Public Works (1896) Department.

SERIAL No. 12-14

G.O., No. 1069-70

DATED 31st

[Despatch Abstract.]

Connection between the S. I. Ry & Southern Mahratta Railway – Forwarding to the Government of India a further letter on the subject of a project for the ____ and for the Extension of the Mysore Railways to Mangalore –

[P.W. 25. 5,000—30-11-96.]

Indexed.

APPENDIX A.

Summary of Estimates for improving the several reaches of the Buckingham Canal as sanctioned in detail from time to time by the Madras Government.

Number on Index Map and General Abstract Estimate.	Sheet Number of Index Map.	Description of Work.	Position.	Reference to Report.	Amount of Estimate as sanctioned in detail by the Madras Government.	Total for each Section.
		NORTHERN CANAL.			RS.	RS.
		Section I.—From St. Mary's Bridge at Madras to Pulicat.				
1	23	Improvements and alterations to Salt Kotar Bridge.	1st mile ..	Paragraph 61 ..	13,000	
2	..	Improvements to the basin at Madras ..	2nd ,, ..	Do. 61 ..	95,685	
3	..	Improvements to canal from basin to Shadayankupam Lock.	2nd to 7th mile ..	Do. 61 ..	19,775	
4	..	Improvements and alterations to Washermanpet Bridge.	3rd mile ..	Do. 61 ..	7,090	
5	..	Do. do. to Trivettore Bridge ..	5th ,, ..	Do. 61 ..	7,090	
6	..	Toll Office and Establishment sheds at Shadayankupam Lock.	7th mile 3rd furlong.	Do. 39 (11).	739	
7	..	Diversion to canal from Shadayankupam Lock to Ennore.	7th mile 3rd furlong to 11th mile.	Do. 61 ..	42,250	
8	..	Flood-gate south bank of Ennore Backwater.	11th mile ..	Do. 61 ..	19,380	
9	..	Do. north bank of do. ..	12th ,, ..	Do. 60 ..	19,380	
10	..	Second-class Rest-house at Ennore ..	13th ,, ..	Do. 39 (11).	5,715	
11	..	Diversion and improvements to canal from Ennore to Pulicat.	12th to 25th mile	Paragraphs 59 and 39 (9).	1,43,360	
12	3	Sidings basins at Pulidivakkam, Kattupally, Kalanjee, and Karangalee.	15th, 17th, 19th and 22nd miles.	Paragraphs 59 and 39 (9).	4,640	
13	..	Flood-gates south bank of Arni River ..	23rd mile 6th furlong.	Paragraph 60 ..	16,650	
14	..	Do. north bank of do. ..	24th mile ..	Do. 59 ..	16,650	
15	..	Two siding basins at Pulicat	25th ,, ..	Paragraphs 59 and 39 (9).	2,685	
16	..	Flood-gate at the Pulicat Lake end ..	25th mile 6th furlong.	Paragraph 59 ..	16,650	
		Add items of General Abstract Estimate, Nos. 65, 68 and 73.	..	..	4,30,759 3,653	
						4,34,412
		Section II.—From Pulicat to Dugarázpatnam.				
1	..	First-class Rest-house at Coromandel ..	27th mile ..	Paragraph 39 (11).	3,160	
2	..	Diversion to canal from Coromandel to Tettupett.	26th to 28th mile.	Do. 58 ..	99,000	
3	..	Flood-gate at Coromandel end	26th mile ..	Do. 58 ..	16,650	
4	..	Siding basin at Coromandel	27th ,, ..	Do. 39 (9).	510	
5	..	Outlet at do.	27th ,, ..	Do. 58 ..	3,950	
6	4	Improvements to canal, 36 miles 2 furlongs to 38 miles.	36th to 38th mile.	Do. 58 ..	7,350	
7	..	Siding basin at Tettupett	38th mile ..	Do. 39 (9).	635	
8	..	Diversion to canal from Tettupett to Jonaghipolliem, 38 miles to 43 miles 5 furlongs.	38th to 43rd mile.	Do. 58 ..	70,000	
9	..	Two siding basins at Chemigaripolliem and Jonaghipolliem.	42nd and 44th miles	Do. 39 (9).	1,055	
10	..	Second-class Rest-house at Jonaghipolliem	44th mile ..	Do. 39 (11).	5,715	
11	..	Improvements to canal, 44 miles to 65 miles 5 furlongs.	44th to 65th mile.	Do. 58 ..	1,35,765	
12	..	One siding basin at Cusbah	46th mile ..	Do. 39 (9).	395	
13	..	Toll Office and Establishment sheds at Royadoruvu.	59th ,, ..	Do. 39 (11).	868	
14	..	Second-class Rest-house at Royadoruvu ..	59th ,, ..	Do. 39 (11).	5,715	
15	..	Two siding basins at Royadoruvu and Pambali.	58th and 64th miles	Do. 39 (9).	1,320	
16	..	Diversion to canal, 65 miles 5 furlongs to 67 miles 2 furlongs.	65th to 67th mile.	Do. 58 ..	20,430	
17	..	Outlet at 67 miles 2 furlongs	67th mile 2nd furlong.	Do. 58 ..	3,660	
18	..	Flood-gate south bank of Dugarázpatnam river.	Do. do. ..	Do. 58 ..	19,030	
		Add items of General Abstract Estimate, Nos. 65, 68, 69 and 73.	..	..	3,95,208 2,63,590	
						6,58,798

Summary of Estimates for improving reaches of Buckingham Canal, &c.—*cont.*

Number on Index Map and General Abstract Estimate.	Sheet Number of Index Map.	Description of Work.	Position.	Reference to Report.	Amount of Estimate as sanctioned in detail by the Madras Government.	Total for each Section.
		NORTHERN CANAL—*cont.*			RS.	RS.
		Section III.—From Dugarázpatnam to Kistnapatam.				
1	..	Diversion to canal 67 miles, 2 furlongs to 72 miles 2 furlongs.	67th to 72nd mile.	Paragraph 57 ..	55,570	
2	..	Flood-gate north bank of Dugarázpatnam river.	67th mile 3rd furlong.	Do. 57 ..	19,030	
3	..	Outlet at 67 miles 3 furlongs	Do. do. ..	Do. 57 ..	3,660	
4	..	Second-class Rest-house at Dugarázpatnam.	69th mile ..	Do. 39 (11).	5,715	
5	..	Stores and office at Dugarázpatnam ..	69th ,, ..	Do. ..	2,340	
6	..	Siding basin at do. ..	69th ,, ..	Do. 39 (9).	1,090	
7	..	Do. at Thupili	72nd mile ..	Do. ..	590	
8	..	Outlet at 71 miles 6 furlongs	71st mile 6th furlong.	Do. 57 ..	3,660	
9	..	Improvements to canal, 72 miles 2 furlongs to 75 miles 3 furlongs.	72nd to 75th mile.	Do. 57 ..	17,200	
10	..	Swarnamukhi diversion and flood-banks ..	76th to 77th ,, ..	Do. 57 ..	36,700	
11	..	Outlet at 76 miles 5 furlongs	76th mile 5th furlong.	Do. 57 ..	3,450	
12	..	Flood-gate south bank of Swarnamukhi river.	77th mile ..	Do. 57 ..	20,880	
13	..	Do. north bank of do. ..	77th mile 1st furlong.	Do. 56 ..	20,880	
14	..	Improvements to canal, 77 miles 1 furlong to 89 miles ½ furlong.	77th to 89th mile.	Do. 56 ..	24,200	
15	..	Second-class Rest-house at Siddavaram ..	79th mile ..	Do. 39 (11).	5,715	
16	..	Two siding basins at Siddavaram and Kanoopur.	79th and 81st miles	Do. 39 (9).	1,270	
17	..	Diversion to canal, 89 miles ½ furlong to 89 miles 7 furlongs.	89th mile ..	Do. 56 ..	8,400	
18	..	Outlet at 89 miles 6 furlongs	89th mile 6th furlong.	Do. 56 ..	3,450	
19	..	Flood-gate south bank of Kundaleru river..	90th mile ..	Do. 56 ..	18,040	
					2,51,840	
		Add items of General Abstract Estimate, Nos. 65, 68, and 73.	..	..	2,88,409	5,40,249
		Section IV.—From Kistnapatam to Pennér River.				
1	5	Flood-gate north bank of Kundaleru river..	91st mile ..	Paragraph 55 ..	18,380	
2	6	Improvements to canal, 90 miles 6 furlongs to 92 miles.	90th to 92nd mile.	Do. 55 ..	6,100	
3	..	Outlet at 90 miles 6 furlongs	90th mile 6th furlong.	Do. 55 ..	3,450	
4	..	Siding basin at 91 miles	91st mile ..	Do. 39 (9).	1,480	
5	..	Bridge at Kistnapatam road crossing ..	91st ,, ..	Do. 39 (10).	10,250	
6	..	First-class Rest-house at Kristnapatam ..	93rd mile ..	Do. 39 (11).	6,630	
7	..	Diversion to canal, 92 miles to 93 miles 4 furlongs.	92nd to 93rd mile.	Do. 55 ..	13,680	
8	..	Siding basin at Kristnapatam	93rd mile ..	Do. 39 (9).	655	
9	..	Improvements to canal, 93 miles 4 furlongs to 95 miles 6 furlongs.	93rd to 95th mile	Do. 55 ..	7,030	
10	..	Outlet at 95 miles 4 furlongs	95th mile 4th furlong.	Do. 55 ..	3,485	
11	..	Flood-gate south bank of Nalatur river ..	Do. do. ..	Do. 55 ..	18,550	
12	..	Improvements to canal, 95 miles 6 furlongs to 97 miles 2 furlongs.	95th to 97th mile.	Do. 54 ..	11,930	
13	..	Flood-gate north bank of Nalatur river ..	95th mile 6th furlong.	Do. 54 ..	18,550	
14	..	Outlet at 95 miles 6 furlongs	Do. do. ..	Do. 54 ..	3,485	
15	..	Diversion to canal, 97 miles 2 furlongs to 97 miles 7 furlongs, and new cut to drainage channel.	97th mile ..	Do. 54 ..	6,340	
16	..	Improvements to canal, 97 miles 7 furlongs to 101 miles 1 furlong.	97th to 101st mile.	Do. 54 ..	4,350	
17	..	Diversion to canal, 101 miles 1 furlong to 101 miles 6 furlongs and cutting drainage channel.	101st mile to 6th furlong.	Do. 54 ..	7,300	
18	..	Outlet at 101 miles 3 furlongs	101st mile 3rd furlong.	Do. 54 ..	3,590	
19	..	Flood-gate south bank of Kódúr river ..	Do. do. ..	Do. 54 ..	15,540	

Summary of Estimates for improving reaches of Buckingham Canal, &c.—*cont.*

Number on Index Map and General Abstract Estimate.	Sheet Number of Index Map.	Description of Work.	Position.	Reference to Report.	Amount of Estimate as sanctioned in detail by the Madras Government.	Total for each Section.
		NORTHERN CANAL—*cont.*			RS.	RS.
		Section IV.—From Kistnapatam to Pennér River—cont.				
20	..	Flood-gate north bank of Kódúr river ..	101st mile 4th furlong.	Paragraph 53 ..	15,540	
21	..	Outlet at 101 miles 4 furlongs	Do. do. ..	Do. 53 ..	3,590	
22	..	Improvements to canal, 101 miles 6 furlongs to 111 miles 3 furlongs and 5 furlongs.	101st to 111th mile.	Do. 53 ..	29,950	
23	..	Toll Office and Establishment sheds at Kódúr.	103rd mile ..	Do. 39 (11).	1,400	
24	..	Outlet at 107 miles 3 furlongs	107th mile 3rd furlong.	Do. 53 ..	3,590	
25	..	Do. at 108 miles 5 furlongs	108th mile 5th furlong.	Do. 53 ..	3,510	
26	..	Siding basin at Mypaud	110th mile ..	Do. 39 (9).	1,075	
27	..	Store and office at do.	110th ,, ..	Do. 39 (11).	2,340	
28	..	Outlet at 111 miles 3 furlongs	111th mile 3rd furlong.	Do. 53 ..	3,510	
29	..	Flood-gate south bank of Gungapatam river.	111th mile 4th furlong.	Do. 53 ..	20,500	
30	..	Improvements to canal, 111 miles 5 furlongs to 114 miles 2 furlongs.	111th to 114th mile.	Do. 52 ..	12,980	
31	..	Flood-gate north bank of Gungapatam river.	111th mile 5th furlong.	Do. 52 ..	20,500	
32	..	Outlet at 113 miles 2 furlongs	113th mile 2nd furlong.	Do. 52 ..	3,510	
33	..	Flood-gate south bank of Pennér river ..	114th mile ..	Do. 52 ..	20,500	
		Add items of General Abstract Estimate, Nos. 65, 68 and 73.	..	..	3,03,270	
					3,09,498	
						6,12,768
		Section V.—From Pennér River to tail of Commamur Canal in Kistna District.				
1	..	Pennér diversion	114th to 117th mile.	Paragraph 51 ..	69,300	
2	..	Flood-gate north bank of Pennér river ..	114th mile 4th furlong.	Do. 51 ..	20,500	
3	..	Training and cross bank of Pennér river ..	Do. do. ..	Do. 51 ..	68,690	
4	..	Second-class Rest-house at Pennér island ..	115th mile ..	Do. 39 (11).	5,715	
5	..	Outlet at 116 miles 7 furlongs	116th mile 7th furlong.	Do. 51 ..	3,510	
6	..	Improvements to canal, 116 miles 7 furlongs to 119 miles 3 furlongs.	116th to 119th mile.	Do. 50 ..	11,145	
7	..	Ramatheertham diversion, 119 miles 3 furlongs to 120 miles 1 furlong.	119th to 120th mile.	Do. 50 ..	8,230	
8	..	Siding basin at Ramatheertham	120th mile ..	Do. 39 (9).	1,310	
9	..	Outlet at 120 miles	120th ,, ..	Do. 50 ..	3,250	
10	..	Improvements to canal, 120 miles 1 furlong to 122 miles 6½ furlongs.	120th to 122nd mile	Do. 50 ..	20,000	
11	..	Diversion to canal, 122 miles 6½ furlongs to 123 miles 5 furlongs.	122nd to 123rd mile.	Do. 50 ..	14,630	
12	..	Two outlets at 123 miles 5 furlongs and 123 miles 6 furlongs.	123rd mile 5th and 6th furlongs.	Do. 50 ..	6,500	
13	..	Flood-gate south bank of Pyderu river ..	123rd mile 5th furlong.	Do. 50 ..	19,060	
14	..	Diversion to canal, 123 miles 6 furlongs to 126 miles 7 furlongs.	123rd mile to 126th mile.	Do. 49 ..	45,900	
15	..	Flood-gate north bank of Pyderu river ..	123rd mile 6th furlong.	Do. 49 ..	19,060	
16	..	Improvements to canal, 126 miles 7 furlongs to 131 miles 7 furlongs.	126th to 131st mile.	Do. 49 ..	25,900	
17	..	Siding basin at Iskapalle	128th mile ..	Do. 39 (9).	1,160	
18	..	Flood-gate south bank of Iskapalle river ..	128th ,, ..	Do. 49 ..	19,080	
19	..	Do. north bank of do. ..	128th ,, ..	Do. 49 ..	19,080	
20	..	Diversion to canal, 131 miles 7 furlongs to 132 miles 5 furlongs.	131st to 132nd mile.	Do. 49 ..	9,364	
21	..	Outlet at 132 miles 5 furlongs	132nd mile 5th furlong.	Do. 49 ..	3,045	
22	..	Flood-gate south bank of Chippaleru river ..	Do. do. ..	Do. 49 ..	18,100	
23	..	Diversion to canal, 132 miles 5 furlongs to 134 miles 3 furlongs.	132nd to 134th mile	Do. 48 ..	18,690	
24	..	Flood-gate north bank of Chippaleru river ..	132nd mile 6th furlong.	Do. 48 ..	18,100	

Summary of Estimates for improving reaches of Buckingham Canal, &c.—*cont.*

Number on Index Map and General Abstract Estimate.	Sheet Number of Index Map.	Description of Work.	Position.	Reference to Report.	Amount of Estimate as sanctioned in detail by the Madras Government.	Total for each Section.
		NORTHERN CANAL—*cont.*			RS.	RS.
		Section V.—From Pennér River to tail of Commamur Canal in Kistna District—cont.				
25	..	Two outlets at 132 miles 6 furlongs ..	132nd mile 6th furlong.	Paragraph 48 ..	6,090	
26	..	Improvements to canal, 134 miles 3 furlongs to 150 miles 5 furlongs.	134th to 150th mile.	Do. 48 ..	33,100	
27	..	Siding basin at Tumalapenta	139th mile 2nd furlong.	Do. 39 (9).	900	
28	..	Second-class Rest-house at Tumalapenta ..	Do. do. ..	Do. 39 (11).	5,715	
29	..	Siding basin at Chenugaripolliem	145th mile ..	Do. 39 (9).	3,180	
30	..	First-class inspection bungalow at Ramapatam.	149th mile 2nd furlong.	Do. 39 (11).	8,004	
31	..	Office and store at Ramapatam	Do. do. ..	Do. 39 ..	2,340	
32	..	Toll Office, &c., at do.	Do. do. ..	Do. 39 ..	1,300	
33	..	Siding basin at do.	Do. do. ..	Do. 39 (9).	2,590	
34	..	Two outlets at 150 miles 5 furlongs ..	150th mile 5th furlong.	Do. 48 ..	5,640	
35	..	Flood-gate south bank of Elekeru river ..	Do. do. ..	Do. 48 ..	13,720	
36	..	Improvements to canal, 151 miles to 159 miles 7 furlongs.	151st to 159th mile.	Do. 47 ..	21,530	
37	..	Flood-gate north bank of Elekeru river ..	151st mile ..	Do. 47 ..	13,720	
38	..	Outlet at 151 miles	151st ,, ..	Do. 47 ..	2,820	
39	..	Two siding basins at Chackicherla and Karedu.	154th and 159th miles.	Do. 39 (9).	1,310	
40	..	Manneru southern diversion	159th to 160th mile.	Do. 47 ..	2,937	
41	..	Outlet at 159 miles 7 furlongs	159th mile 7th furlong.	Do. 47 ..	2,990	
42	..	Flood-gate south bank of Manneru river ..	160th mile ..	Do. 47 ..	20,240	
43	..	Manneru right flood bank ..	160th ,, ..	Do. 46 ..	2,118	
44	..	Do. left do. ..		Do. 46 ..	6,525	
45	..	Do. north diversion	160th mile to 160th mile 6th furlong.	Do. 46 ..	6,250	
46	..	Flood-gate north bank of Manneru river ..	160th mile ..	Do. 46 ..	20,240	
47	..	Outlet at 160 miles	160th ,, ..	Do. 46 ..	2,990	
48	..	Improvements to canal, 160 miles 6 furlongs to 168 miles 2 furlongs.	160th to 168th mile.	Do. 45 ..	31,660	
49	..	Second-class Rest-house at Oollapolliem ..	163rd mile ..	Do. 39 (11).	5,715	
50	..	Siding basin at Oollapolliem	163rd ,, ..	Do. 39 (9).	1,115	
51	..	Outlet at 164 miles 5 furlongs	164th mile 5th furlong.	Do. 45 ..	3,055	
52	..	Siding basin at Pakala	166th mile ..	Do. 39 (9).	615	
53	..	Outlet at 168 miles	168th ,, ..	Do. 45 ..	3,055	
54	..	Flood-gate south bank at Paleru river ..	168th ,, ..	Do. 45 ..	18,440	
55	..	Paleru right flood bank	167th to 168th mile.	Do. 46 ..	6,130	
56	..	Duplicate cut and improvements to canal, 168 miles 2 furlongs to 169 miles 3 furlongs.	168th to 169th mile.	Do. 45 ..	14,100	
57	..	Flood-gate north bank of Paleru river ..	168th mile 2nd furlong.	Do. 45 ..	18,440	
58	..	Flood-gate south bank of Moosee river ..	169th mile 3rd furlong.	Do. 45 ..	18,440	
59	..	Do. north bank of do. ..	Do. do. ..	Do. 45 ..	18,440	
60	..	Outlet at 169 miles 3 furlongs	Do. do. ..	Do. 45 ..	3,055	
61	..	Moosee left flood bank and Enagalur diversion to Moosee.	172nd mile ..	Do. 45 ..	14,960	
62	..	Improvements to canal, 169 miles 3 furlongs to 177 miles.	169th to 177th mile.	Do. 44 ..	15,800	
63	..	Siding basin at Manneru	172nd mile ..	Do. 39 (9).	2,135	
64	..	Bridge at Ethamukkala	173rd ,, ..	Do. 39 (10).	10,250	
65	..	Siding basin at do.	173rd ,, ..	Do. 39 (9).	2,410	
66	..	Thonderu diversion, 177 miles to 177 miles 7 furlongs.	177th ,, ..	Do. 44 ..	11,150	
67	..	Improvements to canal, 177 miles 7 furlongs to 183 miles 1 furlong.	178th to 183rd mile.	Paragraphs 43 and 44.	23,900	
68	..	First-class inspection bungalow at Kothapatam.	179th mile ..	Paragraph 39 (11).	6,630	
69	..	Stores and office at Kothapatam	179th ,, ..	Do. 39 (11).	2,340	
70	..	Bridge at Kothapatam	179th ,, ..	Do. 39 (10).	10,250	
71	..	Basin at do. both sides	179th ,, ..	Do. 39 (9).	8,180	
72	..	Road dam at do.	179th ,, ..	Do. 39 (10).	3,600	
73	..	Siding basin at Mottumala	183rd ,, ..	Do. 39 (9).	505	
74	..	Outlet at 183 miles 2 furlongs	183rd mile 2nd furlong.	Do. 44 ..	3,170	

Summary of Estimates for improving reaches of Buckingham Canal, &c.—*cont.*

Number on Index Map and General Abstract Estimate.	Sheet Number of Index Map.	Description of Work.	Position.	Reference to Report.	Amount of Estimate as sanctioned in detail by the Madras Government.	Total for each Section.
					Rs.	Rs.
		NORTHERN CANAL—*cont.*				
		Section V.—From Pennér River to tail of Commamur Canal in Kistna District—cont.				
75	..	Flood-gate south bank of Mudigoudi river ..	183rd mile 2nd furlong.	Paragraph 44 ..	21,460	
76	..	Improvements to canal, 183 miles 3 furlongs to 186 miles 6 furlongs.	183rd to 186th mile.	Do. 43 ..	41,220	
77	..	Flood-gate north bank of Mudigoudi river ..	183rd mile 3rd furlong.	Do. 43 ..	21,460	
78	..	Siding basin at Patapadu	185th mile ..	Do. 39 (9).	515	
79	..	Gundlacamma right flood-bank	186th mile 6th furlong.	Do. 43 ..	3,400	
80	..	Flood-gate south bank of Gundlacamma river.	Do. do. ..	Do. 43 ..	21,720	
81	..	Improvements to canal, 187 miles to 190 miles 3½ furlongs.	187th to 190th mile.	Do. 43 ..	13,380	
82	..	Gundlacamma left flood-bank	187th mile ..	Do. 43 ..	11,850	
83	..	Flood-gate north of bank of do.	187th ,, ..	Do. 42 ..	21,720	
84	..	Siding basin at Devarampadu	188th ,, ..	Do. 39 (9).	590	
85	..	Diversion at Kanooparthi, 190 miles 3½ furlongs to 191 miles 4 furlongs.	190th to 191st mile.	Do. 42 ..	11,630	
86	..	Second-class Rest-house at Kanooparthi	191st mile ..	Do. 39 (11).	5,715	
87	..	Siding basin at Kanooparthi ..	191st ,, ..	Do. 39 (9).	1,115	
88	..	Two outlets at 191 miles	191st ,, ..	Do. 42 ..	6,780	
89	..	Flood-bank at Kanooparthi	191st to 192nd mile.	Do. 42 ..	1,970	
90	..	Improvements to canal, 191 miles 4 furlongs to 194 miles 7¾ furlongs.	191st to 194th mile.	Do. 42 ..	24,800	
91	..	Toll Office and Establishment sheds at Pedda Ganjam.	195th mile ..	Do. 39 (11).	2,004	
92	..	Siding basin at Pedda Ganjam	195th ,, ..	Do. 39 (9).	430	
93	..	Flood-gate at do.	196th ,, ..	Do. 42 ..	18,300	
94	..	Improvements to canal, 194 miles 7¾ furlongs to 196 miles 3 furlongs.	194th to 196th mile.	Do. 42 ..	3,100	
					11,25,667	
		Add items of General Abstract Estimate, Nos. 65, 68, 69 and 73.	..	..	13,25,229	24,50,896
		Section VI.—Junction Canal from Buckingham Canal to Commamur Canal, Kistna District.				
1	..	Drainage cut			3,830	
2	..	Under-tunnel	195th mile ..	Paragraph 41 ..	14,000	
3	..	Inlet and outlet at the crossing of the Pedda Ganjam creek.	195th ,, ..	Do. 41 ..	2,770	
			195th ,, ..	Do. 41 ..	20,600	
		Add item of General Abstract Estimate, No. 73.	..	..	20,674	41,274
						47,38,397
		Tools and Plant and Machinery (General Abstract Estimate, Item No. 71).	..	..	..	56,103
		Total, Northern Canal ..	..	..	..	47,94,500
		SOUTHERN CANAL.				
		Section I.—From St. Mary's Bridge at Madras to Sadras Canal Lock.				
1	⅛	Lock at Adyar river left bank	..	Paragraph 63 ..	51,280	
		Add items of General Abstract Estimate, Nos. 65, 68 A, 69 A, and 73.	..	..	6,51,957	7,03,237
		Section II.—From Sadras Canal Lock to Pálár River.				
1	..	Improvements to canal from Adyar river to 8 miles 4 furlongs.	0 to 8th mile ..	Paragraph 64 ..	50,700	
2	..	Lock at Adyar river right bank	1st mile ..	Do. 64 ..	42,750	
3	..	Two siding basins at Guindy Bridge and at lattice girder bridge, &c.	1st and 3rd miles.	Do. 39 (9).	4,045	
4	..	Toll Office and Establishment sheds at Palavakkam.	5th mile ..	Do. 39 (11).	925	

Summary of Estimates for improving reaches of Buckingham Canal, &c.—*cont.*

Number on Index Map and General Abstract Estimate.	Sheet Number of Index Map.	Description of Work.	Position.	Reference to Report.	Amount of Estimate as sanctioned in detail by the Madras Government.	Total for each Section.
					Rs.	Rs.
		SOUTHERN CANAL—*cont.*				
		Section II.—From Sadras Canal Lock to Pálár River—cont.				
5	..	Siding basin at Neelankarai	5th mile ..	Paragraph 39 (9).	1,250	
6	..	Diversion to canal, 8 miles 4 furlongs to 15 miles 1 furlong.	8th to 15th mile.	Do. 64 ..	55,200	
7	..	Two siding basins at Vanienchavady, 12 miles and 13 miles.	12th to 13th mile.	Do. 39 (9).	1,800	
8	..	Flood-gate north bank of Covelong backwater.	15th mile 1st furlong.	Do. 64 ..	14,800	
9	..	Diversion to canal, 15 miles 2 furlongs to 31 miles 2 furlongs.	15th to 31st mile.	Do. 65 ..	1,69,300	
10	..	Flood-gate south of Covelong backwater ..	15th mile to 2nd furlong.	Do. 65 ..	14,800	
11	..	Second-class Rest-house at Covelong ..	16th mile 3rd furlong.	Do. 39 (11).	5,715	
12	½	Six siding basins at 16 miles 3 furlongs, 18 miles, 20 miles 4 furlongs, 23 miles 4 furlongs, 28 miles 4 furlongs, and 30 miles 1 furlong.	16th mile 3rd furlong, 18th mile, 20th mile 4th furlong, 23rd mile 4th furlong, 28th mile 4th furlong, and 30th mile 1st furlong.	Do. 39 (9).	9,625	
13	..	Flood-gate north of Edayur backwater ..	31st mile 2nd furlong.	Do. 65 ..	14,800	
14	..	Diversion to canal, 31 miles 4 furlongs to 32 miles 3 furlongs.	31st to 32nd mile.	Do. 66 ..	7,430	
15	..	Flood-gate south bank of Edayur backwater.	31st mile 4th furlong.	Do. 66 ..	14,800	
16	..	Siding basin at Konatur, 32 miles 2 furlongs.	32nd mile 2nd furlong.	Do. 39 (9).	1,695	
17	..	Improvements to canal, 32 miles 3 furlongs to 36 miles 3 furlongs.	32nd to 36th mile.	Do. 66 ..	14,875	
18	..	Siding basin at Sadras	35th mile ..	Do. 66 ..	15,130	
19	..	Flood-gate north of Pudupatnam drain near Sadras.	36th mile 3rd furlong.	Do. 66 ..	92,280	
20	..	Improvements to canal, diversion and flood bank to Pálár river.	36th to 41st mile.	Do. 66 ..	15,130	
21	..	Flood-gate south bank of Pudupatnam drain	36th mile 5th furlong.	Do. 39 (9).	3,375	
22	..	Siding basin at Pudupatnam	37th mile ..	Do. 66 ..	18,950	
23	..	Flood-gate left bank, Pálár river ..	39th ,, ..	Do. 66 ..	14,700	
23 A.	..	Five outlet sluices	13th, 18th, 30th, 33rd and 38th miles.		5,86,745	
					78,608	
		Add items of General Abstract Estimate, Nos. 65, 68, 68 A, and 73.	..	..		6,65,353
		Section III.—From Pálár River to Merkanam.				
		Flood-gate, Pálár river, right bank ..	40th mile ..	Paragraph 66 ..	18,620	
1	..	Second-class Rest-house at Panayur ..	54th ,, ..	Do. 39 (11).	5,715	
2	..	Toll Office and Establishment sheds at Alambarai.	58th ,, ..	Do. 39 (11).	640	
3	..	Store and Office at Alambarai	58th ,, ..	Do. 39 (11).	2,340	
4	..				27,315	
					1,86,450	
		Add items of General Abstract Estimate, Nos. 65, 68, and 73.	..	..		2,13,765
		Tools and Plant and Machinery, Item No. 71.	..	..	..	10,245
		Total, Southern Canal ..	..	..	..	15,92,600
		Grand Total, Northern and Southern Canals.	..	..	..	63,87,100

CHEPÂK,
December 1882.

(Signed) R. R. E. DRAKE-BROCKMAN, Major, R.E.,
Executive Engineer, Buckingham Canal.

APPENDIX B.

Statement showing the Expenditure incurred up to 31st March 1882 and to be incurred on different Sections of the Buckingham Canal.

No.	Sections of Canal.	Expenditure up to the commencement of Famine.	Expenditure during Famine.			Expenditure subsequent to Famine up to 31st March 1882.	Total of Columns 3, 6, and 7.	Further Expenditure to be incurred including the probable Outlay in 1882-83.	Total of Columns 8 and 9.
			Total Famine Expenditure.	Deduct Excess over Normal Rates debited to Famine.	Net Ordinary Expenditure.				
1	2	3	4	5	6	7	8	9	10
	Southern Canal.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	From St. Mary's Bridge at Madras to Junction Canal Lock	16,002	7,12,497	1,29,395	5,83,102	48,053	6,47,157	56,080	7,03,237
2	From Sadras Canal Lock to Pálár River	48,836	39,719	15,591	24,128	361	73,325	5,92,028	6,65,353
3	From Pálár River to Merkanam	...	32,633	15,016	17,617	1,65,793	1,83,410	30,355	2,13,765
		64,838	7,84,849	1,60,002	6,24,847	2,14,207	9,03,892	6,78,463	15,82,355
	Northern Canal.								
1	From St. Mary's Bridge at Madras to Pulicat ...	...	...	...	...	1,452	1,452	4,32,960	4,34,412
2	From Pulicat to Dugarázpatnam	1,800	3,10,685	69,185	2,41,500	7,673	2,50,973	4,07,825	6,58,798
3	From Dugarázpatnam to Kistnapatam	2,85,782	...	...	...	..	2,85,782	2,54,467	5,40,249
4	From Kistnapatam to Pennér River ...	1,96,658	85,239	6,341	78,898	32,434	3,07,990	3,04,778	6,12,768
5	From Pennér River to tail of Commamur Canal ...	...	17,39,875	4,94,500	12,45,375	71,047	13,16,422	11,34,474	24,50,896
6	Junction Canal from Buckingham Canal to Commamur Canal	...	4,281	1,047	3,234	17,440	20,674	20,600	41,274
		4,84,240	21,40,080	5,71,073	15,69,007	1,30,046	21,83,293	25,55,104	47,38,397
	Total ...	5,49,078	29,24,929	7,31,075	21,93,854	3,44,253	30,87,185	32,33,567	63,20,752
	Tools and Plant and Machinery provided for in the General Abstract Estimate	...	...	...	...	...	..	...	66,348
	Grand Total ..	...	...	...	...	...	...	...	63,87,100

(Signed) R. R. E. DRAKE-BROCKMAN, Major, R.E.,
Executive Engineer, Buckingham Canal.

APPENDIX C.

Statement showing the Arrivals at, and Departures from, the Madras Basin of Boats, with their Tonnage, for the period 1st July 1878 to 30th June 1882.

Directions.	Half-year ending 31st December 1878.		Half-year ending 30th June 1879.		Half-year ending 31st December 1879.		Half-year ending 30th June 1880.		Half-year ending 31st December 1880.		Half-year ending 30th June 1881.		Half-year ending 31st December 1881.		Half-year ending 30th June 1882.	
	Number of Boats.	Tons.	Number of Boats.	Tons.	Number of Boats.	Tons.	Number of Boats.	Tons.	Number of Boats.	Tons.	Number of Boats.	Tons.	Number of Boats.	Tons.	Number of Boats.	Tons.
Inwards from A Section ..	3,199	19,880	2,681	14,946	4,019	25,494	1,467	9,330	3,762	26,440	3,890	26,638	3,842	21,841	3,100	15,968
Do. from C do. ..	6,561	81,836	7,125	78,645	5,396	66,406	5,653	70,208	7,657	116,755	5,333	95,975	6,856	96,753	5,070	59,341
Total ..	9,760	101,716	9,806	93,591	9,415	91,900	7,120	79,538	11,419	143,195	9,223	122,613	10,698	118,594	8,170	75,309
Outwards into A Section ..	1,438	7,863	1,629	9,059	730	3,954	277	2,405	2,208	17,037	3,975	26,247	3,828	21,561	3,153	16,639
Do. into C do. ..	959	6,754	1,121	11,463	2,036	24,657	5,591	67,679	7,701	117,591	5,763	62,357	6,918	98,474	5,072	58,018
Total ..	2,397	14,617	2,750	20,522	2,766	28,611	5,868	70,084	9,909	134,628	9,738	88,604	10,746	120,035	8,225	74,657
Grand Total ..	12,157	116,333	12,556	114,113	12,181	120,511	12,988	149,622	21,328	277,823	18,961	211,217	21,444	238,629	16,395	149,966

CHEPÂK,
15th September 1882.

(Signed) R. R. E. DRAKE-BROCKMAN, Major, R.E.,
Executive Engineer, Buckingham Canal.

APPENDIX E.

THE BUCKINGHAM CANAL.

Ootacamund, September 22, 1879.

The following revised rules for the regulation of the navigation of the Buckingham Canal, passed by the Madras Government with such alterations as appeared necessary, are, under the provisions of Section 23 of Act I of 1870, hereby published for general information :—

I.—The Buckingham Canal includes the following lines of navigation, extending from south of the Pálár river in the district of Chingleput to the junction of the tidal and fresh-water canals in the Kistna District near Pedda Ganjam, together passing over a continuous distance of about 256 miles, viz. :—

1*st.*—The Sadras Canal extending from 12 miles south of the right bank of the Pálár river to Palavakkam, distance about 50 miles.

2*nd.*—The Madras Canal extending from Palavakkam to the Shadayankuppam Lock, distance about 16 miles.

3*rd.*—The Pulicat Canal extending from the Shadayankuppam Lock to near Raidurravoo, distance about 48 miles.

4*th.*—The Kistnapatam Canal extending from near Raidurravoo to near Kódúr, distance about 48 miles.

5*th.*—The Ramapatam Canal extending from near Kódúr to Ramapatam, distance about 48 miles.

6*th.*—The Kottapatam Canal extending from Ramapatam to the junction with the Commamur fresh-water canal in the Kistna District, distance about 46 miles.

II.—These lines of navigation include also such portions of all navigable estuaries, backwaters, rivers, and channels, whether salt or fresh, connected with each such lines as have been artificially formed, deepened, or protected; except all those minor channels which have been excavated as feeders to the main line of canal for purposes connected with the Salt and Wood Departments; they shall be each and severally distinct lines of navigation as defined in Section 1 of Act I of 1870 (The Canals and Ferries Act), the provisions of which shall apply to each of these distinct lines of navigation separately, and they shall be denominated sections of the Buckingham Canal as follows :—

1*st.*—A or the Sadras Section.
2*nd.*—B or the Madras Section.
3*rd.*—C or the Pulicat Section.
4*th.*—D or the Kistnapatam Section.
5*th.*—E or the Ramapatam Section.
6*th.*—F or the Kottapatam Section.

III.—From and after the 8th day of October 1879 no vessel, but those hereinafter excepted, shall be allowed on, or to use any of the abovementioned distinct lines of navigation without—

(1*st.*) The payment of an annual license fee at the rates specified in the Schedule A annexed for the use of any one of the abovementioned distinct lines of navigation.

Exception (1).—Vessels possessing licenses for the navigation of the canals of the Godávari or Kistna District will not be required to pay a license fee for the use of any section of the Buckingham Canal.

Exception (2).—The Pulicat fishermen (with boats under 2 tons each) should be free to fish in the backwater without the obligation to take out a license.

(2*nd.*) The payment of a toll at the rates specified in the Schedule B annexed for passing from any one to any other of the abovementioned distinct lines of navigation for which the owner does not hold a license.

Exception (1).—Boats leaving their section will not be liable to toll when returning empty within two months.

Exception (2).—Boats licensed for the Kistna and Godávari plying through the length of the canal to Madras will pay 4 annas per ton on the outward journey, but on returning full or empty, they will pass free at any toll-bar at which they had paid toll within one month.

Exception (3).—Boat-owners have the option of compounding for a year's tolls at Rs. 10 per ton.

Exception (4).—Boats licensed for the whole canal will not pay tolls.

Exception (5).—Boats returning into their own sections with a cargo after an absence from it of ten clear days, or if returning empty after an absence from it of two months, must pay tolls.

IV.—The Executive Engineer of the canal will issue licenses (in the Form C annexed) personally or by agents authorised by him in writing for the purpose, at such times and places as he may notify in the *Fort St. George Gazette* and in the Official Gazette of the district in which the line of navigation, for which licenses are to be issued, is situated. The vessels to be licensed must be brought at the time specified in the notification to the places where licenses are to be issued to be measured and registered and to have the necessary distinguishing marks put on them.

V.—These marks will show by letter the section of the canal to which the vessel belongs and which it is licensed to navigate. They will show the registered number of the vessel, and the tonnage, or the number of passengers the vessel is licensed to carry. They shall be put on under the direction of the Executive Engineer at the cost of the owner of the vessel, who will be held responsible that they are not defaced or obliterated, and that they are renewed from time to time as required. Yachts, pleasure boats, and other vessels not intended to ply for hire, may be marked as the owner desires, provided the figures are clearly legible.

VI.—Applications for licenses shall be made in the Form D annexed, at any time before the 8th October for the current calendar year, and in the months of October, November or December for the ensuing calendar year. Printed forms of applications for licenses will be issued by the Executive Engineer of the Canal at his office in Madras and by the Toll Superintendents of the Canal at the Toll offices at Palavakkam, Shadayankuppam Lock, Raidurravoo, Kódúr, Ramapatam, and Pedda Ganjam.

VII.—The maximum dimensions of vessels brought on the canal hereafter will be limited to 90 feet in length, 13 feet beam, and $2\frac{1}{2}$ feet draught; vessels of greater length and beam that may be now on the canal will be allowed to remain upon it at the owner's risk until they are worn out or renewed, but the draught of water will be limited in all cases to $2\frac{1}{2}$ feet, which draught will be marked by a painted band or water-line round the outside of the hull, provided that the painted band or water-line thus arrived at shall not allow less free-board than 12 inches; or, in other words, be less than 12 inches below the lowest point in the gunwale; and no vessel shall be laden so as entirely to submerge this painted band. The height of fixed fittings, such as the roofs of boats, mast partners, funnel sockets, &c., shall be limited to $6\frac{1}{2}$ feet above the deep load-line.

The height of piled cargo, such as firewood, cotton, leaves, &c., will be limited to the same dimensions and in a similar manner.

VIII.—The gross tonnage of all vessels will be obtained by the following rule :—

$$\frac{L \times B \times D}{50}$$

L being equal to the length of the vessel, measured at half the midship depth, from the afterpart of the stem to the forepart of the stern post.

B is equal to the sum of five widths taken from the inner side of the planking to one side of the rib on the other side, at equal distances of one-sixth of the above length, divided by 6.

D is the midship depth taken from the upper surface of the limber strake (the bottom plank next the keelson, or the centre bottom plank when there is no keelson) to the under-surface of the deck planking in decked vessels, or to the top of the upper strake or gunwale in open vessels.

The net or registered tonnage will be for—
Steamers, the gross tonnage less one-third; and for
Other vessels, the gross tonnage less 15 per cent.;
but the carrying capacity of *any* vessel to the load-line painted round the hull as laid down in Rule VII will be actually tested by weight on the owner of the vessel or his agent bringing it to the Basin at Madras and making written application to the Executive Engineer to have it so tested, and the result arrived at by such testing shall be the registered tonnage of the vessel and be painted on it and adopted as the registered tonnage of the vessel, with effect retrospective to the commencement of the license under which the vessel is plying, *i. e*, all excess license fees and tolls collected from the commencement of the calendar year for which the vessel is licensed will be refunded, and *vice versâ*. In the case of a vessel being tested which is found to have had its tonnage correctly or underestimated by the method of measurement in this rule, the boat-owner or his agent who applies for the testing will pay a fee for testing of eight annas per ton of the tonnage arrived at by the testing. The cost of testing shall be borne by the Government when it is carried out on the order of the officer in charge of the canal, and in such case its effect shall not be retrospective.

APPENDIX D.

Statement showing the Number, Tonnage, and Description of Boats licensed for each Section of the Buckingham Canal for the year 1881.

Particulars.	Uncovered Cargo Boats.																															
	1 Ton.	2 Tons.	3 Tons.	4 Tons.	5 Tons.	6 Tons.	7 Tons.	8 Tons.	9 Tons.	10 Tons.	11 Tons.	12 Tons.	13 Tons.	14 Tons.	15 Tons.	16 Tons.	17 Tons.	18 Tons.	19 Tons.	20 Tons.	21 Tons.	22 Tons.	23 Tons.	24 Tons.	25 Tons.	26 Tons.	27 Tons.	28 Tons.	29 Tons.	30 Tons.	31 Tons.	32 Tons.	35 Tons.	Total.
Government Boats	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Private Boats	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Boats compounded for the whole canal	..	..	..	1	2	..	3	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8
A or Sadras Section	..	..	7	12	5	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	25
B or Madras do.	..	..	..	1	..	..	..	..	..	..	1	..	1	1	2	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8
C or Pulicat do.	4	6	1	13	9	6	7	11	4	6	5	7	7	8	1	14	13	12	7	19	14	13	12	12	17	9	13	16	16	11	8	4	1	306
D or Kistnapatam Section	..	..	..	1	..	3	1	..	1	..	..	..	..	..	1	2	1	2	2	2	..	..	1	..	..	..	..	..	..	..	..	..	..	..	17
E or Ramapatam do.	..	..	..	..	..	1	1	2	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5
F or Kottapatam do.	..	..	..	1	2	1	..	1	1	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10
Total Number of Boats	4	6	8	29	18	11	13	15	6	9	7	7	8	10	4	17	14	15	10	21	14	13	13	12	17	9	13	16	16	11	8	4	1	379
Total Tonnage	4	12	24	116	90	66	91	120	54	90	77	84	104	140	60	272	238	270	190	420	294	286	299	288	425	234	351	448	464	330	248	128	35	6,352
																																		16¼ Tons.

Statement showing the Number, Tonnage, and Description of Boats licensed for each Section, &c.—*cont.*

Particulars.	Covered Cargo, Passengers and Radari Boats.																		Total.	Deck and Dinghy Boats.											
	1 Ton.	2 Tons.	3 Tons.	4 Tons.	5 Tons.	6 Tons.	7 Tons.	8 Tons.	9 Tons.	10 Tons.	11 Tons.	12 Tons.	13 Tons.	14 Tons.	15 Tons.	16 Tons.	17 Tons.	18 Tons.	19 Tons.		1 Ton.	2 Tons.	3 Tons.	4 Tons.	5 Tons.	6 Tons.	7 Tons.	8 Tons.	9 Tons.	10 Tons.	11 Tons.	12 Tons.
Government Boats	..	..	1	3	1	4	2	2	3	..	..	..	1	..	..	..	..	..	..	17	..	..	..	..	..	..	..	..	..	..	..	..
Private Boats	..	..	..	1	1	2	1	..	..	..	..	..	1	..	1	2	..	..	..	9	..	..	..	..	..	..	..	..	..	..	..	..	..
Boats compounded for the whole year	..	1	1	2	1	9	3	5	3	2	3	1	1	1	1	1	..	..	..	35	..	..	..	..	..	..	..	1	..	..	..	..
A or Sadras Section	..	7	27	43	19	4	..	..	..	..	..	..	..	..	..	..	..	..	..	100	..	..	..	..	..	..	..	..	..	..	..	..
B or Madras do.	3	1	4	2	2	..	1	1	..	..	..	..	1	..	1	1	..	..	1	18	..	..	..	..	..	..	..	..	..	..	..	..
C or Pulicat do.	4	24	18	52	55	35	19	18	16	15	8	10	9	5	2	1	..	..	..	291	..	..	..	..	..	..	..	1	..	1	..	1
D or Kistnapatam Section	..	..	..	1	5	..	4	..	2	..	1	1	..	..	..	..	1	..	..	15	..	..	..	..	..	..	..	..	1	..	..	..
E or Ramapatam do.	..	..	1	1	5	6	6	5	3	1	..	1	..	..	..	..	..	..	..	29	..	..	..	..	..	..	..	..	..	3	..	..
F or Kottapatam do.	..	..	..	1	5	1	6	4	..	2	..	..	1	..	..	..	..	..	..	19	..	..	..	..	..	..	..	2	..	2	3	..
Total Number of Boats	7	33	52	106	94	61	41	35	27	20	12	14	13	7	6	3	1	..	1	533	..	..	..	..	..	..	..	4	1	6	..	3
Total Tonnage	7	56	156	424	470	366	287	280	243	200	132	168	169	98	90	48	17	..	19	3,240	..	..	..	..	..	..	..	32	9	60	..	36
																				6 Tons											

Statement showing the Number, Tonnage, and Description of Boats licensed for each Section, &c.—*cont.*

Particulars.	Deck and Dinghy Boats—*cont.*						Total.	Fishing Boats.						Total.	Various other Boats.				Total.	Total Number of all kinds of Boats.	Total Tonnage of Boats.
	13 Tons.	14 Tons.	15 Tons.	16 Tons.	17 Tons.	18 Tons.		1 Ton.	2 Tons.	3 Tons.	4 Tons.	5 Tons.	6 Tons.		1 Ton.	2 Tons.	3 Tons.	4 Tons.			
Government Boats	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	17	114
Private Boats	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9	84
Boats compounded for the whole year	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	44	348
A or Sadras Section	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	125	487
B or Madras do.	1	..	1	..	..	..	5	108	42	3	1	..	..	154	3	8	..	..	11	767	7,816
C or Pulicat do.	..	..	1	..	..	..	2	..	..	..	..	..	1	1	..	1	..	..	1	35	380
D or Kistnapatam Section	..	..	..	..	1	..	4	..	..	..	..	..	..	..	..	..	1	..	1	39	291
E or Ramapatam do.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	48	458
F or Kottapatam do.	2	2	2	1	2	2	17	..	..	..	..	..	..	..	..	..	..	..	..			
Total Number of Boats	3	2	4	1	3	2	29	108	42	3	1	..	1	155	21	10	..	1	32	1,128	..
Total Tonnage	39	28	60	16	51	36	367	108	84	9	4	..	6	211	21	20	..	4	45	..	10,215

(Signed) R. R. E. DRAKE-BROCKMAN, Major, R.E.,
Executive Engineer, Buckingham Canal.

CHEPÂK,
15th September 1882.

IX.—Vessels adapted to carry passengers, *i.e.*, having a covered space for their protection, may be registered as passenger vessels and will then be licensed to carry one passenger for every 5 square feet of deck surface under cover to be measured as follows:—Length, from stem to stern at the deck level; breadth, the sum of five widths taken at equal distances of one-sixth the length and divided by 6; then length and breadth divided by 5 will give the number of passengers a vessel will be licensed to carry, including 40 lb. of luggage for each passenger. When passenger vessels carry cargo as well as passengers, the quantity of cargo allowable will be the registered tonnage less 400 lb. for each passenger on board.

First-class passenger vessels (such as budgerows) plying for hire and not carrying cargo will be licensed at the commencement of the year at the option of the owners, either like other vessels by a license fee of Rs. 2 per ton for one section and tools at 4 annas per ton, or by a license fee at Rs. 4 per ton for the *whole* Buckingham Canal for the year. In the calculation of the tonnage of such boats the free-board will be taken as at 18 inches and the load-line marked accordingly, the tonnage being determined by testing. The minimum fee for licensing a budgerow for the whole canal shall be Rs. 15.

Vessels, the private property of individuals, making use of the canals, but not carrying passengers or goods or plying for hire, will be licensed for a calendar year for the *whole* Buckingham Canal on payment of a fee of Rs. 15.

X.—Rafts will be permitted to navigate the several sections of the Buckingham Canal on payment when entering each such section of the toll prescribed in Schedule B annexed; no raft exceeding 90′ × 13′ × 2″ will be allowed on the canal.

XI.—If a vessel after the issue of a license be enlarged, it shall not again use the canal until it has been remeasured and relicensed. The new license will be granted on surrender of the old license and on payment of the prescribed fee per ton on the difference between the old and new tonnage.

XII.—No person who has taken out a license for the navigation of any section of the canal shall have claim to compensation on account of any impediment to navigation that may occur from any cause whatever.

XIII.—Sea-going vessels brought into rivers and backwaters for shelter, for repair, or for any other purpose except to ply for hire must anchor or lay up outside the fair way of canal traffic which will be defined by the Canal officers; such vessels will not be allowed to enter on the main line of the canal for the purpose of proceeding from one river or backwater to another river or backwater or for any other purpose except in accordance with the rules prescribed for the use of the canal.

XIV.—The Executive Engineer in charge of the canal for the time being is authorised to enforce these rules, to collect tolls and license fees, to remove obstructions to navigation, and to direct prosecutions under the provisions of Sections 7, 8, 9, 10, 12, and 25 of Act No. I of 1870.

BYE-LAWS.

I.—No vessel shall moor on the towing-path side of the canal when there is only one towing-path, nor on the windward side when there are two towing-paths, except when actually loading or unloading, or with the special permission of the Canal officers.

II.—No cargo shall be loaded or unloaded, and no passengers shall be shipped or landed at any lock or masonry work other than the quays or wharfs specially provided for the purpose.

III.—No vessel shall be repaired or fitted on the main line of the canal without the written permission of the Executive Engineer or other officer authorised to give such permission on the Executive Engineer's behalf.

IV.—No vessels shall be moored in a lock channel defined as such by notice-boards erected for the purpose by the Canal officers.

V.—Vessels when moored in main line of the canal shall be made fast stem and stern to the banks in single tier, and there must be a person always in charge of each vessel; vessels when thus moored must, between sunset and sunrise, show a clear bright light not less than 4 feet above the water level and visible all round the vessel.

VI.—When vessels, other than steamers, going under sail in opposite directions, meet, the vessel going with the wind shall give way, while the vessel going against the wind shall hold on its course.

VII.—Vessels not under sail shall give way to vessels under sail, and steamers shall in all cases give way to other vessels.

VIII.—When vessels not under sail, including steamers, meet, those going north should keep to the east, and those going south should keep to the west.

IX.—When a vessel passes another vessel going in the same direction, it should keep to the leeward of vessels under sail, and on the opposite side of the towing line of vessels not under sail.

X.—Vessels when not moored must, between sunset and sunrise, carry lights as follows:—

Steamers, three lights—

1*st*.—A clear white light not less than 9 feet above water and in the centre line of the vessel.

2*nd*.—A bull's-eye bright red light on the port (left) side.

3*rd*.—A bull's-eye bright green light on the starboard (right) side.

The bull's-eye lights to be not less than 8 inches in diameter and not less than 4 feet above water.

Vessels other than steamers must carry a clear white light at the fore end not less than 4 feet above water.

Passenger boats must, in addition to the above lights, carry a light in each cabin or compartment for passengers.

XI.—The maximum speed of steamers will be limited to 10 miles an hour by day and to 5 miles an hour by night, reduced to 4 miles an hour when within half a mile of a lock, or vessels ahead coming in an opposite direction. The steam whistle shall be blown when speed is reduced on the abovementioned occasions and when nearing a vessel going ahead in the same direction, or when approaching any sharp bend in the canal. Steamers passing through portions of the canal under repair or through portions of the canal that cannot stand a high speed shall reduce speed at those places to the limit fixed by the Canal officers on notice-boards erected for this purpose.

XII.—Every vessel shall have its license always on board, and it shall be produced for examination by the Executive Engineer or by any officer authorised by the Executive Engineer to demand an inspection of it.

XIII.—Every vessel plying for hire is liable to be inspected at any time or place by the Executive Engineer or by officers authorised by him to inspect vessels, and the Executive Engineer may withdraw the license of any vessel found to be from any cause unfit for use, and to withhold the license until the vessel is made serviceable.

XIV.—The Executive Engineer may suspend the license of any vessel for any period not exceeding three months, or levy a fine not exceeding 5 rupees in each case, for any infringement of these rules or bye-laws.

THE BUCKINGHAM CANAL, MADRAS.

SCHEDULE A.

License Fees.

Description of Vessel.	Rate per Ton of Registered Tonnage per Annum. Rs. A. P.
For every ship, steamer, boat, barge, or vessel of any description, except those specified in the latter part of Rule IX (for the licenses for the whole canal), propelled in any manner and used for any purpose except fishing or pleasure	2 0 0
For every fishing or pleasure boat	0 4 0

Fractions of tons will be counted as one ton, and the minimum charge for any vessel will be one rupee.

Licenses will be issued on payment of the above fees for the use of any distinct line of navigation included in the Buckingham Canal.

A license will not be granted to the same vessel for the use of more than one line of navigation on the canal, except in the instances of the two classes of vessels specified in the latter part of Rule IX.

Vessels licensed in any month of one year must pay the annual fee for the whole of that year.

Licensed vessels will have to pay no other dues of any sort for the use throughout the year of the section of the canal for which the license is granted.

The fee for a duplicate license will be 2 rupees.

THE BUCKINGHAM CANAL, MADRAS.

SCHEDULE B.

SCHEDULE OF TOLLS.

Tolls.

Description of Vessel.	Rate per Ton of Registered Tonnage. RS A. P.
For every ship, steamer, barge, boat, or vessel of any description and propelled in any manner entering any of the distinct lines of navigation or sections of the canal other than the section in which it is licensed, and which it can use free of tolls	0 4 0
For every raft of floating timber, bamboos, or other floating substance	Rate per Square Yard. RS. A. P. 0 1 0

THE BUCKINGHAM CANAL, MADRAS.

FORM C.

License No. of 1879.

This vessel is licensed to use the section of the Buckingham Canal during the calendar year 1879 free of further charge.

Registered No.
Name of owner.
Residence of owner.
Class of vessel. (*a*)
Extreme length.
Do. breadth.
Do. depth.
Draught of water.
Licensed to carry
Do. do. tons cargo.
Fee paid. passengers.
License issued by

on the day of 1879.

Executive Engineer.

(*a*) Here enter steamer, budgerow, cargo-boat, passenger-boat, fishing-boat, or pleasure-boat as the case may be.

THE BUCKINGHAM CANAL, MADRAS.

FORM D.

APPLICATION FOR LICENSE.

I (or we) the undersigned (1) residing at (2)
in the district of (3)
place (4) on the (5) hereby apply for license to
the year 1879. section of the Buckingham Canal during

Date Signature.

(1) Here enter name or names of owners.
(2) Place of residence.
(3) Name of district in which residing
(4) Description of boat and purpose for which it is to be used, such as passenger-boat, cargo-boat, budgerow, &c.
(5) Section of the canal for which a license is required, *i.e.*, the
A or Sadras Section.
B or Madras Section.
C or Pulicat Section.
D or Kistnapatam Section.
E or Ramapatam Section.
F or Kottapatam Section.

R. H. SANKEY, Colonel, R.E.,
Secretary to Govt., P.W.D.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

No. 106.

READ—the following papers :—

Report by the Executive Engineer, Buckingham Canal Division.

No. 106-A.

Note by the Chief Engineer, Public Works Department.

The history, constructive details, financial position, &c., of this work have been dealt with at such length in the accompanying report that little more than a brief *résumé* of the points will suffice in submitting the project for the consideration of Government.

2. The work now known as the Buckingham Canal, extending along the coast 66 miles south and 195 miles north of Madras (where it unites with the Kistna and Godávari canal systems), had its commencement as early as 1801.

3. Mr. Heefke, with Mr. Basil Cochrane as security, obtained the first concession for excavating 11 miles of channel (which was then known as Lord Clive's canal) between Madras and Ennore, but Mr. Cochrane, obtaining subsequently entire control, finished this portion in 1806, and afterwards extended the communication to Pulicat, 25 miles. This gentleman remained sole proprietor of the work for 45 years, when his rights were bought out by Government. Throughout this period the work was generally known as "Cochrane's Canal," a term which, in spite of the lapse of time and two subsequent changes of title, first, to "East Coast Canal," and, then, later on, to the "Buckingham Canal," still adheres to the first portion.

To maintain a sufficient height of water in the canal, which, otherwise, when the Ennore bar was open, would have reduced the height of water in the Cooum river at Madras, the Shadayankuppam lock was built in 1854 at 7½ miles north of Madras; and, subsequently, the channel was extended as far as Dugarázpatnam, 69 miles north. About the same time the canal was pushed south from Madras 40 miles to the Pálár river.

The ultimate objects in view at this period were to reach Kistnapatam backwater, 21 miles north of Dugarázpatnam, thus affording a terminus for Nellore; and as regards the southern branch of the canal, to make for Merkanam, and ultimately the French territory (Pondicherry).

That much wider views of the ultimate extension of the work obtained is clear from all the reports of the time, but want of funds and difficulties connected with the disposal of the cross drainage (every river along the coast passing the channel on its way to the sea) interfered with the actual progress of the work.

Captain Chambers, Mr. Kennedy, Mr. Fraser and other able officers designed extensions of the work north and south, and it was probably as much due to the fact

that these designs were in readiness as to anything else that on the occurrence of the late severe famine the further prosecution of the work was resolved on.

Under the orders of His Grace the Duke of Buckingham large gangs of work-people from the famine-stricken districts of Bellary, Kurnool, and Cuddapah were marched down to the coast, and worked along the whole line, partly in improving the then existing channel, partly in excavating the new canal extending from Dugaráz-patnam to Pedda Ganjam, the junction of the Kistna system (a length of 126 miles in all) was put in hand to the north, and a further length from the Pálár river south. At one time it is reported that no less than 100,000 men, women, and children were so employed.

The whole line, in its present length, may thus be said to have reached a certain stage of completion with the termination of the famine.

The circumstances which have directly led to the necessity for the present large completion estimate may now be briefly noticed.

From the shallowness of the several backwaters along the coast, out of the connection of which no doubt arose the original conception of the canal, flat-bottomed boats, with only trifling draft, were at first used; owing to this the several connection cuts or channels were given very little depth, say 12, or at most 15 inches.

In many places the backwaters were necessarily much deeper than this, and so also the canals in places, but these were at least the ruling depths.

This view of the requirements and capacity of the work is clearly shown by the trifling outlay which, down to 1856, had taken place in its construction, which did not exceed Rs. 1,400 per mile.

Some of the highest engineering authorities of the time considered that, for the development of an inland coast trade it would not only suffice thus, as it were, to "scratch" out a shallow channel, but that it would be quite a mistake to attempt anything more.

This view in itself was by no means illogical, as, in addition to providing for the small class of boats there in use, it certainly met in a way the difficulties arising out of silt-bearing floods which, in crossing the line of canal all along the coast, would always tend to fill up the channel.

To re-excavate, even along a considerable length, a channel to only 12 or 15 inches might be periodically faced, and few or no works of flood protection would be essential.

This view, like all others dependent on arguments derived from small beginnings had of necessity to yield as traffic increased, and a larger class of boats began, to be built and used on the canal.

It thus came to be recognised that if the work was to meet in any adequate way the strain thrown upon it, a depth of not less than 3 feet everywhere at low water must be secured; and although, as will be observed from an examination of the present report, this has led to greatly enhanced outlay, the conclusions on which it is based appear to be irresistible.

Whereas merely clearing a shallow trough through backwaters might have well suited the requirements of the small flat-bottomed skiffs at first used, it has year by year become more clear that, if a canal with sole 3 feet below low water were to be maintained, the first necessity would be to exclude the land floods which usually accompany cyclones on the coast, and which in many places have been shown to rise to no less than 10 or 11 feet above mean sea level.

Such floods, owing to the flatness of the littoral tract, take some time to vent themselves, and after two or three days they have, in many places, been shown not only to bring in silt sufficient to fill up the canal, but even to raise the bed above mean sea level. The enormous recurring outlay required by the re-excavation of the silt thus poured into the unprotected channel has proved that it would in the end be far cheaper to isolate and protect from flood invasion all the several reaches of the canal between the different drainages as they cross the line.

The necessity of constructing high isolating side-embankments, flood-gates, and the training of the several rivers near the coast have thus, one and all, followed as a matter of necessity.

The trifling outlay which, as before shown, was found to suffice with shallow boats and a small trade, has thus gradually progressed from a capital outlay of Rs. 1,400 per mile in 1856 to nearly—

Rs. 3,500 per mile at end of 1875-76,
" 8,500 " " of 1877-78,
" 12,000 " " of 1881-82.

[This omits the excess over normal rates due to famine, which amounted in the aggregate to Rs. 7,31,075.]

As shown by the completion estimates herewith sent up, amounting with all past outlay to Rs. 63,87,100, the ultimate cost for a fully completed first-class canal, 261 miles in length, will be a little under Rs. 24,500 per mile.

The returns show that all classes of boats employed on the canal have increased in a very marked manner, notwithstanding what is now admitted to have been a vexatious and deterrent method of levying license-fees and tolls.

In 1879 there were in all 723 boats with a gross burden of 6,287 tons. By 1882 these had increased to 1,055 boats, aggregating 10,551 tons.

In 1875 the receipts from tolls, &c., were Rs. 51,113, and the total collections had increased to—

Rs. 1,09,808 in 1880,
" 1,16,527 in 1881,
" 1,00,037 in 1882.

The falling off in the last year was due to certain changes in regard to the tolls not necessary to particularize.

As further illustrating the vitality of the trade which, in the present imperfect condition of the work, exists, it may be mentioned that no less than 241,207 tons passed through the locks north and south of Madras during 1881.

It is now fully recognised that the system on which the tolls have been levied acts as a direct impediment to trade, and on the report of a committee which has lately taken the whole subject into consideration, Government has decided on modifications which, though reducing the actual receipts for the present, will, it is certain, have a very beneficial effect in stimulating traffic.

Sufficient, it is hoped, has been adduced to show the growing commercial value of a work which, while being admirably adapted to all the physical conditions of the coast, suits in every way the native habits as a mode of conveyance for passengers and goods, opens a field of new and diverse employment to the inhabitants of the littoral tract, and affords a highway of limitless capacity at a cost of certainly not over one quarter of that of a railway.

Among other benefits indirectly touched on in the report is the value which may yet attach to the large tracts of land which hitherto from having been open to invasion of tidal water will eventually be reclaimed by the works, and may, like others of a similar character, be turned to the best account as casuarina plantations, the success of which as an industry is now so well established along the older portions of the canal.

As a means of bringing the coal from the Singareni field in Hyderabad at a price which will admit of successful competition with patent fuel and English coal at Madras, the railway authorities have lately expressed themselves to be very sanguine.

But the main advantage and importance of the work is its probable use during the prevalence of famine. As linking the great delta systems of the Godávari and Kistna with Madras and the country to the south, and thus affording a means, whether the sea-board be closed or not, of depositing grain at any point along the whole line ready for transport into the interior, its value must be held to be incalculable. It is on these grounds that the claims of this work to be classed as "Protective" have been urged on the attention of the Government of India, and, it is hoped, that this view may be fully maintained and recognised.

As shown in appendix B to the report, the actual capital amount expended on the work from its commencement down to 31st March 1882 has been Rs. 30,87,185.

As the outlay in the current year will be nearly Rs. 1,36,000, the capital outlay for the completion of the work during 1883-84 and subsequent years will amount to Rs. 31,63,915.

From experience of past working, it is thought that, with temporary increase to the present permanent staff, the expenditure in subsequent years might fairly be raised to three lakhs per annum on original works over and above the amounts needed for repairs and maintenance.

The annual outlay under the latter head, which has for the period, April 1879 to March 1883, on an average amounted to Rs. 99,000, will necessarily, as the works now estimated for advance towards completion, diminish sensibly till, as anticipated by the present Executive Engineer, the whole maintenance of the 261 miles of canal will not exceed Rs. 40,000 per annum (exclusive of establishment), a charge which will be fully covered by the revenue derived from tolls and license-fees.

To provide, then, the requisite ways and means for completion of the work, yearly contributions of one lakh from Provincial (which also bears the full maintenance charges) and two lakhs from Imperial under Protective would, it is thought, best meet the requirements of the case, and would, under all the circumstances of the case, appear to provide in a fair and equitable manner for the incidence of the charges.

8th March 1883. (Signed) R. H. SANKEY, Colonel, R.E.,
Chief Engineer, P.W.D.

Order—dated 14th March 1883, No. 841 W., Public Works.

Ordered that the plans and estimates for the Buckingham Canal Project be forwarded to the Government of India.

(True Extract.)

(Signed) R. H. SANKEY, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintending Engineer, V Circle.
" Chief Engineer for Irrigation.
" Examiner, Public Works Accounts.
" Board of Revenue.

Exd. E. Fernandez.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1883} Madras.

PUBLIC WORKS.

Dated March, 14th.

Recd.

Encl.

G.O., 14th March 1883, No. 841 W.

MARCH.

Buckingham Canal Project

The plans, estimates, &c., for the —, ordered to be forwarded to the Government of India.

From the Committee convened in accordance with Proceedings of Madras Government, No. 612 I., of the 5th August 1882, to the Chief Engineer for Irrigation, dated Camp, Ellore, 12th October 1882.

We have the honor to report that having met at Pedda Ganjam we have discussed the matters referred for our consideration regarding the modifications of the Navigation Rules for the canal system of the East Coast.

2. As regards the first point to which our attention was directed, we have agreed that tolls cannot be entirely abolished, but that tolls should be charged on the basis of time rather than on that of distance or direction of journey. This would admit of the number of toll stations at present existing being considerably reduced.

3. We consider it necessary to maintain a system of tolls in the interests of the public, for although annual licenses are simpler and less harassing to frequent users of the canals, yet the occasional use of the canals of a system should not necessitate the taking out of a whole year's license.

4. We think that if tolls are kept within reasonable limits as to rate and frequency of collection, boats which otherwise would confine themselves to the one system for which they were licensed would make occasional use of the canals of other systems to the general advantage of the public.

5. We therefore recommend the retention of tolls, but on a modified system.

6. Our proposals are that tolls shall be paid at the rate of one-fourth the annual license fee for each separate system, and that a toll once paid at any station of a system shall clear the vessel through all the canals of that system and in any direction for a period of six weeks.

7. We have fixed upon this period as that which would suffice for a through return trip for the greatest distance on the main line, and we have fixed the amount so that it shall be to the advantage of users of the canals for more than six months to take out a license.

8. It will be seen that tolls under this system are practically short licenses.

9. In considering the positions for toll stations, we have thought it advisable to place them as far as possible where there is a natural stop, not at places where artificial bars have to be placed across clear reaches of the canals at which all traffic is stopped, whether toll has to be taken or not.

10. We propose therefore that the only toll stations shall be the head locks of each section of the deltas, all tidal locks, the Ellore Lock, the Western Tammileru Aqueduct on the Kistna Ellore Canal, where the Godávari and Kistna Systems join, and the following places on the Buckingham Canal:—

(1.) Pedda Ganjam, where the Kistna and Buckingham Canal Systems join.

(2.) *Kandleru River.*—We propose this place, because a toll station intermediate between Pedda Ganjam and Shadayankupam Lock is required, so that boats working on the canal between these places can obtain toll tickets without being compelled to proceed for that purpose to either extremity of this long reach of 188 miles.

(3.) Shadayankupam Lock (north of Madras).

(4.) Adyar Southern Lock (south of Madras).

11. The toll stations on the three systems will be reduced from a present number of 47 to 20.

12. We propose that the period for which a toll ticket remains current shall in the case of *rafts* be only one month, as it is very necessary that they should not be allowed to linger in the canal to the inconvenience of the general traffic.

13. Under the rules for rafts sanctioned in G.O., No. 384, of the 8th May 1882, a fresh toll was charged at the end of three weeks, or when the raft changed its direction. We propose that as in the case of boats a toll once paid shall clear a raft throughout the system and in any direction, but that the toll should in consideration of the much greater length of canal which will be thus opened out by one payment be double the present Godávari and Kistna rates. This however will be a very considerable reduction on the present Buckingham Canal rates. The proposed rates form but a small proportion of the value of rafts, and hence will not be oppressive.

14. Points 2 and 3 mentioned in paragraph 5 of the Government Order as specially referred to us are so intimately connected that it is necessary to consider them together.

15. For through traffic it is essential that there shall be only one unit of measurement, and we consider the unit should be that formerly in use in the deltas, and still in use on the Buckingham Canal, viz., 50 cubic feet, which may for convenience be called a ton.

16. We consider that having fixed a measure of capacity and provided for uniformity in the system of measurement, it is unnecessary that any attempt should be made to reconcile this with the *weight* carrying capacity of various builds of boats.

17. As regards the rates of license fees having reverted to the previous unit we propose for the Godávari system to revert also to the previous rate of Rs. 2 per 50 cubic feet in the case of cargo boats.

18. In the case of the Kistna we consider it equitable to fix a rate somewhat higher than that in use with the old unit (Re. 1), because the main line of the system has recently been much improved and connected with the Buckingham Canal. We therefore propose a fee of Rs. $1\frac{1}{2}$ per 50 cubic feet.

19. Hitherto the rate for licenses for the whole of the Buckingham Canal has been nearly five times the Godávari rate, and nearly seven times the Kistna rate, the mileage on the Buckingham Canal being not so much as that of the Kistna system and about $\frac{5}{8}$ths of that of the Godávari. The result has been that boats working on the Buckingham Canal have found it to their advantage to work under the present very complicated system of tolls rather than to take out licenses.

20. Considering that the Buckingham Canal serves a great extent of country, and has a more important terminus than any in either the Godávari or Kistna systems, we consider it advisable to recommend a rate of Rs. 3 per 50 cubic feet for the amount of annual license fee.

21. In order to encourage through traffic we propose a considerable reduction on the total license fees of the three systems separately when boats take out through licenses. The rate for these through licenses for cargo boats we would fix at Rs. 5 per 50 cubic feet.

22. As regards passenger vessels we find that the type of boats in use in the deltas differs so much from those in use on the Buckingham Canal that it is necessary to classify them.

23. For the Godávari and Kistna systems, having reverted to the former unit of measurement, we propose, as in the case of cargo boats, to revert to the former rate.

24. For the Buckingham Canal the proposed rates for the corresponding classes of boats have been made the same as in the deltas.

25. In the case of passenger boats we have however proposed one important modification of present rules, viz., that the space to be allowed for a passenger be increased from 5 to $7\frac{1}{2}$ square feet. This we believe to be advisable in the interests of the public, as with five square feet boats carrying their full number are known to be

inconveniently crowded for long journeys. With through communication made cheaper and simpler it is hoped that the numbers undertaking long journeys may be increased.

26. We also propose that passenger boats should be allowed to take out through licenses at reduced rates.

27. Special provision has been made for a modification of the rule regarding the number of passengers, on the occasion of festivals near Madras, to suit the circumstances of the local traffic at those times.

28. We propose that the revenue derived from through licenses should be credited to each system on the following proportions :—

Cargo Boats.

			Rs.
Amount of through license	1	8 0	5
Godávari System	1	4 0	
Kistna do.	2	4 0	
Buckingham Canal System			5

Passenger Boats.

(*a*) and (*c*) classes, through license	3	0 0	10
Godávari System	2	8 0	
Kistna do.	4	8 0	
Buckingham Canal System			10
(*b*) and (*d*) classes, through license	2	4 0	7
Godavári System	1	8 0	
Kistna do.	3	4 0	
Buckingham Canal System			7

As the proposed through license for steamers is Rs. 10 per 50 cubic feet, the amount to be credited to each system will be the same as in the case of (*a*) and (*c*) passenger boats.

29. In the case of steamers we propose that they shall, as heretofore, pay double the rates for cargo boats, both for licenses and for tolls.

30. Instead of keeping the existing division of rules and bye-laws, which as at present arranged is inconvenient and occasionally misleading, we propose that all the regulations shall be embodied into one set of rules, and that these should be applicable to all the three systems.

31. We have accordingly prepared the draft of a set of rules embodying our present proposals and such of the old rules and bye-laws as it is advisable still to maintain, and submit them herewith for approval. We believe that these rules will be found more concise than the old ones, and more easily intelligible by those whom they affect.

32. We have drawn out and appended to these rules license and toll ticket forms adapted to the new rules.

33. As the Buckingham Canal has been placed under Madras Act I of 1870 ("The Canals and Ferry Act"), whereas the canals of the delta systems have not been brought under that Act, there may probably be differences in their management which would be unadvisable and likely to lead to complications when attempting to work the three systems as one combined whole. We think all should be under the same rules. We are strongly of opinion, however, that the Delta Canal Officers should not be made Magistrates, as their work is important and always heavy. In the deltas there has been no practical difficulty in enforcing the navigation rules, because the numerous locks in both systems have enabled boats transgressing to be at once punished by stoppage.

34. We also desire to bring to notice that the Buckingham Canal is at present worked under the direct orders of the Chief Engineer, Public Works Department,

and the Delta Canals under the orders of the Chief Engineer for Irrigation. We would invite attention, if the navigation of the three systems is to be worked as a whole, to the advisability of ensuring uniformity of orders.

35. If the new rules are to be brought into force for the next calendar year, which seems very advisable, we are of opinion that the orders of Government should be received by the 30th November *at the latest*.

We have the honor to be,
Sir,
Your most obedient servants,

(Signed) J. W. RUNDALL,
Superintending Engineer.
(,,) G. T. WALCH,
Offg. Superintending Engineer.
(,,) W. S. OTTMANN,
Honorary Assist. Engr., P.W.D.

Draft of Revised Navigation Rules for the Godávari, Kistna, and Buckingham Canals.

Reference to present Rules.

SYSTEMS.

I. GENERAL.

Delta Rules I.
Buckingham Canal Rules III.

1. No vessel or raft will be allowed to enter or make use of any canal unless the owner shall have previously taken out a license, or unless toll shall have been paid as hereinafter provided.

II. LICENSES.

Delta Rules II.
Buckingham Canal Rules III.

2. Licenses will be issued for vessels for a calendar year only, and will entitle the vessel to navigate the canals of the system for which the license is issued from date of issue to 31st December following. The owner of a vessel desiring to obtain a license shall apply in person or by letter to an officer empowered to issue licenses, viz., the Executive Engineer of the division or officer authorized in writing by him. The owner shall give to the licensing officer the information required to fill up the license as shown in the license form.

Delta Rules III.
Buckingham Canal Rules III.

3. Every vessel licensed for the conveyance of cargo shall pay a license fee as follows :—

For the Godávari System Rs. 2 per ton of 50 cubic feet.
For the Kistna System ,, 1½ do.
For the Buckingham Canal ,, 3 do.

New Rule.

N.B.—Godávari System Licenses and Toll Tickets hold good as far as the Western Tammileru Aqueduct on the Kistna Ellore Canal.

Delta Rules V.
Buckingham Canal Rules VIII.

4. The annual license fees payable on cargo vessels for the three systems separately can be compounded for one through license available over all the three systems at the rate of Rs. 5 per ton. A boat which has already taken out a license for either of the three systems will not be permitted to compound for that calendar year.

5. The gross tonnage of all vessels will be obtained by the following rule :—

$$\frac{L \times B \times D}{50}$$

L being the length between the stern and fore post at half the midship depth.

B being one-sixth of the sum of five widths taken at equal distances along the above length. The width to be measured from the rib on one side to the planking (skin) on the other side.

D being the depth measured amidship from the top of the keelson, or of the centre plank, to the underside of the deck planking, or to the top of the gunwale in open or passenger vessels.

The net or registered tonnage on which the fee will be charged will be—

For steamers, the gross tonnage less one-third.

For other vessels, the gross tonnage less 15 per cent.

Fractions of a ton above the half will be charged as one ton.

Delta Rule V.
Buckingham Canal Rules, none.

6. On payment of the license fee according to the rates fixed, a license will be issued which will entitle the vessel to the use of all the canals of the system named in the license without any other payment whatever. If a vessel after the issue of a license be enlarged, it shall not ply again until it has been remeasured, and a new license taken out. This will be granted on surrender of the previous license and on payment of the prescribed rate per ton for the difference between the old and new tonnage. The penalty for using on the canals an enlarged vessel without a new license being taken out will be the forfeiture of the license fee previously paid.

Delta Rules VI.
Buckingham Canal Rules IV and V.

7. The license number with the distinguishing letter * of the system must be painted conspicuously in English figures, not less than four inches in height, on each bow of the vessel.

* G. Godávari.
K. Kistna.
B. Buckingham Canal.

The tonnage of the vessel must be similarly marked in English figures on each side of the sternpost.

These marks must be put on the vessel before it commences to use the canals at the expense of the owner, who will be responsible that they are not defaced or obliterated.

Delta Rules VII.
Buckingham Canal Rules IX.

8. License will be issued to vessels adapted for the conveyance of passengers under the following conditions and at the following rates.

Such vessels will be measured for tonnage under Rule V, and they will be permitted to carry one passenger for every 7½ square feet of covered space. The covered space will be calculated from the following measurements :—

Length, over all of covered space.

Breadth, the mean of three widths taken at equal distances.

Passenger boats will be divided into the following classes :—

(*a*) Boats of the "*Ráháddri*" or transit boat type, taking a license which leaves optional to the owner the fares to be charged and the caste of the passengers to be carried.

(*b*) Boats of the "*Ráháddri*" or transit boat type, taking a license by the acceptance of which the owner

undertakes to convey all passengers for whom there is room according to the rules, irrespective of caste, and at rates not exceeding the following maxima, viz., in the general cabin 2 pies per mile per passenger including one cooly head load of luggage; in the separate fore or aft cabins, for every 7½ square feet of cabin, 3 pies per mile per passenger, including one cooly head load of luggage. Any passenger wishing to reserve a separate cabin for his exclusive use will be entitled to do so on paying the full hire for the whole cabin.

A whole boat of this class shall not be hired out to one individual, except by permission of the Executive Engineer or officer authorised by him to issue licenses.

(*c*) Boats of the budgerow type, plying for hire, but not carrying cargo, the rate of fare and the passengers to be carried being optional with the owner.

(*d*) Boats of the "top boat" type, having a covered space for the protection of passengers, taking a license by the acceptance of which the owner undertakes to convey all passengers for whom there is room according to the rules, irrespective of caste, and at rates not exceeding 2 pies per mile per passenger, including one cooly head load of luggage.

During festivals in the neighbourhood of Madras, the rule limiting the number of passengers to be carried by this class of boat may, on application, be temporarily suspended by the Executive Engineer in charge of the division, or officer duly authorized by him to issue licenses.

The license fees for passenger boats will be as follows for each system :—

New Rule.

(*a*) Class, Rs. 4 per ton.
(*b*) ,, ,, 3 ,,
(*c*) ,, ,, 4 ,,
(*d*) ,, ,, 3 ,,

9. The annual license fees payable on passenger boats can be compounded for one through license available over all the three systems at the following rates :—

Delta Rules VIII.
Buckingham Canal Rules IV and V.

(*a*) Class, Rs. 10 per ton.
(*b*) ,, ,, 7 ,,
(*c*) ,, ,, 10 ,,
(*d*) ,, ,, 7 ,,

10. The number of the license issued for a passenger vessel must be painted on the bows in the manner prescribed for cargo vessels.

The tonnage of the vessel and the number of passengers which she is licensed to carry must be painted conspicuously on the stern of the vessel or on the afterpart of the cabin. The number of passengers will be preceded by the letter P.

Delta Rules IX.
Buckingham Canal Rules IX.

11. Passenger vessels may carry cargo as well as passengers, subject to the following conditions :—

(1) That vessels of the types (*b*) and (*d*) must convey passengers, when required to do so, in preference to cargo.
(2) That the quantity of cargo be not greater than the registered tonnage less 400 lb. for each passenger on board.

Delta Rules X.
Buckingham Canal Rules, part of IX.

12. Vessels, the private property of individuals, making use of the canals, but not carrying goods or passengers, or plying for hire, will be licensed to use the canals of a system on payment of a fee of Rs. 12 for the calendar year.

Delta Rules XI.
Buckingham Canal Rules, none.

13. Pleasure boats used for rowing on the canals, but not carrying goods or passengers, will be licensed to use the canals of a system on payment of a fee of Re. 1 for the calendar year.

Delta Rules XV (8).
Buckingham Canal Rules, Schedule A.

14. All fees payable by steamers will be double those of ordinary cargo boats.

The number of the license and tonnage must be painted on steamers in the manner prescribed for cargo boats.

Delta Rules XII.
Buckingham Canal Rules XII.

15. No person who has taken out a license for the navigation of the canals shall have any claim to compensation, in consequence of the closure of all or of any of the canals for repairs, or because of insufficiency of water, or on account of any other impediment to navigation.

III. Tolls.

Delta Rules XIV.
Buckingham Canal Rules III (2nd).

16. Vessels not holding a license will be allowed to navigate the canals on payment of the hereinafter stated tolls and on the following conditions.

Delta Rules XIV (4).
Buckingham Canal, Schedule B.

The rates of toll per ton will be—

Cargo and Passenger Boats.	AS.
Godávari System	8
Kistna ,, ...	6
Buckingham Canal	12

Steamers.	RS.
Godávari System	1
Kistna ,, ...	0¾
Buckingham Canal	1½

Delta Rules XV (9).
Buckingham Canal Rules, Schedule B.

Private Boats referred to in Rule XII.

For each boat, for each system, Rs. 3.

New Rule.

A toll once paid at any toll station of a system will clear the vessel over all the canals of that system and in any direction for a period of six weeks, except in the case of rafts, which must either be removed from the canals *within one month* from the date of the toll ticket, or again pay toll.

Delta Rules XIV.

The toll stations in the Godávari and Kistna Systems will be—

The head lock of each section* of delta.
All tidal locks.

* *Godávari Sections.*	
Eastern.	The Ellore Lock.
Central.	The Western Tammileru Aqueduct on the Kistna Ellore Canal.
Western.	
Kistna Sections.	
Eastern.	
Western.	

The toll stations on the Buckingham Canal will be as follows :—

1. Pedda Ganjam.
2. Kandleru River.
3. Shadayankupam Lock.
4. Adyar Southern Lock.

Delta Rules XIII.
Buckingham Canal Rules, Schedule B.

To determine the tonnage for tolls vessels will be measured under Rule V.

A list of the toll stations for each system will be affixed to a notice board at each toll station in that system.

New Rule.

17. Rafts shall pay tolls at the following rates:—

	as.
Logs of timber, rough or squared, for each unit of 100 square feet.	8
Bamboos for each unit of 100 square feet	4

Delta Rules XIII (1).

Rafts of timber and bamboos mixed will be charged at the rate for timber.

All fractions of the unit will be charged for as a full unit.

IV. Regulations.

Delta Bye-law 18.
Buckingham Canal Rule VII.

18. The extreme dimensions of any vessel allowed to navigate the canals will be 90 feet in length and 13 feet in breadth over all.

Boats built before the 31st December 1880, which exceed the above dimensions, may receive a special license at the discretion of the Executive Engineer of the division.

Buckingham Canal Rule VII.

No boat drawing more than 3¼ feet will be admitted into any lock.

To suit the conditions of masonry works on the southern sections of the Buckingham Canal, the height of fixed fittings such as the roofs of boats, steps of masts, funnel sockets, &c., shall be there limited to 6½ feet above water level. A similar limit shall be applied to piled cargo.

Delta Bye-law No. 9.
Buckingham Canal Rule X.

19. No raft of larger dimensions than 90 feet in length, by 12 feet in breadth, or of more than 2′ draught will be allowed on the canals. Rafts exceeding these dimensions will be stopped until they are reduced and a fresh toll paid on the then measurement under Rule XVI.

Buckingham Canal Rules VII.

20. Boats carrying cargo must have a free board of not less than 9 inches; boats carrying passengers must have a free board of not less than 1 foot.

Delta Bye-law 1.
Buckingham Canal Bye-law 1.

21. No vessel or raft shall moor on the towing-path side if there be only one tow-path, or on the windward side of a canal if there be two tow-paths, except when actually loading or unloading.

Delta Bye-law 2.
Buckingham Canal Bye-law 2.

22. No cargo shall be loaded or unloaded and no passengers be shipped or landed at any lock, or on any masonry work other than the quays or wharfs specially provided for the purpose.

New Rule.

23. No goods shall be stacked on any tow-path or on the canal side of any tow-path under any circumstances, nor shall they be stacked on canal lands without special permission of the canal officers.

Delta Bye-law 3.
Buckingham Canal Bye-law III.

24. No vessel shall be repaired in any canal at any time, without the written permission on the Divisional Executive Engineer, and then only at the place and during the time named in the written permission. Materials used in the repair of vessels will, unless removed from the canal before, or at the time of, the vessels departure, be confiscated, and any expense incurred in their removal must be paid by the owner of the vessel under penalty of suspension of license until it be paid.

Delta Bye-law 4.
Buckingham Canal Bye-law IV.

25. At any lock, or other masonry work, no vessel or raft shall moor within the limits fixed by notice boards.

Delta Bye-law 5.
Buckingham Canal Bye-law V.

26. Every vessel when moored in any canal shall have its masts down, shall be made fast stem and stern to the bank and in a single line.

Delta Rules, part of Bye-law 12.
Buckingham Canal Rules, part of Bye-law X.

Every vessel when thus moored shall be in charge of at least one man, and must between sunset and sunrise exhibit a clear bright light, at not less than 4′ above the water level, visible all round.

Canal Rules XIII (5).
Do. Bye-law 12.

Rafts when moored must be securely fastened to the canal bank at both ends, and between sunset and sunrise must exhibit a clear light at each outer corner.

Delta Bye-law 12.
Buckingham Canal Bye-law X.

27. Vessels when moving must between sunset and sunrise exhibit the following lights:—

Canal Rule XV (3).

All boats one clear bright light at the fore-end, fixed not less that 4 feet above the water.

Steamers, three lights as follows:—One clear white light on the upper deck abaft the funnel, a bull's-eye bright red light on the post (left) side, a bull's-eye bright green light on the star-board (right) side.

The bull's-eye to be not less than 8 inches in diameter. The lights to be so placed and fitted that both may be visible only from a point ahead of the vessel, and so as not to be obscured by any of the fittings, cargo, or passengers. Subject to these provisions the lights may be placed on the front or on top of the cabin, at the sides of the vessel near the bow, or on supports specially provided for the purpose.

Delta Bye-law 13.
Buckingham Canal Bye-law X.

Passenger boats must, in addition to the outside light, keep at least one bright light in the general cabin.

Delta Bye-law 6.
Buckingham Canal Bye-laws VI, VII, and VIII.

28. When vessels meet on the Godávari and Kistna Canals, those going with the current shall give way. In the Buckingham Canal vessels going north shall give way. Vessels under sail shall give way to vessels being towed, and steamers shall give way to all boats.

New Rule.

29. The licenses of cargo boats in an unsafe condition may be suspended by any officer authorized to issue licenses until the vessels be put into a proper state of repair.

Delta Bye-law 14.
Buckingham Canal Bye-law XIII.

30. All passenger vessels shall, whenever it may appear to him to be advisable, be inspected by the Executive Engineer in charge of the Division, or other officer duly authorized by him. The licenses of such as are not maintained in a proper state of repair and cleanliness shall be withdrawn until the vessels are fit for use by the public.

Delta Bye-law 8.

31. No person unless duly authorized shall interfere with the locks or any part of their machinery.

Delta Bye-law 11.

32. Any passenger vessel apparently overloaded must, when required by the Executive Engineer, or by an officer duly authorized by him, by the Superintendent or Assistant Superintendent of Police, or by a Magistrate, stop at

Delta Bye-law 10.
Buckingham Canal Bye-law XII.

any place to have the number of its passengers counted and its cargo examined.

Delta Bye-law 10.
Buckingham Canal, Schedule A.

33. Every vessel and raft must have its license or toll ticket always on board. These shall be produced when called for by any Lock or Toll Superintendent or other duly authorized officer.

Delta Rule XV (1).

34. In the case of a license or toll ticket being lost, and a duplicate copy being required, the fee for its issue will be Rs. 2.

Delta Rules XV (4).
Buckingham Canal Bye-law XI.

35. All steamers using the canals shall be inspected by the Executive Engineer or officer authorized by him, who will see that the machinery is in fair working order, that the boilers are provided with proper gauges, and are apparently in safe working order. The Executive Engineer or other officer will issue an inspection certificate in the form appended, which will hold good for six months.

No steamer shall travel at a greater speed than 8 miles per hour by day-light and 5 miles per hour at night.

Steamers shall reduce their speed to three miles an hour when they come within half a mile of a lock, and shall then whistle to give notice of their approach to the lock establishment. Steamers must be warped into and out of locks, and will not be allowed to use their propellers until quite clear of the locks.

Delta Rules XV (7).
Buckingham Canal Bye-law XI.

Steamers shall whistle when within a 100 yards of any boat, and reduce speed to 5 miles an hour.

Delta Rules XV (11).
Do. XVI.

36. Any vessel or raft damaging the works of the canal or any Government property on them shall have its license or toll ticket taken away and shall not be allowed to use the canals until the cost of repairing the damage has been estimated and the amount has been paid. A pass shall be given by the officer suspending the license to enable the vessel to proceed to its destination.

Buckingham Canal Rule XIII.

37. Sea-going vessels brought into rivers and backwards for shelter, for repair, or for any other purpose except to ply for hire, shall anchor or lay up outside the fair way of canal traffic, which will be defined by the canal officers; such vessels will not be allowed to enter the main line of the canals for the purpose of proceeding from one river or backwater to another river or backwater, or for any other purpose, except in accordance with the rules prescribed for the use of the canals.

Buckingham Canal Rules III.

38. All boats used solely for fishing purposes which have to pass through any portion of the Buckingham Canal must be registered, but will not be charged any fee.

Delta Bye-law 19.

39. Officers in charge of canals are empowered summarily to remove vessels which may have sunk in a canal waterway of any system, or rafts which have been in the canals for more than one month, and shall have failed to pay on demand the fresh toll leviable under Rule XVI, and to recover cost of removal afterwards.

Vessels sunk, abandoned, or left for more than three days without a man in charge will be dealt with as follows:—

(*a.*) If the vessel be licensed a notice will be sent by post, by the officer in charge of the canal, to the registered owner requiring him to remove the vessel within 15 days. Failing such removal the vessel will be sold by auction after giving not less than 15 days' notice of intended sale in the District Gazette.

(*b.*) In the case of unlicensed vessels a notice will be published in the District Gazette requiring the removal of the vessel within 15 days, and stating that if not so removed the vessel will be sold by auction. Such sale may be fixed to take place on any date not prior to 30 days from the date of the publication of the notice to remove. Vessels removed under this rule lie at the owner's risk.

Owners applying to recover possession of vessels or rafts referred to in this bye-law must, before their removal will be permitted, pay all expenses which may have been incurred.

The sale-proceeds of a vessel sold under this bye-law will be available to meet all expenses incurred in the removal and sale of such vessel, and to repair all damage which may have resulted to the canal from its being sunk or abandoned therein. Any balance remaining will be paid to the owner if claimed within three months from the date of the sale; otherwise such balance will be carried to the credit of Government.

Delta Bye-law 15.
Buckingham Canal Bye-law XIV.

40. Executive Engineers in charge of sections of the deltas and of the Buckingham Canal and other officers duly authorized by them will have power to suspend the license of any vessel on account of the infringement of any of the rules and regulations for periods not exceeding—

15 days for a first offence,
30 days for a second offence in the same calendar year,
60 days for a third offence in the same calendar year,

and for a fourth offence in the same calendar year the license may be cancelled.

Vessels plying under a toll ticket may be punished by the suspension of the toll ticket for 15 days for a first offence, and by the withdrawal of the toll ticket for a second offence.

Delta Bye-law 16.

41. Superintending Engineers will exercise the same powers as Executive Engineers in respect of any of these rules.

(Signed) J. W. RUNDALL,
President for Committee.

12th October 1882.

Memorandum regarding the different Forms of Licenses.

It is proposed that the license and toll tickets shall be on different colored paper for each system—

Godávari ... ... White.
Kistna ... ... Red.
Buckingham Canal ... ... Blue.

Through licenses will be printed on green paper.

When a license is taken out, a copy of the navigation rules in the vernacular is to be given to every boat-owner who has not already got one.

When printed for issue, the license forms and tickets will have a counterfoil separated from the original by perforations.

All license forms and toll ticket should be printed on good stout paper.

12th October 1882.

(Signed) J. W. RUNDALL.

.....System

.....

TOLL TICKET FOR RAFT.
తెప్ప పన్ను చీటి.

No.....
నెం.....

Dimensions..... Length } .....feet.
కొలతలు..... పొడుగు } .....అడుగులు.
Breadth } .....feet.
వెడల్పు } .....అడుగులు.

Superficial Area } .....square feet.
చతురం కొలత..... } .....చతురం అడుగులు.

Description of Raft } .....
తెప్పవివరం..... } .....

Amount of Toll paid. Rupees..... Annas.....
చెల్లించిన పన్ను మొత్తం. రూపాయిలు..... అణాలు.....

Issued at .....
చీటీయిచ్చినస్థలం .....

Date of issue .....
చీటీయిచ్చినతారీఖు .....

This ticket will hold good for *one month only*.

Toll Superintendent.

This ticket is issued subject to the Navigation Rules sanctioned in S. O. No.....dated.....

.....System

.....

TOLL TICKET FOR RAFT.
తెప్ప పన్ను చీటి.

No.....
నెం.....

Dimensions..... Length } .....feet.
కొలతలు..... పొడుగు } .....అడుగులు.
Breadth } .....feet.
వెడల్పు } .....అడుగులు.

Superficial Area } .....square feet.
చతురం కొలత..... } .....చతురం అడుగులు.

Description of Raft } .....
తెప్పవివరం..... } .....

Amount of Toll paid. Rupees..... Annas.....
చెల్లించిన పన్ను మొత్తం. రూపాయిలు..... అణాలు.....

Issued at .....
చీటీయిచ్చినస్థలం .....

Date of issue .....
చీటీయిచ్చినతారీఖు .....

This ticket will hold good for *one month only*.

Toll Superintendent.

This ticket is issued subject to the Navigation Rules sanctioned in S. O. No.....dated.....

Rafts not to exceed 90 feet in length, 12 in breadth, 2 feet in draught.

RATES OF TOLL.

	annas.
Logs of timber, rough or squared, per unit of 100 square feet	8
Bamboos per unit of 100 square feet	4

Fractions of the unit will be charged for as a full unit.

Rafts of timber and bamboos mixed will be charged for at the rate for timber.

కొల్లగొట్టుకొను 90 అడుగులు, వెడల్పు 12 అడుగులు, 2 అడుగులు నీటిలోతుకలిగిన తెప్పలు మొదలుకొనగుండకూడదని.

వసూలు రేట్లు.

ఆణాలు.

License for Passenger Vessel, Class (A) or (C), for 18 .

System — No. of License
Owner's name — Residence
Vessel built at — in the year

Maximum number of passengers ; less one for every 400 lb. of cargo carried.
Fares to be charged and caste of passengers to be carried, *optional.*

Extreme Dimensions over all.		Dimensions for Tonnage.				Gross Tonnage.	Deduction of 15 per Cent.	Net Tonnage for License.	License Fee paid.	Date of Issue.	Place of Issue.
Length.	Breadth.	L.	B.	D.	Cubic Feet.						
FEET.	FEET.	FT. IN.	FT. IN.	FT. IN.					RS. A.		

Signature of Licensing Officer.

This License is issued subject to the Navigation Rules sanctioned in G.O., No. dated

---

License for Passenger Vessel, Class (B) or (D), for 18 .

System — No. of License
Owner's name — Residence
Vessel built at — in the year

Maximum number of passengers ... ... { In the general cabin / In the fore cabin / In the aft cabin

Total No.

less one for every 400 lb. of cargo carried.

The holder of this license is required to convey all passengers, for whom there may be room, irrespective of caste, at rates for each passenger (including one cooly headload of luggage) not exceeding 2 pies in the general cabin, and 3 pies in the separate fore and aft cabins, per mile.

Extreme Dimensions over all.		Dimensions for Tonnage.				Gross Tonnage.	Deduction of 15 per Cent.	Net Tonnage for License.	License Fee paid.	Date of Issue.	Place of Issue.
Length.	Breadth.	L.	B.	D.	Cubic Feet.						
FEET.	FEET.	FT. IN.	FT. IN.	FT. IN.					RS. A.		

Signature of Licensing Officer.

This License is issued subject to the Navigation Rules sanctioned in G.O., No. dated

Cargo Boat License for 18 .

System
Name of owner — No. of License
Residence of owner
Boat built at
in the year

Extreme Dimensions over all.		Dimensions for Tonnage.				Gross Tonnage.	Deduction of 15 per Cent.	Net Tonnage for License.	License Fee paid.	Date of Issue.	Place of Issue.
Length.	Breadth.	L.	B.	D.	Cubic Feet.						
FEET.	FEET.	FT. IN.	FT. IN.	FT. IN.					RS. A.		

Signature of Licensing Officer.

NOTE.—This License is issued subject to the Navigation Rules sanctioned in G.O., No. dated

---

Private Boat License for 18 .

System
Name of owner — No. of License
Residence of owner
Boat built at
Description of boat
Amount of license fee paid Rs. — in the year
Date of issue
Place of issue

Signature of Licensing Officer.

N.B.—The License fee for private boats not carrying goods or passengers is Rs. 12 per cent. The fee on pleasure boats used for rowing is Re. 1.

This License is issued subject to the Navigation Rules sanctioned in G.O., No. dated

---

License for Steam Vessel for 18 .

No. of license
Owner's name
Vessel built at — Residence
Description of propeller — in the year
Do. of engines
Do. of boiler
Maximum pressure of steam

Extreme Dimensions over all.		Measurements for Tonnage.				Gross Tonnage.	Deduction of one-third.	Net Tonnage.	License Fee paid.	Date of Issue.	Place of Issue.
Length.	Breadth.	L.	B.	D.	Cubic Feet.						
FEET.	FEET.	FT. IN.	FT. IN.	FT. IN.					RS. A.		

Signature of Licensing Officer.

This License is issued subject to the Navigation Rules sanctioned in G.O., No. dated

Inspection Certificate.

This vessel has been inspected under Navigation Rule No. 35, and is passeed for navigation of the canals for a period of six months from this date _____

Signature of Inspecting Officer.

Station
Date
Certificate *renewed* on

Signature of Inspecting Officer.

Toll Ticket.

System — No.
Name of owner

Extreme Dimensions over all.		Measurements for Tonnage.				Gross Tonnage.	Deduction.	Net Tonnage.	Toll paid.	Date of Issue.	Place of Issue.
Length.	Breadth.	L.	B.	D.	Cubic Feet.						
FEET.	FEET.	FT. IN.	FT. IN.	FT. IN.					RS. A.		

Signature of Issuing Officer.

This ticket is issued subject to the Navigation Rules sanctioned in G.O., No. dated , and will hold good for *six weeks only.*

This ticket is to be surrendered on renewal.

No. 117 I.

Memorandum by the Chief Engineer for Irrigation.

Submitted to Government.

2. The first line of navigable canal opened on the Eastern Coast of the Madras Presidency was the Cochrane's Canal from Madras to the Ennore backwater, and from the Ennore backwater to Pulicat Lake. The work was completed in 1806 on contract, the terms being the exclusive possession of the canal by the contractor for forty-five years, with right to levy toll on all goods carried upon it at certain rates laid down. In 1837 the canal came into the possession of Government, who fixed a rather elaborate system of tolls. The annual receipts from tolls at this time were about Rs. 32,000. In the year 1855 the East Coast Canal to the south of Madras from the Adyar to the Pálár was commenced; this portion of the line was opened to traffic in 1857, and a separate system of tolls was adopted on it.

The extension of the Northern Canal was commenced in the year 1854, and was pushed on from time to time until, in the year 1875, it reached the Kistnapatam backwater, 90 miles to the north of Madras. This was the limit in the year 1876 immediately before the famine. The annual receipts were then—

	RS.
In the Northern Section	39,869
„ Southern „	5,720

In 1877, when it was necessary to find work for thousands of starving people, the connection of the northern and southern sections of the canal through Madras, which had been planned many years before, was undertaken, and the northern extension from Kistnapatam to Pedda Ganjam to join the Kistna Delta Canals being also pushed on vigorously under the government of the Duke of Buckingham, the canal was opened throughout, in 1878, from the Pálár, 47 miles south of Madras, to Pedda Ganjam, 196 miles north, under the name of the Buckingham Canal.

In 1879 the navigation rules for this canal now in force were introduced, under which the canal was divided into six sections. Copy of these rules is attached. Generally speaking they imposed a license fee of Rs. 2 per ton for all boats, except fishing and pleasure boats, the license clearing the boat for one section only. On entering any other section, the boat had to pay a toll of four annas a ton, or boat-owners were allowed to compound for a year's tolls throughout the canal for Rs. 10 a ton.

The navigation receipts have been as follows:—

	Rs.
1880	1,09,805
1881	1,20,056

2. The Godávari Delta Canals navigation commenced in the year 1853, the anicut having been completed in 1852. The navigation was started under the auspices of Government officers, but before long the natives were out of leading strings and look up the navigation with a will, so that in 1863-64, ten years after the navigation commenced, the number of boats on the Delta Canal was 1,200, and the annual receipts amounted to Rs. 24,493. On first opening the navigation no tolls were charged, as was noticed in 1859 by the then Governor, Sir Charles Trevelyan, in a minute on the Godávari irrigation and navigation. He says: "The canals are all toll-free, for it has been wisely determined that it is better to take the Government dues in a consolidated form on the crops than to harass and mulct the people by exactions which cannot be confined to those demanded on behalf of the public." In November 1863, however, a license fee of one rupee per ton was charged.

As the canals have been extended, the navigation rules have been, from time to time, revised, and the license fees raised, and toll stations have been instituted generally at the head and tail locks of each canal, so that boats are not compelled to take out licenses for the year, but may, if it suits their convenience, pay by the trip. Up to 1882 the rates for license fees were generally speaking (taking 50 cubic feet to represent a ton)—

Cargo boats	2 rupees per ton.
Passenger boats—	
First class	4 " "
Second class	3 " "
Rafts, timber	4 annas per 100 square feet.
" bamboos, &c. ..	2 " " "

The measurement of boats was, up to that time, much the same in the Godávari and Buckingham Canals, and the unit of measurement, 50 cubic feet to a ton, was the same, but in 1882 revised rules for the Godávari and Kistna Canals were sanctioned by Government, in which the unit of measurement was altered to a ton of 75 cubic feet, and, as in the Buckingham Canal 50 cubic feet were still continued the unit, there arose difficulties in the case of through traffic, which have brought to notice the necessity for introducing rules of general applicability.

In introducing new rules for navigation in the Delta Canals, the rule has been laid down that navigation should be made to pay, that is, not only should the receipts cover the working expenses, but also interest on the original cost of works constructed solely in the interests of navigation. In a system of canals which combine irrigation and navigation there is, of course, great difficulty in apportioning the share of cost, but under instructions that have been issued from this office, this has been settled, and the yearly accounts show the maintenance charges and interest compared with the receipts. The accounts of last year, ending 31st December 1881, show the following results:—

	Rs.
Maintenance charges	55,106
Interest	24,504
Total ...	79,610
Receipts	55,670

that is, the receipts more than covered the working expenses, but were insufficient to meet the charge for interest. It was contemplated that, as the canals approached completion, the maintenance charges would become lighter, and the receipts would increase until they were sufficient to cover all charges. It is, however, to be noticed that, when the Godávari completion estimates were submitted to the Government of India, all that was claimed for navigation receipts was that they should cover maintenance charges.

3. The Kistna Delta Canal navigation, which was opened a few years later than the Godávari, was started in the same way, and has been generally under the same rules, but as in the Kistna Delta the canals are less advanced than in the Godávari, the license fees charged are less per ton than in the Godávari. In the last revised rules, 1882, cargo boats were charged $2\frac{1}{2}$ rupees against $3\frac{1}{2}$ rupees a ton in the Godávari.

The accounts of last year ending 31st December 1881 show the following results:—

	Rs.
Maintenance charge	60,330
Interest	8,054
Total ...	68,384
Receipts	21,788

but the maintenance charges were much higher than they should have been, in consequence of damage caused by floods.

4. The length of navigable canal now open is—

	Miles.
In the Godávari Delta	458
" Kistna "	278
" Buckingham Canal	243
Total ...	979

The through line from Pálár south of Madras to the port of Cocanada in the mouth of Godávari is—

	Miles.
In Godávari	78
" Kistna	110
" Buckingham Canal	243
Total ...	431