BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1896} Madras.

PUBLIC WORKS.

No 83. Marine dy 12th Feby 1896

Comm. to the Pres. Pat Officer.

(S.) Dun C.N.C.

Dated January, 31*st*.

Recd. *Encl.*

G.O. No. 397 W., 31st Jan. 1896.

JANUARY.

P.P.O.

Mangalore Harbour

Letter from Mr. G. T. Walch submitting his final report and proposals for improving the Mangalore "Inner" harbour and its entrance, communicated with remarks to Superintending Engineer, IV Circle, for submission of detailed estimates.

Order—No. 397 W., dated 31st January 1896.

Communicated to the Superintending Engineer, I circle, who will submit detailed estimates for carrying out the works proposed by Walch. On receipt of these estimates, the Government will consider the question the provision of funds.

(True Extract.)

(Signed) D. Mc[illegible]
NEIL CAMPBELL, Lt.-Col., R.E.,
Joint Secy. to Govt., P.W.D.

To G. T. Walch, Esq., M.I.C.E.
„ the Superintending Engineer, IV Circle, with enclosures.
„ the Marine Department.

Exd. T. K. Narayana Aiyangar.
Spare Copies

This final report also does not deal with the suggestions made in the "Preliminary" one as to the town drains; and the reclamation between the "Bunder" and the "Marine yard," because the former is a Municipal affair, and the latter, though advisable on its own merits and in connection with the proposed railway, is not a necessity as regards the special object dealt with in this report.

Ootacamund,
14th November 1895.

(Signed) G. T. WALCH, M. Inst. C.E.

Abstract approximate estimate for work recommended in final report on Mangalore Harbour.

Dimensions. Length.	Breadth.	Depth.	Quantities.	Description.	Rate.	Per.	Totals.	Remarks.
Ft.	Ft.	Ft.		Recommendation No. 1. *Protection of Sand-spit.*	Rs. A. P.		Rs.	
21,780	3	6	392,040 c. ft.	Stone facing	7 8 0	100 c. ft.	29,400	Assuming average height 6 ft., and breadth 3 ft. Rate, from estimate for similar work supplied by Public Works Department.
				Contingencies	..	..	2,900	
				Total ..	..	..	32,300	
				Recommendation No. 2. *Training Northern, or Gurrupúr backwater.*				
			5,300 Rg. ft.	Groynes	4 0 0	Rg. foot.	21,200	Assuming to be made of stone.
				Planting accretions ..	..	Say.	300	Average height 8 feet. Slopes ½ to 1.
				Contingencies	..	..	2,100	(*Note.*—Various kinds of groynes, *e.g.*, Stone—Earthen banks faced with stone or fascine work—Piles with wattling and filled with brushwood—could be tried and the cheapest effective style adopted).
				Total ..	..	..	23,600	
				Recommendation No. 3. *Training Nétrávati backwater.*				
			10,000 Rg. ft.	Training groynes	3 8 0	Rg. foot.	35,000	Made of earth or sand, with stone facing 1 foot 6 inches thick.
				Planting accretions ..	..	Say.	600	Average height 9 feet. Slopes 1 to 1.
				Contingencies	..	..	3,500	
				Total ..	..	..	39,100	
				Recommendation No. 4. *"Heads" to protect ends of sand-spits at entrance.*				
			1,900 Rg. ft.	Sheet piles averaging 25 feet long.	50 0 0	Rg. foot.	95,000	Piles Rs. 1-8-0 per foot. Driving Rs 12-8-0.
			500 „	Sheet piles averaging 15 feet long.	30 0 0	Do.	15,000	Piles Rs. 1-8-0 per foot. Driving Rs. 7-8-0.
			4,800 „	Waling pieces (2), good jungle wood.	2 0 0	Do.	9,600	Size 12" × 12".
			240 No.	Rear piles, at 10' apart, jungle wood.	15 0 0	Each.	3,600	
			3,600 Rg. ft.	Ties from front to rear piles, jungle wood.	2 0 0	Rg. foot.	7,200	Size 12" × 12".
2,400	15	..	36,000 sq. ft.	Mattress or fascine work for "artificial beach."	2 0 0	100 sq. ft.	720	Rate—rough approximation—no such work yet done.
				Contingencies	..	..	13,880	
				Total ..	..	..	1,45,000	
				Grand Total (exclusive of superintendence).	..	..	2,40,000	

14th November 1895.

(Signed) G. T. WALCH, M. Inst. C.E.

2. *Mangalore town* lies for about 3 miles along the eastern side of the "backwater," which there varies from 1,800 to 2,800 feet in breadth, and is separated from the sea by a low strip of sand, nowhere more than 1,000 feet wide and in parts but little more than 100 feet.

3. Into the "backwater" at its northern end near "Sultan's Battery" flows the "Gurrupúr river" draining some 320 square miles, and across the southern end of the backwater near the "Marine yard" flows the Nétrávati draining about 1,220 square miles. For some 3 or 4 miles before it enters the backwater proper near Sultan's Battery, the course of the "Gurrupúr river" is nearly north and south and roughly parallel to the coast, but the course of the Nétrávati for its last few miles is almost east and west, nearly at right angles to the coast line.

4. The sandy barrier between the backwater and the sea is so narrow, low, and unstable that it is easily breached through when the level of the backwater is raised by river floods; the consequence is that new openings to the sea are frequently formed; sometimes each river has a separate mouth; at other times, as now, there is but one mouth common to both rivers, and these openings or "mouths" shift about along the whole length of the backwater between "Tannirbhavi" opposite Sultan's Battery on the north, and the village of Ullal on the south.

5. This ever-changing position of the harbour entrance and the resulting variations of the state of the bar and of the "backwater," which cause uncertainty as to what from year to year will be the difficulties in the way of shipping, are great drawbacks to the port. Its history is by no means one of continuous deterioration as is sometimes supposed, but one of constant change; a bad state of affairs having been followed by a better one, which has again deteriorated to be followed by improvement, *e.g.*, one of the great complaints as to the present state of the inner harbour is that whereas it used to be deep enough along its eastern side for "pattimars" and large laden cargo boats, to approach the quay (locally known as the "bunder"), the place is now so shallow there that those crafts have to lie some distance from the quay and cargo has to be taken to and from them in small boats; in November 1843, however, the then District Engineer, Captain (now General) F. C. Cotton, R.E., says in his diary . . . . "*no boats* can approach the landing place except near the time of high water and the larger vessels which communicate with the pattimars in the offing make in consequence but one trip a day." . . . "the distance from deep water to the custom-house is about 900 feet;" he therefore proposed dredging a channel for the boats to pass to and from the larger craft; the state of affairs would thus appear to have then been considerably worse than now; and again, the channel from the harbour entrance to the pattimar anchorage opposite the custom-house is now much complained about and is certainly very bad, but in 1837 it was apparently even worse, for in a letter from the "Civil Engineer" to the "Principal Collector, Mangalore," dated 30th May 1837, he says that as the result of there being two mouths to the rivers . . . . "the backwater has become considerably shallow and when the tide is out greatly diminished in breadth, the consequence of which is that whereas formerly pattimars used to lie on the backwater opposite the custom-house, they are now obliged to remain lower down and immediately inside the mouth of the southern river."

6. Records also show that the "bar," though it has sometimes been better than it now is, has not infrequently been worse.

7. There does not appear to have been, in recent times at all events, any deterioration of the open sea anchorage for large vessels, and improvement of it could only be effected by an artificial harbour on the general lines of the one at Madras, at an altogether prohibitory cost. It is not, it is understood, to be now dealt with, the present investigations being confined to the means of making the best of the inner harbour and its entrance.

8. The first step in this direction has been taken by an inspection of the port during the south-west monsoon when the rivers were in fresh, and a general consideration under those conditions of the various proposals which have from time to time been made for improvement of the harbour. All the European merchants and most of the native ones were good enough to state their views and to give all information in their power.

9. But before it can be determined what detail proposals shall be made, it is necessary * that the port should be studied also under the different aspects which it will present when no river waters are affecting it and shipping operations are in full swing; certain surveys and soundings also are required; in the meantime, however, some of the general conclusions already arrived at may be thus stated—

* See covering letter, paragraphs 4 and 5.

(*a*) When, as often has been the case, there have been two openings to the sea, the entrances to the harbour and their "*bars*" have been worse than when the river waters and the tidal scour have been concentrated on one opening.

(*b*) When the "Nétrávati" has had its mouth towards the north of the backwater, its flood waters have scoured out the backwater along the town face to deeper than is the case when that river passes in the most natural course direct to the sea, near the south end of the backwater; but on the other hand the latter position is the best for the harbour entrance and the bar.

(*c*) It is of *primary* importance to secure a good permanent "bar" and entrance to the inner harbour; the difficulties *in it* could always be dealt with by dredging which could be carried on in smooth water at all times.

(*d*) Though it is impossible to divert from the backwater much of the drainage which brings a considerable quantity of silt into it between the "Sultan's Battery" and the "Marine yard," the minor town drains which now form shoals in most inconvenient places along the face of the quay might be so dealt with by silt traps (to be kept constantly cleared by manual labour) that they would cease to be the annoyances and hindrances to traffic that they now are.

(*e*) The tidal scour is the chief, if not the only, factor in keeping the "bar" practicable during the dry season which is also the shipping season, and therefore no appreciable curtailment of the tidal basin should be allowed.

10. From these premises may be deduced the general lines which the proposals to be made will probably have to follow; they are—

(*a*) The protection of the barrier between the sea and the backwater so that it may be possible to carry out,

(*b*) the *firing* of the entrance and bar and keeping them approximately uniform in size and depth instead of allowing them to vary in those particulars year by year.

(*c*) The provision of means of dredging in the inner harbour whenever and wherever required.

11. It may be at once stated that there is no probability of the "Port funds," now considered as belonging exclusively to Mangalore, being able to meet the cost of the works which will be necessary, but the railway from Mysore will raise the port to a position of such general public importance as would seem to warrant its being dealt with liberally from "Provincial," if not "Imperial" funds.

12. Though perhaps not strictly within the intended scope of this report, it seems right to call attention to the necessity for, *as soon as possible*, dredging out the channel from the harbour entrance to the pattimar anchorage opposite the custom-house; the state of this channel has for some time past seriously hampered the port, and will, if not improved, again this year seriously hamper it. This work is one which may well be met from the local "Port funds" and "dues."

See appendices 1 and 2 with this report for correspondence with the Marine Department about this.

13. There is another subject connected with improvements to the port which it may be as well to notice here, and that is, the proposed reclamation of the ragged foreshore between the present "Bunder" and the "Marine yard" referred to in paragraphs 3 and 5 of letter from the Presidency Port officer, No. 695—276 G., dated 20th July 1894, with Proceedings of the Madras Government No. 297-A, dated 26th July 1894.

The project was worked out in detail by Colonel A. T. Frazer, R.E., then Executive Engineer, West Coast Division, in September 1889. His estimate came to Rs. 45,520 and was doubtless approximately correct. The work appears a most advisable one on its own merits even irrespective of the general improvement of the harbour, especially if the railway runs into Mangalore at, or near, the "Marine yard" as will most probably be the case. This reclamation would not, of course, be recommended if it would appreciably reduce the tidal area [see (*e*) of paragraph 9 *supra*], but this would not be the case, for though it would provide some 11 acres of ground for a road, for wharves, for warehouses, and perhaps for railway sidings, &c., the area is so shoal that the quantity of tidal water which at times covers it forms but an insignificant percentage of that which passes in and out of the harbour mouth. Most certainly no private rights in connection with the foreshore in question should be allowed to spring up.

14. For reference there are sent with this report (1) "Marine chart sheet IX" *borrowed* from the Presidency Port officer, and (2) a copy on tracing linen of a "plan of Mangalore harbour taken in January 1885" *borrowed* from the office of the Superintending Engineer, IV Circle.

(Signed) G. T. WALCH, M. INST. C.E.

Ootacamund,
13th September 1894.

Since that preliminary report was written I have paid two more visits to Mangalore—one in February, the other in May. From personal observations then made and from the surveys and soundings taken for me at various times between November and May, I am enabled to submit the following recommendations which, if followed, will, I have no doubt, much improve the inner harbour and its entrance, and will also improve to some extent the *sea bar*, though to have much effect on *it* would require sea walls of upwards of $\frac{3}{4}$ mile long, extending beyond it into deep water, of so massive a character, to withstand the heavy seas of the south-west monsoon, that the work would assume the general character of the Madras harbour walls, and would be so costly a work that it is useless now to consider it.

Confining myself, therefore, to the inner harbour and its entrance, I recommend—

FIRST.—The protection of the sand-spit, or barrier, between the sea and the backwater, from "Tannirbhavi," nearly opposite Sultan's Battery, to Ullal, so that the formation of any second opening to the sea may be prevented, and the entrance to the inner harbour may be fixed to *one* definite place.

No. 397 W., 31st January 1896.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

READ—the following paper :—

From G. T. WALCH, Esq., MEM. INST. C.E., to the Chief Secretary to Government, dated Ootacamund, 14th November 1895.

With reference to paragraph 1 of G.O. No. 377, Marine, dated 21st September 1894, G.O. No. 419, Marine, dated 1st November 1894, and paragraph 4 of G.O. No. 159, Marine, dated 5th June 1895, I have now the honour to submit my final report and proposals in connection with the Mangalore "Inner * harbour and its entrance."

* See paragraph 7 of Preliminary Report.

I would have sent this report sooner, but I have for some time been hoping to get the Proceedings of Madras Government with the Arsikere-Mangalore Railway survey, which I was informed would be accompanied by a "note" on the Mangalore harbour, by Mr. Gilchrist, the Engineer-in-Chief of the Railway Survey, and that note I thought it would be advisable to deal with in my report.

This was specially the case as Mr. Gilchrist was good enough to let me know a good deal that there would be in his "note," and there was evidently much that I could not agree with. However, so much time has passed that I cannot any longer delay my report.

Besides plan A, which accompanies the "report," I send herewith the undermentioned charts specially prepared for me, whilst studying the subject, by Mr. Simpson, the Port Officer, with the help of a Surveyor, and of Mr. Vas, Sub-Division Officer, Public Works Department. To Mr. Simpson I am much indebted for his earnest endeavours during seven months to do what I wanted as far as was possible with the somewhat limited time, and rough appliances at his disposal.

The difficulty of dealing with the subject owing to the absence of such charts and records for previous years is noted in paragraph 5 of my letter, dated 24th May 1895, printed with Proceedings of Madras Government, No. 159, Marine, dated 5th June 1895.

ENCLOSURES.

List of charts referred to in letter above.

1	Chart (tracing)	Mangalore backwater and entrance (scale 1″ = 660′)			for Nov. and Dec. 1894.
1	Do.	do.	do.	do.	for January 1895.
1	Do.	do.	do.	do.	for February 1895.
1	Do.	do.	do.	do.	for March 1895.
1	Do.	do.	do.	do.	for April 1895.
1	Chart (tracing), Entrance to backwater (scale 1″ = 100′) for May 1895.				
1	Combined tracing of charts for November and December 1894, and April 1895 (scale 1″ = 660′)				

MANGALORE HARBOUR.

Final Report and Proposals.

(Referred to in Proceedings of Madras Government No. 377, Marine, dated 21st September 1894, and No. 419, dated 1st November 1894.)

Before proceeding with this report, it will be convenient to re-read the "Preliminary Report" which will have to be frequently referred to.

Preliminary Report called for in G.O. No. 296, Marine, dated 25th July 1894.

Mangalore port consists of an open roadstead where large vessels anchor from one to two miles from the shore, and a "backwater" forming an inner harbour used by the smaller sea-going craft ("pattimars"); access to this inner harbour is through the channel by which the waters of two rivers (the "Nétrávati" and the "Gurrupúr" river) find their way to the sea, the channel being kept open, even when no fresh water is coming down the rivers, by the tidal scour due to the extensive natural basin affected by the tides.

47.03

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1896} Madras.

PUBLIC WORKS.

Dated January, 31st.

Recd.

Encl.

G.O. No. 397 W., 31st Jan. 1896.

JANUARY.

Mangalore Harbour

Letter from Mr. G. T. Walch submitting his final report and proposals for improving the Mangalore "Inner" harbour and its entrance, communicated with remarks to Superintending Engineer, IV Circle, for submission of detailed estimates.

No 83 Marine 12 Feby 1896

Comm. to the Port Officer

S/ Encs.

P.O.

2 Copies to 00

Order—No. 397 W., dated 31st January 1896.

Communicated to the Superintending Engineer, IV Circle, who will submit detailed estimates for carrying out the works proposed by Mr. Walch. On receipt of these estimates, the Government will consider the question of the provision of funds.

(True Extract.)

(Signed) D. McNEIL CAMPBELL, Lt.-Col., R.E.,
Joint Secy. to Govt., P.W.D.

To G. T. Walch, Esq., M.I.C.E.
„ the Superintending Engineer, IV Circle, with enclosures.
„ the Marine Department.

Exd. T. K. Narayana Aiyangar.
Spare Copies

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Ootacamund,
14th November 1895.

(Signed) G. T. WALCH, M. Inst. C.E.

Abstract approximate estimate for work recommended in final report on Mangalore Harbour.

Dimensions. Length.	Dimensions. Breadth.	Dimensions. Depth.	Quantities.	Description.	Rate.	Per.	Totals.	Remarks.
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21,780	3	6	392,040 c. ft.	Stone facing	7 8 0	100 c. ft.	29,400	Assuming average height 6 ft., and breadth 3 ft.
				Contingencies	..	..	2,900	Rate, from estimate for similar work supplied by Public Works Department.
				Total ..	..	..	32,300	
				Recommendation No. 2. *Training Northern, or Gurrupur backwater.*				
			5,300 Rg. ft.	Groynes	4 0 0	Rg. foot.	21,200	Assuming to be made of stone.
				Planting accretions ..	..	Say.	300	Average height 8 feet. Slopes ½ to 1.
				Contingencies	..	..	2,100	(*Note.*—Various kinds of groynes, *e.g.*, Stone—Earthen banks faced with stone or fascine work—Piles with wattling and filled with brushwood—could be tried and the cheapest effective style adopted).
				Total ..	..	..	23,600	
				Recommendation No. 3. *Training Nétrávati backwater.*				
			10,000 Rg. ft.	Training groynes	3 8 0	Rg. foot.	35,000	Made of earth or sand, with stone facing 1 foot 6 inches thick.
				Planting accretions ..	..	Say.	600	Average height 9 feet. Slopes 1 to 1.
				Contingencies	..	..	3,500	
				Total ..	..	..	39,100	
				Recommendation No. 4. "*Heads*" *to protect ends of sand-spits at entrance.*				
			1,900 Rg. ft.	Sheet piles averaging 25 feet long.	50 0 0	Rg. foot.	95,000	Piles Rs. 1-8-0 per foot. Driving Rs 12-8-0.
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			4,800 „	Waling pieces (2), good jungle wood.	2 0 0	Do.	9,600	Size 12″ × 12″.
			240 No.	Rear piles, at 10′ apart, jungle wood.	15 0 0	Each.	3,600	
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2,400	15	..	36,000 sq. ft.	Mattress or fascine work for "artificial beach."	2 0 0	100 sq. ft.	720	Rate—rough approximation—no such work yet done.
				Contingencies	..	..	13,880	
				Total ..	..	..	1,45,000	
				Grand Total (exclusive of superintendence).	..	..	2,40,000	

14th November 1895. (Signed) G. T. WALCH, M. Inst. C.E.

As said in the "preliminary report," 9 (*b*), it is believed that the present position of the harbour entrance is about the best, and there it is proposed to fix it.

But before considering how this is to be accomplished, it is necessary to settle what width of entrance should be provided.

In deciding this, the chief element to be considered is that of the flood discharges which have to be passed, and passed without such restriction as will unduly raise the levels of floods along the lower courses of the rivers.

In the preliminary report the drainage areas of the Nétrávati and Gurrupúr rivers were taken, on the best information then available, as 1,220 and 320 square miles, respectively, but the railway authorities now take them, I am informed, as 1,410 and 352 square miles. Adopting these areas and also the formula and co-efficient used by the railway, viz., "Dicken's" * with 825, the flood discharges of the two rivers are 190,000 cubic feet a second, and 67,000 cubic feet per second, respectively, or in all 257,000 cubic feet per second, to pass out to sea through the entrance.

* $D = 825\ M^{\frac{3}{4}}$

Allowing a velocity through it of 6 miles per hour or, say, 9 feet per second, this large body of water would require 28,555 square feet of sectional area of water-way, and assuming an effective depth of 20 feet, the width required would be slightly over 1,400 feet. This calculation is necessarily largely made up of assumptions, but the width arrived at is about what nature has provided, and to appreciably reduce it would, I believe, be to run serious risk of flooding the margins of the lower reaches of the rivers.

This being the case it is useless to go into any theoretical considerations of whether a narrower entrance would not be better for the simple tidal discharge which has to pass to and fro through it, but I may say that, from what I saw during the spring tides of May, I would not, even if it was the discharge due to them which alone had to be considered, make the width of the entrance much less than now advocated.

To prevent the shifting of the entrance it is necessary to protect the ends of the sand-spits at the place. The simple and inexpensive method which will answer in the backwaters, where the water is still and the scour but slight, will obviously not do here, where the swell and the waves are often considerable, and the scour deep. Nor will it do to try merely a modification of the same method making the protective walls larger, for any such walls would most certainly be undermined and their materials scattered about where they would be constant sources of danger to every craft using the inner harbour. Whatever kind of work is used must go down so deep that it will not be undermined, and it must be composed of materials which cannot be moved and dropped about to form hidden dangers to the shipping; no work practicable at the place meets these requirements except "piling."

In the report already quoted from, Mr. Robertson proposed to fix part of the then harbour mouth, not the present one, by "a row of sheet piling . . . the piles to come up to high water level, to have a waling on the outside, and to be tied back at intervals to others driven into the bank behind. Stone pitching, or a thick layer of stones, should be brought up from the pile heads in a gentle slope for some distance back so as to form an artificial beach for the sea to break upon." . . . Mr. Robertson's suggestions as to the kind of work seems generally most suitable and is adopted, except that, for the reasons given above, it is not advisable to form the "artificial beach" at back of the piles, of loose stone, and instead of it, brushwood "mattresses" or "fascine work" should be used.

The construction of these "heads" to protect the ends of the sand-spits at the entrance will necessarily be costly, for the piling along a considerable part of them will have to average some 25 feet long and be driven some 20 feet into sand.

The suggested positions and forms for these "heads" are shown on Plan A, but they are merely approximations, modifications of which will be rendered necessary by alterations in conditions before they are taken in hand.

There accompanies this report an "abstract approximate estimate" for the work recommended, which amounts to Rs. 2,40,000. This is possibly more than Government anticipated, but if the harbour is to be dealt with at all, it should be so in a systematic and fairly complete manner; to merely put, for instance, a groyne here, and another there, and expect any really beneficial result would be futile; better let the place alone than deal with it in a desultory way which would probably prove not only useless but mischievous.

It will be noticed that, except by a remark in the concluding paragraph of the second recommendation, I have not in this report dealt with the question of *Dredging*, because even without it the works proposed would be complete in themselves and efficacious to a considerable extent; but I am still of opinion that the Mangalore inner harbour will never, no matter what works are carried out, be kept in continuously first-rate order without "the means † of dredging whenever and wherever required."

† Preliminary Report, 10 (*e*).

It will be useless to attempt the execution of any of the subsequent proposals, if this first and most essential one be not efficiently carried out to start with.

This part of the work will be easy and comparatively inexpensive. From what I have seen and read, I am convinced that what have to be guarded against are not breaches caused by the sea, but breaches caused by currents and eddies on the backwater side of the barrier; when such breaches occur just before, or whilst the rivers, especially the Gurrupúr river, are in high flood, they give trouble, perhaps for years, though sooner or later the sea closes them and nature reverts to the one opening to the sea somewhere about opposite the end of the Nétrávati river.

The effect of protection put up by private persons along the margins of the backwater, at Ullal and elsewhere, shows that a comparatively slight edging of stone, carried up to near high tide level, will effectually protect the inner margin of the sand-spit from erosion, and it is such protection that I propose should be used, except near and at the Entrance, which will be dealt with separately.

The general disposition for this sand-spit protection is shown on plan No. A herewith; but this, it will be understood, is only an indication of what is proposed, and changes in configuration, depths, &c., which are constantly taking place, may render it necessary to depart considerably from what is now shown; as long as the protection to the sand-spit is effective, the lines in which it is arranged are of minor moment.

SECOND.—The training of the northern, or Gurrupúr, branch of the backwater between Sultan's Battery and the "Marine yard," so that the energy of the freshwater and tidal currents may not, as now, be dissipated over a wide shallow basin, forming in it tortuous channels of little depth, but be more concentrated on the eastern side of the backwater, where depth and comparative straightness of channel are required for navigation.

The best final width for this portion of the backwater cannot, of course, be now laid down with absolute certainty, the conditions to be dealt with are too complex for this, but an average width of about 1,600 feet will not be too narrow, and even this could be worked up to tentatively.

The reclamation which would be required to secure this, is shown on plan No. A by a green wash, and it would be gradually secured by the construction of training groynes, the ends of which, when they had fulfilled their object, and the width for the backwater was finally decided on, might be connected by training walls.

On the plan are shown some suggested positions for the groynes, but it must be understood that here, as elsewhere in dealing with this subject, it is not possible for me on the data at my disposal to lay down absolute sites, &c., for the works recommended, that must be left to whoever has to work out the scheme in detail, and even when that has been done much must still be left to the judgment of the Engineer who carries out the works.

A word of warning must be here given against even commencing these groynes before the protection of the sand-spit has been carried out. Without that protection the groynes would almost certainly cause breaches in the sand-spit.

It is believed that the greater depth which will result from narrowing the backwater will fully compensate, even in tidal volume, for the reduction in the area of the basin, and will provide a more efficient outlet than now for the Gurrupúr river; it is however possible, that here, as in so many somewhat similar cases, assistance from dredging may be required at first to remove shoals and establish the channel which will facilitate the tidal scour.

THIRD.—The training of the course of the Nétrávati river near its mouth, so as to lead the fluvial and tidal discharges more directly on to the harbour entrance than is now the case.

At present much of the discharge, especially of that of the ebb-tide when there is no fresh water coming down the river, runs round the deep bay on the south side of the river, and then northwards along the narrow sand-spit from Ullal to the entrance, where it has to turn at about right angles to its former course in order to pass out to sea. At the same place also it meets the discharge from the Gurrupúr backwater in almost direct opposition, the result being of course a shoal just inside the harbour mouth, which gives much trouble to navigation.

The two branches of the backwater so lie with reference to one another that the waters issuing from them cannot be made to join at a really favorable angle, but at all events the present state of affairs may be much improved by the training suggested, which will also help to guide the flood waters of the Nétrávati on to the entrance and the bar, in the most advantageous direction.

The general arrangement suggested for the training works is shown on plan No. A.

FOURTH.—The fixing of the harbour entrance.

The necessity for this is stated in the Preliminary report; and in his report of 1871, Mr. George Robertson, the harbour expert employed by the Government of India, says: "Perhaps the most important thing that can be done for the improvement of Mangalore is to fix the harbour mouth and prevent its shifting. So long as the mouth wanders about, the bar will never have the full water on it that is due to the available scour." . . . . "The effect of fixing the harbour mouth will very soon be felt at the bar."

(*d*) Though it is impossible to divert from the backwater much of the drainage which brings a considerable quantity of silt into it between the "Sultan's Battery" and the "Marine yard," the minor town drains which now form shoals in most inconvenient places along the face of the quay might be so dealt with by silt traps (to be kept constantly cleared by manual labour) that they would cease to be the annoyances and hindrances to traffic that they now are.

(*e*) The tidal scour is the chief, if not the only, factor in keeping the "bar" practicable during the dry season which is also the shipping season, and therefore no appreciable curtailment of the tidal basin should be allowed.

10. From these premises may be deduced the general lines which the proposals to be made will probably have to follow; they are—

(*a*) The protection of the barrier between the sea and the backwater so that it may be possible to carry out,

(*b*) the *fixing* of the entrance and bar and keeping them approximately uniform in size and depth instead of allowing them to vary in those particulars year by year.

(*c*) The provision of means of dredging in the inner harbour whenever and wherever required.

11. It may be at once stated that there is no probability of the "Port funds," now considered as belonging exclusively to Mangalore, being able to meet the cost of the works which will be necessary, but the railway from Mysore will raise the port to a position of such general public importance as would seem to warrant its being dealt with liberally from "Provincial," if not "Imperial" funds.

12. Though perhaps not strictly within the intended scope of this report, it seems right to call attention to the necessity for, *as soon as possible*, dredging out the channel from the harbour entrance to the pattimar anchorage opposite the custom-house; the state of this channel has for some time past seriously hampered the port, and will, if not improved, again this year seriously hamper it. This work is one which may well be met from the local "Port funds" and "dues."

See appendices 1 and 2 with this report for correspondence with the Marine Department about this.

13. There is another subject connected with improvements to the port which it may be as well to notice here, and that is, the proposed reclamation of the ragged foreshore between the present "Bunder" and the "Marine yard" referred to in paragraphs 3 and 5 of letter from the Presidency Port officer, No. 695—276 G., dated 20th July 1894, with Proceedings of the Madras Government No. 297-A, dated 26th July 1894.

The project was worked out in detail by Colonel A. T. Frazer, R.E., then Executive Engineer, West Coast Division, in September 1889. His estimate came to Rs. 45,520 and was doubtless approximately correct. The work appears a most advisable one on its own merits even irrespective of the general improvement of the harbour, especially if the railway runs into Mangalore at, or near, the "Marine yard" as will most probably be the case. This reclamation would not, of course, be recommended if it would appreciably reduce the tidal area [see (*e*) of paragraph 9 *supra*], but this would not be the case, for though it would provide some 11 acres of ground for a road, for wharves, for warehouses, and perhaps for railway sidings, &c., the area is so shoal that the quantity of tidal water which at times covers it forms but an insignificant percentage of that which passes in and out of the harbour mouth. Most certainly no private rights in connection with the foreshore in question should be allowed to spring up.

14. For reference there are sent with this report (1) "Marine chart sheet IX" *borrowed* from the Presidency Port officer, and (2) a copy on tracing linen of a "plan of Mangalore harbour taken in January 1885" *borrowed* from the office of the Superintending Engineer, IV Circle.

OOTACAMUND,
13th September 1894.

(Signed) G. T. WALCH, M. INST. C.E.

Since that preliminary report was written I have paid two more visits to Mangalore—one in February, the other in May. From personal observations then made and from the surveys and soundings taken for me at various times between November and May, I am enabled to submit the following recommendations which, if followed, will, I have no doubt, much improve the inner harbour and its entrance, and will also improve to some extent the *sea bar*, though to have much effect on *it* would require sea walls of upwards of ¾ mile long, extending beyond it into deep water, of so massive a character, to withstand the heavy seas of the south-west monsoon, that the work would assume the general character of the Madras harbour walls, and would be so costly a work that it is useless now to consider it.

Confining myself, therefore, to the inner harbour and its entrance, I recommend—

FIRST.—The protection of the sand-spit, or barrier, between the sea and the backwater, from "Tannirbhavi," nearly opposite Sultan's Battery, to Ullal, so that the formation of any second opening to the sea may be prevented, and the entrance to the inner harbour may be fixed to *one* definite place.

2. *Mangalore town* lies for about 3 miles along the eastern side of the "backwater," which there varies from 1,800 to 2,800 feet in breadth, and is separated from the sea by a low strip of sand, nowhere more than 1,000 feet wide and in parts but little more than 100 feet.

3. Into the "backwater" at its northern end near "Sultan's Battery" flows the "Gurrupúr river" draining some 320 square miles, and across the southern end of the backwater near the "Marine yard" flows the Nétrávati draining about 1,220 square miles. For some 3 or 4 miles before it enters the backwater proper near Sultan's Battery, the course of the "Gurrupúr river" is nearly north and south and roughly parallel to the coast, but the course of the Nétrávati for its last few miles is almost east and west, nearly at right angles to the coast line.

4. The sandy barrier between the backwater and the sea is so narrow, low, and unstable that it is easily breached through when the level of the backwater is raised by river floods; the consequence is that new openings to the sea are frequently formed; sometimes each river has a separate mouth; at other times, as now, there is but one mouth common to both rivers, and these openings or "mouths" shift about along the whole length of the backwater between "Tannirbhavi" opposite Sultan's Battery on the north, and the village of Ullal on the south.

5. This ever-changing position of the harbour entrance and the resulting variations of the state of the bar and of the "backwater," which cause uncertainty as to what from year to year will be the difficulties in the way of shipping, are great drawbacks to the port. Its history is by no means one of continuous deterioration as is sometimes supposed, but one of constant change; a bad state of affairs having been followed by a better one, which has again deteriorated to be followed by improvement, *e.g.*, one of the great complaints as to the present state of the inner harbour is that whereas it used to be deep enough along its eastern side for "pattimars" and large laden cargo boats, to approach the quay (locally known as the "bunder"), the place is now so shallow there that those crafts have to lie some distance from the quay and cargo has to be taken to and from them in small boats; in November 1843, however, the then District Engineer, Captain (now General) F. C. Cotton, R.E., says in his diary . . . . . "*no boats* can approach the landing place except near the time of high water and the larger vessels which communicate with the pattimars in the offing make in consequence but one trip a day." . . . . "the distance from deep water to the custom-house is about 900 feet;" he therefore proposed dredging a channel for the boats to pass to and from the larger craft; the state of affairs would thus appear to have then been considerably worse than now; and again, the channel from the harbour entrance to the pattimar anchorage opposite the custom-house is now much complained about and is certainly very bad, but in 1837 it was apparently even worse, for in a letter from the "Civil Engineer" to the "Principal Collector, Mangalore," dated 30th May 1837, he says that as the result of there being two mouths to the rivers . . . . . "the backwater has become considerably shallow and when the tide is out greatly diminished in breadth, the consequence of which is that whereas formerly pattimars used to lie on the backwater opposite the custom-house, they are now obliged to remain lower down and immediately inside the mouth of the southern river."

6. Records also show that the "bar," though it has sometimes been better than it now is, has not infrequently been worse.

7. There does not appear to have been, in recent times at all events, any deterioration of the open sea anchorage for large vessels, and improvement of it could only be effected by an artificial harbour on the general lines of the one at Madras, at an altogether prohibitory cost. It is not, it is understood, to be now dealt with, the present investigations being confined to the means of making the best of the inner harbour and its entrance.

8. The first step in this direction has been taken by an inspection of the port during the south-west monsoon when the rivers were in fresh, and a general consideration under those conditions of the various proposals which have from time to time been made for improvement of the harbour. All the European merchants and most of the native ones were good enough to state their views and to give all information in their power.

9. But before it can be determined what detail proposals shall be made, it is necessary * that the port should be studied also under the different aspects which it will present when no river waters are affecting it and shipping operations are in full swing; certain surveys and soundings also are required; in the meantime, however, some of the general conclusions already arrived at may be thus stated—

* See covering letter, paragraphs 4 and 5.

(*a*) When, as often has been the case, there have been two openings to the sea, the entrances to the harbour and their "*bars*" have been worse than when the river waters and the tidal scour have been concentrated on one opening.

(*b*) When the "Nétrávati" has had its mouth towards the north of the backwater, its flood waters have scoured out the backwater along the town face to deeper than is the case when that river passes in the most natural course direct to the sea, near the south end of the backwater; but on the other hand the latter position is the best for the harbour entrance and the bar.

(*c*) It is of *primary* importance to secure a good permanent "bar" and entrance to the inner harbour; the difficulties *in it* could always be dealt with by dredging which could be carried on in smooth water at all times.

Marine Current No: 106

15-1-96 marine No. 15 mar
14-6-95 " 172.
5-6-95 " 159.
25-7-94 " 266.
14-3-96 " 171 Mar. 2-96
27-1-96 " 133 "
7 1395 096

No. 397 W., 31st January 1896.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

READ—the following paper :—

From G. T. WALCH, Esq., MEM. INST. C.E., to the Chief Secretary to Government, dated Ootacamund, 14th November 1895.

With reference to paragraph 1 of G.O. No. 377, Marine, dated 21st September 1894, G.O. No. 419, Marine, dated 1st November 1894, and paragraph 4 of G.O. No. 159, Marine, dated 5th June 1895, I have now the honour to submit my final report and proposals in connection with the Mangalore "Inner * harbour and its entrance."

* See paragraph 7 of Preliminary Report.

I would have sent this report sooner, but I have for some time been hoping to get the Proceedings of Madras Government with the Arsikere-Mangalore Railway survey, which I was informed would be accompanied by a "note" on the Mangalore harbour, by Mr. Gilchrist, the Engineer-in-Chief of the Railway Survey, and that note I thought it would be advisable to deal with in my report.

This was specially the case as Mr. Gilchrist was good enough to let me know a good deal that there would be in his "note," and there was evidently much that I could not agree with. However, so much time has passed that I cannot any longer delay my report.

Besides plan A, which accompanies the "report," I send herewith the undermentioned charts specially prepared for me, whilst studying the subject, by Mr. Simpson, the Port Officer, with the help of a Surveyor, and of Mr. Vas, Sub-Division Officer, Public Works Department. To Mr. Simpson I am much indebted for his earnest endeavours during seven months to do what I wanted as far as was possible with the somewhat limited time, and rough appliances at his disposal.

The difficulty of dealing with the subject owing to the absence of such charts and records for previous years is noted in paragraph 5 of my letter, dated 24th May 1895, printed with Proceedings of Madras Government, No. 159, Marine, dated 5th June 1895.

ENCLOSURES.

List of charts referred to in letter above.

1 Chart (tracing) Mangalore backwater and entrance (scale 1″ = 660′) for Nov. and Dec. 1894.
1 Do. do. do. do. for January 1895.
1 Do. do. do. do. for February 1895.
1 Do. do. do. do. for March 1895.
1 Do. do. do. do. for April 1895.
1 Chart (tracing), Entrance to backwater (scale 1″ = 100′) for May 1895.
1 Combined tracing of charts for November and December 1894, and April 1895 (scale 1″ = 660′)

MANGALORE HARBOUR.

Final Report and Proposals.

(Referred to in Proceedings of Madras Government No. 377, Marine, dated 21st September 1894, and No. 419, dated 1st November 1894.)

Before proceeding with this report, it will be convenient to re-read the "Preliminary Report" which will have to be frequently referred to.

Preliminary Report called for in G.O. No. 296, Marine, dated 25th July 1894.

Mangalore port consists of an open roadstead where large vessels anchor from one to two miles from the shore, and a "backwater" forming an inner harbour used by the smaller sea-going craft ("pattimars"); access to this inner harbour is through the channel by which the waters of two rivers (the "Nétrávati" and the "Gurrupúr" river) find their way to the sea, the channel being kept open, even when no fresh water is coming down the rivers, by the tidal scour due to the extensive natural basin affected by the tides.

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1896} Madras.

PUBLIC WORKS.

Dated January, 31st.

Recd. *Encl.*

G.O. No. 397 W., 31st Jan. 1896.

JANUARY.

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No 83 Marine 12 Feby 1896.

Communicated to the Presidency Port officer

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Mangalore Harbour

Letter from Mr. G. T. Walch submitting his final report and proposals for improving the Mangalore "Inner" harbour and its entrance, communicated with remarks to Superintending Engineer, IV Circle, for submission of detailed estimates.

Order—No. 397 W., dated 31st January 1896.

Communicated to the Superintending Engineer, IV Circle, who will submit detailed estimates for carrying out the works proposed by Mr. Walch. On receipt of these estimates, the Government will consider the question of the provision of funds.

(True Extract.)

Under Secy. to Govt., P.W.D.

To G. T. Walch, Esq., M.I.C.E.
„ the Superintending Engineer, IV Circle, with enclosures.
„ the Marine Department.

Exd. T. K. Narayana Aiyangar.

Spare Copies

This final report also does not deal with the suggestions made in the "Preliminary" one as to the town drains; and the reclamation between the "Bunder" and the "Marine yard," because the former is a Municipal affair, and the latter, though advisable on its own merits and in connection with the proposed railway, is not a necessity as regards the special object dealt with in this report.

Ootacamund,
14th November 1895.

(Signed) G. T. WALCH, M. Inst. C.E.

Abstract approximate estimate for work recommended in final report on Mangalore Harbour.

Dimensions. Length.	Breadth.	Depth.	Quantities.	Description.	Rate.	Per.	Totals.	Remarks.
Ft.	Ft.	Ft.		Recommendation No. 1. *Protection of Sand-spit.*	Rs. A. P.		Rs.	
21,780	3	6	392,040 c. ft.	Stone facing	7 8 0	100 c. ft.	29,400	Assuming average height 6 ft., and breadth 3 ft. Rate, from estimate for similar work supplied by Public Works Department.
				Contingencies	..	..	2,900	
				Total ..	..	..	32,300	
				Recommendation No. 2. *Training Northern, or Gurrupúr backwater.*				
			5,300 Rg. ft.	Groynes	4 0 0	Rg. foot.	21,200	Assuming to be made of stone.
				Planting accretions ..	..	Say.	300	Average height 8 feet. Slopes ½ to 1.
				Contingencies	..	..	2,100	(*Note.*—Various kinds of groynes, *e.g.*, Stone—Earthen banks faced with stone or fascine work—Piles with wattling and filled with brushwood—could be tried and the cheapest effective style adopted).
				Total ..	..	..	23,600	
				Recommendation No. 3. *Training Nétrávati backwater.*				
			10,000 Rg. ft.	Training groynes	3 8 0	Rg. foot.	35,000	Made of earth or sand, with stone facing 1 foot 6 inches thick.
				Planting accretions ..	..	Say.	600	Average height 9 feet. Slopes 1 to 1.
				Contingencies	..	..	3,500	
				Total ..	..	..	39,100	
				Recommendation No. 4. *"Heads" to protect ends of sand-spits at entrance.*				
			1,900 Rg. ft.	Sheet piles averaging 25 feet long.	50 0 0	R.. foot.	95,000	Piles Rs. 1–8–0 per foot. Driving Rs 12–8–0.
			500 „	Sheet piles averaging 15 feet long.	30 0 0	Do.	15,000	Piles Rs. 1–8–0 per foot. Driving Rs. 7–8–0.
			4,800 „	Waling pieces (2), good jungle wood.	2 0 0	Do.	9,600	Size 12″ × 12″.
			240 No.	Rear piles, at 10′ apart, jungle wood.	15 0 0	Each.	3,600	
			3,600 Rg. ft.	Ties from front to rear piles, jungle wood.	2 0 0	Rg. foot.	7,200	Size 12″ × 12″.
2,400	15	..	36,000 sq. ft.	Mattress or fascine work for "artificial beach."	2 0 0	100 sq. ft.	720	Rate—rough approximation—no such work yet done.
				Contingencies	..	..	13,880	
				Total ..	..	..	1,45,000	
				Grand Total (exclusive of superintendence).	..	..	2,40,000	

14th November 1895.

(Signed) G. T. WALCH, M. Inst. C.E.

It will be useless to attempt the execution of any of the subsequent proposals, if this first and most essential one be not efficiently carried out to start with.

This part of the work will be easy and comparatively inexpensive. From what I have seen and read, I am convinced that what have to be guarded against are not breaches caused by the sea, but breaches caused by currents and eddies on the backwater side of the barrier; when such breaches occur just before, or whilst the rivers, especially the Gurrupúr river, are in high flood, they give trouble, perhaps for years, though sooner or later the sea closes them and nature reverts to the one opening to the sea somewhere about opposite the end of the Nétrávati river.

The effect of protection put up by private persons along the margins of the backwater, at Ullal and elsewhere, shows that a comparatively slight edging of stone, carried up to near high tide level, will effectually protect the inner margin of the sand-spit from erosion, and it is such protection that I propose should be used, except near and at the Entrance, which will be dealt with separately.

The general disposition for this sand-spit protection is shown on plan No. A herewith; but this, it will be understood, is only an indication of what is proposed, and changes in configuration, depths, &c., which are constantly taking place, may render it necessary to depart considerably from what is now shown; as long as the protection to the sand-spit is effective, the lines in which it is arranged are of minor moment.

SECOND.—The training of the northern, or Gurrupúr, branch of the backwater between Sultan's Battery and the "Marine yard," so that the energy of the freshwater and tidal currents may not, as now, be dissipated over a wide shallow basin, forming in it tortuous channels of little depth, but be more concentrated on the eastern side of the backwater, where depth and comparative straightness of channel are required for navigation.

The best final width for this portion of the backwater cannot, of course, be now laid down with absolute certainty, the conditions to be dealt with are too complex for this, but an average width of about 1,600 feet will not be too narrow, and even this could be worked up to tentatively.

The reclamation which would be required to secure this, is shown on plan No. A by a green wash, and it would be gradually secured by the construction of training groynes, the ends of which, when they had fulfilled their object, and the width for the backwater was finally decided on, might be connected by training walls.

On the plan are shown some suggested positions for the groynes, but it must be understood that here, as elsewhere in dealing with this subject, it is not possible for me on the data at my disposal to lay down absolute sites, &c., for the works recommended, that must be left to whoever has to work out the scheme in detail, and even when that has been done much must still be left to the judgment of the Engineer who carries out the works.

A word of warning must be here given against even commencing these groynes before the protection of the sand-spit has been carried out. Without that protection the groynes would almost certainly cause breaches in the sand-spit.

It is believed that the greater depth which will result from narrowing the backwater will fully compensate, even in tidal volume, for the reduction in the area of the basin, and will provide a more efficient outlet than now for the Gurrupúr river; it is however possible, that here, as in so many somewhat similar cases, assistance from dredging may be required at first to remove shoals and establish the channel which will facilitate the tidal scour.

THIRD.—The training of the course of the Nétrávati river near its mouth, so as to lead the fluvial and tidal discharges more directly on to the harbour entrance than is now the case.

At present much of the discharge, especially of that of the ebb-tide when there is no fresh water coming down the river, runs round the deep bay on the south side of the river, and then northwards along the narrow sand-spit from Ullal to the entrance, where it has to turn at about right angles to its former course in order to pass out to sea. At the same place also it meets the discharge from the Gurrupúr backwater in almost direct opposition, the result being of course a shoal just inside the harbour mouth, which gives much trouble to navigation.

The two branches of the backwater so lie with reference to one another that the waters issuing from them cannot be made to join at a really favorable angle, but at all events the present state of affairs may be much improved by the training suggested, which will also help to guide the flood waters of the Nétrávati on to the entrance and the bar, in the most advantageous direction.

The general arrangement suggested for the training works is shown on plan No. A.

FOURTH.—The fixing of the harbour entrance.

The necessity for this is stated in the Preliminary report; and in his report of 1871, Mr. George Robertson, the harbour expert employed by the Government of India, says: "Perhaps the most important thing that can be done for the improvement of Mangalore is to fix the harbour mouth and prevent its shifting. So long as the mouth wanders about, the bar will never have the full water on it that is due to the available scour." . . . . "The effect of fixing the harbour mouth will very soon be felt at the bar."

As said in the "preliminary report," 9 (*b*), it is believed that the present position of the harbour entrance is about the best, and there it is proposed to fix it.

But before considering how this is to be accomplished, it is necessary to settle what width of entrance should be provided.

In deciding this, the chief element to be considered is that of the flood discharges which have to be passed, and passed without such restriction as will unduly raise the levels of floods along the lower courses of the rivers.

In the preliminary report the drainage areas of the Nétrávati and Gurrupúr rivers were taken, on the best information then available, as 1,220 and 320 square miles, respectively, but the railway authorities now take them, I am informed, as 1,410 and 352 square miles. Adopting these areas and also the formula and co-efficient used by the railway, viz., "Dicken's" * with 825, the flood discharges of the two rivers are 190,000 cubic feet a second, and 67,000 cubic feet per second, respectively, or in all 257,000 cubic feet per second, to pass out to sea through the entrance.

$$* D = 825\ M^{\frac{3}{4}}$$

Allowing a velocity through it of 6 miles per hour or, say, 9 feet per second, this large body of water would require 28,555 square feet of sectional area of water-way, and assuming an effective depth of 20 feet, the width required would be slightly over 1,400 feet. This calculation is necessarily largely made up of assumptions, but the width arrived at is about what nature has provided, and to appreciably reduce it would, I believe, be to run serious risk of flooding the margins of the lower reaches of the rivers.

This being the case it is useless to go into any theoretical considerations of whether a narrower entrance would not be better for the simple tidal discharge which has to pass to and fro through it, but I may say that, from what I saw during the spring tides of May, I would not, even if it was the discharge due to them which alone had to be considered, make the width of the entrance much less than now advocated.

To prevent the shifting of the entrance it is necessary to protect the ends of the sand-spits at the place. The simple and inexpensive method which will answer in the backwaters, where the water is still and the scour but slight, will obviously not do here, where the swell and the waves are often considerable, and the scour deep. Nor will it do to try merely a modification of the same method making the protective walls larger, for any such walls would most certainly be undermined and their materials scattered about where they would be constant sources of danger to every craft using the inner harbour. Whatever kind of work is used must go down so deep that it will not be undermined, and it must be composed of materials which cannot be moved and dropped about to form hidden dangers to the shipping; no work practicable at the place meets these requirements except "piling."

In the report already quoted from, Mr. Robertson proposed to fix part of the then harbour mouth, not the present one, by "a row of sheet piling . . . the piles to come up to high water level, to have a waling on the outside, and to be tied back at intervals to others driven into the bank behind. Stone pitching, or a thick layer of stones, should be brought up from the pile heads in a gentle slope for some distance back so as to form an artificial beach for the sea to break upon." . . . . Mr. Robertson's suggestions as to the kind of work seems generally most suitable and is adopted, except that, for the reasons given above, it is not advisable to form the "artificial beach" at back of the piles, of loose stone, and instead of it, brushwood "mattresses" or "fascine work" should be used.

The construction of these "heads" to protect the ends of the sand-spits at the entrance will necessarily be costly, for the piling along a considerable part of them will have to average some 25 feet long and be driven some 20 feet into sand.

The suggested positions and forms for these "heads" are shown on Plan A, but they are merely approximations, modifications of which will be rendered necessary by alterations in conditions before they are taken in hand.

There accompanies this report an "abstract approximate estimate" for the work recommended, which amounts to Rs. 2,40,000. This is possibly more than Government anticipated, but if the harbour is to be dealt with at all, it should be so in a systematic and fairly complete manner; to merely put, for instance, a groyne here, and another there, and expect any really beneficial result would be futile; better let the place alone than deal with it in a desultory way which would probably prove not only useless but mischievous.

It will be noticed that, except by a remark in the concluding paragraph of the second recommendation, I have not in this report dealt with the question of *Dredging*, because even without it the works proposed would be complete in themselves and efficacious to a considerable extent; but I am still of opinion that the Mangalore inner harbour will never, no matter what works are carried out, be kept in continuously first-rate order without "the means † of dredging whenever and wherever required."

† Preliminary Report, 10 (*e*).

2. *Mangalore town* lies for about 3 miles along the eastern side of the "backwater," which there varies from 1,800 to 2,800 feet in breadth, and is separated from the sea by a low strip of sand, nowhere more than 1,000 feet wide and in parts but little more than 100 feet.

3. Into the "backwater" at its northern end near "Sultan's Battery" flows the "Gurrupúr river" draining some 320 square miles, and across the southern end of the backwater near the "Marine yard" flows the Nétrávati draining about 1,220 square miles. For some 3 or 4 miles before it enters the backwater proper near Sultan's Battery, the course of the "Gurrupúr river" is nearly north and south and roughly parallel to the coast, but the course of the Nétrávati for its last few miles is almost east and west, nearly at right angles to the coast line.

4. The sandy barrier between the backwater and the sea is so narrow, low, and unstable that it is easily breached through when the level of the backwater is raised by river floods; the consequence is that new openings to the sea are frequently formed; sometimes each river has a separate mouth; at other times, as now, there is but one mouth common to both rivers, and these openings or "mouths" shift about along the whole length of the backwater between "Tannirbhavi" opposite Sultan's Battery on the north, and the village of Ullal on the south.

5. This ever-changing position of the harbour entrance and the resulting variations of the state of the bar and of the "backwater," which cause uncertainty as to what from year to year will be the difficulties in the way of shipping, are great drawbacks to the port. Its history is by no means one of continuous deterioration as is sometimes supposed, but one of constant change; a bad state of affairs having been followed by a better one, which has again deteriorated to be followed by improvement, *e.g.*, one of the great complaints as to the present state of the inner harbour is that whereas it used to be deep enough along its eastern side for "pattimars" and large laden cargo boats, to approach the quay (locally known as the "bunder"), the place is now so shallow there that those crafts have to lie some distance from the quay and cargo has to be taken to and from them in small boats; in November 1843, however, the then District Engineer, Captain (now General) F. C. Cotton, R.E., says in his diary . . . . "*no boats* can approach the landing place except near the time of high water and the larger vessels which communicate with the pattimars in the offing make in consequence but one trip a day." . . . "the distance from deep water to the custom-house is about 900 feet;" he therefore proposed dredging a channel for the boats to pass to and from the larger craft; the state of affairs would thus appear to have then been considerably worse than now; and again, the channel from the harbour entrance to the pattimar anchorage opposite the custom-house is now much complained about and is certainly very bad, but in 1837 it was apparently even worse, for in a letter from the "Civil Engineer" to the "Principal Collector, Mangalore," dated 30th May 1837, he says that as the result of there being two mouths to the rivers . . . . "the backwater has become considerably shallow and when the tide is out greatly diminished in breadth, the consequence of which is that whereas formerly pattimars used to lie on the backwater opposite the custom-house, they are now obliged to remain lower down and immediately inside the mouth of the southern river."

6. Records also show that the "bar," though it has sometimes been better than it now is, has not infrequently been worse.

7. There does not appear to have been, in recent times at all events, any deterioration of the open sea anchorage for large vessels, and improvement of it could only be effected by an artificial harbour on the general lines of the one at Madras, at an altogether prohibitory cost. It is not, it is understood, to be now dealt with, the present investigations being confined to the means of making the best of the inner harbour and its entrance.

8. The first step in this direction has been taken by an inspection of the port during the south-west monsoon when the rivers were in fresh, and a general consideration under those conditions of the various proposals which have from time to time been made for improvement of the harbour. All the European merchants and most of the native ones were good enough to state their views and to give all information in their power.

9. But before it can be determined what detail proposals shall be made, it is necessary * that the port should be studied also under the different aspects which it will present when no river waters are affecting it and shipping operations are in full swing; certain surveys and soundings also are required; in the meantime, however, some of the general conclusions already arrived at may be thus stated—

* See covering letter, paragraphs 4 and 5.

(*a*) When, as often has been the case, there have been two openings to the sea, the entrances to the harbour and their "*bars*" have been worse than when the river waters and the tidal scour have been concentrated on one opening.

(*b*) When the "Nétrávati" has had its mouth towards the north of the backwater, its flood waters have scoured out the backwater along the town face to deeper than is the case when that river passes in the most natural course direct to the sea, near the south end of the backwater; but on the other hand the latter position is the best for the harbour entrance and the bar.

(*c*) It is of *primary* importance to secure a good permanent "bar" and entrance to the inner harbour; the difficulties *in it* could always be dealt with by dredging which could be carried on in smooth water at all times.

(*d*) Though it is impossible to divert from the backwater much of the drainage which brings a considerable quantity of silt into it between the "Sultan's Battery" and the "Marine yard," the minor town drains which now form shoals in most inconvenient places along the face of the quay might be so dealt with by silt traps (to be kept constantly cleared by manual labour) that they would cease to be the annoyances and hindrances to traffic that they now are.

(*e*) The tidal scour is the chief, if not the only, factor in keeping the "bar" practicable during the dry season which is also the shipping season, and therefore no appreciable curtailment of the tidal basin should be allowed.

10. From these premises may be deduced the general lines which the proposals to be made will probably have to follow; they are—

(*a*) The protection of the barrier between the sea and the backwater so that it may be possible to carry out,

(*b*) the *fixing* of the entrance and bar and keeping them approximately uniform in size and depth instead of allowing them to vary in those particulars year by year.

(*c*) The provision of means of dredging in the inner harbour whenever and wherever required.

11. It may be at once stated that there is no probability of the "Port funds," now considered as belonging exclusively to Mangalore, being able to meet the cost of the works which will be necessary, but the railway from Mysore will raise the port to a position of such general public importance as would seem to warrant its being dealt with liberally from "Provincial," if not "Imperial" funds.

12. Though perhaps not strictly within the intended scope of this report, it seems right to call attention to the necessity for, *as soon as possible*, dredging out the channel from the harbour entrance to the pattimar anchorage opposite the custom-house; the state of this channel has for some time past seriously hampered the port, and will, if not improved, again this year seriously hamper it. This work is one which may well be met from the local "Port funds" and "dues."

See appendices 1 and 2 with this report for correspondence with the Marine Department about this.

13. There is another subject connected with improvements to the port which it may be as well to notice here, and that is, the proposed reclamation of the ragged foreshore between the present "Bunder" and the "Marine yard" referred to in paragraphs 3 and 5 of letter from the Presidency Port officer, No. 695—276 G., dated 20th July 1894, with Proceedings of the Madras Government No. 297-A, dated 26th July 1894.

The project was worked out in detail by Colonel A. T. Frazer, R.E., then Executive Engineer, West Coast Division, in September 1889. His estimate came to Rs. 45,520 and was doubtless approximately correct. The work appears a most advisable one on its own merits even irrespective of the general improvement of the harbour, especially if the railway runs into Mangalore at, or near, the "Marine yard" as will most probably be the case. This reclamation would not, of course, be recommended if it would appreciably reduce the tidal area [see (*e*) of paragraph 9 *supra*], but this would not be the case, for though it would provide some 11 acres of ground for a road, for wharves, for warehouses, and perhaps for railway sidings, &c., the area is so shoal that the quantity of tidal water which at times covers it forms but an insignificant percentage of that which passes in and out of the harbour mouth. Most certainly no private rights in connection with the foreshore in question should be allowed to spring up.

14. For reference there are sent with this report (1) "Marine chart sheet IX" *borrowed* from the Presidency Port officer, and (2) a copy on tracing linen of a "plan of Mangalore harbour taken in January 1885" *borrowed* from the office of the Superintending Engineer, IV Circle.

Ootacamund,
13th September 1894.

(Signed) G. T. WALCH, M. INST. C.E.

Since that preliminary report was written I have paid two more visits to Mangalore—one in February, the other in May. From personal observations then made and from the surveys and soundings taken for me at various times between November and May, I am enabled to submit the following recommendations which, if followed, will, I have no doubt, much improve the inner harbour and its entrance, and will also improve to some extent the *sea bar*, though to have much effect on *it* would require sea walls of upwards of ¾ mile long, extending beyond it into deep water, of so massive a character, to withstand the heavy seas of the south-west monsoon, that the work would assume the general character of the Madras harbour walls, and would be so costly a work that it is useless now to consider it.

Confining myself, therefore, to the inner harbour and its entrance, I recommend—

FIRST.—The protection of the sand-spit, or barrier, between the sea and the backwater, from "Tannirbhavi," nearly opposite Sultan's Battery, to Ullal, so that the formation of any second opening to the sea may be prevented, and the entrance to the inner harbour may be fixed to *one* definite place.

No. 397 W., 31st January 1896.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following paper :—

From G. T. WALCH, Esq., Mem. Inst. c.e., to the Chief Secretary to Government, dated Ootacamund, 14th November 1895.

With reference to paragraph 1 of G.O. No. 377, Marine, dated 21st September 1894, G.O. No. 419, Marine, dated 1st November 1894, and paragraph 4 of G.O. No. 159, Marine, dated 5th June 1895, I have now the honour to submit my final report and proposals in connection with the Mangalore "Inner * harbour and its entrance."

* See paragraph 7 of Preliminary Report.

I would have sent this report sooner, but I have for some time been hoping to get the Proceedings of Madras Government with the Arsikere-Mangalore Railway survey, which I was informed would be accompanied by a "note" on the Mangalore harbour, by Mr. Gilchrist, the Engineer-in-Chief of the Railway Survey, and that note I thought it would be advisable to deal with in my report.

This was specially the case as Mr. Gilchrist was good enough to let me know a good deal that there would be in his "note," and there was evidently much that I could not agree with. However, so much time has passed that I cannot any longer delay my report.

Besides plan A, which accompanies the "report," I send herewith the undermentioned charts specially prepared for me, whilst studying the subject, by Mr. Simpson, the Port Officer, with the help of a Surveyor, and of Mr. Vas, Sub-Division Officer, Public Works Department. To Mr. Simpson I am much indebted for his earnest endeavours during seven months to do what I wanted as far as was possible with the somewhat limited time, and rough appliances at his disposal.

The difficulty of dealing with the subject owing to the absence of such charts and records for previous years is noted in paragraph 5 of my letter, dated 24th May 1895, printed with Proceedings of Madras Government, No. 159, Marine, dated 5th June 1895.

Enclosures.

List of charts referred to in letter above.

1 Chart (tracing)	Mangalore backwater and entrance (scale 1″ = 660′)				for Nov. and Dec. 1894.
1	Do.	do.	do.	do.	for January 1895.
1	Do.	do.	do.	do.	for February 1895.
1	Do.	do.	do.	do.	for March 1895.
1	Do.	do.	do.	do.	for April 1895.
1	Do.	do.	do.	do.	for May 1895.

1 Chart (tracing), Entrance to backwater (scale 1″ = 100′)
1 Combined tracing of charts for November and December 1894, and April 1895 (scale 1″ = 660′)

Mangalore Harbour.

Final Report and Proposals.

(Referred to in Proceedings of Madras Government No. 377, Marine, dated 21st September 1894, and No. 419, dated 1st November 1894.)

Before proceeding with this report, it will be convenient to re-read the "Preliminary Report" which will have to be frequently referred to.

Preliminary Report called for in G.O. No. 296, Marine, dated 25th July 1894.

Mangalore port consists of an open roadstead where large vessels anchor from one to two miles from the shore, and a "backwater" forming an inner harbour used by the smaller seagoing craft ("pattimars"); access to this inner harbour is through the channel by which the waters of two rivers (the "Nétrávati" and the "Gurrupúr" river) find their way to the sea, the channel being kept open, even when no fresh water is coming down the rivers, by the tidal scour due to the extensive natural basin affected by the tides.

No. 59, Financial, 22nd January 1896.

GOVERNMENT OF MADRAS.

FINANCIAL DEPARTMENT.

Read—the following paper :—

From F. C. HARRISON, Esq., Officiating Accountant-General to the Government of Madras, to the Chief Secretary to Government, dated Fort St. George, 19th December 1895, No. 3560.

I have the honour, with reference to G.O., No. 1087, dated the 10th December 1894, to forward tables showing the powers at present exercised by various officers in respect of establishment, contingent and other charges. For the sake of convenience I have had the information arranged in two separate ways. In one statement I show the description of charge and the powers enjoyed in respect to it by the several departments, and in the other I show the department first and then its powers. Government will find the first method of some assistance in comparing the powers given to different departments in respect of charges of a similar character.

2. There are several points which would have formed the subject of separate communications, but it seemed preferable that the raising of them should be deferred until Government was in the position, as it is now, of surveying the questions raised as a whole. In particular and chiefly I allude to the power delegated by Government in respect of temporary appointments. It is a general rule that delegated powers cannot be re-delegated. Article 95 of the Civil Service Regulations vests the power of sanctioning temporary appointments in the Local Government. It appears, therefore, necessary in the event of Government desiring to maintain or amplify its existing practice that the assent of the Government of India should be obtained to it. I notice from the tables annexed that powers have been delegated in various ways subject to limits of salary, time, budget provision or scales.

3. With regard to contingencies the powers of a Local Government are far more elastic, being regulated by article 75 of the Civil Account Code. This general provision is, however, restricted in certain cases by the particular rulings quoted in article 98. In this view the delegation of the power to sanction rent, which is a recurring charge, requires confirmation.

4. Other points that occur to me are—

(i) that it might be possible perhaps to consolidate and unify to some extent the powers given as regards refunds and rewards.

(ii) that the delegation of the power to write off deficiencies in medical stores to the Surgeon-General is contrary to article 279 of the Civil Account Code.

(iii) that the power given to the Commissioner of Police to purchase horses subject to budget provision appears somewhat extensive. The Government of India have ruled that inclusion in the budget is not a sanction for the incurrent of expenditure. It is respectfully urged that the propriety of actually expending the sums provided is more conveniently considered at a later date.

(iv) that the delegation to the Board and the High Court of the power to sanction miscellaneous expenditure without restriction is contrary to the meaning of article 75 which contemplates all but ordinary expenditure coming under Government control.

* * * * *

Enclosures.

Item of expenditure.	Head of department.	Extent of power.	Authority.
Temporary establishments.	Board of Revenue ..	To sanction the entertainment of amins and process-servers under Act II of 1864 during kist months, provided the fixed rates of Rs. 10 per mensem to amins and Rs. 7 to peons is not exceeded.	G.Os., Nos. 942 and 779, Revenue, dated 1st May 1879 and 1st June 1884.
Do.	Do. ..	To sanction temporary hands for the District Press for periods not exceeding one year.	G.O., No. 859, Revenue, dated 21st October 1889.
Do.	Do. ..	To sanction temporary establishment for managing attached estates under section 28 of Madras Act II of 1864, provided that the cost does not exceed Rs. 100 per mensem.	G.O., No. 823, Revenue, dated 7th July 1884.
Do.	Do. ..	To sanction all temporary establishments in the Forest Department subject to the proviso that pay of each member of such establishment is below Rs. 100 per mensem.	Section 8, Forest Code.
Do.	Do. ..	To sanction extra hands for settlement parties up to the limit of budget grant.	G.O., No. 706, Revenue, dated 25th May 1859.
Do.	Collectors	To entertain establishments for stamping weights and measures within the limit of the receipts on such account.	Appendix to Board's Standing Order No. 238.
Do.	Superintendent of Revenue Survey.	To sanction the entertainment of temporary field establishments within the budget grant.	G.Os., No. 2097, Revenue, dated 25th October 1879, and No. 261, Revenue, dated 2nd March 1880.
Do.	Inspector-General of Registration.	To sanction the entertainment of section writers.	G.O., No. 230, Judicial, dated 27th January 1888.
Do.	District Registrars ..	To employ a second peon for about thirty days in a year when they go on tour of inspection of Sub-Registry offices.	G.O., Mis. No. 285, Judicial, dated 22nd March 1882.
Do.	District and Sessions Judges.	To entertain when necessary an additional translator and pay him at the rate of Re. 1 for 300 Vernacular words to translate the record of sessions cases referable to the High Court.	G.O., No. 1557, Judicial, dated 20th September 1862.
Do.	Do.	To entertain extra copyists, readers and examiners when emergency requires it.	G.O., No. 549, Judicial, dated 3rd March 1886.
Do.	District Magistrates ..	To entertain two clerks on Rs. 25 each for two months in every year for the preparation of Criminal Statistics.	G.O., No. 883, Judicial, dated 5th April 1884.
Do.	Do. ..	To sanction an extra warder in cases where a lunatic is sent to a sub-jail for observation or detention, the pay of such warder being Rs. 10 in the Nilgiri district and Rs. 8 elsewhere.	G.Os., Nos. 512, 2516, 1135 and 374, dated 22nd February 1883, 21st September 1883, 2nd July 1889 and 28th February 1890.
Do.	Inspector-General of Prisons.	To sanction two extra warders on Rs. 7 each to guard lunatics sent to district jails.	G.O., No. 374, Judicial, dated 28th February 1890, and Rule 222, Jail Code.
Do.	Do.	To sanction temporary warders in place of permanent warders deputed in charge of prisoners on transfer from one jail to another.	G.O., No. 3207, Judicial, dated 8th December 1884.
Do.	Do.	To sanction one warder on Rs. 7 for every addition of 11 prisoners to the population in Central Jails and of 10 prisoners to the population in District Jails.	Rule 220, Jail Code.
Do.	Do.	To sanction one third-grade head warder on Rs. 10 per mensem, and three third class warders on Rs. 7 each to guard condemned prisoners.	Rule 221, Jail Code.
Do.	Superintendent of Jails.	To entertain temporary warders in place of permanent warders sent in charge of prisoners under the Prisoners Testimony Act.	G.O., No. 403, Judicial, dated 21st March 1872.
Do.	Director of Public Instruction.	To sanction temporary establishments for the offices of the Assistant and Sub-Assistant Inspectors of Schools within budget provision.	G.O., No. 442, Educational, dated 9th June 1892.
Do.	Surgeon-General with Government.	To sanction temporary establishments in Lunatic Asylums for periods of twelve months or less so long as the number of keepers does not exceed the proportion of one keeper to seven insanes. An additional keeper may be entertained in cases where the number of insanes exceeds a multiple of seven by three or more.	G.O., No. 1751, Judicial, dated 12th October 1889.
Travelling Allowances	Board of Revenue ..	To sanction travelling allowances to inferior servants in the Revenue Department on transfer.	G.O., No. 908, Financial, dated 29th October 1894.

Item of expenditure.	Head of department.	Extent of power.	Authority.
Travelling Allowances —*cont.*	Board of Revenue—*cont.*	To sanction charges for the conveyance of horses and tents by rail or steamer in the case of officers subordinate to the Board in the Revenue Settlement and Separate Revenue Departments, and at the following rates in the case of officers of the Land Revenue Departments:— Horses. Tents. MDS. Collectors .. .. 4 65 Sub-Collectors .. 4 55 Head Assistants .. 3 45 Other Divisional Officers 3 35	G.Os., No 504, Financial, dated 19th June 1882, and No. 516, Financial, dated 26th June 1891.
Do.	Superintendent of Revenue Survey.	To sanction charges for the conveyance of camp and horses of officers of the Survey Department to the following limits:— Horses. Camp. MDS. Deputy Superintendent .. .. 3 35 Assistant Superintendent 3 25	G.Os., No. 1114, Financial, dated 5th September 1882, and No. 1182, Revenue, dated 25th September 1883.
Do.	Inspector-General of Prisons.	To sanction travelling allowances to inferior servants in the Jail Department on transfer under article 1216 (*b*) of the Civil Service Regulations.	G.O., No. 1864, Judicial, dated 2nd November 1889.
Do.	Inspector-General of Police.	To sanction charges for the conveyance of camp and horses of officers of the Police Department to the following limits:— Horses. Camp. MDS. Deputy Inspector-General .. .. 4 55 Superintendent .. 3 55 Assistant Superintendent .. .. 3 55 LB. Inspectors 1 700	G.O., No. 2010, Judicial, dated 1st August 1883.
Office-rent	Board of Revenue ..	To sanction all rent charges in the Revenue Department including accommodation for the offices of the Stationary Sub-Magistrates.	G.Os., No. 1262, Financial, dated 4th July 1879; No 1048, Revenue, dated 17th September 1884; and No 326, Revenue, dated 8th May 1894.
Do.	Do. ..	To sanction rent and other recurring expenditure in the Forest Department.	Section 146, Forest Code.
Do.	Superintendent of Revenue Survey.	To sanction rent of Survey offices below Rs. 50 per mensem.	G.O., No. 373, Revenue, dated 25th May 1894.
.. .. ..	Inspector-General of Registration.	To sanction rent not exceeding Rs. 10 per mensem for Registration offices.	G.O., No. 3135, Judicial, dated 19th December 1894.
Do.	Inspector-General of Police.	To sanction rent to a limit of Rs. 150 for each district for Police officers and station houses.	G.O., No. 723, Judicial, dated 7th June 1860.
Do.	Commissioner of Police.	To sanction rent for Police station houses in the Presidency Town up to a limit of Rs. 70 per mensem.	G.O., No. 111, Judicial, dated 20th February 1889.
Do.	Director of Public Instruction.	To sanction rent of school-houses not exceeding Rs. 10 per mensem.	G.O., No. 631 R., Financial, dated 13th July 1895.
Do.	Do.	To sanction rent for the accommodation of offices of Sub-Assistant Inspectors of Schools to the extent of Rs. 2 per mensem.	G.O., No. 835, Educational, dated 30th November 1882.
Petty Construction and Repairs.	Board of Revenue ..	To sanction new work or repairs to a maximum limit of Rs. 1,000.	G O., No. 370, Financial, dated 7th May 1895.
Do.	Do. ..	To sanction new works entered in the budget between Rs. 2,000 and Rs. 5,000, all repairs costing more than Rs. 2,000, and allotment from savings for unforeseen works up to Rs. 5,000 in each case in the Separate Revenue Department.	G.O., No. 172, Financial, dated 27th February 1894.
Do.	Collectors	To sanction new works or repairs to the maximum limit of Rs. 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Do.	Superintendent of Stamps.	Do. do.	Do.

Item of expenditure.	Head of department.	Extent of power.	Authority.
Petty Construction and Repairs—*cont.*	Inspector-General of Registration.	To sanction new works or repairs to the maximum limit of Rs. 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Do.	Registrars, High Court.	Do. do.	Do.
Do.	District Magistrates ..	To sanction new works or repairs to the maximum limit of Rs. 1,000 as regards buildings in their charge.	Do.
Do.	Government Agents (Ganjám, Vizagapatam and Gódávari).	To sanction new works or repairs to a maximum limit of Rs. 1,000, new roads to a limit of Rs. 3,000, and repairs to communications without any limit.	G.Os., No. 370, Financial, dated 7th May 1895, and No. 1040, Financial, dated 29th November 1894.
Do.	Inspector-General of Prisons.	To sanction new works or repairs to a maximum limit of Rs, 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Do.	Superintendents of Central Jails.	To incur charges for repairs to ordinary Jail buildings to the extent of Rs. 200 at the rate of Rs. 50 for a single work.	Rule 1229, Jail Code.
Do.	Superintendents of District Jails.	To incur charges for repairs to ordinary Jail buildings to the extent of Rs. 40 at the rate of Rs. 10 for a single work.	Do.
Do.	Inspector-General of Police.	To sanction new works or repairs to a maximum limit of Rs. 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Do.	Commissioner of Police.	Do. do.	Do.
Do.	District Superintendents of Police.	To sanction new works or repairs to a maximum limit of Rs. 100.	Do.
Do.	Director of Public Instruction.	To sanction new works or repairs to a maximum limit of Rs. 1,000.	Do.
Do.	The Venerable the Archdeacon.	To sanction new works or repairs to a maximum limit of Rs. 500.	Do.
Do.	Senior Chaplain, Church of Scotland.	Do. do.	Do.
Do.	Chaplains of all creeds.	To sanction new works or repairs to a maximum limit of Rs. 50.	Do.
Do.	Surgeon-General with Government.	To sanction new works or repairs to a maximum limit of Rs. 1,000.	Do.
Do.	Presidency Port Officer.	Do. do.	Do.
Do.	Local head of any department not specially empowered.	To sanction new works or repairs to a maximum limit of Rs. 50.	Do.
Irrigation Minor Works and Navigation.	Board of Revenue ..	To sanction allotments for individual works and establishment charges including contingencies not exceeding 15 per cent. of the outlay on works.	G.Os., No. 72, Revenue, dated 1st February 1886; No. 1029, Revenue, dated 23rd November 1886, and No. 537, Revenue, dated 2nd June 1887.
Refunds ..	Do. ..	To sanction all salt refunds	Board's Proceedings, No. 154, Separate Revenue, dated 15th March 1892, passed with reference to G.O., No. 112, Revenue, dated 1st February 1892.
Do. ..	Do. ..	To sanction refund of the value of spoilt or useless stamps or the repurchase of stamps not required for use if applied for within one year from the date on which the stamp was spoilt or rendered useless.	G.O., No. 1868, Revenue, dated 6th December 1881.
Do. ..	Do. ..	To sanction refund of penalties levied under section 34 or 37 of Act I of 1879 if applied for in writing within one year from the date of payment of the penalty.	Section 42, Stamp Act I of 1879.
Do. ..	Do. ..	To sanction refund in money of the difference between the amount of probate or administration duty originally paid on an estate, and that to be paid on the value of the estate as subsequently ascertained or make an allowance for the difference between the amounts, as in the case of spoilt stamp on application made within six months from the date on which the true value of the property was ascertained.	Section 19-A, Court Fees Act VII of 1870.

Item of expenditure.	Head of department.	Extent of power.	Authority.
Refunds—*cont.* ..	Board of Revenue—*cont.*	To sanction refund of probate or administration duty on the amount of debts actually paid out of the assets of an estate on which duty has been already paid including the debts if application be made within three years from date of payment of the debts or within such further period as the chief controlling revenue authority may allow.	Section 19-B, Court Fees Act VII of 1870.
Do.	Do. ..	To sanction refunds of revenue, fines or of interest on arrears of land revenue in cases where Collectors feel a doubt as to the propriety of granting refunds.	G.O., No. 112, Revenue, dated 1st February 1892.
Do.	Collectors	To sanction all refunds of land revenue, fines, excise duty on spirits and drugs, interest on arrears of revenue, income-tax (including those deducted from salaries, &c.), penalties under section 36 of the Stamp Act I of 1879, spoilt stamps, and stamps received back from deceased vendors, and of import and export duties and drawbacks of customs duties.	Appendix to Board's Standing Order No. 238, Para. I.
Do.	Inspector-General of Registration.	To sanction refund of fines under section 70 of the Registration Act.	G.O., No. 994, Judicial, dated 19th May 1881.
Do.	District and Sub-Registrars.	To sanction refund of fees and fines under Rule 25 of the Registration Rules.	Do.
Do.	District Magistrates ..	To sanction refunds of surplus sale-proceeds of impounded cattle credited to Government if the claim is preferred within three months.	G.O., No. 691, Revenue, dated 12th August 1889.
Do.	Commissioner for Government Examinations.	To sanction refunds of fees collected from candidates for Government Examinations.	G.O., No. 650, Educational, dated 5th September 1892.
Do.	Superintendent of Stationery.	To sanction refunds of the value of articles of stationery purchased from him and subsequently returned to him not exceeding Rs. 50 in each case.	G.O., Mis. No. 2729, Financial, dated 1st December 1883.
Do.	Registrar of the University.	To sanction refund of fees collected from candidates for the University Examinations.	G.O., No. 109, Educational, dated 3rd March 1883.
..w Charges (in..ing Fees to Pleaders).	Board of Revenue ..	To sanction fees to vakils in excess of the regulation fees or of the minimum fee of Rs. 5 for a single case and all unusual cost in law suits.	G.Os., No. 314, Judicial, dated 7th February 1888, and No. 747, Revenue, dated 22nd July 1892.
Do.	Do. ..	To sanction payment of amounts decreed to private parties in civil suits decided against Government.	G.O., No. 78, Revenue, dated 24th January 1887.
Do.	Do. ..	To sanction payment of a larger fee than Rs. 50 to a pleader engaged in a civil or criminal suit in the Forest Department.	Section 233, Forest Code.
Do.	Collectors	To sanction payment of all ordinary costs in all cases including pauper suits, and of fees to pleaders not in excess of the regulation or other authorized fees. In cases in which the regulation fee is less than Rs. 5 and is considered inadequate, a fee not exceeding Rs. 5 may be sanctioned.	G.Os., No. 747, Revenue, dated 22nd July 1892, and No. 314, Judicial, dated 7th February 1888.
Do.	High Court and Sessions Judges.	To sanction the employment of a vakil to defend undefended prisoners in original trials for murder before Sessions Courts, also where a capital sentence is possible and also where capital sentences are referred to the High Court for confirmation. The fee to be granted should never exceed Rs. 50.	G.Os., No. 2323, Judicial, dated 2nd September 1885; No. 1063, Judicial, dated 23rd May 1893; and No. 1864, Judicial, dated 31st July 1894.
Do.	District Magistrates ..	To sanction a sum not exceeding Rs. 25 in each case as fee to vakils in criminal cases and a sum not exceeding Rs. 50 in special case. In Ganjám the limit is always Rs. 50.	G.Os., Nos. 3333 and 1137, Judicial, dated 17th December 1883 and 7th May 1884.

Item of expenditure.	Head of department.	Extent of power.	Authority.
Law Charges (including Fees to Pleaders—*cont.*	Government Agents, Ganjám and Vizagapatam, and the Principal Assistant Agent, Ganjám.	To appoint their managers or head clerks to conduct prosecution in Sessions cases when a Government Prosecutor or other competent pleader is not available and allow them fees in the shape of local allowance not exceeding Rs. 25 in each case, and not exceeding Rs. 250 a month in the aggregate including their pay.	G.Os., Nos. 394 and 1756, Judicial, dated 13th February 1883 and 7th July 1885.
Rewards	Board of Revenue ..	To sanction rewards up to Rs. 500 in any salt or abkári case in which a penalty or confiscation has been adjudged by a competent authority and up to Rs. 200 in any case in which any person may have been convicted of an offence against salt or abkári laws, but in which no penalty or confiscation has been imposed or realised, and up to Rs. 100 in each case for the employment of informers or for any other purpose connected with the prevention or detection or salt and abkári offences.	G.O., No. 428, Revenue, dated 4th June 1886.
Do.	Do. ..	To sanction rewards exceeding Rs 100 in each case in the Land Customs Department.	G.O., No. 814, Revenue, dated 16th July 1880.
Do.	Do. ..	To sanction rewards to informers of frauds committed by karnams in regard to concealed cultivation or any item of Land Revenue, forming part of the annual settlement, to the extent of 50 per cent. of the year's assessment of the land or other due concerned.	Board's Standing Order No. 115.
Do.	Do. ..	To sanction rewards exceeding the proceeds of the forest produce confiscated *plus* the amount for which any other property confiscated in the same case may sell, and also that of the fine that may be imposed on the offender up to a limit of Rs. 500; and where no property has been confiscated or no penalty has been imposed or realized, to a limit of Rs. 200.	G.O., No. 68, Revenue, dated 7th February 1889.
Do.	Collectors	To sanction rewards to informers under the Land Customs Act up to Rs. 100 in each case.	G.O., No. 814, Revenue, dated 16th July 1880.
Do.	Do.	To sanction rewards to an amount not exceeding the proceeds of the *forest* produce confiscated *plus* the amount for which any other property confiscated in the same case may sell and also that of the fine imposed on the offender to a limit of Rs. 100; and where no property has been confiscated or no fine has been imposed or realized to a limit of Rs. 25.	G.O., No. 68, Revenue, dated 7th February 1889.
Do.	Do.	To sanction rewards debitable to Sea Customs and Excise not exceeding Rs. 100 in each case.	Appendix to Board's Standing Order No. 238.
Do.	Collectors and Divisional Officers.	To sanction rewards for the destruction of wild animals at the prescribed rates.	G.O., No. 85, Revenue, dated 29th January 1890.
Do.	Deputy Commissioners of Salt and Abkári Revenue.	To sanction rewards up to Rs. 100 in any salt or abkári case in which a penalty or confiscation has been adjudged by a competent authority and up to Rs. 25 in any case in which any person may be convicted of an offence against Salt or Abkári laws but in which no penalty or confiscation is imposed or realized.	G.O., No. 428, Revenue, dated 4th June 1886.
Do.	Assistant Commissioners of Salt and Abkári Revenue.	To sanction rewards up to Rs. 25 in any salt or abkári case in which a penalty or confiscation has been adjudged by a competent authority and up to Rs. 10 in any case in which any person may have been convicted of an offence against Salt or Abkári laws but in which no penalty or confiscation has been imposed or realized.	Do.

Item of expenditure.	Head of department.	Extent of power.	Authority.
Rewards—*cont.* ..	District Magistrates ..	To sanction rewards not exceeding Rs. 100 to each informer who may have contributed to a conviction for an offence under Chapter VIII of the Stamp Act.	G.O., No. 907, Judicial, dated 9th May 1881.
Do. ..	District Magistrates and Commissioner of Police.	To sanction a sum not exceeding Rs. 20 to persons engaged in saving life for each achievement.	G.O., No. 526, Judicial, dated 9th March 1895.
Do. ..	District Magistrate ..	To sanction rewards to persons giving information leading to the detection of perpetrators of crime to the extent of Rs. 100 for any one offender apprehended and convicted.	Do.
Do. ..	Inspector-General of Prisons.	To sanction rewards for the recapture of escaped prisoners up to a maximum of Rs. 50 in each case.	Do.
Do. ..	Inspector-General and Commissioner of Police.	To sanction rewards to the extent of Rs. 100 to policemen for meritorious services rendered.	Do.
Write-off	Board of Revenue ..	To write-off valuable timber or other forest produce, live-stock, tools and plant of the value of over Rs. 500.	Section 109, Forest Code.
Do.	Do. ..	To write-off irrecoverable advances of the value of Rs. 1,000 and under in the Forest Department.	Do. 195 do.
Do.	Collectors	To sanction the write-off of the accounts valuable timber or other forest produce, live-stock, tools and plant of the value of Rs. 500 or less.	Do. 109 do.
Do.	Surgeon-General with Government.	To write-off deficiencies in hospitals and dispensaries to the extent of Rs. 100.	G.O., No. 788, Public, dated 23rd October 1894.
Loans and Advances .	Board of Revenue ..	To sanction advances under the Land Improvement Act of sums exceeding Rupees 1,000 and not exceeding Rs. 5,000.	G.O., No. 434, Revenue, dated 7th June 1886.
Do. ..	Collectors	To sanction advances under the Land Improvement Loans Act of sums not exceeding Rs. 1,000.	Appendix to Board's S.O. No. 238.
Do. ..	Do.	To sanction advances to contractors of Rs. 500 or more in the Forest Department.	Section 192, Forest Code.
Do. ..	Do.	To sanction advances to disbursers above the limits prescribed for District Forest-officers.	Do. 194 do.
Do. ..	District Forest-officers .	To sanction in cases of emergency advances sufficient to cover charges for records, carts, furniture, &c., for one month to themselves and to officers subordinate to them when proceeding on tour to a considerable distance from head quarters.	Do. 143 do.
Do.	Do. ..	To sanction advances to contractors of less than Rs. 500.	Do. 192 do.
Do.	Do. ..	To sanction advances to disbursers to the following limits:—	Do. 194 do.
		Rs. To office clerks .. .. 50 To subordinates below the class of Foresters .. 20 To Deputy Rangers not in charge of Ranges and Foresters .. .. .. 100 To Deputy Rangers in charge of Ranges .. 200 To Rangers 1,000	
Do. ..	Conservators of Forests.	To sanction in cases of emergency advances sufficient to cover charges for records, carts, and furniture for one month to themselves and to subordinates accompanying them when proceeding on tour to a considerable distance from head quarters.	Do. 143 do.

Item of expenditure.	Head of department.	Extent of power.	Authority.
Purchase of furniture.	Superintendent of Revenue Survey.	To sanction the purchase of country articles each costing not less than Rs. 50 and not more than Rs. 100.	G.O., No. 292, Financial, dated 17th February 1879.
Do.	Conservators of Forests.	To sanction the purchase of furniture, country articles each costing less than Rs. 50 and European articles each costing less than Rs 5.	Section 148, Forest Code.
Do.	Deputy Commissioners of Salt and Abkári Revenue.	To purchase country articles to a limit of Rs. 25 in each case.	G.O., No. 379, Financial, dated 13th May 1895.
Do.	District Superintendent of Police.	To purchase country articles up to a limit of Rs. 25 in each case.	G.O., No. 160, Financial, dated 15th February 1895.
Do.	Surgeon-General with Government.	To sanction individual items of furniture for civil hospitals within budget provision.	G.Os., Nos. 1407 and 1475, Public, dated 15th October and 5th November 1881.
Do.	Civil Medical Officers in charge of Districts, Medical officers in charge of Presidency State Hospitals and Medical Officers in charge of lunatic asylums.	To purchase country articles up to a limit of Rs. 25 in each case.	G.O., No. 261, Financial, dated 21st March 1895.
Do.	Superintendent of Stationery.	To purchase European articles locally when absolutely necessary, provided the cost of each purchase does not exceed Rs. 100.	G.O., No. 1344, Financial, dated 28th June 1883.
Do.	Heads of Departments .	To purchase country articles, the cost of which does not exceed Rs. 100 and European articles, the cost of which does not exceed Rs. 10.	G.Os., Nos. 14 and 160, Financial, dated 9th January and 15th February 1895.
Do.	Collectors	To purchase country articles, the cost of which does not exceed Rs. 50 each and European articles, the cost of which does not exceed Rs. 5 each in department under their control.	Appendix to Board's S.O. No. 238.
Budget allotment ..	The Honourable the Judges of the High Court. Board of Revenue (all departments). Inspector-General of Police. Inspector-General of Prisons. Inspector-General of Registration. Director of Public Instruction. Surgeon-General.	To sanction transfers from one minor head to another within the same major head, provided the expenditure is entirely, under their control.	G.O., No. 602, Financial, dated 20th August 1895.
Do.	Heads of Departments other than those mentioned above.	To sanction transfers from one detailed head to another within the same minor head.	Do.
Transfer of clerks ..	Inspector-General of Registration.	To transfer clerks from one Registration office to another as the occasion requires.	G.O., No. 1422, Judicial, dated 5th August 1892.
Contingent allowances.	Do.	To increase or reduce the contingent allowance of any Registration office in accordance with the sanctioned scale.	G.O., No. 848, Judicial, dated 2nd August 1882.
Entertainment of apothecaries and hospital assistants.	Surgeon-General ..	To entertain in his department without further sanction of Government civil apothecaries and hospital assistants who pass out of the Medical College.	G.O., No. 788, Public, dated 23rd October 1894.
Batta to prisoners acquitted as well as released from Jail.	Sessions Judges and District and Divisional Magistrates.	To sanction batta at the rates allowed to third-class witnesses to acquitted prisoners without means, and living at a distance of more than 10 miles from the courts ; and at the same rate to prisoners released from Jail under Section 435 of the Criminal Procedure Code and residing at more than 10 miles distance.	G.Os., Nos. 180, 603 and 1436, Judicial, dated 21st January, 6th March and 11th June 1884, respectively.

Item of expenditure.	Head of department.	Extent of power.	Authority.
Subsistence and travelling allowance to strangers and indigent persons.	District Magistrates ..	To sanction charges on account of the maintenance of strangers and indigent persons and travelling allowance to destitute paupers to reach their destination up to Rs. 25 a month.	G.Os., Nos. 3025 and 2711, Judicial, dated 29th November 1879 and 12th October 1883.
Burial and funeral charges of paupers.	District Magistrate and the Commissioner of Police.	To incur expenditure up to a limit of Rs. 10 in each case for the burial of destitute Europeans and East Indians and up to a limit of Rs. 2 in each case for the burial of natives.	G.O., No. 2102, Judicial, dated 31st December 1890.
Educational grants ..	Director of Public Instruction.	To sanction furniture grants up to Rs. 200.	Chapter 8, Grant-in-Aid Code.
Do. ..	Do.	To sanction building grants up to Rs. 1,000.	Do. 7, do.
Do. ..	Do.	To sanction salary and other grants within the limit prescribed in the Code.	Grant-in-aid Code.
Scholarships in training institutions.	Do.	To sanction scholarships in training institutions within the limits prescribed in the Educational Rules.	Madras Educational Rule
Stipends	Do.	To sanction moiety of pay to teachers under training.	Article 24, Madras Educational Rules, Section 6.
Scholarships, general and technical.	Do.	To sanction general and technical scholarships within the limits of the Government scholarship notification.	....
Remuneration to sweepers, scavengers, &c.	Inspector-General of Registration.	To sanction remuneration to sweepers up to Rs. 2 a month in Registration offices.	G.O., No. 1342, Judicial, dated 24th June 1895.
Do.	Inspector-General of Police.	To sanction the entertainment of sweepers whose whole time is not devoted to the public service and to charge their wages to contingencies.	G.O., No. 1343, Judicial, dated 24th June 1895.
Do.	Director of Public Instruction.	To sanction the entertainment of sweeper, scavengers and conductresses whose whole time is not devoted to the public service and to charge their wages to contingencies.	G.O., No. 631 R., Financial, dated 13th July 1895.
Remuneration for services of females.	District and Sub-Registrars.	To sanction remuneration to females making enquiries of gosha women to a limit of Re. 1 in each case in the districts and Rs. 1-8-0 in the town of Madras.	G.Os., Nos. 2146 and 356, Judicial, dated 4th October 1875 and 7th March 1866.
Fees to interpreters ..	Sessions Judges, District Magistrates and Subordinate Magistrates under the authority of District Magistrates.	To incur expenditure up to Rs. 10 in each case for the interpretation of evidence given in a language not understood by the accused.	G.O., No. 2411, Judicial, dated 22nd November 1881.
Remuneration to Examiners.	Commissioner for Government Examinations.	To sanction remuneration up to Rs. 100 to members who take part in the conduct of primary school and lower secondary examinations.	G.Os., Nos. 361 and 492, Educational, dated 22nd May 1890 and 29th June 1892.
Charges for registration of land traffic.	Board of Revenue ..	To sanction charges for the preparation of monthly statements of food-grains relating to the registration of road traffic.	G.O., No. 1982, Revenue, dated 13th April 1892.
Do.	Do. ..	To sanction all charges in connection with the registration of land traffic.	G.O., No. 711, Revenue, dated 17th March 1881.
Charges for rain-gauges.	Do. ..	To sanction all charges in connection with rain-gauges.	Appendix to Board's S.O. No. 238.
Salt compensation ..	Do. ..	Payment of arrears within the second fasli.	G.O., No. 1056, Revenue, dated 15th July 1872.
Purchase and repair of tents.	Do. ..	To sanction the purchase and repair of tents of officers in the Separate Revenue department.	G.O., No. 2891, Financial, dated 16th September 1881.
Supply of medicine chests.	Do. ..	To indent on Medical Stores for the supply of medicine chests to officers of the Salt department.	G.O., No. 1610, Financial, dated 30th October 1882.
Charges for belts and badges.	Do. ..	To sanction renewal of cloth belts *within* two years and gold-laced belts of duffadars *within* four years and all renewal of badges.	Board of Revenue Proceedings, No. 316, dated 8th June 1893.

Item of expenditure.	Head of department.	Extent of power.	Authority.
Purchase of stallions.	Board of Revenue ..	To sanction charges for the purchase of stallions for pony-breeding operations within the budget grant.	G.O., No. 3368, Revenue, dated 13th September 1893.
Purchase of window delivery ticket.	Do. ..	To sanction charges for the purchase of window delivery ticket.	G.O., No. 1558, Revenue, dated 12th December 1883.
Purchase of press materials and stock.	Do. ..	To sanction the purchase of press materials and stock.	G.O., No. 292, Financial, dated 17th February 1879.
Charges for protection of human life.	Do. ..	To sanction such charges as in the case of floods subject to budget provision.	G.O., No. 1459, Revenue, dated 20th December 1882.
Purchase of clocks ..	Do. ..	To sanction the purchase of clocks and time-pieces for the use of divisional and taluk offices, though they cost more than Rs. 10 each and the purchase of survey instruments for the use of Revenue Inspectors.	G.O., No. 108, dated 29th January 1892, and paragraph 7 of Board's S.O. No. 240.
Purchase of live-stock, furniture and tents.	Do. ..	To sanction the purchase of live-stock, furniture and tents up to Rs. 2,000 in the Forest department.	Section 148, Forest Code.
Do.	Collectors	To sanction the purchase of furniture, country-made articles of the value of less than Rs. 50 each, and European articles of less than Rs. 5 each in the Forest department.	Do.
Capital expenditure (Forest department).	Board of Revenue ..	To sanction all capital expenditure as defined in sections 144 and 145 of the Forest Code, each of the value exceeding Rs. 500, but not exceeding Rs. 10,000.	Do.
Do.	Collectors	To sanction capital expenditure when the value of each does not exceed Rs. 500.	Do.
Ordinary expenditure (Forest department).	Board of Revenue ..	To sanction all ordinary expenditure as defined in Section 144 of the Forest Code when the value of each work exceeds Rs. 2,000.	Do.
Do.	Collectors	To sanction ordinary expenditure when the value of each work does not exceed Rs. 2,000.	Do.
Purchase of instruments, boundary pillars, &c. (Survey department).	Superintendent of Revenue Survey.	To incur charges for instruments, boundary pillars, &c., within budget provision.	G.O., No. 292, Financial, dated 17th February 1879.
Purchase of vernacular newspapers.	Translators to Government.	To purchase vernacular newspapers for the purpose of their reports.	G.O., No. 1518, Public, dated 14th November 1887.
Purchase of horses ..	Commissioner of Police.	To purchase horses up to the limit of the budget provision.	G.O., No. 530, Judicial, dated 20th March 1891.
Purchase of books, apparatus, &c.	Director of Public Instruction.	To sanction the purchase of class books, library books, prize books, apparatus, &c., within budget provision.	G.Os., No. 6, Educational, dated 10th January 1872 and No. 292, Financial, dated 17th February 1879.
Do.	Superintendent, Central Museum.	To purchase standard books for the museum library without reference to Government and within budget provision.	G.O., No. 714, Revenue, dated 8th August 1893.
Survey tour charges of students.	Director of Public Instruction.	To sanction survey tour charges of engineering students within the budget grant.	G.O., No. 488, Educational, dated 10th July 1893.
Charges for clothing.	Surgeon-General ..	To incur charges on account of clothing to peons of his own office and to certain class of servants of Presidency Hospitals under certain conditions and limitations.	G.O., No. 411, Public, dated 11th June 1894.
Purchase of medicines.	Civil Medical Officers in charge of districts, Medical Officers in charge of Presidency Hospitals and of lunatic asylums.	To purchase in cases of exceptional illness medicines not usually supplied by the Medical Stores Depôt to a limit of Rs. 5 for each purchase and to annual limit of Rs. 50.	G.Os., Nos. 815, 160 and 537, Public, dated 31st October 1894, 6th March and 2nd July 1895, respectively.
Miscellaneous contingent charges.	Board of Revenue.	To sanction all miscellaneous contingent charges.	Appendix to Board's S.O. No. 438.
Do.	High Court	To sanction contingent charges subject to the usual limitation as regards purchase of country and European articles and books.	G.O., No. 2867, Financial, dated 14th December 1883.

Item of expenditure.	Head of department.	Extent of power.	Authority.
Miscellaneous contingent charges—*cont.*	Presidency Port Officer.	To sanction petty contingent charges of whatever nature debitable to Port Funds within the limit of Rs. 200.	G.O., No. 1000, Financial, dated 17th November 1894.
Charges for printing at private presses.	The Right Reverend the Bishop of Madras.	To incur printing charges at Ootacamund in emergent cases without sanction of Government.	G.O., No. 170, Ecclesiastical, dated 22nd August 1885.
Do. ..	Heads of Departments.	To sanction charges for printing at private presses within budget provision.	G.O., No. 1000, Financial, dated 17th November 1894.

Head of department.	Item of expenditure.	Extent of power.	Authority.
Board of Revenue ..	Temporary establishments.	To sanction the entertainment of amins and process servers under Act II of 1864 during the kist months, provided the fixed rates of Rs. 10 per mensem to amins and Rs. 7 for peons is not exceeded.	G.Os., Nos. 942 and 779, Revenue, dated 1st May 1879 and 21st June 1884.
Do. ..	Do. ..	To sanction temporary hands for the District Press for periods not exceeding one year.	G.O., No. 859, Revenue, dated 21st October 1889.
Do. ..	Do. ..	To sanction extra hands for the Settlement parties up to the limit of the budget grant.	G.O., No. 706, Revenue, dated 25th May 1859.
Do. ..	Do. ..	To sanction temporary establishment for managing attached estates under Section 28 of the Madras Act II of 1864, provided that the cost does not exceed Rs. 100 per mensem.	G.O., No. 823, Revenue, dated 7th July 1884.
Do. ..	Do. ..	To sanction all temporary establishments in the Forest department subject to the proviso that the pay of each person of such establishment is below Rs. 100.	Forest Code, Section 8.
Do. ..	Travelling allowance..	To sanction travelling allowance to inferior servants on transfer.	G.O., No. 908, Financial, dated 29th October 1894.
Do. ..	Do. ..	To sanction charges for conveyance of horses and tents by rail or steamer in the case of officers subordinate to the Board (in the Revenue Settlement and Separate Revenue departments), and at the following rates in the case of officers of the Land Revenue department:—	G.Os., Nos. 504, and 516, Financial, dated 19th June 1882 and 26th June 1891.

	Horses.	Tents.	
Collectors ..	4	65	Maunds.
Sub-Collectors.	4	55	,,
Head Assistants ..	3	45	,,
Other Divisional officers.	3	35	,,

Do. ..	Office rent	To sanction all rent charges in the Revenue department including accommodation for the offices of Stationary Sub-Magistrates.	G.Os., No. 1262, Financial, dated 4th July 1879, and Nos. 1048 and 326, Revenue, dated 17th September 1884 and 8th May 1894.
Do. ..	Office rent, &c. ..	To sanction all regularly recurring expenditure like *office rent* in the Forest department.	Forest Code, Section 146.
Do. ..	Petty construction and repairs.	To sanction petty construction and repairs to a maximum of Rs. 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Do. ..	Do. ..	To sanction new works entered in the budget between Rs. 2,000 and Rs. 5,000; all repairs costing more than Rs. 2,000 and allotments from savings for unforeseen works up to Rs. 5,000 in each case in the Separate Revenue department.	G.O., No. 172, Financial, dated 27th February 1894.
Do. ..	Irrigation Minor Works and Navigation.	To sanction allotments for individual works and establishments charges including contingencies not exceeding 15 per cent. of the outlay on works.	G.Os., Nos. 72, 1029 and 537, Revenue, dated 1st February, 23rd November 1886 and 2nd June 1887.

Head of department.	Item of expenditure.	Extent of power.	Authority.
Board of Revenue—*cont.*	Law charges (including fees to pleaders).	To sanction fees to vakils in excess of the regulation fees or of the minimum fee Rs. 5 for a single case and all unusual costs in law suits.	G.O , No. 314, Judicial, dated 7th February 1888, and No. 747, Revenue, dated 22nd July 1892.
Do. ..	Do. ..	To sanction payment of amounts decreed to private parties in civil suits decided against Government.	G.O., No. 78, Revenue, dated 24th January 1887.
Do. ..	Do. ..	To sanction payment of a larger fee than Rs. 50 to a pleader entertained in a civil or criminal suit in the Forest department.	Forest Code, section 233.
Do. ..	Charges for registration of road traffic.	To sanction charges for the preparation of monthly statements of food-grains relating to the registration of road traffic.	G.O., No. 1982, Revenue, dated 13th April 1892.
Do. ..	Refunds	To sanction all salt refunds.	Board's Proceedings, No. 154, Separate Revenue, dated 15th March 1892, passed with reference to G.O., No. 112, Revenue, dated 1st February 1892.
Do. ..	Do.	To sanction refund of the value of spoilt or useless stamps, or the repurchase of stamps not required for use if applied for within one year from the date on which the stamp was spoilt or rendered useless.	G.O., No. 1868, Revenue, dated 6th December 1881.
Do. ..	Do.	To sanction refund of penalties levied under sections 34 or 37 of Act I of 1879 if applied for in writing within one year from the date of payment of the penalty.	Section 42 of the Stamp Act I of 1879.
Do. ..	Do.	To sanction refund in money of the differences between the amount of probate or administration duty originally paid on an estate and that to be paid on the value of the estate as subsequently ascertained or make an allowance for the difference between the amounts as in the case of spoilt stamps on application made within six months from the date on which the true value of the property has been ascertained.	Section 19 A of the Court-fees Act VII of 1870.
Do. ..	Do.	To sanction refunds of probate or administration duty on the amount of debts actually paid out of the assets of an estate on which duty has been already paid including the debts if application be made within three years from date of payment of the debts or within such further period as the Chief Controlling Revenue authority may allow.	Section 19 B of the Court-fees Act VII of 1870.
Do. ..	Do.	To sanction refunds of land revenue, fines or of interest on arrears of revenue in cases where Collectors feel a doubt as to the property of granting refunds.	G.O., No. 112, Revenue, dated 1st February 1892.
Do. ..	Rewards	To sanction rewards up to Rs. 500 in any salt or abkári case in which a penalty or confiscation has been adjudged by a competent authority and up to Rs. 200 in any case in which any person may have been convicted of an offence against salt and abkári laws but in which no penalty or confiscation has been imposed or realized and up to Rs 100 in each case for the employment of informers or for any other purpose connected with the prevention or detection of salt and abkári offences.	G.O., No. 428, Revenue, dated 4th June 1886.
Do. ..	Do.	To sanction rewards exceeding Rs. 100 in each case in the Land Customs department.	G.O., No. 814, Revenue, dated 16th July 1880.
Do. ..	Do.	To sanction rewards to informers of frauds committed by karnams in regard to concealed cultivation or any item of land revenue forming part of the annual settlement to the extent of 50 per cent. of the year's assessment of the land or other due concerned.	Board's Standing Order No. 115.

Head of department.	Item of expenditure.	Extent of power.	Authority.
Board of Revenue—*cont.*	Rewards—*cont.* ..	To sanction rewards to an amount not exceeding the proceeds of the forest produce confiscated *plus* the amount for which any other property confiscated in the same case may sell and also that of the fine that may be imposed on the offender up to a limit of Rs. 500. And where no property has been confiscated or no penalty has been imposed or realized to a limit of Rs. 200.	G.O., No. 68, Revenue, dated 7th February 1889.
Do. ..	Salt compensation ..	Payment of arrears within the second fasli.	G.O., No. 1056, Revenue, dated 15th July 1872.
Do. ..	Purchase and repair of tents.	To sanction purchase and repair of tents (Separate Revenue Department).	Government of India No. 2891, Financial, dated 16th September 1881.
Do. ..	Supply of medicine chests.	To indent on Medical Stores for the supply of medicine chests to officers of the Salt Department.	G.O., No. 1610, Financial, dated 30th October 1882.
Do. ..	Charges for peons' belts and badges.	To sanction renewal of cloth belts within two years and gold-laced belts of duffadars within four years and all renewal of badges.	Board's Proceedings, No. 316, dated 8th June 1893.
Do. ..	Land Traffic Registration.	To sanction all charges in connection with the registration of land traffic.	G.O., No. 711, Revenue, dated 17th March 1881.
Do. ..	Rain-gauges	To sanction all charges in connection with rain-gauges.	Appendix to Board's Standing Order No. 238.
Do. ..	Purchase of stallions ..	To sanction charges for the purchase of stallions for pony-breeding operations within the budget grant.	G.O., No. 3368, Revenue, dated 13th September 1893.
Do. ..	Window-delivery ticket.	To sanction charges for the purchase of window-delivery ticket.	G.O., No. 1558, Revenue, dated 12th December 1883.
Do. ..	Press materials and stock.	To sanction the purchase of press materials and stock.	G.O., No. 292, Financial, dated 17th February 1879.
Do. ..	Charges for the protection of human life.	To sanction such charges as in the case of floods subject to budget provision.	G.O., No. 1459, Revenue, dated 20th December 1882.
Do. ..	Purchase of clocks ..	To sanction the purchase of clocks and time-pieces for the use of the divisional and taluk offices, though they cost more than Rs. 10 each and the purchase of survey instruments for the use of Revenue Inspectors.	G.O., No. 108, dated 29th January 1892, and paragraph 7 of Board's Standing Order No. 240.
Do. ..	Budget allotment ..	To sanction transfers of budget allotment from one minor head to another within the same major head provided the expenditure is entirely under their control.	G.O., No. 602, Financial, dated 20th August 1895.
Do. ..	Write off	To write off valuable timber or other forest produce, live-stock, stores, tools or plant of the value of over Rs. 500.	Forest Code, section 109.
Do. ..	Do.	To write off irrecoverable advances of the value of Rs. 1,000 and under in the forest department.	Forest Code, section 195.
Do. ..	Loans and advances ..	To sanction advances under the Land Improvement Loans Act of sums exceeding Rs. 1,000 and not exceeding Rs. 5,000.	G.O., No. 434, Revenue, dated 7th June 1886.
Do. ..	Purchase of live-stock, &c. (Forest department).	To sanction purchase of live-stock furniture and tents up to Rs. 2,000.	Forest Code, section 148.
Do. ..	Capital expenditure ..	To sanction all capital expenditure as defined in sections 144 and 145 of the Forest Code, each of the value exceeding Rupees 500 but not exceeding Rs. 10,000.	Do.
Do. ..	Ordinary expenditure..	To sanction all ordinary expenditure as defined in section 144 of the Forest Code when the value of each work exceeds Rs. 2,000.	Do.
Do. ..	Miscellaneous contingent charges.	To sanction all miscellaneous contingent charges.	Appendix to Board's Standing Order No. 238.

Head of department.	Item of expenditure.	Extent of power.	Authority.
Collectors	Law charges	To sanction payment of all ordinary costs in all cases including pauper suits and of fees to pleaders not in excess of the regulation or other authorized fees. In cases in which the regulation fee is less than Rs. 5 and is considered inadequate. A fee not exceeding that amount may be sanctioned.	G.O., No. 747, Revenue, dated 22nd July 1892, and G.O., No. 314, Judicial, dated 7th February 1888.
Do. ..	Petty construction and repairs.	To sanction new works or repairs to the maximum limit of Rs. 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Do. ..	Rewards	To sanction rewards to informers under the Land Customs Act up to Rs. 100 in each case.	G.O., No. 814, Revenue, dated 16th July 1880.
Do. ..	Do.	To sanction rewards for the destruction of wild animals at the rates prescribed.	G.O., No. 85, Revenue, dated 29th January 1890.
Do. ..	Capital expenditure (Forest).	To sanction capital expenditure when the value of each does not exceed Rs. 500.	Forest Code, section 148.
Do. ..	Ordinary expenditure (Forest).	To sanction ordinary expenditure works not exceeding Rs. 2,000.	Do.
Do. ..	Contingencies (Forest).	To sanction purchase of furniture, country-made articles of the value of less than Rs. 50 each, and European articles of less than Rs. 5 each.	Do.
Do. ..	Writes off (Forest) ..	To sanction write off the accounts valuable timber or other forest produce and live-stock, tools and plant of the value of Rs. 500 and less.	Forest Code, section 109.
Do. ..	Rewards (Forest) ..	To sanction rewards to an amount not exceeding the proceeds of the forest produce confiscated *plus* the amount for which any other property confiscated in the same case may sell and also that of the fine imposed on the offender to a limit of Rs. 100 and where no property has been confiscated or no fine has been imposed or realized to a limit of Rs. 25.	G.O., No. 68, Revenue, dated 7th February 1889.
Do. ..	Forest advances ..	To sanction advances to contractors of Rs. 500 or more.	Forest Code, section 192.
Do. ..	Do. ..	To sanction advances to disbursers above the limits prescribed for District Forest-officers.	Do. do. 194.
Do. ..	Refunds	To sanction all refunds of land revenue, fines, excise duty on spirits and drugs. Interest on arrears of revenue, Income-tax (including those deducted from salaries), penalties under section 36 of the Stamp Act I of 1879, spoilt stamps and stamps received back from deceased vendors and of import and export duties and drawbacks of customs duties.	(Appendix to Board's Standing Order No. 238.)
Do. ..	Rewards	To sanction rewards debitable to Sea Customs and excise not exceeding Rs. 100 in each case.	Do.
Do. ..	Loans and advances ..	To sanction advances under the Land Improvement Act of sums not exceeding Rs. 1,000.	Do.
Do. ..	Furniture	To purchase country articles, the cost of which does not exceed Rs. 50 each and European articles, the cost of which does not exceed Rs. 5 each in departments under their control.	Do.
Do. ..	Temporary establishment.	To entertain establishments for stamping weights and measures within the limit of the receipts on such account.	Do.
Divisional Officers (Land Revenue Department).	Rewards	To sanction rewards for the destruction of wild animals within the prescribed rates.	G.O., No. 85, Revenue, dated 29th January 1890.
Superintendent of Revenue Survey.	Temporary establishment.	To sanction the entertainment of temporary field establishments within the budget grant.	G.O., No. 2097, Revenue, dated 25th October 1879, and No. 261, Revenue, dated 2nd March 1880.

Head of department.	Item of expenditure.	Extent of power.	Authority.
Superintendent of Revenue Survey—*cont.*	Travelling allowances.	To sanction charges for the conveyance of camp and horses of officers of the Survey department to the following limits :— Horses. Camp. Deputy Superintendent .. 3 35 mds. Assistant Superintendent .. 3 25 „	G.Os., Nos. 1182, Revenue, and 1114, Financial, dated 25th September 1883 and 5th September 1882.
Do.	Office rent	To sanction rent of Survey offices below Rs. 50 per mensem.	G.O., No. 373, Revenue, dated 25th May 1894.
Do.	Purchase of country articles.	To sanction the purchase of country articles each costing not less than Rs. 50 and not more than Rs. 100.	G.O., No. 292, Financial, dated 17th February 1879.
Do.	Survey charges, other than office contingencies.	To incur charges for instruments, boundary pillars, &c., within budget provision.	Do.
District Forest-officers	Advances	To sanction in cases of emergency, advances sufficient to cover charges for records, carts, furniture, &c., for one month to themselves and to officers subordinate to them when proceeding on tour to a considerable distance from head-quarters.	Forest Code, section 143.
Do. ..	Do.	To sanction advances to contractors of less than Rs. 500.	Forest Code, section 192.
Do. ..	Do.	To sanction advances to disbursers to the following limits :— Rs. To office clerks .. .. 50 Subordinates below the class of foresters .. .. .. 20 Deputy Rangers not in charge of ranges and foresters .. 100 Deputy Rangers in charge of ranges. 1,000	Do. Forest Code, section 194.
Conservators of Forests.	Purchase of furniture..	To sanction the purchase of furniture, country articles, each costing less than Rs. 50 and European articles each costing less than Rs. 5.	Forest Code, section 148.
Do.	Advances.	To sanction in cases of emergency, advances sufficient to cover the charges for records, carts and furniture for one month to themselves and to subordinates accompanying them when proceeding on tour to a considerable distance from head-quarters.	Forest Code, section 143.
Deputy Commissioners of Salt and Abkári Revenue.	Purchase of country articles.	To purchase country articles to a limit of Rs. 25 in each case.	G.O., No. 379, Financial, dated 13th May 1895.
Do.	Rewards	To sanction rewards up to Rs. 100 in any salt or abkári case in which a penalty or confiscation has been adjudged by a competent authority, and up to Rs. 25 in any case in which any person may be convicted of an offence against Salt and Abkári Laws but in which no penalty or confiscation has been imposed or realized.	G.O., No. 428, Revenue, dated 4th June 1886.
Assistant Commissioners of Salt and Abkári Revenue.	Do.	To sanction rewards up to Rs. 25 in any salt or abkári case in which a penalty or confiscation has been adjudged by a competent authority and up to Rs. 10 in any case in which any person may have been convicted of an offence against Salt or Abkári Laws but in which no penalty or confiscation has been imposed or realized.	Do.
Superintendent of Stamps.	Petty construction and repairs.	To sanction new works or repairs to the maximum limit of Rs. 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Inspector-General of Registration.	Temporary establishment.	To sanction the entertainment of section writers.	G.O., No. 230, Judicial, dated 27th January 1888.
Do.	Transfer of clerks ..	To transfer clerks from one office to another as necessity requires.	G.O., No. 1422, Judicial, dated 5th August 1892.

Head of department.	Item of expenditure.	Extent of power.	Authority.
Inspector-General of Registration.—*cont.*	Refunds	To sanction refunds of fines under section 70 of the Registration Act.	G.O., No. 994, Judicial, dated 19th May 1881.
Do.	Petty construction and repairs.	To sanction new works or repairs to the maximum limit of Rs. 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Do.	Contingent charges ..	To sanction the increase or reduction of the contingent allowance of any Registration office in accordance with the sanctioned scale.	G.O., No. 848, Judicial, dated 2nd August 1882.
Do.	Remuneration to sweepers.	To sanction remuneration to sweepers up to Rs. 2 a month in Registration offices.	G.O., No. 1342, Judicial, dated 24th June 1895.
Do.	Budget allotment ..	To sanction transfers from one minor head to another within the same major head provided the expenditure is entirely under his control.	G.O., No. 602, Financial, dated 20th August 1895.
Do.	Rent	To sanction rent not exceeding Rs. 10 per mensem for Registration offices.	G.O., No. 3135, Judicial, dated 19th December 1894.
District Registrars ..	Temporary establishment.	To employ a second peon for about thirty days once a year when they go on tour of inspection of Sub-Registrar's offices.	G.O., Mis. No 285, Judicial, dated 22nd March 1882.
Do. ..	Refunds	To sanction refunds of fees and fines under Rule 25 of the Registration rules.	G.O., No 994, Judicial, dated 19th May 1881.
Do. ..	Remuneration for services of females.	To sanction remuneration to females making enquiries of gosha women to a limit of Re. 1 in each case in the districts and Rs. 1-8-0 in Madras.	G.Os., No. 2146, Judicial, dated 4th October 1875, and No. 356, Judicial, dated 7th March 1866.
Sub-Registrars ..	Refunds	To sanction refunds of fees and fines under Rule 25 of the Registration rules.	G.O., No. 994, Judicial, dated 19th May 1881.
Do. ..	Remuneration for services of females.	To incur charges for making enquiries of gosha women to a limit of Re. 1 in the districts and Rs. 1-8-0 in the town of Madras in each case.	G.Os., No. 2146, Judicial, dated 4th October 1875, and No. 356, Judicial, dated 7th March 1866.
Translators to Government.	Purchase of vernacular newspapers.	To purchase copies of vernacular newspapers for the purpose of their reports.	G.O., No. 1518, Public, dated 14th November 1887.
High Court	Petty construction and repairs.	To sanction new works or repairs to a maximum of Rs. 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Do.	Contingent charges ..	To sanction contingent charges subject to the usual limitation as regards the purchase of country and European articles and books.	G.O., No. 2867, Financial, dated 14th December 1883.
Do.	Budget allotments ..	To sanction transfers from one minor head to another within the same major head provided the expenditure is entirely under their control.	G.O., No. 602, Financial, dated 20th August 1895.
Do.	Law charges	To sanction the engagement of a vakil to defend undefended prisoners in original trials for murder before the Sessions Court, also where a capital sentence is possible, and also in cases where capital sentences are referred to the High Court for confirmation. The fee to be granted should never exceed Rs. 50.	G.Os., No. 2323, Judicial, dated 2nd September 1885, No. 1063, Judicial, dated 23rd May 1893, and No. 1864, Judicial, dated 31st July 1894.
District and Sessions Judges.	Do.	Do. do.	Do.
Do.	Fees to Interpreters ..	To incur expenditure up to Rs. 10 in each case for the interpretation of evidence given in a language not understood by the accused.	G.O., No. 2411, Judicial, dated 22nd November 1881.
Do.	Batta to prisoners acquitted as well as released from jail.	To sanction batta at the rates allowed to third-class witnesses to acquitted prisoners without means, and living at a distance of more than 10 miles from the Courts, and at the same rate to prisoners released from jail under section 435 of the Criminal Procedure Code, and residing at more than 10 miles distance.	G.Os., Nos. 180, 603 and 1436, Judicial, dated 21st January, 6th March and 11th June 1884, respectively.

Head of department.	Item of expenditure.	Extent of power.	Authority.
District and Sessions Judges—*cont.*	Temporary establishment.	To entertain, when necessary, an additional Translator at the rate of Re. 1 for 300 vernacular words to translate the record of Sessions cases referable to the High Court.	G.O., No 1557, Judicial, dated 20th September 1862.
Do.	Do.	To entertain extra copyists, readers, and examiners when emergency requires it.	G.O., No. 549, Judicial, dated 3rd March 1886.
District Magistrates..	Do.	To sanction the entertainment of two clerks on Rs. 25 each for two months in every year for the preparation of criminal statistics.	G.O., No. 883, Judicial, dated 5th April 1884.
Do. ..	Do.	To sanction an extra warder in cases where a lunatic is sent to a sub-jail for observation or detention, the pay of such warder being Rs. 10 in the Nilgiri district and Rs. 8 elsewhere.	G.Os., Nos. 512, 1135, 374 and 2516, dated 22nd February 1883, 2nd July 1889, 28th February 1890 and 21st September 1883, respectively.
Do. ..	Refunds	To sanction refunds of surplus sale-proceeds of impounded cattle credited to Government if the claim is preferred within three months.	G.O., No. 691, Revenue, dated 12th August 1889.
Do. ..	Petty construction and repairs.	To sanction new works or repairs to the limit of Rs. 1,000 as regards buildings in their charge.	G.O., No. 370, Financial, dated 7th May 1895.
Do. ..	Rewards	To sanction rewards not exceeding Rs. 100 to each informer who may have contributed to a conviction for an offence under chapter VIII of the Stamp Act.	G.O., No. 907, Judicial, dated 9th May 1881.
Do. ..	Do.	To sanction a sum not exceeding Rs. 20 for persons engaged in saving life for each achievement.	G.O., No. 526, Judicial, dated 9th March 1895.
Do. ..	Do.	To sanction rewards to persons giving information leading to the discovery of perpetrators of crime to the extent of Rs. 100 for any one offender apprehended and convicted.	G.O., No. 526, Judicial, dated 9th March 1895.
Do. ..	Fees to Pleaders in Criminal cases.	To sanction a sum not exceeding Rs. 25 in each case and not exceeding Rs. 50 in special cases. In Ganjám the limit is always Rs. 50.	G.O., Nos. 3333 and 1137, Judicial, dated 17th December 1883 and 7th May 1884.
Do. ..	Fees to Interpreters ..	To incur expenditure up to Rs. 10 in each case for the interpretation of evidence given in a language not understood by the accused.	G.O., No. 2411, Judicial, dated 22nd November 1881.
Do. ..	Batta to acquitted prisoners and to prisoners released from jail.	To sanction batta at the rates allowed to third-class witnesses to acquitted prisoners without means and living at a distance of more than 10 miles from the Court; and at the same rate to prisoners released from jail under section 435 of the Criminal Procedure Code, and residing at more than 10 miles distance.	G.Os., Nos. 180, 603, and 1436, Judicial, dated 21st January, 6th March and 11th June 1884.
Do. ..	Subsistence and travelling allowance to strangers and indigent persons.	To sanction charges on account of the maintenance of strangers and indigent persons, and travelling allowance to destitute paupers to reach their destination up to Rs. 25 a month.	G.Os., Nos. 3025 and 2711, Judicial, dated 29th November 1879 and 12th October 1883.
Do. ..	Burial and funeral charges of paupers.	To incur expenditure up to a limit of Rs. 10 in each case for the burial of destitute Europeans and East Indians and to the limit of Rs. 2 in the case of natives.	G.O., No. 2102, Judicial, dated 31st December 1890.
Divisional Magistrates.	Batta to acquitted prisoners and to prisoners released from Jail.	To sanction batta at the rates allowed to third-class witnesses to acquitted prisoners without means, and living at a distance of more than 10 miles from the Court and at the same rates to prisoners released from jail under section 435 of the Criminal Procedure Code, and residing at more than 10 miles distance.	G.Os., Nos. 180, 603 and 1436, Judicial, dated 21st January, 6th March and 11th June 1884, respectively.
Subordinate Magistrates (under the authority of District Magistrates).	Fees to Interpreters ..	To incur expenditure up to Rs. 10 in each case for the interpretation of evidence given in a language not understood by the accused.	G.O., No. 2411, Judicial, dated 22nd November 1881.

Head of department.	Item of expenditure.	Extent of power.	Authority.
Government Agents (Ganjâm, Vizagapatam and Gódâvari).	Petty construction and repairs and works.	To sanction new works or repairs to a limit of Rs. 1,000. New roads to a limit of Rs. 300 and repairs to communications without any limit.	G.Os., Nos. 370 and 1040, Financial, dated 7th May 1895 and 29th November 1894.
Government Agents (Ganjam and Vizagapatam).	Law charges	To appoint their Managers or head clerks to conduct prosecution in Sessions cases when a Government Prosecutor or other competent pleader is not available and allow them fees in the shape of local allowance not exceeding Rs. 25 for each case, and not exceeding Rs. 250 a month in the aggregate including their pay.	G.Os., Nos. 394 and 1756, Judicial, dated 13th February 1883, and 7th July 1885.
Principal Assistant Agent, Ganjâm.	Do.	Do. do.	Do.
Inspector-General of Prisons.	Temporary establishment.	To sanction two extra warders on Rs. 7 each to guard lunatics sent to District Jails.	G.O., No. 374, Judicial, dated 28th February 1890 and Rule 222 Jail Code.
Do.	Do.	To sanction temporary warders in place of permanent warders deputed in charge of prisoners on transfer from one jail to another.	G.O., No. 3207, Judicial, dated 8th December 1884.
Do.	Do.	To sanction one warder on Rs. 7 for every addition of eleven prisoners to the population in Central Jails and of ten prisoners to the population in District Jails.	Rule 220, Jail Code.
Do.	Temporary establishment.	To sanction one 3rd-grade head warder on Rs. 10 per mensem and three 3rd-class warders, each on Rs. 7 per mensem, to guard condemned prisoners.	Rule 221, Jail Code.
Do.	Budget allotment ..	To sanction transfer from one minor head to another within the same major head provided the expenditure is entirely under his control.	G.O., No. 602, Financial, dated 20th August 1895.
Do.	Travelling allowances..	To sanction travelling allowances to inferior servants in the Jail department on transfer under Article 1216 (*b*) of the Civil Service Regulations.	G.O., No. 1864, Judicial, dated 2nd November 1889.
Do.	Petty construction and repairs.	To sanction new works or repairs to a maximum limit of Rs. 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Do.	Rewards	To sanction rewards for the recapture of escaped convicts up to a maximum of Rs. 50 in each case.	G.O., No. 526, Judicial, dated 9th March 1895.
Superintendent of Jails.	Temporary establishment.	To entertain temporary warders in place of permanent warders sent in charge of prisoners under the Prisoners' Testimony Act.	G.O., No. 403, Judicial, dated 21st March 1872.
Superintendent of Jails (Central).	Petty construction and repairs.	To incur charges for repairs to ordinary jail buildings to the extent of Rs. 200 at the rate of Rs. 50 for a single work.	Rule 1229, Jail Code.
Superintendent of Jails (District).	Do.	To incur charges for repairs to ordinary jail buildings to the extent of Rs. 40 at the rate of Rs. 10 for a single work.	Do.
Inspector-General of Police.	Travelling allowances.	To sanction charges for the conveyance of camp and horses of officers of the Police department to the following limits :—	G.O., No. 2010, Judicial, dated 1st August 1883.
		HORSES. CAMP. Deputy Inspector-General .. 4 55 maunds. Superintendents .. 3 55 ,, Assistant Superintendents .. .. 3 55 ,, Inspectors .. .. 1 700 lb.	
Do.	Office rent	To sanction rent to a limit of Rs. 150 for each district for Police offices and station houses.	G.O., No. 723, Judicial, dated 7th June 1860.
Do.	Petty construction and repairs.	To sanction new works or repairs to a maximum limit of 1,000.	G.O., No. 370, Financial, dated 7th May 1895.

Head of department.	Item of expenditure.	Extent of power.	Authority.
Inspector-General of Police—*cont.*	Budget allotment ..	To sanction transfers from one minor head to another under the same major head provided the expenditure is entirely under his control.	G.O., No. 602, Financial, dated 20th August 1895.
Do.	Rewards	To sanction rewards to the extent of Rupees 100 to policemen for meritorious service rendered.	G.O., No. 526, Judicial, dated 9th March 1895.
Do.	Remuneration to sweepers.	To sanction the entertainment of sweepers whose whole time is not devoted to the public service and charge these wages to contingencies.	G.O., No. 1343, Judicial, dated 24th June 1895.
Commissioner of Police	Petty construction and repairs.	To sanction new works or repairs to the extent of Rs. 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Do.	Purchase of horses ..	To purchase horses up to the limit of budget provision.	G.O., No. 530, Judicial, dated 20th March 1891.
Do.	Rewards	To sanction a sum not exceeding Rs. 20 to persons engaged in saving life for each achievement.	G.O., No. 526, Judicial, dated 9th March 1895.
Do.	Do.	To sanction rewards to the extent of Rupees 100 to policemen for meritorious service rendered.	Do.
Do.	Rent	To sanction rent for Police station-houses in the Presidency town up to a limit of Rs. 70 per mensem.	G.O., No. 111, Judicial, dated 20th February 1889.
Do.	Burial and funeral charges of paupers.	To incur expenditure up to a limit of Rs. 10 in each case for the burial of destitute Europeans and East Indians and to a limit of Rs. 2 in the case of Natives.	G.O., No. 2102, Judicial, dated 31st December 1890.
District Superintendents of Police.	Purchase of country articles.	To purchase country articles up to a limit of Rs. 25 in each case.	G.O., No. 160, Financial, dated 15th February 1895.
Do.	Petty construction and repairs.	To sanction new works or repairs to a maximum limit of Rs. 100.	G.O., No. 370, Financial, dated 7th May 1895.
Director of Public Instruction.	Temporary establishment.	To sanction temporary establishments for the offices of the Assistants and Sub-Assistant Inspectors within budget provision.	G.O., No. 442, Educational, dated 9th June 1892.
Do.	Office rent	To sanction rent of school-houses not exceeding Rs. 10 per mensem.	G.O., No 631 R., Financial, dated 13th July 1895.
Do.	Do.	To sanction rent for the office accommodation of Sub-Assistant Inspectors to the extent of Rs. 2 per mensem.	G.O., No. 885, Educational, dated 30th November 1892.
Do.	Petty construction and repairs.	To sanction new works or repairs to the maximum limit of Rs. 1,000.	G.O , No. 370, Financial, dated 7th May 1895.
Do.	Purchase of books, &c.	To sanction the purchase of class books, library books, prize books, furniture and apparatus within budget grant.	G.O., No. 6, Educational, dated 10th January 1872 and No. 292, Financial, dated 17th February 1879.
Do.	Survey tour charges ..	To sanction survey tour charges of engineering students within budget grant.	G.O., No. 488, Educational, dated 10th July 1893.
Do.	Remuneration to sweepers, &c.	To sanction the entertainment of sweepers, scavengers and conductresses whose whole time is not devoted to the public service and to charge their wages to contingencies.	G.O., No 631 R., Financial, dated 13th July 1895.
Do.	Stipends	To sanction moiety of pay to teachers under training.	Section VI, Madras Educational Rules, Article 24.
Do.	Scholarships, general and technical.	To sanction general and technical scholarships within the limits of the Government scholarship notification.	....
Do.	Budget allotment ..	To sanction transfer from one minor head to another within the same major head provided the expenditure is entirely under his control.	G.O., No. 602, Financial, dated 20th August 1895.
Do.	Scholarships in training institutions.	To sanction scholarships in training institutions within the limits prescribed in the Educational rules.	Madras Educational rules.

Head of department.	Item of expenditure.	Extent of power.	Authority.
Director of Public Instruction—*cont.*	Furniture grant ..	To sanction furniture grants up to Rs. 200.	Chapter 8, Grant-in-aid Code.
Do.	Building grant ..	To sanction building grants up to Rs. 1,000.	Chapter 7, Grant-in-aid Code.
Do.	Salary and other grants.	To sanction salary and other grants within the limits prescribed in the Code.	Grant-in-aid Code.
Right Reverend the Bishop of Madras.	Printing charges ..	To incur printing charges at Ootacamund in emergent cases without sanction of Government.	G.O., No. 170, Ecclesiastical, dated 22nd August 1885.
The Venerable the Archdeacon.	Petty construction and repairs.	To sanction new works or repairs up to a maximum limit of Rs. 500.	G.O., No. 370, Financial, dated 7th May 1895.
Senior Chaplain, Church of Scotland.	Do.	Do. do. ..	Do.
Chaplains of all creeds.	Do.	To sanction new works or repairs to a maximum limit of Rs. 50.	Do.
Surgeon-General with Government.	Temporary establishment.	To sanction temporary establishments in Lunatic Asylums for periods of twelve months or less so long as the number of keepers does not exceed the proportion of one keeper to seven insanes. An additional keeper may be entertained in cases where the number of insanes exceeds a multiple of seventy-three or more.	G.O., No. 1751, Judicial, dated 12th October 1889.
Do.	Entertainment of Apothecaries and Hospital Assistants.	To entertain in his department without further sanction of Government Civil Apothecaries and Hospital Assistants who pass out of the Medical College.	G.O., No. 788, Public, dated 23rd October 1894.
Do.	Petty construction and repairs.	To sanction new works or repairs to a maximum limit of Rs. 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Do.	Write off	To write off deficiencies in hospitals and dispensaries to the extent of Rs. 100.	G.O., No. 788, Public, dated 23rd October 1894.
Do.	Charges of clothing ..	To incur charges on account of clothing to peons of his own office and to certain class of servants attached to Presidency Hospitals under certain conditions and limitations.	G.O., No. 401, Public, dated 11th June 1894.
Do.	Furniture	To sanction individual items of furniture for Civil Hospitals within budget provision.	G.Os., Nos. 1407 and 1475, Public, dated 15th October and 5th November 1881.
Do.	Budget allotment ..	To sanction transfers from one minor head to another within the same major head provided the expenditure is entirely under his control.	G.O., No. 602, Financial, dated 20th August 1895.
Civil Medical Officers in charge of Districts.	Purchase of medicines.	To purchase in cases of exceptional illness medicines not usually supplied by the Medical Store depôt to a limit of Rs. 5 for each purchase and to an annual limit of Rs. 50.	G.Os., Nos. 815, 160 and 537, Public, dated 31st October 1894, 6th March and 2nd July 1895, respectively.
Do.	Purchase of country articles.	To purchase country articles to a limit of Rs. 25 in each case.	G.O., No. 261, Financial, dated 21st March 1895.
Medical Officers in charge of Presidency Hospitals.	Purchase of medicines.	To purchase in cases of exceptional illness medicines not usually supplied by the Medical Store depôt to a limit of Rs. 5 for each purchase and to an annual limit of Rs. 50.	G.Os., Nos. 815, 160 and 537, Public, dated 31st October 1894, 6th March and 2nd July 1895, respectively.
Do.	Purchase of country articles.	To purchase country articles up to a limit of Rs. 25 in each case.	G.O., No. 261, Financial, dated 21st March 1895.
Medical Officers in charge of Lunatic Asylums.	Purchase of medicines.	To purchase in cases of exceptional illness medicines not usually supplied by the Medical Store depôt to a limit of Rs. 5 for each purchase and to an annual limit of Rs. 50.	G.Os., Nos. 815, 160 and 537, Public, dated 31st October 1894, 6th March and 2nd July 1895, respectively.
Do.	Purchase of country articles.	To purchase country articles up to a limit of Rs. 25 in each case.	G.O., No. 261, Financial, dated 21st March 1895.
Commissioner for Government Examinations.	Refunds	To sanction refunds of fees collected from candidates for Government Examinations.	G.O., No. 650, Educational, dated 5th September 1892.

Head of department.	Item of expenditure.	Extent of power.	Authority.
Commissioner for Government Examinations—*cont.*	Remuneration to Examiners.	To sanction remuneration up to Rs. 100 to members who take part in the conduct of the Primary school and Lower Secondary examinations.	G.Os., Nos. 361 and 492, Educational, dated 22nd May 1890 and 29th June 1892.
Superintendent, Central Museum.	Purchase of books ..	To purchase standard books for the museum library without reference to Government and within budget provision.	G.O., No. 714, Revenue, dated 8th August 1893.
Superintendent of Stationery.	Refunds	To sanction refunds of the value of articles of stationery purchased from him and subsequently returned not exceeding Rs. 50 in each case.	G.O., Mis. No. 2729, Financial, dated 1st December 1883.
Do.	Purchase of Europe articles.	To purchase European articles locally when absolutely necessary provided the cost of each purchase does not exceed Rs. 100.	G.O., No. 1344, Financial, dated 28th June 1883.
Presidency Port Officer.	Contingencies ..	To sanction petty contingent charges of whatever nature debitable to Port Funds within the limit of Rs. 200.	G.O., No. 1000, Financial, dated 17th November 1894.
Do.	Petty construction and repairs.	To sanction new works or repairs to a maximum limit of Rs. 1,000.	G.O., No. 370, Financial, dated 7th May 1895.
Registrar of the University.	Refunds	To sanction refunds of fees collected from candidates for University Examinations.	G.O., No. 109, Educational, dated 3rd March 1883.
Heads of Departments.	Furniture	To purchase country articles the cost of which does not exceed Rs. 100 and European articles the cost of which does not exceed Rs. 10.	G.Os., Nos. 14 and 160, Financial, dated 9th January and 15th February 1895.
Do.	Printing at private presses.	To sanction charges for printing at private presses within budget provision.	G.O., No. 1000, Financial, dated 17th November 1894.
Do. (other than specially empowered).	Transfer of budget allotment.	To transfer budget allotments from one detailed head to another under the same minor head.	G.O., No. 602, Financial, dated 20th August 1895.
Local Head of any department not specially empowered.	Petty construction and repairs.	To sanction new works or repairs to a maximum limit of Rs. 50.	G.O., No. 370, Financial, dated 7th May 1895.

Order—No. 59, Financial, dated 22nd January 1896.

Communicated to the departments of the Secretariat for scrutiny and remarks.

2. It is desirable that the powers which are delegated to heads of departments should, as far as possible, be uniform.

3. Any rulings embodied in departmental Codes, Manuals or Circular Orders, which have not been reproduced by the Accountant General, should be added to the lists.

4. In cases in which orders assigning specific powers have subsequently merged in orders granting more general powers, the latter alone should be retained.

5. Paragraph 5 of the Accountant-General's letter regarding the reforms to be introduced in the classification and control of contingent expenditure will be separately dealt with.

(True Extract.)

J. F. PRICE,
Chief Secretary.

To the Departments of the Secretariat
(including Chief Secretary's departments.)
„ Accountant-General.

Exd. A. Raitt.