then put down as a death from fever. This picture of the case is not an exaggerated one, and I think will be confirmed by any one who is acquainted with the habits of natives in this part of the country.

10. I will now quote a few of the opinions of my assistants on the subject. Mr. Hardaker, writing from Pittapore, states :—"I am told the pernicious system of starvation (lunkanum) is

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extensively observed among all classes of the inhabitants of the village when suffering from fever, as it is believed by them that it is necessary for the cure of fever, and that starving for many days does not weaken them, but that the weakness they feel is due to the results of fever. I have taken pains to advise them against this practice, and have also spoken to the Sub-Magistrate to advise the people not to starve themselves. Of the two casualties noted, one was a brother of the Rajah who was treated by a native doctor, and strictly put under the starvation treatment for about fifteen days when he succumbed. The second case, a man of some influence in the village, died also from the effects of fever and starvation."

Mr. Falloon has also reported to me that "the deaths were attributable to starvation."

Mr. Gillson reported from Yernagoodem as follows :—

"The natives have two principal medicines for all complaints—ruskapooram or perchloride of mercury and opium, particularly the former. It is given to the smallest infant and to the aged. In some houses they are suffering from the effects of it, extreme mercurialization with very offensive fœtor from the mouth, and pains all over the body and particularly in the joints, and to aggravate the complaint they starve themselves. No wonder the mortality should be great. They do not believe in European medicine. The fact of my arrival was tom-tommed through the village more than a dozen times, and no one came forward for treatment. Having heard that this was a bad village for fever, I went in company with the Munsif making inquiries if there was any one ailing from fever * * * *. The natives, rich and poor, high and low, are given to lunkanum and the two medicines mentioned above. They have no faith in European medicines except quinine when given in powder ; no confidence in pills."

On another occasion Mr. Gillson says : "If the two evils mentioned in my former reports, lunkanum and the administration of ruskapooram, could be put a stop to by law, it would save many a life."

11. I have had numerous opportunities of observing the effect of this mode of treatment on persons suffering from fever. The first effect of this enforced abstinence from food is certainly to diminish the fever, but at the same time it tends to render it continuous. In a few days the sufferers fall into a low typhoid condition in which they gradually sink. I have seen several cases of the kind, and they much resembled people in the last stages of typhus or typhoid fever. Their voice was hollow and husky, and the prostration extreme. Most of them were unable to sleep, and suffered from restlessness and excitement of the nervous system similar to what is observed in delirium tremens. Their tongue was brown and dry, and in some cases there was a low muttering delirium. Some of the cases which at first sight appeared hopeless recovered when stimulants and proper nourishment were administered, but there is no doubt that many must pass into a condition in which recovery is impossible, but I consider that in all these cases as long as there is life there is hope. In two cases some Liebig's Extract of Meat was given and some wine, and afterwards a full dose of opium. One of these cases after this treatment slept for nearly two days to the alarm of his relations, but on awaking was able to take food, and soon made a rapid recovery. The other case also recovered.

12. The reason that natives starve themselves for fever probably is that they have no appetite at the commencement of the disease, and, therefore, think that all food must be bad for them. In ordinary health the native distends his stomach with a large meal of rice or other grain, and when taken ill is naturally unable to take such a quantity of food, and having no idea of nursing or dieting himself abstains altogether. After a prolonged abstinence his strength and digestive system become so impaired that he is unable to eat his ordinary food when he tries. His stomach rejects it and starvation practically continues. If suitable nourishment, such as soup, milk, or conjee, is given the digestive organs will soon recover their tone, and the patient in a few days will be able to revert to his usual diet.

13. In the hills and neighbourhood of the hills fevers of a very virulent type prevail, and which will occasionally prove fatal under any circumstances. In the plains, too, many persons will die from anæmia, chronic diarrhœa, and dropsy—diseases in many cases attributable to the remote effects of malarial fever, but these cases do not appear in the returns under the head of "Deaths

from fever." But from what I have seen lately I firmly believe that most of the mortality in this district which is put down to fever is not due to fever but to the treatment of it. This is perhaps a strong opinion to hold, but I hold it upon these grounds. The disease yields readily to treatment, the worst cases being those in which starvation has been prescribed. These cases begin to improve directly food is given, which would probably not be the case if the prostration were dependant upon the fever alone, as is seen in typhus or typhoid fever as met with in England. My assistants have also reported to me that the deaths are chiefly due to starvation. That the fever is a curable disease I will here quote the high authority of Dr. Maclean, who wrote after a very large Indian experience: "I have never seen a person die from uncomplicated intermittent fever. The prognosis in such cases under rational management is favourable. The danger to life is from the malarial cachexia and the organic changes to which it gives rise."

Vide "System of Medicine" edited by J. Russell Reynolds, M.D., F.R.S., Vol. I., p. 601, 2nd edition.

Again, with reference to remittent fever, the same author writes: "Death from an uncomplicated remittent fever ought to be a rare occurrence, and under good management so it is. Even in ardent cases in sthenic constitutions the prognosis is favourable, and if skilfully treated recovery may be confidently looked for in a large majority of even adynamic cases, if seen sufficiently early."

Op. cit., p. 615.

This being the case, I would again urge the necessity for some special legislation upon the subject, as year by year numbers of lives are being destroyed by the practice, but the custom of starving fever patients has become so common among them, and has taken such deep root among all classes of natives, that it will probably be many years before it can be eradicated.

14. In the course of this inquiry I have endeavoured to ascertain whether, in years of great fever mortality, the type of fever varies, or is more severe than in ordinary years, but I cannot learn with any certainty that it is different. In some years many more people will suffer from fever, and will in consequence adopt their usual treatment, and the mortality will be proportionately greater. The fever we have seen this year was not severe and readily amenable to treatment, and I have not heard of a single case of death where proper treatment was adopted, and I believe that, independent of any medicinal treatment, but with care and attention paid to the wants of the sufferers, few cases would terminate fatally.

15. I regret that I have no means of estimating with anything like an approach to truth the mortality among those attacked with fever, but there can be no doubt that a large number of people do suffer from the disease in the course of the year. It may be a severe attack, but probably more often a slight one that they experience, but numbers do suffer though they may continue their occupation all the time. The proportion of attacks among women and children, I am inclined to think, is somewhat less, as they are not quite so much exposed to the weather as men, and the majority of our patients have been men. I look upon it that a native suffers from fever occasionally pretty much in the same way as in England we suffer from a cough or cold.

16. The alleged causes of fever are very numerous, and natives have various opinions on the subject. Bad drainage, bad drinking water, exposure to cold, night dews or wind, a heavy rainfall, excessive irrigation, and eating new rice are all put down as a cause of fever.

17. The delta taluqs, which consist for the most part of irrigated land, show less mortality from fever than the dry taluqs. During the past calendar year the former show a mortality of 5·9 per 1000 from this cause, while the death rate in the latter is as high as 9·15 per 1000 of the population. There is, to my mind, no evidence that artificial irrigation is productive of fever.

18. I have particularly inquired into this part of the subject, and have compared the register of rainfall in the different taluqs for the last four years with the mortality in the same taluqs during that period, and I have projected a series of diagrams showing the relation, if any, that exists between the two. The data at present existing are insufficient to enable us to determine how far fever is influenced by the rainfall, but I am inclined to believe that a light north-east monsoon is less likely to be followed by a period of severe fever prevalence than an ordinary or a heavy monsoon, but I do not think that the converse holds good, and I think that a reference to the diagrams will support this opinion. In 1868 and in 1871 there was a failure of the north-east monsoon, and the cold seasons following, particularly that of the first year, show a freedom from excessive fever mortality. In 1869 there was an average north-east monsoon, and this was followed by a period of great fever mortality, while in 1870 there was a particularly heavy monsoon, and not an unusual mortality.

Influence of rainfall.

19. I have also inquired into the question as to how far temperature determines the prevalence of fever, but the sources of information on this point are very limited. The only place in the district where I can find an accurate record of temperature is at the Superintending Engineer's Office at Dowlaishweram. I have here compared the mean temperature of each month with the corresponding fever mortality during the past four years, and I think it comes out pretty clearly that the mortality is highest when the temperature is low, and particularly when there is a great variation between the day and night temperature. No record of the night temperature has been kept, but observations have been taken at 6 A.M every morning throughout the year, and I consider these numbers may be taken as an approximation to the night temperature. I have also prepared a diagram showing the relation of the temperature and rainfall as observed at Dowlaishweram to the fever mortality throughout the whole district. It would have been a great assistance in this inquiry to have met with a record of the hygrometric condition of the atmosphere as deduced from observations with the dry and wet bulb thermometers, but unfutunately no such record is available. A source of error probably exists in the records at Dowlaishweram, as the thermometers are not well situated and the variations shown are probably less than what actually occurred.

20. In most Indian villages there is some sort of natural drainage. The surface water generally finds its way to a tank in or near the village, and in a few villages the water flows into the canals. In some few places, but they are the exception, there is hardly any drainage at all, and water simply settles where it falls, and is either absorbed by the ground or dries up. In the Godavery District the natural tendency of the drainage is towards the sea.

21. In the dry weather, as a rule, there is nothing offensive about the villages in this district, but in damp weather, and more particularly after a slight shower of rain, the smell at times is very offensive. The ground which has become impregnated with the excreta of man and beast then gives rise to noxious smells, but I have not been able to find that there is any relation between the prevalence of malarial fever and the insanitary condition of the villages where it prevails. Some of the villages where fever prevailed most, and which were visited by the Sanitary Commissioner and myself, appeared to us to be on the whole clean villages, and favourably situated as regards elevation and facilities for drainage. On the other hand, I have observed that some dirty villages were not subject to fever. Apothecary Falloon, however, reported to me that some of the villages in the Nursapoor Taluq were in a very filthy state. He says: "With the exception of Nursapoor the other villages are in a very filthy condition; heaps of rubbish allowed to accumulate, and adjoining grounds resorted to for purposes of nature. The smell on entering a village is most disgusting; almost all the huts are damp." I have not been in that part of the district myself, but in Ramachendrapoor, where fever prevails most, the villages are not quite so bad as this.

About the sanitary condition of Chintalapoody and surrounding villages in the Ellore Taluq, Assistant-Apothecary Sungeevee reports: "Some of the houses are kept very clean, while others, especially those of the poorer classes, are not so. In some places filth and all sorts of rubbish are thrown into ash-pits in front of the houses, or accumulated in some corner or other. A calf or pig help to compose the inmates of some houses. There are no public latrines; no drains to carry off the dirty water which consequently is allowed to stagnate about the place. Most of the houses are overcrowded, and the ventilation imperfect. They are surrounded by wild shrubs undergoing decomposition and by different kinds of vegetation."

22. In most of the villages that I have visited the water has been of good quality as far as I could judge, and is derived from wells, tanks, and the canals. The approaches to the wells are

not sufficiently attended to. The waste water stagnates about them and drains back into them. Many of the wells in the district require repair, and it would be desirable if cocoanut trees were planted in their neighbourhood to absorb the waste water. This has already been done in some cases.

Apothecary Gillson, who has been located part of the time in Yernagoodem, seems to be of opinion that bad drinking water is one of the causes of fever. In one of his weekly reports from that place he remarks: "There is a tank supplied by channels coming down from the hills and jungles about fifty miles from here in the north-west of the district. The water is muddy and of a reddish colour, and smells. There is no doubt of its contamination, and the tank is filled with rubbish of all kinds, particularly decayed leaves and vegetable matter. The wells are not used for drinking purposes, the water being brackish, except in cases of necessity." About another village in the same taluq he says: "The village is clean in some parts, filthy in others, particularly near the well used for drinking purposes. A lot of rubbish is thrown about, and a few yards off there is a small pond and the water is stagnant and offensive."

Mr. Hardaker, most of the time that he was employed on this special duty, itinerated in Peddapoor and Pittapoor Taluqs. About the water supply at Ramarum he says: "Water from a large tank; the supply is kept up by the rains, and there is no connexion with the hill streams. The water does not appear good; it is milky in appearance, but not offensive in odour. Two-thirds of the tank are covered on its surface with vegetation, and the water is impregnated with a good deal of decayed vegetable matter. The water must be very impure, as at one end of the tank cattle are brought in and washed, and in any part of it foul clothing is washed by the inhabitants of the village."

In the delta water of excellent quality is supplied by the [illegible] channels, but the natives frequently refuse to make use of it for drinking, preferring the water from the wells and tanks. The condition of the tank at Ramarum, as noticed by Mr. Hardaker, is common to the whole district. Nearly all the tanks are partly covered with weed of some kind, and are used by the inhabitants for both washing and drinking purposes. I do not think that the presence of living vegetation and fish are in any way detrimental to the quality of the water. On the contrary aquatic plants oxygenate the water and tend to keep it sweet through the hot weather, but washing clothes in it and allowing buffaloes to lie in it must of necessity foul the water considerably. Though I have not been able to find any satisfactory evidence that an impure water supply is a cause of fever, I would not ignore the fact that this may become at any time a source of great danger to the public health.

23. It appears to me that the cause of fever will one day be found to depend upon climatic conditions and local influences combined. The social customs and habits of the people are also an item for consideration. The chief and permanent habitat of fever in this part of the country is along the eastern ghauts, and we find that the localities most exposed to winds blowing from these parts are most affected by the disease, and that the localities most exposed to the sea breezes are affected in a smaller degree. I would here call attention more particularly to the geographical position of the district, a large portion of which, it will be observed, lies to the south-west of these ghauts, and consequently is most fully exposed to the influences of the north-east monsoon, which blows down through the Ganjam and Vizagapatam Districts, collecting the malarial poison and acquiring its noxious properties from these ghauts. On referring to a map of this part of India, it will be seen that the line of coast in Ganjam and Vizagapatam is north-east, and the consequence is that the north-east monsoon is practically a land wind. One portion of the Godavery District which juts out towards the sea, viz., Coringa, receives the north-east monsoon as a sea breeze, and is in consequence singularly free from fever. I am not aware that there is any accurate record of the mortality among the hill tribes who inhabit these parts, but it is hardly necessary to the question as the inhabitants of the hills have become more or less insusceptible to fever, but we know that to the inhabitant of the plains and also to the European these regions are a source of great danger. Assuming that these ghauts are one of the sources of the production of fever, and the assumption is reasonable, it may be asked why the mortality varies so much from year to year.

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At present we are unable to answer this question, but it seems probable that the conditions necessary to the development of the poison vary from time to time, and that these conditions, climatic or otherwise which give rise to it, should be sought for in these localities, and that the disease should also be studied in its permanent habitations.

24. Though there is every evidence that malarial fever is due to the presence of a specific poison of some kind, yet I am strongly of opinion that exposure to cold is one of the chief causes that bring about an attack of the disease. This exposure to cold, which to mind is a cause of fever, would in a cold or temperate climate render a person liable to pneumonia or pleurisy or acute rheumatism—diseases which in this country are of comparatively unfrequent occurrence. I have found that in a large number of cases the sufferers have been exposed to cold sometime previous to the attack. At the time of year when fever is most prevalent among the population, they are more exposed than at other times of the year. In November and December they are getting in their crops and numbers sleep out under trees in the damp fields, many in the open air and in a heavy dew. A few sleep in low sheds built of palmyra leaves, temporarily run up for the purpose, and which afford but an imperfect protection. None of the poorer classes seem to have any adequate clothing; one or two their cloths are all they possess. In the last report I noticed that the well-fed and well-clothed do not suffer in the same proportion as the poorer classes, and I am now quite convinced that this in the case, but if any of the better classes are attacked with fever they will still adopt the same line of treatment as their poorer brethren, and their chance of recovery is not much greater. Another reason that leads me to think that exposure to cold is a frequent cause of fever is the fact that there is a great deal of sickness among the lock lascars employed on the delta canals. These men are up at all hours of the night and exposed during all weathers. It would be desirable to supply this class of public servants with suitable clothing, as their pay is small and they can probably ill-afford to buy it. The frequent sickness among them must be a source of loss to the Department.

During the three months that I have been engaged on this special duty I have been out in the district most of the time, but before going out I took the precaution to supply my servants with warm clothing, and though we visited parts of the district where fever prevailed among the inhabitants, yet the only case of fever met with in my party was a boat lascar who was temporarily employed and not provided with extra clothing.

25. I have lately been through part of the district in company with Mr. Cornish, the Sanitary Commissioner, and we looked for evidence of any injurious effect that malaria might be causing upon the health of the inhabitants, but we found little or none. The people look strong and well, and in no way as if their constitutions were undermined by fever, and I am not aware that the recent census shows any decrease in the number of the inhabitants. The people of the Godavery District are on the whole a fine race, and though their physique is not equal to that of the European they by no means give one the idea of a fever-stricken population. I have not found that enlargement of the spleen is a very common sequelæ of the fever. Enlargement of the liver and this organ is chiefly met with in persons who have suffered repeatedly from the disease, and is more common in the neighbourhood of the hills than in the delta. The spleen, I believe, enlarges with every attack of fever, but it is only after repeated congestions that it loses its elasticity and remains permanently increased in size. There are, however, other after effects from which people suffer, but these, too, are generally met with in cases which have been mismanaged from the first, and in which the disease has continued off and on for weeks or even months. These are chiefly anœmia or a poor state of the blood with loss of strength, ear-ache, nervous affections, and in some few cases paralysis and disease of the kidneys. The kidneys are rarely implicated early in the disease, but when they are affected in or after a case of fever it is a symptom of the gravest importance. The reason that the kidneys generally escape in the early part of the disease is that the organs chiefly congested in malarial fever are those belonging to the portal system, such as the stomach, liver, and spleen. No injurious after effects are commonly experienced after a short attack of fever, however severe, but it is after a person has suffered repeatedly from the disease that the internal organs suffer from chronic congestion and hypertrophy.

26. The data necessary for the satisfactory pursuit of this inquiry are not yet available, and at present we are unable to prognosticate whether a given year will be one of fever prevalence or not. The data that we have are limited and imperfect. In the first place we require accurate returns of the mortality for a number of years, not only in this but in adjoining districts, for I consider this is a question affecting not only the Godavery District, but all this part of the country. We require, too, accurate records of the temperature, rainfall, and hygrometric conditions of the atmosphere in different parts of the district, and a record of the prevailing winds. This last item, I consider, very necessary, as it is believed the delta of the Godavery suffers most during a north or north-west wind. Next we should be acquainted with the geological features of this part of the coast, information which will, no doubt, be supplied before long by the Geographical Survey Department. It is not impossible but that some peculiar condition of the atmosphere, either attended with a deficiency of ozone, or some unusual electric condition, may be present before or during a severe epidemic of this disease.

27. Though the epidemic has now in a great measure subsided, the Civil authorities of the district should still be prepared to help the inhabitants when the disease recurs, and they should not relax in their efforts to inform the people how to prevent it, and how to deal with it when it does recur. The Inspector-General's circulars should be sent to *every* village in the district, and the Munsifs and Heads of villages should be directed, from time to time, to inform the inhabitants, with beat of tom-tom, of the nature of its contents, particularly impressing upon them to avoid starvation in fever, to clothe themselves warmly, and to apply for medicine. A small supply of quinine should be sent to all the chief villages, and the inhabitants of all villages should be informed of the nearest point where a supply can be obtained. I do not see what more can be done at present, but in time I hope to see competent practitioners disposed throughout the district.

28. Fever has not been so prevalent this cold season as in some former years. The cases have generally been of a mild type, and yielded readily to treatment. The deaths that have occurred are attributable to the treatment adopted by the natives rather than to the fever itself, the mortality from which would be small were it not for the pernicious system of starvation to which they are addicted, and I am still of opinion that some special steps, legal or otherwise, should be taken to put a stop to the practice.

29. In conclusion, I have to express my thanks to the Collector and Superintending Engineer of the District for the assistance they have afforded me while conducting this inquiry. Mr. Sullivan, the Officiating Collector, and, in his absence, Mr. K. Jaganathum Puntulu Garu, the Deputy Collector, have furnished me with returns and information with the greatest promptness, and it is owing to their assistance that I have been able to compile this report and the appendices much sooner than I could otherwise have expected. In the course of conversations on the subject Colonel Fischer has given me much valuable information, and, in addition to the assistance he has afforded me in an official capacity, I am also indebted to him for his kindness and private hospitality.

COCANADA,
February 6th, 1872.

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

No. 59-A. From Surgeon-Major W. R. CORNISH, F.R.C.S., Sanitary Commissioner for Madras, to the Secretary to Government, Fort St. George, dated Madras, 10th May 1872, No. 581.

No. 545 of 29th April 1872, Public Department.

I have the honour to acknowledge receipt of Proceedings of Government, as per margin, with enclosures.

Proceedings of the Madras Government, Public Department,
30th December 1872.

2. I will in the first place offer a few remarks on the report of Assistant-Surgeon Wright.

3. This document contains an account of the measures adopted by Mr. Wright and his assistants to carry out the intentions of Government in affording medical aid to the people of the Godavery District during the late season of fever prevalence. It describes the difficulties attending a special itinerating medical agency of this nature; the habits and prejudices of the people in regard to European notions of medical treatment; and the nature of the fever, which, in almost every cold season, is productive of great loss of life.

4. Mr. Wright's experience during the present year has confirmed the view which I advanced sometime ago, and which is borne out by the recorded death rates of the district, that the hilly and upland taluqs have had a higher fever mortality than the taluqs and estates subjected to irrigation.

During the past year, it is stated, the fever mortality in the delta (irrigated) taluqs was 5·9 per mille, while in the hilly and inland taluqs (non-irrigated) the death rate was 9·15 per mille.

5. I give below a table showing the deaths reported from fever in the several months of the year in each taluq, and the ratio of fever deaths to population, and from this it will be seen that the hilly districts of Ellore, Ernagudiem, Rajahmundry, and Peddapore have had the highest ratios of fever deaths :—

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Statement

DEATHS FROM FEVERS.

Months.	Hamaschendrapoor.	Amalapoor.	Nursapoor.	Undi.	Tanuku.	Ellore.	Yernegudiem.	Rajahmundry.	Peddapore.	Zemindaries.	Total.
January	144	137	53	31	143	121	253	78	119	221	1,100
February	77	71	46	40	66	77	73	26	78	136	699
March	67	106	44	33	95	82	52	47	51	109	586
April	83	91	50	19	65	52	71	25	52	94	502
May	50	82	62	18	56	55	63	43	47	107	583
June...	58	68	55	24	68	72	83	45	40	88	601
July	82	103	30	17	80	88	93	34	83	99	709
August	135	129	63	30	86	95	79	50	70	114	841
September	113	123	75	34	113	74	107	50	65	110	863
October	121	112	56	24	102	90	118	66	61	105	855
November	383	181	112	91	353	275	376	127	165	121	2,214
December	136	99	61	87	181	151	153	168	216	165	1,302
Total ...	1,439	1,301	707	398	1,408	1,232	1,521	754	1,047	1,499	11,756

RATIO PER 1000 OF POPULATION.

	Hamaschendrapoor.	Amalapoor.	Nursapoor.	Undi.	Tanuku.	Ellore.	Yernegudiem.	Rajahmundry.	Peddapore.	Zemindaries.	Total.
January	0·78	0·72	0·33	0·36	0·94	1·01	1·17	0·77	1·57	1·07	0·91
February	0·41	0·37	0·23	0·47	0·43	0·64	0·55	0·25	0·76	0·66	0·48
March	0·36	0·56	0·27	0·39	0·62	0·69	0·39	0·46	0·50	0·53	0·48
April	0·45	0·48	0·30	0·23	0·43	0·43	0·54	0·24	0·51	0·45	0·42
May	0·27	0 43	0·38	0·21	0·35	0·46	0·48	0·42	0·46	0·52	0·40
June...	0·31	0·35	0·34	0·28	0·44	0·60	0·63	0·44	0·39	0·43	0·42
July	0·44	0·54	0·18	0 20	0·53	0·73	0·71	0·33	0·81	0·38	0·40
August	0·67	0·68	0·39	0 35	0·56	0·80	0·60	0·49	0·68	0·55	0·53
September	0·61	0·64	0·46	0·40	0·74	0·62	0·82	0·49	0·73	0·53	0·60
October	0·65	0·59	0·34	0 28	0·67	0·75	0·90	0·05	0·60	0·51	0·59
November	2·08	0·95	0·69	1·03	2·38	1·47	2·88	1 25	1·62	0·73	1·55
December	0·73	0 52	0·37	0·44	1·19	1·27	1·17	1·61	2 13	0·80	0 95
Total ...	7·81	6 67	4·37	4·71	9 35	10·37	11·66	7·47	10·31	7·30	7·92

6. Mr. Wright's figures, taken from the vital statistics collected in the Revenue Department, are precisely the same as those rendered to myself for tabulation. The general truth, however, of these figures was confirmed during the late tour made by Mr. Wright and myself. We could find but little evidence of active malaria in the irrigated taluqs, while in the hilly taluqs of the interior we received uniform accounts of a greater prevalence of fever, though no one locality could be pointed out to us as peculiarily noticeable for fever. Owing to the low state of the river Godavery (in January) no steamers could run, and we could not, therefore, visit, as intended, the jungle tracts on the banks of the river.

Fever was generally active in the district in November and December, but not so prevalent and fatal as in 1869 and 1870 at the same season of the year.

There was no special appearance of malarial cachexia in the people. On the whole I should say that the delta population was a healthy race, judging from the personal physique of the men, women, and children. The fact that, notwithstanding the fatality of this seasonal fever and cholera epidemics, the population has increased by 10·2 per cent., since the census of 1867 is sufficient to show that the constitutions of the people are not permanently impaired by the fever. In permanently malarious localities the population becomes infertile.

No such calamity has fallen upon the people of the Godavery District.

7. Mr. Wright's remarks in regard to the nature of the fever, and the lamentable ignorance and superstition of the people in regard to the treatment of the disease, I fully concur in.

The fever I have satisfied myself is, in the main, a malarious intermittent, and easily cured by proper remedies; but readily aggravated into a fatal malady by neglect and improper treatment. The system of fasting, described by Mr. Wright, is universal in the Godavery District, and, to some extent, in the Kistna. It is, I imagine, approved of by the native doctors, in whom the people place more faith than they do in European practitioners; and, consequently, any endeavour made to discourage this method of treatment, while the indigenous practitioners of the country recommend it, I hold to be futile.

8. The real remedy seems to me, not the passing of a legislative act to render penal such a plan of treatment (for no law can compel people to eat and drink when they believe that eating and drinking is not good for them), but to endeavour to afford something like a proper education to the class of practitioners who are now the principal agents in maintaining so pernicious a system of practice.

9. The inquiry in regard to the influences of rainfall, great alterations of temperature, neglected drainage, water supply, and filthy villages, is not so complete as might be desired.

So far as the local rainfall may be regarded as a cause of fever, it may be remarked that, in the year 1868, when the north-east monsoon rains failed, the fever failed also in a great degree; while in 1871, when the north-east rains partially failed, the fever prevailed, but in a less degree than usual. In 1869 and 1870 there was no failure of the north-east rains, and no failure of fever. These connexions of rainfall and fever may be mere coincidences, but I think it may be assumed, from the experience of the past, that a moderate rainfall in October, in the Godavery District and the tract of country to the northward, is essential to the production of

the causes of fever in November and December. I append a diagram showing the rainfall and fever mortality in the irrigated and non-irrigated districts, separately, for a period of six years; and whoever will look at that diagram must see that the causes of fever are common to the whole district, whatever particular views may be entertained in reference to the influence of rainfall.

10. The observations on temperature relate only to a single station, Dowlaishweram, and here I have reason to think, from the mode of conducting the observations, the extreme diurnal ranges of temperature of the air are not clearly shown; I know practically that the daily range of temperature in the cold season in the Godavery District is considerable, and that the poorer classes who are inadequately housed, and if clothed at all, only with their cotton cloth, of necessity feel these sudden changes.

Mr. Wright points out, also, that, at this season of the year, the people are busy with the rice harvest, and that many of them sleep out in the fields with very inadequate protection from the heavy dews and chilly night air. His suggestion for the supply of warm clothing to the lock peons, &c., I fully endorse.

11. The water supply of most of the villages we visited in the delta was taken from wells, the people preferring well water to that from the canals; but in parts of the country where the subsoil water is brackish, the canal water (river water of the Godavery) is used. Two or more good wells of drinking water in every village where the subsoil water is drinkable (the wells masonry lined and protected by parapet walls and masonry platforms) would, I have no doubt, be appreciated by the people, if such works could be generally provided by Local Fund Boards.

12. The villages of the Godavery District are neither dirtier nor cleaner than villages in other parts of India. The houses are mostly mud-walled and thatched, and, as is usual with an agricultural people, cattle are brought into the yard enclosures every night for protection. The outskirts of all villages are tainted with fecal matter, but this condition is normal throughout India, and, on the whole, I cannot say that there is anything special in the local conditions of the people to account for their liability to fever in the cold months of the year.

13. There is one circumstance not alluded to by Wright that may perhaps have an influence in increasing the *mortality* of the population from fever. It is that a very large proportion of the population are habitual opium eaters. I am aware that the attention of Government has been directed to the consumption of opium in the Northern Districts of this Presidency, but Government, I imagine, have but a faint conception of the extent of the traffic, and of the general use of the drug by all classes. The Telugu people do not, like the Chinese, smoke opium, but swallow solid lumps of the drug; and those who habitually use it suffer from nervous depression and excitability when, by any circumstances, the supply of the drug is withheld. If during an attack of fever both food and drink and the daily pill of opium are prohibited, I can understand that the danger to life may be much augmented.

14. In the course of my tour I made a point of acquiring all the facts I could glean in regard to the consumption of opium, and with this view consulted a number of native officials and others. The Tahsildar of Rajahmundry estimated that opium

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to the value of two lakhs per annum (£20,000) was brought in the town, but not wholly for local consumption. At Ellore some very intelligent natives estimated that four-fifths of the men and three-fourths of the women were opium eaters, while it was stated that the habit was practised even by the children of the age of twelve and upwards. All agreed that the habit was a general one and common amongst all classes. In the Central Delta, in a village in the Amalapoor Taluq, Mr. Wright and myself walked through the place on a market day, and here we saw from six to eight persons engaged in the sale of opium, and I can testify to the fact that these individuals were doing a brisker trade than any of the people engaged in the sale of food and clothing.

15. The opium here was of two kinds—"Malwa" opium, sold in thin flat cakes weighing about two ounces each, and "Hyderabad" grown opium, a dark, nauseous odourred drug, in large, soft, lumps. The Malwa opium, I was assured, was most valued on account of its greater strength. The retail price of this drug was 4 Rupees weight of opium for 1 Rupee.

16. The opium traffic of this district lies chiefly with Hyderabad, and the greater part of it is brought down viâ Juggiapett. This Malwa opium, consumed in the Northern District, so far as I know, pays no duty to the British Government, and the habitual use of it, as a common stimulant, as witnessed with my own eyes in a part of the district but rarely visited by Europeans, I cannot but regard with grave anxiety in relation to the future material and moral progress of the people.

17. Every official and intelligent native I spoke to admitted the fact of opium eating being an almost universal practice. The theory is that opium keeps away fever and disease generally, and makes the people feel strong. I was assured by some respectable natives that they knew of instances of excess where a piece of opium, the size of a pigeon's egg, would be daily consumed; and, so far as I could make out, from five to ten grains of opium was considered a moderate daily allowance.

18. A boat peon who accompained me to Amalapoor showed me a small silver box full of opium, holding perhaps fifteen or twenty grains, and the next day the box was again shown empty. He informed me that he had used the whole in the interim, and unless he could procure more would get fever. As a matter of fact he did get some feverish excitement and wildness of manner for the two next days. This man suffered from internal organic disease, and commenced the habit of opium eating, by his own account, for the relief of pain.

19. I do not place these facts before Government with the view of recommending legislation on the subject of the opium traffic, although these facts, added to the information already in the possession of Government, are sufficient to show that the Indian Revenues must suffer considerably from the consumption of opium, on which no duty is paid; but merely with the view of showing that there are circumstances common to a large proportion of the population of the district which may render persons attacked with malarious fever what medical men call "bad subjects" for recovery.

20. The main facts collected by myself and Mr. Wright show that there is a special season of the year when fever may be expected to appear in the Godavery

District, and that this special prevalence is, at least, coincident with the setting in of the north-east monsoon winds and rain.

When the October rains are absent the fever is less marked, and when they prevail the fever prevails also; but there seems to be no definite connexion between the amount of rainfall and amount of fever. It is sufficient for the seasonal recurrence of fever that rain should fall all through the south-west monsoon and in October.

21. Mr. Wright's local inquiries further tend to confirm the fact, which I have elsewhere pointed out as of universal application, that the area of the district most peculiarly exposed to see air is the area in which the minimum of malarious diseases prevail.

22. The covering letter to Mr. Wright's report by Inspector-General Balfour, No. 115, of 15th April 1872, contains a suggestion for the employment of "an intelligent and conciliatory warrant medical officer to itinerate in the district, and to converse with and instruct the medical practitioners and villagers, inculcating a more rational dietic treatment."

23. As I have been over the district and have learnt, practically, some of the difficulties to be encountered in getting the people to take our medicines, and have witnessed the extraordinary tenacity with which they cling to their own notions about the cure of fever, I have no hesitation in saying that Inspector-General Balfour's suggestion is inadequate to the requirements of the case.

24. In the first place I must mention that the employment of warrant officers (East Indian or European) on such a service is distasteful to the people.

Of the four Apothecaries sent up last year not one, I believe, knew the language of the district, or was able to converse with the people without the aid of an interpreter. Caste prejudices, I may mention, are everywhere very strong in these Northern Districts, so that the employment of any but caste natives, acquainted with the language, in such a work as suggested by Mr. Balfour would be a grave mistake.

25. The various local officials I consulted on the subject expressed an opinion that the employment of warrant officers on such a duty was not consonant with the wishes of the people, and that the good accomplished by them was hardly worth the expenditure. The Local Funds Board have expressed their readiness to employ, at the least, one educated medical man (native) in each taluq, and are prepared to pay fair salaries to such men.

26. So long ago as 1867, Mr. Fraser, the Collector of the District, suggested that "ten or twelve lads should be brought into Rajahmundry to be instructed to such an extent in medicine, and the things appertaining to it, and simple surgery, as would make them homely and acceptable benefactors to their friends and neighbours."

According to Dr. W. Aitken, this plan would meet with the approbation of the people, and the Collector reported that, if necessary, the people were prepared to bear a tax for the support and instruction of such a class of pupils (*vide* Civil Department Reports, 1867). Notwithstanding the readiness of the people to have their own doctors taught, nothing has get been attempted to meet their expressed wishes.

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27. In addition to the objection to the employment of Eurasians on such a duty as proposed by Dr. Balfour, I would point to the actual experience of last year to show how little can be done by an itinerating staff when the whole population are more or less prostrated by fever. Mr. Wright and his assistants, in three months, constantly moving about, treated or supplied medicines to about 1300 persons, and it is obvious that a single man moving over so wide a country would have even less influence with the people than the special staff organized last year had. I need not say that the treatment of the sick by an itinerating agency is very unsatisfatory. Over and over again, when I accompanied Mr. Wright, he was applied to for medicines, not for the use of applicants, but for relatives who did not appear, and of whose diseases we had only the unsupported testimony of the applicants.

28. The truth is, the people of the Northern Districts are generally backward in education and intelligence. Caste feeling and caste prejudices have great influence over them, and they cling resolutely to old customs, be they good or evil. In regard to the more rational treatment of fever and other diseases it seems to me hopeless to expect any marked beneficial results until the education of the indigenous medical practitioners is insisted upon; and, in regard to this matter, I have earnestly to suggest that the Provincial Medical Schools, so long talked of, should be at once organized. In almost every district of this Presidency suitable employment already awaits competent medical men; but these medical men should, to succeed, be of the same country and class as the people themselves.

The raising of the standard of acquirements of the local medical practitioners must necessarily be a slow process; but it appears to me to be the only method of procedure that is really worthy of discussion. The condition of the population of the country in regard to epidemic diseases, and their lack of qualified medical aid, is now sufficiently known, and the time for action, I submit, has arrived, when the Government may fairly take measures for the regulation of the training of the medical practitioners of the country, and for the establishment of a public health department on a sound and practical basis.

29. In paragraph 12 of his letter, I observed that Inspector-General Balfour questions the correctness of certain conclusions arrived at by myself and Assistant-Surgeon Wright in regard to the effects of the north-east winds in producing the fevers of the Godavery District. It will be in the recollection of Government that recently a theory was broached that irrigation works, especially in the North-Western Provinces, had caused an increase of fever, and in regard to the Godavery District, Dr. Aitken, a very careful observer, so far supported the view that he noticed in 1867, that "fever seemed to be specially prevalent in the delta taluqs." If it had been proved that irrigation works caused unhealthiness of districts it is obvious that the action of Government in encouraging such works would have needed important modifications.

30. In my letter, No. 523, of 16th May 1870, in reviewing Dr. Sutherland's remarks on the influence of obstructed lines of drainage in causing fever, I took occasion to show that malaria was not usually the result of irrigation on the seaboard of the peninsula, whatever it might be elsewhere, and I adduced the instances of the Kistna, Nellore, Madras, Tanjore, and Tinnevelly Districts to show

that tracts of country open to the influences of sea air were remarkable, as a rule, for their low ratios of fever mortality. The Godavery District, I pointed out, was an exception to the general healthy condition of the irrigated seaboard, and it became, therefore, an important question to determine the special influences to which it was exposed.

31. On considering the geographical position of the Godavery District, it was evident that a large portion of that district, even of the irrigated delta, during the north-east monsoon winds, was exposed, not to sea influences, but to winds blowing over hundreds of miles of known malarious country; and, as the season of fever prevalence and the northerly winds entirely coincided, it seemed only reasonable to conclude that a miasm from the unhealthy country to the north might have been borne in upon the district during the prevalence of such winds.

32. That an atmosphere which has passed over a large tract of land acquires some taint from the earth is absolutely certain. It has been proved over and over again that the air of a land wind is often loaded with organic particles, while sea air and air on mountain tops is nearly or wholly free of impurity. Mr. Broughton recently made a most valuable experiment on this point, and he found that, while the rainfall of the south-west monsoon was almost wholly free of organic particles at Ootacamund, a collection of rain water in a storm coming from the north-east in the land wind season, *i.e.*, over a long tract of land, was laden with organic matter yielding ammonia. Now the rain in either case simply washes the atmosphere, and the observation, therefore, may be held to be universally true, that land winds contract impurity from the earth, while breezes from the ocean are nearly, if not quite, pure.

33. Government will see, I trust, that the observation I made in regard to influences from the sea was no theoretical view, but based entirely on actual facts observed, not only in the Godavery, but in all our seaboard districts.

34. Mr. Balfour makes use of the expression "horizontal diffusion or transportation of malaria," and says that my views in regard to such a mode of movement are not in accordance with the belief of other sanitary authorities. I would observe, in reply, that I have never made use of any expression that would imply that malaria is "horizontally" or "vertically" or "radially" distributed, and that if distribution by winds is meant, I am not aware of any sanitary authority who does not admit that malaria may be so transported or moved.

35. And in regard to the distances to which malaria may be so carried, Mr. Balfour would seem to lose sight of the fact that the hilly districts of the Godavery District actually suffer more than the irrigated delta, which is at a greater distance from the malarious tract of country to the north; and that the seasonal fever prevails, but to a lesser degree, in the Kistna District to the south, especially in the upland taluqs, proving thereby that the cause of the fever is a general and not merely a local cause.

The distance to which malaria may be carried by the atmosphere in an active state is not accurately known. The fever miasm is probably neutralised or destroyed partially by sea air, or by great dilution in the atmosphere, or by oxidation; and I have no doubt that there is a limit to the distance at which malaria may be active. It undoubtedly requires some favourable conditions of atmosphere

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and soil, such as obtain in the Godavery District from October to December or January, to be powerful away from the locality whence the miasm sprung.

36. Mr. Balfour argues that "as northerly winds have been traversing the district ever since the world assumed its present form," and "it is only in the last few years that fever epidemics have been prevailing in the Collectorate, the facts seem to militate against the theory of the winds being the carrying agents of the fever."

But in this explanation I may remark the "facts" are wholly assumed. We have no statistics of the death rate of the population prior to 1866. Ever since that year we have had to note a seasonal increment of fever, coinciding with the season of the north-east monsoon, and we have no right to assume that the people were healthy before 1866 just because no registration was carried on. As a matter of fact, we know that when the Mofussil Police was organized in 1860 the men of the force died in large numbers, especially in the hilly taluqs, from fever; and we infer that the population generally suffered in the same way.

During the year 1871, the deaths from fever in the Salem District are rather more than three times as great as they were in 1868, but if there had been no registry, no indication whatever would have been given of the southward progress of fever to this part of the country. The records of the Inspector-General's Office will show that the whole tract of the Northern Circars, especially away from the influence of the seaboard, has been liable to periodical increments of fever ever since we have had any knowledge of the country. In 1818, I think, the British Factory at Ganjam was abandoned on account of the deadly nature of the fever, and the experience of our troops in Orissa and Kimedy subsequently have pointed exactly to the conclusion I have advanced, that the hilly districts of the Northern Circars are periodically subjected to a malarial miasm in great activity. I need not refer more than incidentally to the comparatively recent experiment in establishing a sanitarium at Gallikonda in 1860-61 in which every individual, I believe, who resided on the spot suffered severely from fever.

37. Since my former remarks on the Godavery Fever were submitted to Government, I have been giving a good deal of attention to the subject of the distribution and movement of malaria. The subject is dealt with at some length in my Administration Report for 1871, and I may state briefly here that I have succeeded in tracing a great movement of malaria or fever miasm showing itself first in the northernmost of our districts, and extending slowly to the south.

This movement is now active and progressing in Salem, South Arcot, and districts to the southward, while there is evidence of a decline of fever in the north.

This movement, already extending over years, is evidently something apart from the mere seasonal accession of fever noticed in special localities, as in the Godavery District, in connexion with certain winds. The causes lie deep and hidden, and it would be premature at present to speculate on them.

It is quite possible that, in regard to such inquiries, I may not always be in accord with other sanitary authorities. The subject is one but little understood, and my object is to ascertain what is true, and not what other people have thought

to be true. Independent inquiry and legitimate deduction from ascertained facts should guide all sanitary investigation.

38. In paragraph 3 of Government Order I observe that the correctness of the mortuary registration of the Godavery District is questioned, as the total mortality of the district in 1871 is given as only 14·9 per mille. I think the low figure is to be explained in some measure by the absence of cholera, small-pox, and indeed every other form of disease, but fever. I have no reason to question the general accuracy of the death returns of this district; they are quite as good as those of other districts, but all alike fall short, I believe, in yielding the true death ratio; mainly, I think, from inattention in reporting deaths of children. I give in the margin the death ratios of the district for former years, and the variations are explainable, in a great measure, by the presence or absence of epidemic diseases. Thus, in 1870, the death ratio of this district was the highest of all, except the town of Madras, and it was accounted for by 13,305 persons being swept away by cholera; whereas, in 1871, the cholera deaths were only 204.

	Death ratio. Godavery District.
1866	31·7
1867	17·8
1868	14·4
1869	22·3
1870	27·1
1871	14·9

No. 60. ORDER THEREON, 30th December 1872, No. 1413.

With the first of the foregoing letters, the Inspector-General, Indian Medical Department, submits the further report of Assistant-Surgeon Wright of the result of his inquiries into the causes and nature of the fever which prevails in the Godavery District.

2. Mr. Wright commenced his inquiries in the latter part of October 1871, aided by four subordinate medical officers.

3. The number of cases personally treated by him and his staff to the end of January 1872 was 1370. Of these 93 were of remittent fever, 1037 of ague, and 240 cases of other kinds. Five of this number of patients died.

4. The deaths from fever, during six years, are stated to have been as follows:—

In 1866	9,562
,, 1867	13,882
,, 1868	8,262
,, 1869	17,180
,, 1870	12,654
,, 1871	11,309

The population is estimated at 1,427,464, and the death rate from fever in 1871, although not so large as in previous years, was 7·92 per mille, and from all causes 14·906 per mille.

5. Mr. Wright, having had full opportunity of observing the nature of the fever, is of opinion that the fever which prevailed in 1871-72 was "ague of a simple and uncomplicated kind." "It is possible," he writes, "that the type of fever may vary in different years, but I now suspect that I was wrong last year in stating that the fever which caused the greatest mortality was a remittent fever.

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I was led into this error from having seen some cases in which the fever was continuous, and the prostration extreme, but which I believe now to have been originally simple cases of ague in which the fever from neglect and pernicious treatment had become continuous."

6. Mr. Wright describes the course of fever in a native, and remarks that the first effect of the treatment usually pursued, of enforced abstinence from food, is certainly to diminish the fever, while at the same time it tends to render it continuous. In a few days the sufferers fall into a low typhoid condition, in which they gradually sink. He firmly believes that most of the mortality in the Godavery District, which is put down to fever, is not due to fever, but to the treatment of it. The disease yields readily to medical treatment, but the worst cases are those in which "starvation has been prescribed." The custom of starving fever patients has become common among the people, and has taken deep root among all classes. The fever in 1871-72 was not of a severe type and was readily amenable to treatment, and Assistant-Surgeon Wright had not heard of a single case of death where proper treatment was adopted; and he believes that, independent of any medical treatment, but with care and attention paid to the wants of the sufferers, few cases would terminate fatally. Mr. Wright states that the alleged causes of fever are very numerous, and that natives have various opinions on the subject. They are mainly bad drainage, bad drinking water, exposure to cold, night dews or wind, a heavy rainfall, excessive irrigation, and eating new rice.

7. The delta taluqs, which consist for the most part of irrigated land, showed less mortality from fever than the dry taluqs. During 1871 the mortality from fever in the former was 5·9 per mille, and in the latter 9·15 per mille. The inference drawn by Mr. Wright from this is that there is no evidence that artificial irrigation is productive of fever.

8. His inquiries as to the influence of rainfall induces him to believe that a light north-east monsoon is less likely to be followed by a period of severe fever than an ordinary or a heavy monsoon, but he does not think that the converse holds good.

9. In respect of the drainage and sanitary condition of the villages in the Godavery District, Mr. Wright remarks that in the dry weather there is, as a rule, nothing offensive; but in damp weather, and more particularly after a slight shower of rain, the smell, at times, is very offensive. He has not, however, been able to find that there is any relation between the prevalence of malarial fever and the insanitary condition of the villages where it prevails.

10. The water in most of the villages which Mr. Wright visited was, as far as he could judge, of good quality, and was derived from wells, tanks, and canals. In the delta water of excellent quality is supplied by the canals and irrigation channels, but the inhabitants frequently refuse to make use of it for drinking, preferring the water from wells and tanks. Though Mr. Wright has not been able to find any satisfactory evidence that an impure water supply is a cause of fever, he does not ignore the fact that it may become, at any time, a source of great danger to the public health, and believes that the cause of fever will, some day, be found to depend upon climatic conditions and local influences combined. The localities most exposed to winds blowing from the eastern ghauts are most

26. The Inspector-General, Indian Medical Department, will report whether arrangements can be made for supplying the Local Fund Boards in the Godavery District with properly educated native practitioners, and what rates of pay should be given to them.

(True Extract.)

Chief Secretary.

To the Inspector-General, Indian Medical Department.
,, Sanitary Commissioner.
,, Collector of the Godavery District.
,, ,, of Ganjam.
,, ,, of Vizagapatam.
,, Revenue Department.
,, Public Works Department.
,, President of the Municipal Commission, Godavery District.
,, ,, of the Local Fund Board, Godavery District.

Frd. J. Wright.

affected by fever, and the localities most exposed to the sea breezes are affected in a lesser degree. A large portion of the district lies to the south-west of the ghauts, and is consequently most exposed to the influences of the north-east monsoon, which blows through the Ganjam and Vizagapatam Districts, collecting the malarial poison and acquiring its noxious properties from the ghauts. But though there is every evidence that malarial fever is due to the presence of some poison, Mr. Wright is strongly of opinion that exposure to cold is one of its chief causes.

11. Mr. Wright found little or no evidence of general injury to the health of the inhabitants from malaria. The people looked strong and healthy, and not as if their constitutions were impaired by attacks of fever. He did not find enlargement of the spleen to be a very common sequelæ of the fever. Enlargement of the liver was chiefly met with in persons who had suffered repeatedly from the disease, and was more common in the neighbourhood of the hills than in the delta.

12. To admit of a more satisfactory investigation into the causes of the fever which prevails in the Godavery District, Mr. Wright considers it necessary that there should be obtained :—

(*a.*) Accurate returns of the mortality for a number of years in the Godavery and adjoining districts.

(*b.*) Accurate records of the temperature, rainfall, and hygrometric conditions of the atmosphere in different parts of the district, and a record of the prevailing winds.

(*c.*) Information regarding the geological features of the coast.

13. The Inspector-General, Indian Medical Department, recommends—

(*a.*) The deputation of an intelligent warrant medical officer to itinerate in the tract of country where the fever usually prevails, to instruct the village medical men and the villagers to adopt the use of a more rational dietetic treatment than they now pursue, indicating the vegetable medicines of the district to which, if unwilling to use quinine, they might have recourse.

(*b.*) The desirability of Municipal and Local Fund Boards establishing small dispensaries in certain central localities.

(*c.*) The Civil authorities to continue to distribute quinine throughout the district, and to circulate, annually, copies, in the vernacular, of the memorandum on the treatment of fever and the hygienic measures to be observed.

14. The information relative to the geological features of the coast desired by Mr. Wright is, the Inspector-General remarks, to be found in the works by Drs. Heyne, Voysey, and Benza.

15. The Sanitary Commissioner, to whom these papers were referred for any remarks he might have to offer, observes that fever was generally active in the district in November and December, but not so prevalent and fatal as in 1869 and 1870 at the same season of the year, and that, notwithstanding the fatality of the seasonal fever and cholera epidemics, the population had increased by 10·2 per cent. since the census of 1867.

16. Dr. Cornish is satisfied that the fever is, in the main, a malarious intermittent, and easily cured by proper remedies. The real remedy which suggests

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itself to him is to discourage the system of fasting, which is so universally adopted by the people, and approved of by the native doctors, in cases of fever, and to endeavour to give the class of practitioners, who are now the principal agents in maintaining so pernicious a system of practice, a suitable professional education.

17. Dr. Cornish thinks that it may be assumed from the experience of the past that a moderate rainfall in October in the Godavery District and the tract to the northward is essential to the production of the causes of fever in November and December. He endorses the suggestion of Assistant-Surgeon Wright that the lascars employed in the locks on the delta canals, who are up at all hours of the night and exposed to all weathers, should be supplied with warm clothing, and he recommends that two or more good wells of drinking water in every village, where the subsoil water is drinkable, should be provided.

18. In paragraphs 13 to 19, Dr. Cornish brings to notice the fact that a large proportion of the population of the Godavery District are habitual opium eaters, and that this may possibly have an influence in increasing the mortality from fever.

19. Dr. Cornish is averse to the proposed employment of a warrant medical Officer to itinerate in the district, as caste prejudices are very strong in the Northern Districts, and the various local officials whom he consulted on the subject were of opinion that the employment of warrant officers was not consonant with the wishes of the people. The Local Fund Boards, he states, are prepared to employ at least one educated native medical man in each taluq, and to pay such men fair salaries.

20. His Excellency the Governor in Council has read these papers with great interest, and desires again to record his appreciation of the ability with which Assistant-Surgeon Wright performed the duty entrusted to him.

21. The Collectors of the Godavery, Vizagapatam, and Ganjam Districts will be requested to obtain and furnish the Inspector-General, Indian Medical Department, with such returns of mortality as their records will supply. The Collector of the Godavery District will adopt measures for recording the temperature, rainfall, &c., in different parts of the district.

22. The desirability of establishing small dispensaries in certain central localities, and the sinking of wells in villages where the subsoil water is drinkable, will be referred to the Municipal and Local Fund Boards in the Godavery District, with the view to their taking such action in the matter as they may consider necessary.

23. The Collector of the Godavery District will attend to the suggestion for the distribution of quinine, and the circulation of the memorandum on the treatment of fever, &c.

24. He will submit his views on the remarks of the Sanitary Commissioner in respect to the extensive importation and use of opium amongst the inhabitants of the district.

25. The suggestion that the lascars employed at the locks on the canals in the delta should be supplied with warm clothing will be considered and disposed of in the Public Works Department.

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PUBLIC.

To ~~W. 86.~~

THE INSPECTOR-GENERAL,
INDIAN MEDICAL DEPARTMENT.,
&c., &c., &c.

Dated December, 30th.

Recd. Jany. 13th. Encl.

G. O., 30th December 1872, No. 1413.

DECEMBER.
Nos. 59-60.

Reviewing the further report of Assistant-Surgeon Wright of the result of his inquiries into the causes and nature of the fever which prevails in the Godavery District, and passing orders thereon.

No. 79.
Commd to the Board's Rec
12/1-73.

15 Jany '73.

7 Encls & 2 Dup Recd 20 Jany