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JUNE.

Inspection Notes.

Recording, with remarks, Sanitary Commissioner's — on the Masulipatam Municipality.

No. 165-7 W. dy 3rd July 1894.

Communicated to the Supdg. Engr. II Circle, who will report on the Suggestions regarding the drainage of the swamps, Grounds Masulipatam

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The houses are very poorly constructed of badly-burnt brick. They present usually a dilapidated condition, as a result of the action of damp absorbed from the sub-soil and the action of sea-air. It seems impossible to rely upon lime plaster adhering to a house for even short periods. Thus, the use of Portland cement, which is rarely to be seen in native houses elsewhere, is here very common. Indeed, the cement plastering of pyals and for a distance of about five feet from the ground of the outside of houses has become a matter of custom. Unfortunately, its use where it would be of more utility, namely, in the interior of houses, is not so frequently seen. The necessity for expenditure of this description proves that the houses are exceedingly damp, as might be expected from the proximity of the sub-soil water and the poor surface-water drainage of the town. The municipality should do their best under section 180, and by private influence, to render the adoption of a "damp-proof course" in dwellings a matter constantly attended to. By inserting a course of impervious material in the walls of buildings near the ground, it is possible to prevent the capillary attraction which enables the bricks of buildings to absorb moisture. It ought not to prove difficult to teach persons who have already found out for themselves the utility of Portland cement the value of damp-proof courses also. I show a diagram of what is intended. The impervious course might be made of asphalte, stone-slabs laid in cement, cement concrete, &c. The inhabitants also should be encouraged to use concrete for the floors, and where it can be afforded this should be rendered with cement.

Drainage.—I had excellent opportunities of judging of the condition of surface drainage. A heavy, but still not extraordinary, fall of rain had occurred—8·9 inches in the 24 hours. The result was, however, to transform the whole of the immediate surrounding of the town usually known as the "swamps" into seas of water as far as the eye could stretch. Nor were matters much better in the town itself. To get from a bungalow near the Protestant church to the town proper, I had to wade thigh-deep for nearly half-a-mile and, having got there, I found the town to be a series of islands. In any place but Masulipatam I fancy such a condition of affairs would have been considered as a little short of a disaster, but the inhabitants regarded matters with the utmost *sang froid*, and proceeded with their duties through the water as if it were a normal state of affairs. In fact, whenever a rapid fall of rain occurs, a state more or less approaching this *is* the normal condition of affairs.

There exist six outlet channels for surface drainage to the sea, but it is evident they are insufficient and should be increased in number or improved. Thus, granting the fall cannot be enhanced, the capacity might at least be made greater, and the flow in the period of time be increased by widening them. This might certainly be done, for example, in the case of the

Chairman's Remarks.

This is a good suggestion and the people must be encouraged to adopt it.

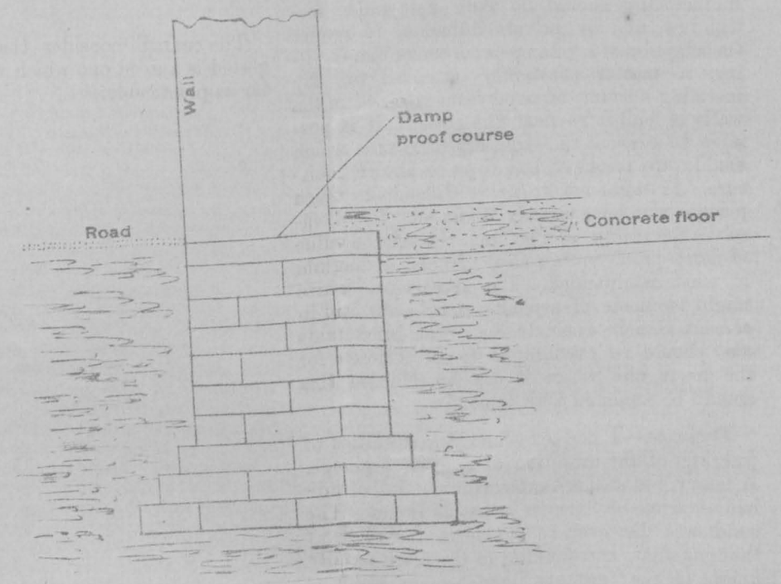
(Intld.) R. S.
Divl. Officer.

The council consider that the course suggested is a good one which will be adopted as far as practicable.

The drainage of the town is anything but satisfactory. A systematic enquiry will have to be made into the matter. As remarked by the Chairman, the Public Works Department should take steps to drain the swamps more rapidly.

(Intld.) R. S.

The drains terminate outside the town just where the swamps commence. The difference in fall is so small between the town and swamp that when the swamps are flooded the town is entirely water-clogged. If the Department of Public Works could be persuaded to arrange for a rapid drainage of the surrounding swamp the town would not suffer as it does during the heavy fall of rain of the north-east monsoon. It has been frequently noticed by me after heavy rains that the water in the swamps which receives the drainage of several miles of surrounding country works its way up the municipal drains into a part of the town.



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MASULIPATAM TOWN

Scale 4 Inches = 1 Mile

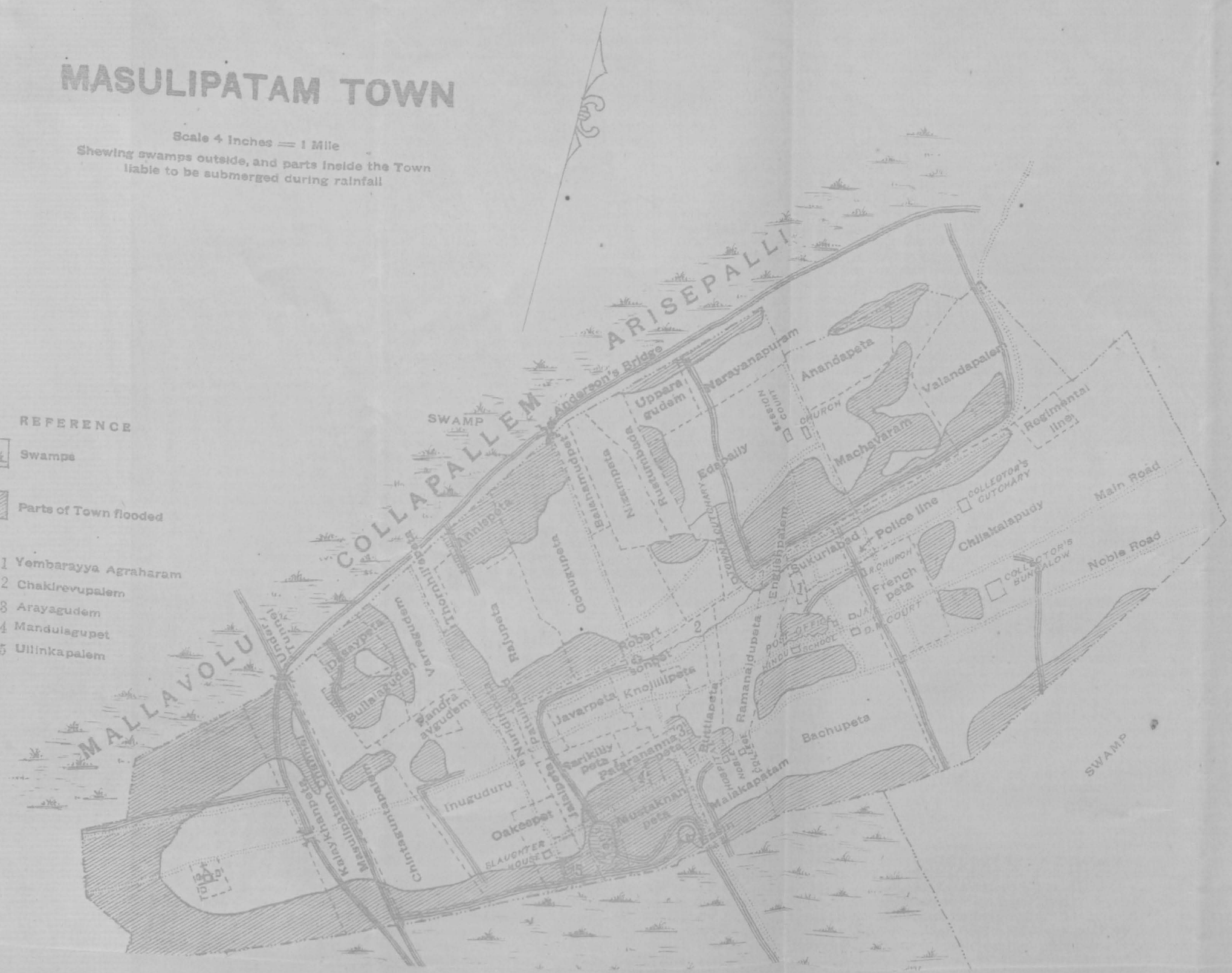
Shewing swamps outside, and parts inside the Town liable to be submerged during rainfall

REFERENCE

Swamps

Parts of Town flooded

1 Yembarayya Agraharam
2 Chakirevupalem
3 Arayagudem
4 Mandulagupet
5 Ullinkapalem



Inspection Notes.

outlet near the Cantonment road. Here, the so-called " Pleasure Park " was completely hidden by water, and dip wells—exposing the Kistna water-supply system—were filled with surface water flowing over the parapet walls. I would strongly advise that the whole question of drainage of this town and its surroundings be entered into. So far as I could ascertain no systematic enquiry has ever been made.

It is probable the Sanitary Engineer could devise measures for the relief of the town from the inconveniences and insanitary effects of floods of this character. Nor do I think efforts should stop here. As shown in the accompanying map, there is an immense area surrounding the town which is in a constant state of swamp. Judging by the fact that certain portions are in part of the year under cultivation, the land is of value,—the water in its interstices being apparently not contaminated with sea water. It seems to me that at least careful enquiry should be made as to how far these lands might not be reclaimed by the use of embankments and suitable drainage works on the methods successfully adopted in the fens of Lincolnshire and in Holland. In the former, various forms of water-lifts are used actuated by wind power, and the result has been, not only to secure much land for cultivation, but has rendered the country comparatively healthy by diminishing malaria. Although I can quite conceive such a work might require heavy sums for completion, it also seems to me that it is one that should not be dismissed without due enquiry and that in possessing in this district, where land is of such value, so large a tract, *there would be room for recovery in years to come of money laid out.*

Roads.—The roads of the town were not in good order, although certain of those recently repaired were pointed out which have been well executed. There has been in past years—and apparently this still continues—much encroachment by house-owners upon the streets. The consequence is that houses are found projecting at various angles instead of presenting a fairly uniform line; the roads not being provided with side-channels, except in rare instances, storm-water may run alongside the houses, say, for one or two hundred yards fairly evenly, when, meeting with a house at an angle, it may be suddenly projected into the middle of the road. The consequence is that the roadways are torn up at intervals. The absence of side-channels is probably due to the heavy cost of masonry in this locality; but from the manner in which the roads were destroyed, I should consider that the municipality would find it pay them, if they cannot afford to make side-channels, to alter projecting angles of houses by offering compensation or, at least, run round them small interrupted drains.

Sewage disposal.—There being no system of drainage of even the imperfect character usually found in municipal towns for leading

Chairman's Remarks.

The drainage of the swamps environing the town and consequently of the town itself is, I believe, seriously impeded by certain canal works in charge of the Public Works Department. I have addressed the Superintending Engineer on the subject.

(Signed) J. N. ATKINSON.

In this connection I respectfully beg that the Government would be pleased to depute the Sanitary Engineer to visit the town and favour the council with a complete scheme for the drainage of the town so that the council may see their way to allot funds for its completion in as short a time as circumstances permit.

The swamps around the town are not within the municipal limits, as will be seen from the notification of Government embodied in their Proceedings, No. 663, dated 3rd July 1866.

The drainage and improvement of the swamps is to be attended to by the Department of Public Works. Certain portions of the swamp have been brought under cultivation and a rich harvest is reaped yearly. The Revenue Department collect land-revenue and water-tax. The recommendations of the Sanitary Commissioner may be successfully carried out if Government be pleased to direct the Department of Public Works to look to the matter, and unless some measures are adopted to rapidly and thoroughly drain the surrounding swamps every attempt to drain the town itself would prove abortive.

Some of the roads are in a very bad condition. Steps must be taken to put them in order.

(Intld.) R. S.

This question of acquiring land to alter the projecting angles of houses will be settled when the drainage scheme is adopted by the council.

It should be no "question of acquiring land." The Sanitary Commissioner speaks of encroachments on streets. The council can easily stop these encroachments if it so wishes.

(Signed) J. N. ATKINSON.

Inspection Notes.

sewage water inside channels to outlets—albeit in most cases, unsuitable—it follows that practically the whole of the sewage of the inhabitants soaks in the soil of the site from year to year. There are reported to be 39 cesspools, of which the municipality removes daily the contents of 14.

Conservancy.—Arrangements for night-soil collection and removal are very far below the requirements of a population of 38,809; there being but 8 small masonry and 5 corrugated-iron latrines, and 5 carts. The masonry latrines are of a pattern that might well be improved upon, the surfaces being pervious and the space at choice of those using them being too great. I would advise that in cases where the latrines are out of repair, it would be well to rebuild the interiors, according to the standard designs of the Sanitary Board. Rubbish is collected in 33 corrugated-iron dust-bins, is removed in 18 bamboo basket carts and is conveyed to 6 rubbish depôts situated in the "swamps." These could only have been reached by the use of a boat at the time of my inspection. I, however, saw one near the slaughter-house which was duly provided with a cinerator that had evidently not been used for a very long period; nor, indeed, was it in a condition of repair that would enable it to be used successfully. It was evident that rubbish was simply cast here pell-mell, without any further thought as to disposal.

Night-soil depôts are also situated in the swamps, where it is said burial in trenches is duly carried out.

Private Scavenging.—The number of private latrines in the town has never been fully ascertained. They are, however, estimated at 1,000. As a matter of fact, the number of private latrines must fall not much short of the number of houses that happens to possess a patch of ground behind it. The municipality now undertakes the cleansing of 304 against 189 of last year, which is an improvement; there is, however, much room for further effort.

The results of efforts at Conservancy.—The number of public latrines and rubbish and night-soil carts being very much below requirements of the population, it follows that much organic matter is day by day left to accumulate upon the soil. Indeed, did not Masulipatam possess a soil capable of readily disposing of much filth, more marked evidence of want of sanitary care would result than the vital statistics exhibit. As an effect of the action of apparently low forms of animal life, fœcal matter within a few hours of deposit on the surface of the soil is disintegrated and, as far as appearances go, becomes an integral part of the soil. Large numbers of stray pigs also fulfil the duty of scavengers in certain parts of the town.

Chairman's Remarks.

I do not think the cinerators are used. All the rubbish depôts I have seen are as the Sanitary Commissioner describes this one.

(Signed) J. N. ATKINSON.

The council propose to entertain the following extra establishment at a cost of Rs. 4,000 in addition to Rs. 9,100 provided in the budget for 1894–95. The council are unable to do more for conservancy at present. They are aware that the proposals of the Sanitary Commissioner in this respect are to be adopted in full, but the financial condition of the municipality does not allow them to give effect to these proposals in their entirety.

The additional establishment will be as follows:—

6 carts for road-cleaning with 12 scavengers,
4 „ private scavenging with 8 toties,
4 „ cesspool-cleaning with 8 toties,

and 4 peons on Rs. 7 each.

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To effect removal of night-soil and urine, the municipality would require not less than 43 iron carts drawn by two bullocks, against 5 at present. For removal of rubbish, 34 carts would be required against 18 at present The state of backyards of dwellings is usually insanitary in the extreme, collections of human and animal fœcal matter and household rubbish being found at all points more or less in, I believe, the greater proportion of houses. Broken walls, ruined houses and excavations in which surface drainage and filth lodge, are frequent features. The municipality evidently has allowed the sections of the Act dealing with dwellings to fall in abeyance.

There is no demand for night-soil or rubbish as manure, and the sole transaction made by the municipality was in the past year, when Rs. 4–11–0 were realized. In a country such as that surrounding Masulipatam, there is not much likelihood of a demand being forthcoming for municipal refuse, the silt from the Kistna water brought by the canal being all that is required. It is, however, possible that agriculturists might be made to appreciate the ash left after incineration, but it is obvious that the present form of cinerator is next to useless. There are several forms of cinerators of expensive patterns in the market, but these it would be unnecessary for the municipality to employ until their conservancy organization was on such a footing as to render it worth while to have a large apparatus. Pending this—which, even if a loan was to be raised to meet it, should be the first question to engage the attention of the municipality — I think the "Silchar cinerator" may be advised for adoption. The clinker secured would be most useful for road-making in a town where metal is most costly.

Water-supply.—The water-supply is at present derived from the Masulipatam canal conveying Kistna water, and from wells. The latter are easily sunk; the sub-soil water being so close to the surface that 2½ to 3 feet of excavation is usually sufficient to strike water, and a depth of 6 feet to ensure permanence of supply throughout the hot weather. Unfortunately, no two wells are alike as to quality of water even when fairly close together. In one there may be brackish, in the other usable, water. The inhabitants have a *naïve* way of explaining the brackishness of the wells supply; they ascribe it to the effects of the sea-water imbibed by the land after the great cyclonic wave of 1864. Whilst this is not without some bearing on the subject and it is probable deposit of salts must have resulted here and there as the result of evaporation of water in the sub-soil by capillary attraction, the brackishness must result chiefly from the contamination of the sub-soil of the site by the excreta of human beings and animals during long period of occupation. The Kistna canal supply is introduced into the town by means of masonry conduits, which

Chairman's Remarks.

The total strength of the conservancy establishment will be as shown below:—

26 carts for road cleaning with 52 toties,
9 „ private scavengering with 18 toties,
5 „ cesspool cleaning with 10 toties,

with 5 inspectors and 4 peons to supervise their work.

Provision of Rs. 2,500 has been made in the budget for 1894–95 for the purchase of dust-bins and iron latrines.

Notices are being issued and prosecutions instituted for not having repaired dilapidated buildings.

Rubbish was sold for Rs. 21 during the current official year. For 1894–95 I have called for tenders. A Muhammadan has offered Rs. 30 for burnt ashes. I have been in correspondence with the Forest department for the disposal of night-soil.

The Forest department is going to trench the night-soil into one of its reserves. Practical proof of its value as a manure may probably cause a demand for it.

(Signed) J. N. ATKINSON.

I have called for a design and estimate of "Silchar cinerator," on receipt of which the matter will be laid before the council for their consideration.

Inspection Notes

serve dip-cisterns placed at the sides of the roads whence the inhabitants draw their water. The conduits are in anything but a water-tight condition. On my wishing to see the condition of the pipe, a portion of the ground covering it was excavated, but it was found impossible to view it without prolonged baling, as there was a heavy leak at the spot. There is no doubt this is the condition in the majority of the course of the conduits; indeed, it is stated that since the introduction of the Kistna water into the town, the wells in the sub-soil have been found not to be so brackish as formerly; evidently a result of percolation in the sub-soil on account of leakage from the conduits. Within 30 yards of this spot is a Mussalman graveyard (the Rajjutra). The fact of the conduit containing water, even if under pressure, would not prevent entrance from without of impurities on variation of the quantity of the contents, complete cessation of flow, sudden change of velocity of the current or of the direction of the conduit occurring. The spot examined by me is, however, not the only place where the contamination from graveyards is to be feared. Near the Cantonment high road, the main pipe passes direct through a Mussulman graveyard. It is evident that the passing of water through a graveyard in so imperfect a structure as the conduit here used is dangerous. Even holding in memory the fact that a new water-supply is looked for, the state of affairs here should have attention. The best course would be to divert the pipe; but if this be not feasible, an iron pipe should be employed in this portion, or, at least, the existing conduit should be surrounded with cement concrete, whichever happens to be the cheaper. But, possible contamination by no means ceases with these instances. It is evident with a conduit defective in structure and with open wells at intervals on its course, the contamination must be frequent both by addition from the impure sub-soil and by the more direct method of contamination by the use of foul chatties, ropes, &c. Nor is it solely within the town that the canal is subject to contamination. At its origin at Bezwada, it receives the drainage from that town and is much defiled by boat-passengers on the canal.

With no river at hand, with a canal subject to contamination and flowing but nine months in the year and a sub-soil containing chiefly brackish water, the question of supplying Masulipatam with a satisfactory public water-scheme presents much difficulty. The Sanitary Engineer, who has reported on the subject, has advised the making of a bored artesian well, and I believe apparatus will shortly be sent to the town for this purpose. The surroundings of Masulipatam do not present features that would encourage the hope that an artesian well—that is,a well freeing a body of water under sufficient pressure to deliver at the surface—is obtainable. Instead of the land having a gradual fall from the higher portion of the country and continuing with this gradient below the sea, where the fine deposit at the terminal ends of the confined

Chairman's Remarks.

It is proposed to divert the conduit here.

Inspection Notes.

strata might offer resistance to the exit of the subterranean water, there is here evidence of very small fall throughout and an unusually abrupt termination. Thus, I am indebted to the Port officer for the information that for 7 miles from the shore the depth is almost uniform and amounts to but a few feet, but at a distance of 21 miles a sudden dip occurs of 100 fathoms. Should a boring be made, therefore, in this area, it is quite possible a practically inexhaustible store of water may be struck; but it is extremely unlikely it will have any tendency to deliver at the surface, showing that the water is under pressure; although it is probable the water-level may assume that of the sea. The alluvial soil must here represent a huge sponge-like mass, with its interstices filled with water held at a definite level by sea pressure only. If there be a stratum composed of the typical two impervious layers enclosing between them a pervious stratum containing water, it is probable that they follow the same lines of dead evenness seen on the surface of the alluvial plain on the land side, which would again not favour the occurrence of confined streams under pressure. Masulipatam may, however, have the good luck to obtain abundance of water at a minimum of trouble in boring; but none but a prophet — and, then, only one who knows — would venture to predict the quality of the water that may be obtained. It may be good or so brackish as to be unusable. Seeing that the apparatus has not to be bought by the municipality, and that it is unlikely any difficulties will be encountered during boring, it is advisable the attempt be made. But if successful both as to quality and quantity, one deep well would not be enough for the total supply of the town, and hence some other action might be taken in the meantime. There are certain sandy tracts in and close to the town where it is said good water is obtained. These might be carefully explored by the staff which undertakes the sinking of the artesian well and the question be settled as to whether it would be possible to secure sufficient water of good quality by the method of driven wells joined together for pumping. The Sanitary Engineer before proposing the artesian well suggested exploring the swamps for drinking water. As the whole of the swamps were under water at the time of my visit, I could not judge of the character of the area; the idea is however, practically the same, and in neither case can the source suggested be regarded as good. Failing to get a satisfactory supply from either deep or driven wells, the only alternative is that the town should look for its supply to the canal. If this be the final result, it is to be hoped that a railway from Bezwada would have rendered boat traffic useless, and that Government would then be in a position to no longer license boats—it being impossible to secure the purity of the water so long as this traffic is permitted. As sedimentation and filtration and storage for a long period would be requisite, such a scheme would probably be very expensive.

In the meantime, such little good water as is obtainable in Masulipatam should be taken

Chairman's Remarks.

Nothing at present can be decided until the source from which the water-supply of this town is to be obtained is decided upon and the council are looking forward to early steps being taken in artesian well borings.

The well in question is situated in the compound of the District Munsif's Court. The

Inspection Notes.

care of. There is at least one well— that in the Munsif Court compound—which is said to yield good water, and is used by a very large number of natives and Europeans, who send for it from distant parts of the town. Yet, this is not provided with a parapet wall or basement, and when I saw it the surface water from the path, by which all sorts and conditions of bearers of water-vessels passed, was freely flowing into it. The well is but 6 feet deep in common with most of the wells; it would, therefore, cost very little to have it cleaned out; the pot rings might be substituted by the largest obtainable glazed sewer stoneware pipes, and a basement and parapet wall founded on concrete might be built round it. If these alterations approached Rs. 100 in cost, it would be better to place a hand-pump in the well after cleaning, and close it at the top.

The solitary well yielding good water in the village of Chilakalapudi is out of repair. It should be put into correct order with basement and drain complete. In the village of Gilakaladindi, there is no water that is drinkable. If the people could be persuaded to settle nearer the fort, it would be advisable for the municipality to purchase land and place it at their disposal. If not, the village might be supplied by a bullock-power pump from "driven" wells sunk near the canal, where there is a supply of good sub-soil water. Having been elevated to a cistern, the water could be forwarded by gravitation in a small—say, 2-inch—iron pipe to the village. This would by no means be an expensive procedure. In the fort, the chief source of supply is from the ditch, which has been arranged as a store for Kistna water. It is much silted up. I advise it be cleaned out, and that wells be sunk at the side of the tank. These should receive water from the ditch either by a passage or by a pipe. If a passage be formed, it could also by the deposit of filtering material be made to act as a filter. This also would not be an expensive measure.

Vegetable Market.—Robinson's Square is a well-built, open space almost in the centre of the town and an active place for trade. The place is disfigured by numerous huts of a temporary character, which are used by petty shopkeepers. Within the square is a large collection of stalls built of such material as bamboo-matting, that are used by sellers of vegetables. These places are let on contract by the municipality. I cannot help thinking the whole system is a mistake. None of these temporary buildings should be allowed in so good a locality. There ought to be no difficulty, with so great a demand for even this wretched character of accommodation, for the municipality to make a good market of its own and reap good profit from it.

Meat Market.—The meat is here sold on platforms having plain lime-plaster surfaces, much worn and broken. There is no water for flushing purposes on the site. The butchers use boxes saturated with prehistoric accumulations of juices from the meat, &c. Any water that is

Chairman's Remarks.

District Munsif has been furnished with an extract of these notes and has been requested to order the necessary repairs to be made to the well as suggested by the Sanitary Commissioner.

This well will be put in thorough repairs as suggested.

It is impossible to persuade the inhabitants of Gilakaladindi to settle down in the fort. But steps will be taken to supply drinking-water to the inhabitants of Gilakaladindi by pipes from a reservoir to be constructed near the canal at the fort as suggested as soon as funds will permit as the water will have to be conveyed about a mile-and-a-half before it can get to the village.

The ditch at the fort will be deepened this year and a well will be sunk near the bund deep enough to supply water during hot weather.

The council are aware that the square puts on an ugly appearance by numerous temporary sheds that have been allowed to be put up. But the council propose to supplement the 49 godowns now in existence in the square by an equal number. An estimate for this purpose is under preparation. With the materials of the old stalls at Oakespeta, the council hope that about 50 stalls may be built with no great expense. Until a market on a recognised plan is constructed, the council feel that a very elaborate establishment would be required to make daily collections of fees in market.

The proposals of the Sanitary Commissioner with regard to the meat market will be carried out as far as practicable.

Blocks of wood are used for cutting the meat and the boxes are used only to sit upon and are not used for any other purpose.

Inspection Notes.

used must be brought from a distance, there being no arrangements for flushing water on the spot. Small Cuddapah slabs, polished, should be used in lieu of the boxes; the lime plaster should be substituted by cement plaster. As to Cuddapah slabs, I believe, the same description of stone is obtainable near Bezwada, as the new cutcherry floor there is being made of it.

Vaccination.—The calf vaccine station is within the hospital compound. The building is out of repair and is unsuitable, in that the flooring is made of rammed earth. This should be rendered impervious by the use of concrete and cement plaster, or by smooth stone pointed with cement. Stalls with shallow drains, just sufficiently large to allow of the calf laying down, should be built. In consequence of the rough accommodation available, continuous cultivation of lymph has at intervals become impossible; the "stock" has degenerated and ultimately faded out, rendering renewal from elsewhere imperative. The work is conducted by 1st-class Vaccinator Brahmayya. Examination of two pyal schools showed that of 44 present, 20 were vaccinated, 12 had had small-pox, and 12 were unprotected.

The following shows the results of the vaccinator's work during the previous and current years up to date:—

Chairman's Remarks.

The floor of the vaccination shed will be repaired as suggested. The council are under the impression that the system of vaccination now in force is a tentative one. If this system is to continue for a number of years, the council consider it advisable to put up a pucka shed with stalls for calves.

—	1889.	1890.	1891.	1892.	1893 up to end of October.
Number vaccinated	1,302	1,686	1,776	3,946	2,465
,, ,, successfully	1,219	1,608	1,510	3,784	2,384
,, ,, under one year of age	97	197	216	905	812
,, verified by inspecting officer	324	197	Information not available.		
Births	1,018	1,324	1,071	1,111	802

Registration.—This is conducted by two registrars. Attendance of the certifying parties at the office is insisted upon. A good system is pursued of placing in public positions notices drawing the attention of the public to the fact that registration of births and deaths is compulsory. The following statistics were secured during the current year up to date, and are here compared with results of previous years:—

No remarks.

—	1888.	1889.	1891.	1892.	1893 up to October.
Deaths from—					
Cholera	25	5	113	3	79
Small-pox	..	45	189	2	2
Fevers	113	208	79	247	163
Dysentery and diarrhœa	1	39	33	77	60
Other causes	566	637	637	710	607
Total	705	934	1,051	1,039	911
Death-rate per mille per annum	(a) 20·1 (b) 18·4	26·6 24·1	27·1 26·9	26·7 26·3	28·1 27·4
Births	1,018	1,324	1,071	1,111	802
Birth-rate per mille per annum	(a) 29·0 (b) 26·5	37·8 34·2	27·6 27·4	28·6 28·1	24·8 24·2

(a) Calculated on the census population of 1891. (b) Calculated on the estimated population.

Inspection Notes.

Sanitary Administration.—The municipality would, I think, do well to consider whether their system of handing the majority of the executive work to contractors might not be modified with advantage to the municipality. Thus, as to conservancy which is conducted solely by contract, whilst it certainly is a matter of convenience in most towns to secure the constant supply of the desired number of bullocks, when the municipality then proceeds to arrange that the actual work of cleansing shall be effected on this system, I think it abdicates its correct position with respect to the tax-prayers. It stands to reason that the contractor must make a profit out of the arrangement, and that even if the number of men employed be laid down in the terms, by procuring under-aged, old and feeble persons, instead of stalwart coolies, to perform the work, it may be executed perfunctorily, penal clauses notwithstanding. The correct conservancy of a town is so important a part of the functions of a municipality, that cleansing should, I think, be performed by its personal staff. In the matter of the market also, I consider the contract system in this instance must represent a losing concern to the municipality, and believe by taking the matter into their hands and erecting a suitable market a fair addition to their income might be obtained. In the matter of encroachments, which are very common, the Chairman has brought to notice that much delay would be prevented were it not contended by the council that notice to stay an obstruction can only legally be issued with their consent. The delay in obtaining this in the first place, in their giving the required thirty days' notice, and, lastly, in bringing the case up for prosecution, wastes much valuable time. Again in the matter of filthy compounds, in which Masulipatam abounds, it is contended by the Bench Magistrates that the Chairman has no right *to issue notices* to the persons concerned for the removal of noxious vegetation, &c., and that this course can only be legally taken by the council at a general meeting. As a result of this opinion four of the Bench Magistrates being councillors also, the Chairman's action in giving notices in 80 cases was disapproved, and their attempted prosecution disallowed by these magistrates. Under these circumstances, it is not to be wondered at that any attempt on the part of the executive to remind the inhabitants of the desirability of obeying the sanitary clauses of the Act should receive scant attention, seeing that they are aware that each case must be brought before the council to be dealt with; and yet the Madras District Municipalities Act declares that in the Chairman is "vested the entire executive power of the municipal council," and that he is "directly responsible for the due fulfilment of the purposes of the Act." With these points I have only an interest in so far as sanitary advance is affected; with the legal maze possible as an outcome of their consideration I have no concern. I am, however, certain that the raising of such trivial technicalities, which

Chairman's Remarks.

The council cannot do away now with the contract of scavengers for reasons stated in paragraph 103 of my letter, No. 343, dated 18th July 1893, embodied in G.O., No. 1355 M., dated 6th October 1893, the administration report for 1892–93. But I have persuaded the contractors to give up their contract before their term is over. As soon as Government sanctions the establishment now sanctioned by the council, I propose to get Yanadies from Nellore as a set-off against the present class of people so that sanitation may not suffer if they take it into their heads to strike work when pressure is brought to bear upon them. Had it not been for the contract system, it would not have been possible to make them work properly. The scavengers as a class are very independent and troublesome and no other people are available to replace them.

The council have since given the Chairman power under sections Nos. 156, 166, 167, 176, 183, 184, 185, 186, 207, 219, 228 and 274 to issue notices.

Inspection Notes.

are not heard of elsewhere, must impede seriously the progress of sanitation in Masulipatam, and I would advise the municipal council to do their utmost to meet the attempts of the Chairman to enforce "due fulfilment of the purposes of the Act." For example, it seems to me if their consent in each case is requisite legally, the proper course for the council to pursue rather than let sanitary efforts lag, is to hold their meetings at such frequent intervals that no delay in such matters could be possible. Thus, although doubtless at a personal sacrifice of time, it would be feasible to achieve the desired results without hindrance by reason of legal difficulties which have been discovered by councillors when exercising their function of Bench Magistrates.

Care should be exercised in not allowing the better neighbourhoods to be filled up by inferior buildings. An example of this is seen on the Cantonment high road, where a settlement of chucklers has been allowed.

(Signed) W. G. KING, Surgeon-Major,
Ag. Sanitary Commissioner.

Chairman's Remarks.

There are a great many of these little colonies that have been allowed to spring up amongst the respectable houses which, if removed, would greatly improve the sanitation as well as the appearance of the town. Steps will be taken to gradually remove them.

(Signed) J. W. MAIDEN,
Chairman, M.C., Masulipatam.

Proceedings of the Masulipatam Municipal Council passed at a meeting held on Saturday, the 10th March 1894.

* * * * * * * * *

1. Read Sanitary Commissioner's Inspection notes on the Masulipatam Municipality for 1893–94.

Resolution.—The different points referred to by the Sanitary Commissioner have been considered and will be carried out as far as practicable and as far as funds will allow.

* * * * * * * * *

Dis. No. 1364.

Forwarded to the Collector for submission to Government.

(Signed) R. SURIA RAO NAYUDU,
Deputy Collector.

Masulipatam,
2*nd April* 1894.

Forwarded.

(Signed) J. N. ATKINSON,
Collector.

Masulipatam,
11*th April* 1894.

Order—dated 8th June 1894, No. 727 M., Local and Municipal.

Recorded with the following remarks:—

(1) The attention of the Public Works Department will be drawn to the suggestions of the Sanitary Commissioner regarding the drainage of the swamps round the town and to the remarks of the Chairman and the Collector with reference to the same question.

(2) The Sanitary Engineer should visit Masulipatam as soon as his other engagements permit and should institute a full enquiry into the question of supplying the town with a system of drainage, reporting the result to Government. His attention will be called to Dr. King's remarks regarding this subject and the water-supply question.

(3) The Municipal Council's special attention will be drawn to the observations of the Sanitary Commissioner and the Collector on the subject of encroachments in public streets and the disposal of the town rubbish. The action which it proposes to take in these matters should be reported.

(4) A proposition statement in the prescribed form for the entertainment of the additional conservancy establishment referred to in the Chairman's remarks should be submitted.

(5) Now that the Council has authorized the Chairman to issue notices under the Act, he should use every endeavour to improve the sanitary condition of the back-yards in the town. Systematic prosecution of the owners of filthy premises is certain to produce an increased resort to the services of the municipal private scavengers.

(6) The Council will be requested to report what it means by stating that the "system of vaccination now in force is a tentative one."

(7) The paragraphs in the Sanitary Commissioner's inspection notes should have been numbered.

(True Extract.)

J. F. PRICE,
Chief Secretary.

To the Chairman, Municipal Council, Masulipatam.
" Collector of Kistna.
" Sanitary Commissioner.
" Sanitary Engineer.
" Public Works Department.
Editors' Table.

Exd. J. Moses.

16—8—16.

Govt. of {1894} Madras.

LOCAL AND MUNICIPAL.

Issued

Recd. 9/7 Encl.

G.O., 8th June 1894, No. 727 M.

JUNE.

Inspection Notes.

Recording, with remarks, Sanitary Commissioner's — on the Masulipatam Municipality.

Rs: 1657/16 dy 3d July 1894.

Communicated to the Suptg: Engineer II Circle who will report on the suggestions regarding the drainage of the Swamps round Masulipatam.

(Sd) J. P. W.

S. E. II Circle
Ch. E. for Insp.

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

READ—the following paper:—

From J. W. MAIDEN, Esq., Chairman, Municipal Council, Masulipatam, to the Chief Secretary to Government (through the Divisional officer, Kistna), dated 28th March 1894, No. 990.

I have the honour to forward herewith the inspection notes of the Sanitary Commissioner for Madras on this municipality for 1893–94 with my remarks thereon for such orders of Government as they deem necessary.

2. A copy of the municipal council's resolution, No. 1, dated 10th March 1894, referring to these notes, is enclosed.

ENCLOSURES.

INSPECTION Notes of the Sanitary Commissioner for Madras.

KISTNA DISTRICT.

MASULIPATAM MUNICIPALITY.

Inspected 8th, 9th and 10th November 1893.

		Males.	Females.	Total.
Population per census of	1881	16,831	18,225	35,056
	1891	18,601	20,208	38,809

Inspection Notes.	Chairman's Remarks.
The town is situated upon the flat, alluvial plain formed by the Kistna, which stretches at this point several miles below the sea, with so small a gradient that ships have to anchor off the port at a distance of nearly seven miles. With this statement as to the physical condition of the site, it is a foregone conclusion that difficulty must exist as to surface and subsoil drainage of the town. The fluctuation of the latter is from 3 feet to 6 feet in the best parts of the town, and from 6 feet to the surface in those less fortunate. This condition of affairs has long rendered Masulipatam one of the places notorious for the existence of beriberi and rheumatic affections amongst its inhabitants.	Yes.

Inspection Notes.

The houses are very poorly constructed of badly-burnt brick. They present usually a dilapidated condition, as a result of the action of damp absorbed from the sub-soil and the action of sea-air. It seems impossible to rely upon lime plaster adhering to a house for even short periods. Thus, the use of Portland cement, which is rarely to be seen in native houses elsewhere, is here very common. Indeed, the cement plastering of pyals and for a distance of about five feet from the ground of the outside of houses has become a matter of custom. Unfortunately, its use where it would be of more utility, namely, in the interior of houses, is not so frequently seen. The necessity for expenditure of this description proves that the houses are exceedingly damp, as might be expected from the proximity of the sub-soil water and the poor surface-water drainage of the town. The municipality should do their best under section 180, and by private influence, to render the adoption of a "damp-proof course" in dwellings a matter constantly attended to. By inserting a course of impervious material in the walls of buildings near the ground, it is possible to prevent the capillary attraction which enables the bricks of buildings to absorb moisture. It ought not to prove difficult to teach persons who have already found out for themselves the utility of Portland cement the value of damp-proof courses also. I show a diagram of what is intended. The impervious course might be made of asphalte, stone-slabs laid in cement, cement concrete, &c. The inhabitants also should be encouraged to use concrete for the floors, and where it can be afforded this should be rendered with cement.

Drainage.—I had excellent opportunities of judging of the condition of surface drainage. A heavy, but still not extraordinary, fall of rain had occurred—8·9 inches in the 24 hours. The result was, however, to transform the whole of the immediate surrounding of the town usually known as the "swamps" into seas of water as far as the eye could stretch. Nor were matters much better in the town itself. To get from a bungalow near the Protestant church to the town proper, I had to wade thigh-deep for nearly half-a-mile and, having got there, I found the town to be a series of islands. In any place but Masulipatam I fancy such a condition of affairs would have been considered as a little short of a disaster, but the inhabitants regarded matters with the utmost *sang froid*, and proceeded with their duties through the water as if it were a normal state of affairs. In fact, whenever a rapid fall of rain occurs, a state more or less approaching this *is* the normal condition of affairs.

There exist six outlet channels for surface drainage to the sea, but it is evident they are insufficient and should be increased in number or improved. Thus, granting the fall cannot be enhanced, the capacity might at least be made greater, and the flow in the period of time be increased by widening them. This might certainly be done, for example, in the case of the

Chairman's Remarks.

—

This is a good suggestion and the people must be encouraged to adopt it.

(Intld.) R. S.
Divl. Officer.

—

The council consider that the cour
gested is a good one which will be adop
far as practicable.

—

The drainage of the town is anything but satisfactory. A systematic enquiry will have to be made into the matter. As remarked by the Chairman, the Public Works Department should take steps to drain the swamps more rapidly.

(Intld.) R. S.

—

The drains terminate outside the town just where the swamps commence. The difference in fall is so small between the town and swamp that when the swamps are flooded the town is entirely water-clogged. If the Department of Public Works could be persuaded to arrange for a rapid drainage of the surrounding swamp the town would not suffer as it does during the heavy fall of rain of the north-east monsoon. It has been frequently noticed by me after heavy rains that the water in the swamps which receives the drainage of several miles of surrounding country works its way up the municipal drains into a part of the town.

MASULIPATAM TOWN

Scale 4 Inches = 1 Mile

Shewing swamps outside, and parts inside the Town liable to be submerged during rainfall

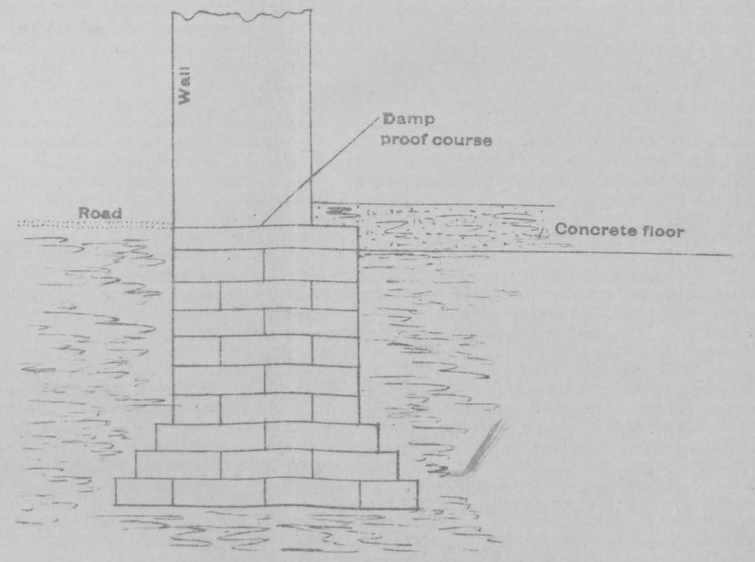
REFERENCE

Swamps

Parts of Town flooded

1 Yembarayya Agraharam
2 Chakirevupalem
3 Arayagudem
4 Mandulagupet
5 Ullinkapalem

COLLAPALLEM
ARISEPALLI
MALLAVOLU
RAVAPALEM
BAY OF BENGAL
SWAMP
Anderson's Bridge
Uppara gudem
Narsanapuram
Anandapeta
Valandapalem
Machavaram
Eddapally
Ellore Road
Regimental line
Police line
Sukurlabad
French peta
Chilakalapudy
Main Road
Noble Road
Collector's Cutchary
Collector's Bungalow
Church
Court
Post Office
Dispensary
Jail
Enclosure
Annlepeta
Nizampeta
Rustumbada
Balaramudupeta
Coduvupeta
Rajupeta
Thotinnilapeta
Vaisyagudem
Dasaypeta
Bullaiyavdem
Pandra yavdem
Nunchipeta
Javarpeta
Knojjilipeta
Sarkilly peta
Pallaranna peta
Ruttlapeta
Ramanaidupeta
Bachupeta
Malakapalam
Mustaknan peta
Inuguduru
Oakespet
Slaughter House
Chintagunta bund
Masulipatam Canal
Kalavakalanka Canal
Tidal
Swamp
Fort
T. Lock
Weir
EMBANKMENT
Garaldibba
Gilakalad dindy



Reg : No. 1452 Copies 105

Zinco., Survey, Office, Madras.
1894

Inspection Notes.

outlet near the Cantonment road. Here, the so-called "Pleasure Park" was completely hidden by water, and dip wells—exposing the Kistna water-supply system—were filled with surface water flowing over the parapet walls. I would strongly advise that the whole question of drainage of this town and its surroundings be entered into. So far as I could ascertain no systematic enquiry has ever been made.

It is probable the Sanitary Engineer could devise measures for the relief of the town from the inconveniences and insanitary effects of floods of this character. Nor do I think efforts should stop here. As shown in the accompanying map, there is an immense area surrounding the town which is in a constant state of swamp. Judging by the fact that certain portions are in part of the year under cultivation, the land is of value,—the water in its interstices being apparently not contaminated with sea water. It seems to me that at least careful enquiry should be made as to how far these lands might not be reclaimed by the use of embankments and suitable drainage works on the methods successfully adopted in the fens of Lincolnshire and in Holland. In the former, various forms of water-lifts are used actuated by wind power, and the result has been, not only to secure much land for cultivation, but has rendered the country comparatively healthy by diminishing malaria. Although I can quite conceive such a work might require heavy sums for completion, it also seems to me that it is one that should not be dismissed without due enquiry and that in possessing in this district, where land is of such value, so large a tract, *there would be room for recovery in years to come of money laid out.*

Roads.—The roads of the town were not in good order, although certain of those recently repaired were pointed out which have been well executed. There has been in past years—and apparently this still continues—much encroachment by house-owners upon the streets. The consequence is that houses are found projecting at various angles instead of presenting a fairly uniform line; the roads not being provided with side-channels, except in rare instances, storm-water may run alongside the houses, say, for one or two hundred yards fairly evenly, when, meeting with a house at an angle, it may be suddenly projected into the middle of the road. The consequence is that the roadways are torn up at intervals. The absence of side-channels is probably due to the heavy cost of masonry in this locality; but from the manner in which the roads were destroyed, I should consider that the municipality would find it pay them, if they cannot afford to make side-channels, to alter projecting angles of houses by offering compensation or, at least, run round them small interrupted drains.

Sewage disposal.—There being no system of drainage of even the imperfect character usually found in municipal towns for leading

Chairman's Remarks.

The drainage of the swamps environing the town and consequently of the town itself is, I believe, seriously impeded by certain canal works in charge of the Public Works Department. I have addressed the Superintending Engineer on the subject.

(Signed) J. N. ATKINSON.

In this connection I respectfully beg that the Government would be pleased to depute the Sanitary Engineer to visit the town and favour the council with a complete scheme for the drainage of the town so that the council may see their way to allot funds for its completion in as short a time as circumstances permit.

The swamps around the town are not within the municipal limits, as will be seen from the notification of Government embodied in their Proceedings, No. 663, dated 3rd July 1866.

The drainage and improvement of the swamps is to be attended to by the Department of Public Works. Certain portions of the swamp have been brought under cultivation and a rich harvest is reaped yearly. The Revenue Department collect land-revenue and water-tax. The recommendations of the Sanitary Commissioner may be successfully carried out if Government be pleased to direct the Department of Public Works to look to the matter, and unless some measures are adopted to rapidly and thoroughly drain the surrounding swamps every attempt to drain the town itself would prove abortive.

Some of the roads are in a very bad condition. Steps must be taken to put them in order.

(Intld.) R. S.

This question of acquiring land to alter the projecting angles of houses will be settled when the drainage scheme is adopted by the council.

It should be no "question of acquiring land." The Sanitary Commissioner speaks of encroachments on streets. The council can easily stop these encroachments if it so wishes.

(Signed) J. N. ATKINSON.

Inspection Notes.

sewage water inside channels to outlets—albeit in most cases, unsuitable—it follows that practically the whole of the sewage of the inhabitants soaks in the soil of the site from year to year. There are reported to be 39 cesspools, of which the municipality removes daily the contents of 14.

Conservancy.—Arrangements for night-soil collection and removal are very far below the requirements of a population of 38,809; there being but 8 small masonry and 5 corrugated-iron latrines, and 5 carts. The masonry latrines are of a pattern that might well be improved upon, the surfaces being pervious and the space at choice of those using them being too great. I would advise that in cases where the latrines are out of repair, it would be well to rebuild the interiors, according to the standard designs of the Sanitary Board. Rubbish is collected in 33 corrugated-iron dust-bins, is removed in 18 bamboo basket carts and is conveyed to 6 rubbish depôts situated in the "swamps." These could only have been reached by the use of a boat at the time of my inspection. I, however, saw one near the slaughter-house which was duly provided with a cinerator that had evidently not been used for a very long period; nor, indeed, was it in a condition of repair that would enable it to be used successfully. It was evident that rubbish was simply cast here pell-mell, without any further thought as to disposal.

Night-soil depôts are also situated in the swamps, where it is said burial in trenches is duly carried out.

Private Scavenging.—The number of private latrines in the town has never been fully ascertained. They are, however, estimated at 1,000. As a matter of fact, the number of private latrines must fall not much short of the number of houses that happens to possess a patch of ground behind it. The municipality now undertakes the cleansing of 304 against 189 of last year, which is an improvement; there is, however, much room for further effort.

The results of efforts at Conservancy.—The number of public latrines and rubbish and night-soil carts being very much below requirements of the population, it follows that much organic matter is day by day left to accumulate upon the soil. Indeed, did not Masulipatam possess a soil capable of readily disposing of much filth, more marked evidence of want of sanitary care would result than the vital statistics exhibit. As an effect of the action of apparently low forms of animal life, fœcal matter within a few hours of deposit on the surface of the soil is disintegrated and, as far as appearances go, becomes an integral part of the soil. Large numbers of stray pigs also fulfil the duty of scavengers in certain parts of the town.

Chairman's Remarks.

I do not think the cinerators are used. All the rubbish depôts I have seen are as the Sanitary Commissioner describes this one.

(Signed) J. N. ATKINSON.

The council propose to entertain the following extra establishment at a cost of Rs. 4,000 in addition to Rs. 9,100 provided in the budget for 1894–95. The council are unable to do more for conservancy at present. They are aware that the proposals of the Sanitary Commissioner in this respect are to be adopted in full, but the financial condition of the municipality does not allow them to give effect to these proposals in their entirety.

The additional establishment will be as follows:—

6 carts for road-cleaning with 12 scavengers,
4 „ private scavenging with 8 toties,
4 „ cesspool-cleaning with 8 toties,

and 4 peons on Rs. 7 each.

Inspection Notes.

To effect removal of night-soil and urine, the municipality would require not less than 43 iron carts drawn by two bullocks, against 5 at present. For removal of rubbish, 34 carts would be required against 18 at present. The state of backyards of dwellings is usually insanitary in the extreme, collections of human and animal fœcal matter and household rubbish being found at all points more or less in, I believe, the greater proportion of houses. Broken walls, ruined houses and excavations in which surface drainage and filth lodge, are frequent features. The municipality evidently has allowed the sections of the Act dealing with dwellings to fall in abeyance.

There is no demand for night-soil or rubbish as manure, and the sole transaction made by the municipality was in the past year, when Rs. 4–11–0 were realized. In a country such as that surrounding Masulipatam, there is not much likelihood of a demand being forthcoming for municipal refuse, the silt from the Kistna water brought by the canal being all that is required. It is, however, possible that agriculturists might be made to appreciate the ash left after incineration, but it is obvious that the present form of cinerator is next to useless. There are several forms of cinerators of expensive patterns in the market, but these it would be unnecessary for the municipality to employ until their conservancy organization was on such a footing as to render it worth while to have a large apparatus. Pending this—which, even if a loan was to be raised to meet it, should be the first question to engage the attention of the municipality — I think the "Silchar cinerator" may be advised for adoption. The clinker secured would be most useful for road-making in a town where metal is most costly.

Water-supply.—The water-supply is at present derived from the Masulipatam canal conveying Kistna water, and from wells. The latter are easily sunk; the sub-soil water being so close to the surface that 2½ to 3 feet of excavation is usually sufficient to strike water, and a depth of 6 feet to ensure permanence of supply throughout the hot weather. Unfortunately, no two wells are alike as to quality of water even when fairly close together. In one there may be brackish, in the other usable, water. The inhabitants have a *naive* way of explaining the brackishness of the wells supply; they ascribe it to the effects of the sea-water imbibed by the land after the great cyclonic wave of 1864. Whilst this is not without some bearing on the subject and it is probable deposit of salts must have resulted here and there as the result of evaporation of water in the sub-soil by capillary attraction, the brackishness must result chiefly from the contamination of the sub-soil of the site by the excreta of human beings and animals during long period of occupation. The Kistna canal supply is introduced into the town by means of masonry conduits, which

Chairman's Remarks.

The total strength of the conservancy establishment will be as shown below:—

26 carts for road cleaning with 52 toties,
9 „ private scavengering with 18 toties,
5 „ cesspool cleaning with 10 toties,

with 5 inspectors and 4 peons to supervise their work.

Provision of Rs. 2,500 has been made in the budget for 1894–95 for the purchase of dust-bins and iron latrines.

Notices are being issued and prosecutions instituted for not having repaired dilapidated buildings.

Rubbish was sold for Rs. 21 during the current official year. For 1894–95 I have called for tenders. A Muhammadan has offered Rs. 30 for burnt ashes. I have been in correspondence with the Forest department for the disposal of night-soil.

The Forest department is going to trench the night-soil into one of its reserves. Practical proof of its value as a manure may probably cause a demand for it.

(Signed) J. N. ATKINSON.

I have called for a design and estimate of "Silchar cinerator," on receipt of which the matter will be laid before the council for their consideration.

Inspection Notes

Chairman's Remarks.

serve dip-cisterns placed at the sides of the roads whence the inhabitants draw their water. The conduits are in anything but a water-tight condition. On my wishing to see the condition of the pipe, a portion of the ground covering it was excavated, but it was found impossible to view it without prolonged baling, as there was a heavy leak at the spot. There is no doubt this is the condition in the majority of the course of the conduits; indeed, it is stated that since the introduction of the Kistna water into the town, the wells in the sub-soil have been found not to be so brackish as formerly; evidently a result of percolation in the sub-soil on account of leakage from the conduits. Within 30 yards of this spot is a Mussalman graveyard (the Rajjutra). The fact of the conduit containing water, even if under pressure, would not prevent entrance from without of impurities on variation of the quantity of the contents, complete cessation of flow, sudden change of velocity of the current or of the direction of the conduit occurring. The spot examined by me is, however, not the only place where the contamination from graveyards is to be feared. Near the Cantonment high road, the main pipe passes direct through a Mussulman graveyard. It is evident that the passing of water through a graveyard in so imperfect a structure as the conduit here used is dangerous. Even holding in memory the fact that a new water-supply is looked for, the state of affairs here should have attention. The best course would be to divert the pipe; but if this be not feasible, an iron pipe should be employed in this portion, or, at least, the existing conduit should be surrounded with cement concrete, whichever happens to be the cheaper. But, possible contamination by no means ceases with these instances. It is evident with a conduit defective in structure and with open wells at intervals on its course, the contamination must be frequent both by addition from the impure sub-soil and by the more direct method of contamination by the use of foul chatties, ropes, &c. Nor is it solely within the town that the canal is subject to contamination. At its origin at Bezwada, it receives the drainage from that town and is much defiled by boat-passengers on the canal.

It is proposed to divert the conduit here.

With no river at hand, with a canal subject to contamination and flowing but nine months in the year and a sub-soil containing chiefly brackish water, the question of supplying Masulipatam with a satisfactory public water-scheme presents much difficulty. The Sanitary Engineer, who has reported on the subject, has advised the making of a bored artesian well, and I believe apparatus will shortly be sent to the town for this purpose. The surroundings of Masulipatam do not present features that would encourage the hope that an artesian well—that is,a well freeing a body of water under sufficient pressure to deliver at the surface—is obtainable. Instead of the land having a gradual fall from the higher portion of the country and continuing with this gradient below the sea, where the fine deposit at the terminal ends of the confined

Inspection Notes.

Chairman's Remarks.

strata might offer resistance to the exit of the subterranean water, there is here evidence of very small fall throughout and an unusually abrupt termination. Thus, I am indebted to the Port officer for the information that for 7 miles from the shore the depth is almost uniform and amounts to but a few feet, but at a distance of 21 miles a sudden dip occurs of 100 fathoms. Should a boring be made, therefore, in this area, it is quite possible a practically inexhaustible store of water may be struck; but it is extremely unlikely it will have any tendency to deliver at the surface, showing that the water is under pressure; although it is probable the water-level may assume that of the sea. The alluvial soil must here represent a huge sponge-like mass, with its interstices filled with water held at a definite level by sea pressure only. If there be a stratum composed of the typical two impervious layers enclosing between them a pervious stratum containing water, it is probable that they follow the same lines of dead evenness seen on the surface of the alluvial plain on the land side, which would again not favour the occurrence of confined streams under pressure. Masulipatam may, however, have the good luck to obtain abundance of water at a minimum of trouble in boring; but none but a prophet — and, then, only one who knows — would venture to predict the quality of the water that may be obtained. It may be good or so brackish as to be unusable. Seeing that the apparatus has not to be bought by the municipality, and that it is unlikely any difficulties will be encountered during boring, it is advisable the attempt be made. But if successful both as to quality and quantity, one deep well would not be enough for the total supply of the town, and hence some other action might be taken in the meantime. There are certain sandy tracts in and close to the town where it is said good water is obtained. These might be carefully explored by the staff which undertakes the sinking of the artesian well and the question be settled as to whether it would be possible to secure sufficient water of good quality by the method of driven wells joined together for pumping. The Sanitary Engineer before proposing the artesian well suggested exploring the swamps for drinking water. As the whole of the swamps were under water at the time of my visit, I could not judge of the character of the area; the idea is however, practically the same, and in neither case can the source suggested be regarded as good. Failing to get a satisfactory supply from either deep or driven wells, the only alternative is that the town should look for its supply to the canal. If this be the final result, it is to be hoped that a railway from Bezwada would have rendered boat traffic useless, and that Government would then be in a position to no longer license boats—it being impossible to secure the purity of the water so long as this traffic is permitted. As sedimentation and filtration and storage for a long period would be requisite, such a scheme would probably be very expensive.

In the meantime, such little good water as is obtainable in Masulipatam should be taken

Nothing at present can be decided until the source from which the water-supply of this town is to be obtained is decided upon and the council are looking forward to early steps being taken in artesian well borings.

The well in question is situated in the compound of the District Munsif's Court. The

Inspection Notes.

care of. There is at least one well— that in the Munsif Court compound—which is said to yield good water, and is used by a very large number of natives and Europeans, who send for it from distant parts of the town. Yet, this is not provided with a parapet wall or basement, and when I saw it the surface water from the path, by which all sorts and conditions of bearers of water-vessels passed, was freely flowing into it. The well is but 6 feet deep in common with most of the wells; it would, therefore, cost very little to have it cleaned out; the pot rings might be substituted by the largest obtainable glazed sewer stoneware pipes, and a basement and parapet wall founded on concrete might be built round it. If these alterations approached Rs. 100 in cost, it would be better to place a hand-pump in the well after cleaning, and close it at the top.

The solitary well yielding good water in the village of Chilakalapudi is out of repair. It should be put into correct order with basement and drain complete. In the village of Gilakaladindi, there is no water that is drinkable. If the people could be persuaded to settle nearer the fort, it would be advisable for the municipality to purchase land and place it at their disposal. If not, the village might be supplied by a bullock-power pump from "driven" wells sunk near the canal, where there is a supply of good sub-soil water. Having been elevated to a cistern, the water could be forwarded by gravitation in a small—say, 2-inch—iron pipe to the village. This would by no means be an expensive procedure. In the fort, the chief source of supply is from the ditch, which has been arranged as a store for Kistna water. It is much silted up. I advise it be cleaned out, and that wells be sunk at the side of the tank. These should receive water from the ditch either by a passage or by a pipe. If a passage be formed, it could also by the deposit of filtering material be made to act as a filter. This also would not be an expensive measure.

Vegetable Market.—Robinson's Square is a well-built, open space almost in the centre of the town and an active place for trade. The place is disfigured by numerous huts of a temporary character, which are used by petty shopkeepers. Within the square is a large collection of stalls built of such material as bamboo-matting, that are used by sellers of vegetables. These places are let on contract by the municipality. I cannot help thinking the whole system is a mistake. None of these temporary buildings should be allowed in so good a locality. There ought to be no difficulty, with so great a demand for even this wretched character of accommodation, for the municipality to make a good market of its own and reap good profit from it.

Meat Market.—The meat is here sold on platforms having plain lime-plaster surfaces, much worn and broken. There is no water for flushing purposes on the site. The butchers use boxes saturated with prehistoric accumulations of juices from the meat, &c. Any water that is

Chairman's Remarks.

District Munsif has been furnished with an extract of these notes and has been requested to order the necessary repairs to be made to the well as suggested by the Sanitary Commissioner.

This well will be put in thorough repairs as suggested.

It is impossible to persuade the inhabitants of Gilakaladindi to settle down in the fort. But steps will be taken to supply drinking-water to the inhabitants of Gilakaladindi by pipes from a reservoir to be constructed near the canal at the fort as suggested as soon as funds will permit as the water will have to be conveyed about a mile-and-a-half before it can get to the village.

The ditch at the fort will be deepened this year and a well will be sunk near the bund deep enough to supply water during hot weather.

The council are aware that the square puts on an ugly appearance by numerous temporary sheds that have been allowed to be put up. But the council propose to supplement the 49 godowns now in existence in the square by an equal number. An estimate for this purpose is under preparation. With the materials of the old stalls at Oakespeta, the council hope that about 50 stalls may be built with no great expense. Until a market on a recognised plan is constructed, the council feel that a very elaborate establishment would be required to make daily collections of fees in market.

The proposals of the Sanitary Commissioner with regard to the meat market will be carried out as far as practicable.

Blocks of wood are used for cutting the meat and the boxes are used only to sit upon and are not used for any other purpose.

Inspection Notes.

used must be brought from a distance, there being no arrangements for flushing water on the spot. Small Cuddapah slabs, polished, should be used in lieu of the boxes; the lime plaster should be substituted by cement plaster. As to Cuddapah slabs, I believe, the same description of stone is obtainable near Bezwada, as the new cutcherry floor there is being made of it.

Vaccination.—The calf vaccine station is within the hospital compound. The building is out of repair and is unsuitable, in that the flooring is made of rammed earth. This should be rendered impervious by the use of concrete and cement plaster, or by smooth stone pointed with cement. Stalls with shallow drains, just sufficiently large to allow of the calf laying down, should be built. In consequence of the rough accommodation available, continuous cultivation of lymph has at intervals become impossible; the "stock" has degenerated and ultimately faded out, rendering renewal from elsewhere imperative. The work is conducted by 1st-class Vaccinator Brahmayya. Examination of two pyal schools showed that of 44 present, 20 were vaccinated, 12 had had small-pox, and 12 were unprotected.

The following shows the results of the vaccinator's work during the previous and current years up to date:—

Chairman's Remarks.

The floor of the vaccination shed will be repaired as suggested. The council are under the impression that the system of vaccination now in force is a tentative one. If this system is to continue for a number of years, the council consider it advisable to put up a pucka shed with stalls for calves.

—	1889.	1890.	1891.	1892.	1893 up to end of October.
Number vaccinated	1,302	1,686	1,776	3,946	2,465
,, ,, successfully	1,219	1,608	1,510	3,784	2,384
,, ,, under one year of age	97	197	216	905	812
,, verified by inspecting officer	324	197	Information not available.		
Births	1,018	1,324	1,071	1,111	802

Registration.—This is conducted by two registrars. Attendance of the certifying parties at the office is insisted upon. A good system is pursued of placing in public positions notices drawing the attention of the public to the fact that registration of births and deaths is compulsory. The following statistics were secured during the current year up to date, and are here compared with results of previous years:—

No remarks.

—	1888.	1889.	1891.	1892.	1893 up to October.
Deaths from—					
Cholera	25	5	113	3	79
Small-pox	..	45	189	2	2
Fevers	113	208	79	247	163
Dysentery and diarrhœa	1	39	33	77	60
Other causes	566	637	637	710	607
Total	705	934	1,051	1,039	911
Death-rate per mille per annum (a)	20·1	26·6	27·1	26·7	28·1
Death-rate per mille per annum (b)	18·4	24·1	26·9	26·3	27·4
Births	1,018	1,324	1,071	1,111	802
Birth-rate per mille per annum (a)	29·0	37·8	27·6	28·6	24·8
Birth-rate per mille per annum (b)	26·5	34·2	27·4	28·1	24·2

(a) Calculated on the census population of 1891. (b) Calculated on the estimated population.

Inspection Notes.

Sanitary Administration.—The municipality would, I think, do well to consider whether their system of handing the majority of the executive work to contractors might not be modified with advantage to the municipality. Thus, as to conservancy which is conducted solely by contract, whilst it certainly is a matter of convenience in most towns to secure the constant supply of the desired number of bullocks, when the municipality then proceeds to arrange that the actual work of cleansing shall be effected on this system, I think it abdicates its correct position with respect to the tax-prayers. It stands to reason that the contractor must make a profit out of the arrangement, and that even if the number of men employed be laid down in the terms, by procuring under-aged, old and feeble persons, instead of stalwart coolies, to perform the work, it may be executed perfunctorily, penal clauses notwithstanding. The correct conservancy of a town is so important a part of the functions of a municipality, that cleansing should, I think, be performed by its personal staff. In the matter of the market also, I consider the contract system in this instance must represent a losing concern to the municipality, and believe by taking the matter into their hands and erecting a suitable market a fair addition to their income might be obtained. In the matter of encroachments, which are very common, the Chairman has brought to notice that much delay would be prevented were it not contended by the council that notice to stay an obstruction can only legally be issued with their consent. The delay in obtaining this in the first place, in their giving the required thirty days' notice, and, lastly, in bringing the case up for prosecution, wastes much valuable time. Again in the matter of filthy compounds, in which Masulipatam abounds, it is contended by the Bench Magistrates that the Chairman has no right *to issue notices* to the persons concerned for the removal of noxious vegetation, &c., and that this course can only be legally taken by the council at a general meeting. As a result of this opinion four of the Bench Magistrates being councillors also, the Chairman's action in giving notices in 80 cases was disapproved, and their attempted prosecution disallowed by these magistrates. Under these circumstances, it is not to be wondered at that any attempt on the part of the executive to remind the inhabitants of the desirability of obeying the sanitary clauses of the Act should receive scant attention, seeing that they are aware that each case must be brought before the council to be dealt with; and yet the Madras District Municipalities Act declares that in the Chairman is "vested the entire executive power of the municipal council," and that he is "directly responsible for the due fulfilment of the purposes of the Act." With these points I have only an interest in so far as sanitary advance is affected; with the legal maze possible as an outcome of their consideration I have no concern. I am, however, certain that the raising of such trivial technicalities, which

Chairman's Remarks.

The council cannot do away now with the contract of scavengers for reasons stated in paragraph 103 of my letter, No. 343, dated 18th July 1893, embodied in G.O., No. 1355 M., dated 6th October 1893, the administration report for 1892–93. But I have persuaded the contractors to give up their contract before their term is over. As soon as Government sanctions the establishment now sanctioned by the council, I propose to get Yanadies from Nellore as a set-off against the present class of people so that sanitation may not suffer if they take it into their heads to strike work when pressure is brought to bear upon them. Had it not been for the contract system, it would not have been possible to make them work properly. The scavengers as a class are very independent and troublesome and no other people are available to replace them.

The council have since given the Chairman power under sections Nos. 156, 166, 167, 176, 183, 184, 185, 186, 207, 219, 228 and 274 to issue notices.

Inspection Notes.

are not heard of elsewhere, must impede seriously the progress of sanitation in Masulipatam, and I would advise the municipal council to do their utmost to meet the attempts of the Chairman to enforce "due fulfilment of the purposes of the Act." For example, it seems to me if their consent in each case is requisite legally, the proper course for the council to pursue rather than let sanitary efforts lag, is to hold their meetings at such frequent intervals that no delay in such matters could be possible. Thus, although doubtless at a personal sacrifice of time, it would be feasible to achieve the desired results without hindrance by reason of legal difficulties which have been discovered by councillors when exercising their function of Bench Magistrates.

Care should be exercised in not allowing the better neighbourhoods to be filled up by inferior buildings. An example of this is seen on the Cantonment high road, where a settlement of chucklers has been allowed.

(Signed) W. G. KING, Surgeon-Major,
Ag. Sanitary Commissioner.

Chairman's Remarks.

There are a great many of these little colonies that have been allowed to spring up amongst the respectable houses which, if removed, would greatly improve the sanitation as well as the appearance of the town. Steps will be taken to gradually remove them.

(Signed) J. W. MAIDEN,
Chairman, M.C., Masulipatam.

PROCEEDINGS of the Masulipatam Municipal Council passed at a meeting held on Saturday, the 10th March 1894.

* * * * * *

1. Read Sanitary Commissioner's Inspection notes on the Masulipatam Municipality for 1893–94.

Resolution.—The different points referred to by the Sanitary Commissioner have been considered and will be carried out as far as practicable and as far as funds will allow.

* * * * *

Dis. No. 1364.

Forwarded to the Collector for submission to Government.

MASULIPATAM,
2nd April 1894.

(Signed) R. SURIA RAO NAYUDU,
Deputy Collector.

Forwarded.

MASULIPATAM,
11th April 1894.

(Signed) J. N. ATKINSON,
Collector.

ORDER—dated 8th June 1894, No. 727 M., Local and Municipal.

Recorded with the following remarks:—

(1) The attention of the Public Works Department will be drawn to the suggestions of the Sanitary Commissioner regarding the drainage of the swamps round the town and to the remarks of the Chairman and the Collector with reference to the same question.

(2) The Sanitary Engineer should visit Masulipatam as soon as his other engagements permit and should institute a full enquiry into the question of supplying the town with a system of drainage, reporting the result to Government. His attention will be called to Dr. King's remarks regarding this subject and the water-supply question.

(3) The Municipal Council's special attention will be drawn to the observations of the Sanitary Commissioner and the Collector on the subject of encroachments in public streets and the disposal of the town rubbish. The action which it proposes to take in these matters should be reported.

(4) A proposition statement in the prescribed form for the entertainment of the additional conservancy establishment referred to in the Chairman's remarks should be submitted.

(5) Now that the Council has authorized the Chairman to issue notices under the Act, he should use every endeavour to improve the sanitary condition of the back-yards in the town. Systematic prosecution of the owners of filthy premises is certain to produce an increased resort to the services of the municipal private scavengers.

(6) The Council will be requested to report what it means by stating that the "system of vaccination now in force is a tentative one."

(7) The paragraphs in the Sanitary Commissioner's inspection notes should have been numbered.

(True Extract.)

Under Secretary, P.W.D.,
for *Chief Secretary.*

To the Chairman, Municipal Council, Masulipatam.
" Collector of Kistna.
" Sanitary Commissioner.
" Sanitary Engineer.
" Public Works Department.
Editors' Table.

Exd. J. Moses.

88C

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

Read—the following paper:—

From J. W. MAIDEN, Esq., Chairman, Municipal Council, Masulipatam, to the Chief Secretary to Government (through the Divisional officer, Kistna), dated 28th March 1894, No. 990.

I have the honour to forward herewith the inspection notes of the Sanitary Commissioner for Madras on this municipality for 1893–94 with my remarks thereon for such orders of Government as they deem necessary.

2. A copy of the municipal council's resolution, No. 1, dated 10th March 1894, referring to these notes, is enclosed.

Enclosures.

Inspection Notes of the Sanitary Commissioner for Madras.

KISTNA DISTRICT.

Masulipatam Municipality.

Inspected 8th, 9th and 10th November 1893.

		Males.	Females.	Total.
Population per census of	1881	16,831	18,225	35,056
	1891	18,601	20,208	38,809

Inspection Notes.	Chairman's Remarks.
The town is situated upon the flat, alluvial plain formed by the Kistna, which stretches at this point several miles below the sea, with so small a gradient that ships have to anchor off the port at a distance of nearly seven miles. With this statement as to the physical condition of the site, it is a foregone conclusion that difficulty must exist as to surface and subsoil drainage of the town. The fluctuation of the latter is from 3 feet to 6 feet in the best parts of the town, and from 6 feet to the surface in those less fortunate. This condition of affairs has long rendered Masulipatam one of the places notorious for the existence of beriberi and rheumatic affections amongst its inhabitants.	Yes.