Br 372 W. 9th July/81

157 & 158

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

8th July 1879, No. 1,801-A W.

Buildings and Roads.
Civil Works.

Read the following papers :—

No. 38. Proceedings of the Board of Revenue, dated 14th March 1878, No. 695.

Proceedings of the Madras Government in the Revenue Department, dated 21st February 1878, No. 284.

ABSTRACT.—*Sadras and Buckingham Canal.*—Considering that the time has arrived for a complete change in the system of tolling hitherto in force and for the introduction of a plan similar to that sanctioned in 1872 provisionally, and requesting the Board of Revenue to report on the subject.

From R. W. BARLOW, Esq., Collector of the Chingleput District, to the Acting Secretary, Board of Revenue, dated Saidapet, 5th March 1878, No. 98.

WITH reference to paragraph 15 of the Board's Proceedings, dated 24th January 1878, No. 216, I have the honor to report that at the time the budget of the Cochrane's and Sadras Canal Fund for 1878-79 was prepared, I had no information before me either as to what portions of the East Coast Canal in the district of Nellore, recently completed from Famine Funds, would be opened for traffic during next year, or as to what number of boats might arrive from those parts at Madras and pay tolls. I therefore restricted the estimate to the average collections of ordinary years ; if, however, the Board are in a position to estimate the additional revenue that might be derived from the extension of the canal northwards, I would suggest that the necessary alteration may be made in the budget.

From the same Officer, dated Saidapet, 7th March 1878, No. 100.

ADVERTING to the Board's Proceedings, No. 400, dated 14th ultimo, and in reply to a demi-official from the Secretary, dated 5th instant, I have the honor to forward a set of draft rules for the whole system of the East Coast Canals.

2. As I have been directed in the demi-official to prepare the draft to suit the introduction of Act I of 1870 and the license system throughout, I have adopted the rules approved of by Government in G.O., No. 1,400, dated 10th October 1872, the only addition being one to regulate the speed at which steam launches are to run. I should have preferred to add a rule regarding the overcrowding of boats necessary, in my opinion, for the comfort, though perhaps not for the safety, of the passengers ; but have omitted it as Government in the order above quoted laid down that such interference is not necessary.

3. In conclusion, I have to inform the Board that the Salt Boat Contractor cannot claim any compensation for change of system, as there is an express condition in his contract barring such claim, though the Board will doubtless award what they may consider equitable.

ENCLOSURE No. 1.—Draft Rules.

From Colonel E. A. FOORD, R.E., Chief Engineer, Public Works Department, to the Acting Secretary to the Board of Revenue, dated Fort St. George, 9th March 1878, No. 1,226.

I HAVE the honor to forward herewith as requested by you personally a statement of the establishment proposed to be entertained for the supervision and maintenance of the Buckingham Canal, which will be divided into the following executive charges :—

	Head-quarters.
Buckingham Canal Division	Madras.
No. 1 Sub-division for Sub-divisional Officer ...	Pulicat or Coromandel.
Do. for Overseers	Madras and Dugurazpatam.
No. 2 Sub-division for Sub-divisional Officer ...	Ramapatam.
Do. for Overseers	Eskapilly and Pakala.

The Divisional charge will include 250 miles of canal, each sub-divisional charge 125 miles, and each Overseer's charge $62\frac{1}{2}$ miles.

This establishment does not include the subordinate agency which may be required for the collection of revenue.

Maintenance such as clearing, &c., 230 rupees per mile for 250 miles.

ENCLOSURE No. 1.

ESTABLISHMENT proposed for the Buckingham Canal.

	Cost.
Establishment—	RS.
1 Executive Engineer, 1st Grade, at Rupees 950	950
1 Supervisor, do. at „ 200	200
1 Do. 2nd do. at „ 150	150
2 Overseers, 1st do. at „ 100	200
2 Do. 2nd do. at „ 80	160
1 Do. 3rd do. at „ 60	60
Total per mensem ...	1,720
Total per annum Rupees 1,720 × 12 =	20,640
Establishment for one Executive Engineer—	
1 Accountant, at Rupees 60	60
1 Draftsman and Estimator, at Rupees 40	40
1 Assistant Accountant and Writer, at Rupees 30	30
1 Do. do. do. at „ 20	20
3 Lascars, at Rupees 7 each	21
Total per mensem ...	171
Total per annum Rupees 171 × 12 =	2,052
Establishment for two Supervisors—	
1 Writer and Accountant, at Rupees 25	25
2 Lascars, at Rupees 7 each	14
	392
Total per mensem ...	78
Total per annum Rupees 78 × 12 =	936

	RS.
Establishment for five Overseers—	
1 Gumastah, at Rupees 15	15
2 Lascars, at Rupees 6 each	12
	27
	5
Total per mensem ...	135
Total per annum Rupees 135 × 12 =	1,620
Grand Total per annum ...	25,248

MEMORANDUM.

THE license fee on the Southern Canal is Rupees 2 per ton per annum.

2. Boats on the Northern Canal are only charged for passing the Shadayancooppam Lock as they *come into* Madras. No charge is made for boats leaving. The charge is 4 annas per ton for *all* cargo boats. Passenger boats pay 4 annas per trip per boat and only as they come *in*.

Exceptions.—Budgerows pay 8 annas for inward trip. The boats of the officers of the Public Works Department on inspection and of the Police Inspector of the northern salt-pans pay nothing.

3. Lattice bridge will do for the new toll on the Southern Canal, as I think it is a sufficient distance from Madras without being too far.

4. A table is enclosed showing financial results. The change will not be great on the Northern Canal. Assuming the aggregate tonnage of the serviceable boats to be 10,000* tons, these figures show the increase in Rupees 10,000. The change on the Southern Canal, where no tolls have been hitherto levied, will be considerable, amounting roughly to Rupees 5,190 of increase against the aggregate previous collections Rupees 1,400 per year; but it is a question whether the change may not cause a falling off in the traffic, and therefore in the estimated receipts.

* The exact tonnage will follow. Since reported as 13,460 tons on the *Northern* Canal.

5. Government do pay tolls on salt boats on the Northern Canal, but nothing towards licenses on the Southern.

6. The Boat Contractor on the Northern Canal can claim no compensation, as there is an express provision in his contract to the contrary; but if the Board should award any, the amount will be trifling, say, if the salt boats are employed for three months in the year, the amount of compensation to be paid would be one-fourth of the fees for their aggregate tonnage.

(Signed) R. W. BARLOW,
Collector.

11th March 1878.

ENCLOSURE No. 1.

CARGO BOATS.

Year.	Tonnage.	Rate per Ton.	Amount.	Total of Columns 4 and 8.
5	6	7	8	9
		Rs. A. P.	Rs. A. P.	Rs. A. P.
... ...	202,038¼	0 4 0	50,509 9 0	51,113 13 0
.. ..	157,315	0 4 0	39,328 12 0	39,869 0 0
... ...	90,615¼	0 4 0	22,653 13 0	23,110 1 0
Total for three years ...	449,968¾	0 4 0	1,12,492 2 0	1,14,092 14 0
Average for one year ...	149,989½	0 4 0	37,497 6 0	38,030 15 4
Add license fee at 1 rupee per ton per annum	...	...	...	13,460 0 0
Total Estimated Revenue ...	..	...	...	48,030 15 4
... ...	26,398	0 4 0	6,599 8 0	7,138 4 0
... ...	20,805	0 4 0	5,201 4 0	5,719 12 0
... ...	17,558	0 4 0	4,389 8 0	4,816 8 0
Total for three years ...	64,761	0 4 0	16,190 4 0	17,674 8 0
Average for one year ...	21,587	0 4 0	5,396 12 0	5,891 8 0
Add license fee at 1 rupee per ton per annum	...	...	...	700 0 0
Total Estimated Revenue ...	...	...	...	6,591 8 0

PASSENGER BOATS.

Year.	Number.	Rate per Boat.	Amount.
1	2	3	4
Northern Canal.		Rs. A. P.	Rs. A. P.
1875	2,417	0 4 0	604 4 0
1876	2,161	0 4 0	540 4 0
1877	1,825	0 4 0	456 4 0
Total for three years ...	6,403	0 4 0	1,600 12 0
Average for one year ...	2,134⅓	0 4 0	533 9 4
Add license fee at 1 rupee per annum	...	...	...
Total Estimated Revenue ...	...	...	...
Southern Canal.			
1875	2,155	0 4 0	538 12 0
1876	2,074	0 4 0	518 8 0
1877	1,708	0 4 0	427 0 0
Total for three years ...	5,937	0 4 0	1,484 4 0
Average for one year ...	1,979	0 4 0	494 12 0
Add license fee at 1 rupee per annum	...	...	...
Total Estimated Revenue ...	...	...	...

IN the foregoing order the Board are called upon to report on the question of applying Act I of 1870 to the whole line of the East Coast Canal from the Kistna to the South Arcot Districts, and of introducing a uniform system for the collection of dues thereon, the plan of tolls and licenses combined being suggested. It being desired that the new system should be brought into force from the commencement of the next official year, the Board were directed to lose no time in settling, in communication with the Public Works Department, what the establishment and rates should be. The Board have accordingly conferred with the Chief Engineer on the subject and have obtained some information from the Collector of Chingleput, but the time allowed for report does not admit of their consulting the Collector of Nellore as they would have done had time permitted, or of procuring such full information as is essential to a proper consideration of the subject. It is apparently in contemplation to appoint an officer of standing in the Public Works Department to the charge of the whole line, and the Board would prefer to see the system at present in force continued for a short time longer where traffic exists, whilst a little delay in introducing taxation where traffic has to be commenced may not be impolitic. Meantime the special officer would be able to investigate the conditions and prospects of traffic thoroughly, and to submit matured proposals after consulting the local authorities. Constant changes are undesirable, and as the information at the Board's disposal is very limited, it is highly probable that any arrangements which they may now propose will require modification at no distant date. They will endeavour, however, to comply with the wishes of Government.

2. As regards the application of Act I of 1870, the Board opposed the proposal in their Proceedings of the 20th November 1875 on the ground that the sole object of the suggestion was to provide for the extension of the East Coast Canal northwards from the surplus funds of other districts. The bulk of the balance of the Canal and Ferry Fund belongs to the Godavari and will shortly be locally utilized. If therefore immediate action is considered necessary, the Board see no objection now to steps being taken to introduce the Act. They think that the rules embodied in G.O., dated 10th October 1872, will suffice, at any rate till some experience of their working is gained. The draft forwarded by the Collector of Chingleput is a transcript of these rules, with an additional clause to regulate the speed of steam launches. The Board must, however, point out that under the provisions of Section 23 of the Act the rules cannot be brought into operation until the expiration of at least two months from the date of first publication in the official gazettes.

3. As regards the introduction of a uniform system, the Board are in favor of a combination of tolls and licenses. At present there are no tolls on the Sadras Canal, a license fee of Rupees 2 per ton per annum being the only charge. On Cochrane's Canal there are no license fees, but tolls are leviable on boats passing the Shadayancooppam lock at the rate of 4 annas per ton on all cargo boats and 4 annas per trip on passenger boats. These tolls are collected at the basin by the Superintendent; the traffic is registered at the lock and passes are issued which are given up to the Superintendent at the basin. Accounts are rendered both by the Superintendent at the basin and by the Conicopillay at the lock to the Salt Deputy Collector. No tolls are levied on traffic outwards. Budgerows pay 8 annas per inward trip; boats of public officers are exempt. The Board think that a uniform annual license fee entitling boats to ply on any part of the canal throughout its whole length during the year should be fixed with reference to tonnage; as traffic on the portion of the canal recently completed will not be developed for some time it is obvious that boats plying on that section will not be able to pay so high a fee as those engaged on the portion which has long been in working order; a very moderate rate must therefore be fixed at first, and the Board would suggest 1 rupee per ton for all boats which appears from G.O., dated 4th March 1873, No. 691, to be the rate in force on the Godavari and Kistna Canals. The Board think that a differential rate for boats exceeding a certain limit of size, as proposed when the subject was under discussion before, is highly desirable. The rate might be Rupees 2 per ton on all boats registered as over 30 tons. On the Northern Canal the license fees will be so much clear gain, as no reduction of the number of boats is likely to result from

the imposition of the charge. The present tonnage of boats plying on the Northern Canal is reported by the Collector of Chingleput to be 13,460 tons. The license fees on the Southern Canal aggregate Rupees 1,400 ; if the rate is reduced to one rupee per ton there will be a loss of Rupees 700. The Board however propose to levy tolls on this canal also at some suitable site at a sufficient distance from the town to prevent evasion by unloading outside. The lattice bridge appears a suitable site, and the Collector approves the selection. The tolls on the Northern Canal should continue to be levied at existing rates, and the same rates may be tried on the Southern Canal ; but as under the proposed arrangement boats will be able to make only four trips per annum for the charge formerly levied, it may be necessary to lower the tolls on the south. As boats passing outwards are not charged through traffic will not be twice tolled.

4. The financial effect of the Board's proposal appears from a statement furnished by the Collector of Chingleput showing the traffic on both sections during the past three years. The number of boats registered as over 30 tons was not, however, called for through an oversight ; hence the license fee has been calculated at a uniform rate of one rupee. The average of the receipts from tolls on the Northern Canal is Rupees 38,031, and a license fee at one rupee per ton will give an additional income of Rupees 13,460. The traffic on the Southern Canal would have yielded at the same rates of toll Rupees 5,891 on an average per annum. With a license fee of one rupee per ton the receipts would have been about Rupees 6,591 instead of Rupees 1,400. The total receipts on traffic equivalent to the average of the past three years would be about Rupees 58,000 instead of Rupees 39,400. The Budget Estimate for the ensuing year is Rupees 40,050, which, as explained by the Collector of Chingleput in his letter of the 5th March, is based on the average collections in his district. The Board can frame no estimate of the receipts likely to be derived from license fees upon the boats plying between the Kistna District and Pulicat Lake, and time does not admit of a reference to Nellore ; it may eventually be possible to levy moderate tolls on this section also, but the annual fee must suffice until the traffic has been fairly established. There will however be the license fees leviable on any accession to the number of boats that the opening of this section may give rise to ; and there can be little reasonable doubt but that the junction of the canals and the extension of the line already effected will greatly increase the amount of traffic plying.

5. Turning to outlay the statement appended to the Board's review* of the Budget Estimates of the Cochrane's and Sadras Canal Fund for the ensuing year shows the maintenance allowance proposed and cost of establishment, both petty establishment under the Public Works Department and staff for the collection of revenue ; the former item is Rupees 33,500, the latter Rupees 4,690 for Chingleput, and Rupees 4,610 for Nellore. Cost of supervision is entered at Rupees 2,440 exclusive of cost of petty establishment. The Chief Engineer states that the establishment to be entertained for the supervision and maintenance of the Buckingham Canal will cost Rupees 25,248 per annum, exclusive of the subordinate agency required for the collection of revenue ; the only item which may be struck out of the budget is the entry of Rupees 5,930 for cost of petty establishment which appears to have been provided for by the Chief Engineer ; on the other hand the levy of tolls on the Southern Canal may necessitate a slight increase of the establishment there. The cost of maintenance is put down by the Chief Engineer at Rupees 230 per mile for 250 miles or Rupees 57,500 in lieu of Rupees 33,500 ; this will swallow up nearly all the receipts ; the allowance is now only Rupees 100 per mile south of Pulicat, and Rupees 150 has been entered in the budget for 1878-79 for the section north of Pulicat. The total expenditure according to the information furnished by the Chief Engineer will be as follows :—

* Proceedings, 24th January 1878, No. 216.

	Rs.
Maintenance	57,500
Public Works Department Establishment	25,248
Establishment for collection of revenue and contingencies ...	3,366
Total ...	86,114

No information as to the probable cost of necessary improvement has been furnished. It is clear that the eventual increase may be expected ; the receipts will not, at present at any rate, cover the whole cost of the expensive establishment proposed and maintenance allowance at so high a rate as Rupees 230 per mile ; the Board think that the debit for Public Works Department supervision should be limited to 25 per cent. of the outlay, following the usual course where Local and Special Funds are concerned, and that the maintenance allowance must be reduced if equilibrium is to be maintained. If the collections do not fall short of the sum estimated on the traffic of the past three years, viz., Rupees 58,000 (and the contrary may be expected), they will suffice to meet maintenance at Rupees 150 per mile, 25 per cent. for Public Works Department supervision and charges for collection, a margin being left for unforeseen expenses or miscalculation of receipts.

	Rs.
Maintenance of 250 miles, at Rs. 150.	37,500
25 per cent. for Public Works Department supervision	9,375
Establishment for collection and contingencies, say	4,000
Total ...	50,875

6. One other point requires notice. A contract has been entered into for the conveyance of salt to Homes' Gardens and the Madras Cotaurs from the pans, and this contract does not expire until 31st March 1880. The tolls on the Northern Canal are paid by Government, but no reduction of the license fee on the Southern Canal is allowed on this account. There will be no difficulty in arranging terms with the contractor by remitting a portion of the license fee to be newly imposed with reference to the tonnage and period of employment.

(True Copies and Extract.)

(Signed) C. A GALTON,
Acting Secretary.

RULES FOR THE REGULATION OF THE NAVIGATION OF THE BUCKINGHAM CANAL.

NOTE.

THE outline draft of the above rules now submitted is framed on the rules published in the *Fort St. George Gazette*, dated the 3rd December 1878, which have been sanctioned for the Godavari and the Kistna Canals.

2. These rules appear to be defective or capable of improvement in the following respects :—

1st.—They do not appear to be based on Act I of 1870 (The Canals and Ferries Act), and several of their provisions, more especially bye-laws 15 and 19, cannot, it is thought, be legally carried out.

2nd.—The fees charged are altogether incommensurate with the advantages gained by the use of the canals and out of all proportion small in comparison with the expenditure incurred in forming or in fitting the canals for navigation or in providing for even the upkeep of the works.

3rd.—The varying classification of vessels and fee seems to be unnecessarily complicated, and the rates appear to be in some respects inequitable.

3. In regard to the first-mentioned defect, instances have occurred in which the servants of the Public Works Department have been prosecuted and punished for forcibly removing carts found obstructing traffic on public roads, and it is to be feared that similar serious results would follow the seizure, the removal, and the sale of derelict vessels on the canals on the sole authority of the rules in question. It is possibly intended that these rules should be enforced under the authority of Act I of 1870, but this is not mentioned, and the Act is not once referred to anywhere in the rules in support of their provisions.

4. In reference to the second defect. The cost of carriage by the canal from Madras to Nellore and Ongole is at the present time only one-twelfth of what it is by the comparatively excellent road to those towns, and the time occupied on the journey by canal is only about one-third of the time occupied by road. The cost of carriage by the canals of the Godavari and the Kistna is probably not one-twentieth of the cost of carriage on the bad roads of those districts ; and it is probable that much of the produce of those districts would never be moved if it had to be carried by road alone. In these respects the value of the canals to the public in general and especially to the provinces is very great, while the profits of carrier or boat-owners are enormous.

5. For example, an ordinary cargo boat to carry 30 tons can be purchased for 500 rupees ; it is worked by two men and a boy at a cost of 15 rupees a month or 180 rupees a year, and, taking the Godavari scales of fees as the standard, it pays 2 rupees per ton or 60 rupees per annum for the use of the canals. It travels easily 200 miles a month or 2,400 miles a year, and its hire, according to the rates now prevailing, is about 3 pie per ton per mile.

The annual outlay for such a boat is :—

	RS.
Interest on original cost of 500 rupees at 5 per cent.	25
Depreciation and repairs at 15 per cent.	75
Working expenses	180
Canal dues	60
Total annual outlay ...	340

and calculating the earning at the rate of 3 pie per ton per mile—

the income is 2,400 × 30 × 3 pie	1,125
Which gives a clear gain of	785

or one and a half times the original cost of the vessel to the owner.

6. On the other hand the return to Government is extremely small. There are 750 miles of navigable canals in the Godavari and Kistna Districts, and the navigation fees collected amount to about 50,000 rupees per annum or between 60 and 70 rupees per mile, an amount which must be quite insufficient for the up-keep of the establishment and the works much less to yield any return for the original cost of making the canals navigable.

7. The third defect, that is to say, the various classification of vessels and fees, seems likely to create unnecessary trouble and confusion, to the navigation establishment as well as to the owners of vessels ; it is, moreover, inequitable in its application, and gives rise to a practice of circumvention on the part of boat-owners which it seems desirable to avoid ; for instance, a passenger boat is supposed to pay a fee of 6 annas for every square foot of deck surface, the average depth of such boats is about 3 feet and $16\frac{2}{3}$ square feet is equal to a ton or 50 cubic feet of cargo measurement. The fee of 6 annas a square foot for passenger vessels is therefore equal to $6\frac{1}{4}$ rupees a ton, and if the same vessel was classed as a cargo boat it would have to pay only 2 rupees a ton in the Godavari and 1 rupee a ton in the Kistna District. As a matter of fact the rule is to a great extent inoperative by having passenger boats registered as cargo boats, and there is nothing in the rules to prevent cargo boats carrying passengers which they really do.

8. The alternative fee provided for in Rule XIV seems to be even more objectionable than the high rate charged for passengers' boats. It demands a fixed toll without reference to the size or circumstances of the vessel or the length of the canal to be used. For instance, an unlicensed 5-ton boat has to pay 6 rupees for using the canal from Dowlaishvaram to Cocanada a distance of about twenty-eight miles or at the rate of about 8 pie per ton per mile, a 60-ton boat can perform the same journey for 6 rupees also or at the rate of $\frac{3}{5}$rds of a pie per ton per mile. The Commamur Canal over fifty miles long can be used by the same boats at about half the cost per ton per mile they would have to pay respectively on the Cocanada Canal.

9. An attempt has been made in drafting rules for the Buckingham Canal to avoid the above-mentioned apparent defects in the rules for the Godavari and the Kistna Canals.

The Buckingham Canal rules are based entirely on Act I of 1870, and the repetition of what is fully provided for in the Act is avoided in the rules. The fees proposed to be levied are comparatively extremely low, but they are sufficient to provide for the upkeep of the work and to yield some return on its first cost which is all that is required. The fees provided for are the same on all vessels using the canal except fishing and pleasure boats, from which for obvious reasons and for registration purposes only but a very small fee is demanded. The fees are proportional to the size of the vessel and to the extent to which in the case of each vessel the canal is used.

10. Owing to the limitation and exemption provided for in Section 4 of the Act it has been necessary to treat each of the old and new sections of the canal as separate lines of navigation. If Section 4 of the Act was amended by providing for tools AND licenses instead of tolls or licenses, and if the last paragraph was expunged, the drawing up of navigation rules for canals generally would be much simplified, and the division of the Buckingham Canal into distinct lines of navigation would be in the present case unnecessary.

11. In fixing the scale of fees and tolls provided for in these rules, three things have been considered—

1*st*,—the cost of the works and the amount required to maintain them in efficient order ;

2*nd*,—the extent of the traffic and its capability to produce the amount required ;

3*rd*,—the earnings and the ability of boat-owners to pay the fees and tolls proposed to be levied.

12. The Buckingham Canal has (or will) cost one mile with another 15,000 rupees per mile, and its upkeep, including establishment, will cost 300 rupees per mile per annum. The annual revenue for each mile of the canal should therefore be—

	RS.
The interest on first cost of Rs. 15,000 per mile, at 5 per cent. ...	750
And the cost per mile per annum for repairs and establishment ...	300
or a total of ...	1,050

13. The present system of registering traffic on the Buckingham Canal is thoroughly unreliable and unsatisfactory, passenger boats of from 5 to 10 tons burden are, according to the Madras rules, registered as 1 ton burden, while in one instance at least the registered tonnage of the Cocanada boats now plying on the canal is by a mistake in the measurement double what it should be ; there is no apparent check on the returns of traffic or revenue, and their accuracy is wholly dependent on the disposition of the subordinate establishment. There may be nothing wrong in the collection and disposal of the revenue, but there is much room for irregularity in this respect, while from competent observation there is no doubt the reported traffic is much less than what the traffic really is.

14. It is useless however to speculate on what the actual traffic is at present, and for the purpose in hand the official returns must be accepted.

These returns give the following results for the year ending the 31st December last :—

Floating tonnage on the canal in round numbers ...	Tons	15,000
Inward and outward traffic from Madras	,,	268,902
Ton mileage	Miles	9,162,295
Passengers carried	No.	140,011
Fees and tolls collected to	Rs.	52,282-1-0

15. On the Sadras section where boats are licensed and no tolls collected :—

The traffic amounted to	Tons	71,286
The ton mileage	Miles	1,223,923
The average distance each ton of the traffic was carried ...	,,	$17\frac{1}{6}$
The fees collected were	Rs.	878

which is equal to Rupees 21-6-8 for each mile of the 41 miles of canal open, or $\frac{1}{7}$th of a pie per ton per mile carried.

16. On the northern section 196 miles in length where one toll is collected at 4 annas a ton and where boats are not licensed—

The traffic amounted to	Tons	205,616
The ton mileage to	Miles	7,938,432
The average distance each ton of cargo travelled ...	,,	$38\frac{1}{2}$
Tolls collected	Rs.	51,404-1-0
Which is equal to	,,	262-4-3
Per mile of canal open, or	,,	0-0-$1\frac{1}{4}$

nearly per ton per mile of traffic.

17. The quantity of salt carried on the Sadras section was 31,880 tons, and on the Pulicat section 95,709 tons, equal in each case to nearly half the entire traffic.

The average distance salt was carried on the Pulicat section is 12 miles, the ton mileage is therefore equal to 95,709 × 12 = 1,148,508. The fees collected from this traffic amounted to Rupees 23,927-4-0 or 4 pies per ton per mile, while the remainder of the traffic on this section of the canal amounting to 109,907 tons was carried 6,789,924 miles or an average distance of $61\frac{3}{4}$ miles per ton, the fees charged being 27,476-13-0 or about $\frac{1}{4}$ths of a pie per ton per mile. This shows that the canal revenue has been greatly dependent on the salt traffic, and that the fees paid by Government per ton per mile on this account is five times greater than what is paid by the public for the similar use of the canal.

18. It would be inconvenient to divide the canal into section of 12 or 15 miles to suit the salt traffic and to equalise the incidence of the fees on this and other traffic on such a short distance. The most convenient limit for the length of a section of the canal is considered to be 48 miles, and salt like other traffic must pay more or less in proportion to the actual distance it travels within and beyond these limits. The division of the canal into sections of this limit will equalise the charges on all traffic as nearly as such equalisation can practically be carried out, this limit of about 48 miles has therefore been adopted in the rules, and it is proposed to erect toll bars as near to these limits as local circumstances will admit.

19. The rules provide for a license or registration fee of 2 rupees per ton all round, on all vessels of all descriptions using a distinct section of the canal, except fishing and pleasure boats which will be registered for a fee of 4 annas a ton. The rules provide also for the collection of tolls at the rate of 4 annas a ton or 1 pie per ton per mile for the use of any section of the canal other than the section in which the vessels is registered, which it is allowed to use free of tolls.

20. The length of canal now open is in round numbers 245 miles, and calculating on the present returns of traffic, the registration fees and tolls will yield a revenue of Rupees 516-10-8 per mile as follows :—

	RS.	A.	P.
Registration fees on 15,000 tons at 2 rupees	30,000	0	0
Do. on fishing and pleasure boats, say, 1,000 tons at 4 annas	250	0	0
Tolls on traffic carried 48 miles and less, 200,000 tons at 4 annas.	50,000	0	0
Do. do. carried more than 48 miles and less than 96 miles, 50,000 tons at 8 annas	25,000	0	0
Do. do. from 96 to 144 miles, 10,000 tons at 12 annas ...	7,500	0	0
Do. do. from 144 to 192 miles, 5,000 tons at 1 rupee ...	5,000	0	0
Do. above 192 miles that is to say entering the canal at its north end 3,902 at 1¼ rupees	4,877	8	0
Rafts, say	500	0	0
Rest-house fees, canal produce, &c.	872	0	0
Total ...	1,24,000	0	0
or ...	516	10	8

per mile of canal open.

21. This is only about half what is required to pay interest on first cost and to maintain the canal in working order, but it is more than sufficient for the latter purpose, which is one great point that will be gained by the introduction of the new rules. The calculation does not moreover include intermediate traffic, that is to say traffic that does not leave or enter Madras which is not now included in the returns and upon which an additional revenue of 25,000 rupees per annum at least may be expected. It does not include traffic entering Madras that is probably omitted from the present return, and it takes no account of the daily increase in the traffic from the north end of the canal; when all these are accounted for there can be no doubt the traffic on the canal is quite able to pay its way in a liberal manner.

22. In regard to the ability of boat-owners to pay the fees and tolls provided for in the rules, it has been shown that the owner of a 30-ton vessel clears the large sum of Rupees 785 per annum after paying all current demands, and the payment of tolls at the rate of 1 pie a ton a mile or 375 rupees per annum when the vessel is in tolerably full work will still leave the owner a very large margin of profit; but even if this was not the case, and considering that the present cost of carriage by the canal is only from $\frac{1}{12}$th to $\frac{1}{20}$th of the cost of carriage by road the present charges for carrying traffic might be reasonably increased, if necessary, to meet the additional fees for which the rules provide.

23. The rules provide for boats licensed to use the canals of the Godavari and Kistna Districts being allowed to use the Buckingham Canal without undergoing the expense and trouble of taking out a fresh license, and the payment of the tolls is all that will 'he demanded of them. The boats of the Buckingham Canal should be allowed to use the canals of the Godavari and Kistna in a similar manner without taking out a license or licenses in those districts, but anything that can be done in this direction will be of no avail so long as Rule XIV of the Godavari and Kistna rules is allowed to stand as it is. This rule is apparently intended to force the owners of vessels to take out licenses, and this could be done by simply ruling that all vessels *should* take out licenses. Rule XIV would not then be necessary for the purpose for which it is apparently intended.

24. It has been already shown (paragraph 8 above) how inequitably this rule bears on the boats of the Godavari and Kistna Districts. It acts with still greater hardship on the small boats of the Southern Districts, and it is causing much obstruction to traffic at the junction of the Commamur and Buckingham Canals; for instance, a 6-ton boat with goods or passengers, say, for Santaravur, only 8 miles from the junction of the two canals, has to pay 6 rupees or about 12 annas per ton per mile for the use of this short length of the Commamur Canal, or take out a license for navigating the Kistna Canals, or not use the canal at all. The latter alternative is generally adopted, and the goods or passengers have to be landed and kept on the bank until a boat belonging to the upper canals can be brought to take them to their destination. The result is that owners of goods or passengers to or from the Northern Districts will not, if they can at all help it, employ the Madras boats; the boats of the Northern Districts are not always available and goods and passengers are often kept waiting for days and weeks for them while there are hundreds of Madras boats idle and ready for the work. The obstruction to traffic and

the hardships caused by this rule should be removed by having it cancelled as soon as possible, and a ratable and reasonable system of tolls established instead.

25. It is some times argued that canal revenue should be collected in the shape of license fees alone, but a license fee that would yield anything approaching adequate revenue would appear at first sight a formidable amount, as for instance in the example given in paragraph 5 above, the proportional fee would amount for a 30-ton boat to Rupees 435 per annum, enough to frighten the most ardent speculator away from boat building or from investing money in any way connected with canal navigation; and it might happen from some cause or other that while one vessel was lying idle the greater part of the year, another would be at constant work; in the first case the fee would be a heavy burden for which no return was received; in the latter case it would be no burden at all on the constant earnings of the vessel, a license fee should therefore be as small as possible in order to bear lightly on those who had no work, and in this view it might be advisable to reduce the fees provided in the Buckingham Canal rules from 2 to 1 rupee per ton. The amount thus given up would be comparatively small and the canal can afford to lose it.

26. The objection to tolls is the difficulty and expense of collecting them; these are evils that cannot be avoided, and experience shows that with ordinary caution and check they are not so great as might be supposed or as some people think. Tolls must be the back-bone of canal revenue; this is clearly shown by the experience of the northern and southern sections of the Buckingham Canal, where in the one case with a very imperfect system of tolls the revenue amounts to the comparatively decent sum of Rupees 262-4-3 per mile, while in the other case where the license system is in force and the traffic nearly as great, the revenue amounts to only 26-6-8 per mile, and the revenue in the Godavari and the Kistna though better than on the Sadras Canal amounts under the license system to only between 60 and 70 rupees per mile. There is the further advantage in regard to tolls, and that is, that they bear only on those who are really using the canals and whose earnings can well afford to pay them. With these remarks the rules are recommended for adoption and early sanction.

OOTACAMUND,
20th June 1879.

(Signed) J. O'SHAUGHNESSY,
Executive Engineer.

I.—The Buckingham Canal includes the following lines of navigation, extending from the Palar river in the district of Chingleput to the junction of the tidal and fresh water canals in the Kistna District near Peddaganjam, together passing over a continuous distance of about 245 miles, namely,—

1*st.*—The Sadras Canal extending from the right bank of the Palar river to the right bank of the Adyar river, distance about 43 miles.

2*nd.*—The Madras Canal extending from the right bank of the Adyar river to the Shadayancooppam Lock, distance about 12 miles.

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

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

5*th.*—The Ramapatam Canal extending from near Kodoor 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 all navigable estuaries, backwaters, rivers and channels, whether salt or fresh, connected with each such line; 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 15th day of September 1879, no vessel shall be allowed on, or to use any of the above mentioned 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 above mentioned distinct lines of navigation.

Exception.—Vessels possessing licenses for the navigation of the canals of the Godavari or Kistna Districts will not be required to pay a license fee for the use of any section of the Buckingham Canal.

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 above mentioned distinct lines of navigation for which the owner does not hold a license.

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 notifications 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.

VI.—Applications for licenses shall be made in the Form D annexed, at any time before the 15th September 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 Superintendents of Sections of the canal at their offices at Covelong, Madras, Pulicat, Dugarajapatam, Eskapilly, and Kottapatam.

VII.—The maximum dimensions of vessels brought on the canal hereafter will be limited to 90 feet in length, 13 feet beam and 2½ feet draft; 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 draft of water will be limited in all cases to 2½ feet, and no vessel shall hereafter be laden beyond this depth, which will be marked by a painted band or water line round the outside of the hull. The height of fixed fittings, such as the roofs of boats, mast partners, funnel sockets, &c., shall be limited to 6½ 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 innerside of the planking on one side to 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 undersurface 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.

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 five square feet of deck surface 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 divded by 6, then length × breadth divided by 5 will give the number of passengers a vessel will be licensed to carry, including 40 lbs. 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 lbs. for each passenger on board.

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.—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. 1 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 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 vessel 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 shall have their masts down; they 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 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 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 vessel ahead coming in an opposite direction. The steam whistle shall be blown when speed is reduced on the above mentioned 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 place 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 for any infringement of these rules or bye-laws.

XV.—The penalty for infringement of the latter part of Rule V will be a double charge for the new license, in addition to any suspension of license which may be ordered.

THE BUCKINGHAM CANAL, MADRAS.

SCHEDULE A.

LICENSE FEES.

Description of Vessel.	Rate.	
For every ship, steamer, boat, barge or vessel of any description propelled in any manner and used for any purpose except fishing or pleasure ...	Rs. 2-0-0	Per ton of registered tonnage per annum.
For every fishing or pleasure boat	„ 0-4-0	Do. 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.

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 BUCKINGHAM CANAL, MADRAS.

SCHEDULE B.

SCHEDULE OF TOLLS.

Tolls.

Description of Vessel.	Rate.	
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	Rs. 0-4-0	Per ton of registered tonnage.
For every raft of floating timber, bamboos, or other floating substance	„ 0-1-0	Per square yard.

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 tons cargo.
Do. do. passengers.
Fee paid.
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)
hereby apply for license to place (4)
on the (5)
section of the Buckingham Canal during the year 1879.

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.

No. 38-A. Proceedings, Revenue Department, dated 5th July 1879, No. 2,411.

No. 39. ORDER THEREON, 8th July 1879, No. 1,801-A W.

HIS GRACE the Governor in Council is pleased to approve of the above rules and bye-laws for the regulation of the navigation on the Buckingham Canal, and directs that under the provisions of Section 23 of Act I of 1870 (The Canals and Ferries

Act) they be published in the *Fort St. George Gazette* and in the Gazettes of the Chingleput, Nellore, Kistna, and Godavari Districts for a period of six weeks from this date.

2. The attention of the Revenue Board and of the Collectors of Nellore and Chingleput Districts will be drawn to the rules in view to their suggesting any points for consideration during the six weeks of preliminary publication.

3. The Collector of Chingleput will transfer from this date the Toll and License Establishment now employed under his orders on the canal to the establishment of the Executive Engineer of the canal, who will submit at once a statement of the further establishment required for carrying out these rules, and who will arrange to have the necessary number of schedules and forms printed and ready for use when required.

The Chief Engineer for Irrigation will report how the inconvenience caused by the operation of Rule XIV of the Godavari and Kistna rules can be best removed, and he will submit as soon as possible proposals for such other alterations in those rules as are necessary for giving to the boats on the Buckingham Canal the same facilities to navigate the canals of the Godavari and Kistna as are given in these rules to the vessels of the Godavari and Kistna Canals to navigate the Buckingham Canal.

(True Extract.)

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

To the Superintendent of the Government Press.
" Chief Engineer for Irrigation.
" Superintending Engineers, First, Second, and Third Circles.
" Revenue Department.
" Collector of Chingleput.
" do. of Madras.
" do. of Nellore.
" do. of Kistna.
" do. of Godavari.
" Commissioner of Salt Revenue.
" Examiner of Public Works Accounts.

Exd. S. T. Austin.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of 1879; Madras.

PUBLIC WORKS.

To

THE SUPERINTENDENT OF THE
GOVERNMENT PRESS,

&c., &c., &c.

Dated 5th July 1880.

Issued

Read.

Read.

G. O., 5th July 1879, No. 1,801-A. W.

JULY.

Nos. 33-39.

Buckingham Canal.—Approves of the proposed rules and bye-laws for the regulation of the navigation on the —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

14th June 1880, No. 1,388 W.

Buildings and Roads.
Civil Works.

Read the following papers :—

No. 34. From Major H. M. VIBART, R.E., Acting Superintending Engineer, Third Circle, to the Chief Engineer, Public Works Department, dated Chepauk, 22nd December 1879, No. 7,457.

I HAVE the honor to forward statements of tests undertaken to ascertain the "load line" carrying capacity of boats as compared with their measured tonnage as prescribed by the rules in force for the navigation of the Buckingham Canal. These experiments have been carefully carried out by Mr. Sub-Engineer Ottmann, Executive Officer in charge of the canal. He was led to carry them out from observing that boats generally carried less than their measured tonnage.

Two Statements.
Four Sketches.

2. I also beg to forward statements regarding the great disparity between the measurements of boats on the Buckingham Canal as compared with those on the Godávari and Kistna systems of navigation.

1*st*.—As regards the "load line capacity," experiments have been made as regards five different kinds of boats —

	No. tested.
Madras top boats	10
Do. cargo boats	5
Kistna and Godávari cargo boats	3
Do. do. passenger boats	3
Deck boats, barrel-shaped	4

By a reference to the statements it will be found that in only one class of boats does the registered tonnage agree with the tonnage capable of being carried up to load line. I enclose four sketches of boats in use on the canal, the one marked A being the Madras cargo boat above alluded to. In all the other descriptions in use the tonnage capable of being carried up to load line is greatly less than the registered tonnage. In the Madras top boats it is found to be nearly 24 per cent. less; in the Kistna and Godávari cargo boats about 30 per cent.; the Godávari and Kistna passenger boats nearly 32 per cent.; and the deck boats, barrel-shaped, actually 55 per cent. less.

3. To remedy this state of things I would recommend that the method of measurement should remain as it is, but that to each class of boats a co-efficient should

be applied which would reduce the measured tonnage to that capable of being carried up to load line.

Thus I would propose the co-efficients to be—

For Madras cargo boats	Unity.
For do. top do.	·76
For Kistna and Godávari cargo boats	·70
For do. do. passenger boats	·68
For deck barrel-shaped boats	·45

4. Next as to the Buckingham Canal measurements as compared with those taken in Godávari and Kistna, 110 cases are given in the statement now submitted. Of these, ten are rahadari boats. The difference is found to be greatest in these owing to measurements being taken (in the Godávari and Kistna) to the top of the upper deck instead of to gunwale. The depth of vessel should, it seems to me, most certainly be taken from the gunwale and not the top of the upper deck, which is merely put up for a protection to goods and passengers.

The aggregate tonnage of these ten boats in the original registry came to 558 tons, whereas the present tonnage, according to Buckingham Canal Rules, is only 206, and if the co-efficient proposed was introduced (viz., ·68), it would only amount to 140, or an average of about 14 tons each boat.

The cargo boats given in the list number 96; the aggregate tonnage of these originally was set down at 2,730, whereas, according to Buckingham Canal Rules, it is 2,058 only, and if the co-efficient proposed be applied, it will be further reduced to 1,440·6, or only to an average of 15 tons per boat.

There are only four top boats in the list. The aggregate tonnage of the four having previously been 48 tons, is now 40 tons, an average of 10 tons in place of 12 for each boat.

In the list sent in there are two boats about which there appears to be some mistake. Mr. Ottmann being away I am unable to be sure on this point, but the two boats I allude to are marked in the list with an asterisk—

No. 1,672, cargo boat.
,, 1,793, top boat.

The original tonnage in both these cases is set down as less than the present tonnage under Buckingham Canal Rules. I am inclined to think these must be clerical errors.

5. In conclusion I have the honor to request you will be good enough to inform what steps should be taken to remedy the two serious matters that are brought to light in this letter.

THIRD CLASS.

STATEMENT showing the former and present Tonnage of Boats plying on the Buckingham Canal.

Boat No.	Description of Boat.	Tonnage as per original Registry.	Present Tonnage as per Buckingham Canal Rules.	Remarks.
1,905	Rahadari boat	50	19	These boats, which belong to Kistna and Godávari Canals, were measured there to top of deck over gunwale some 3 feet 9 inches, consequently the great disparity between former and present tonnage.
2,023	Do.	60	22	
1,845	Do.	67	25	
1,848	Do.	49	15	
1,856	Do.	43	15	
2,028	Do.	60	20	
1,895	Do.	49	19	

Statement showing the former and present Tonnage of Boats, &c.—*cont.*

Boat Number.	Description of Boat.	Tonnage as per original Registry.	Present Tonnage as per Buckingham Canal Rules.	Remarks.
1,878	Rahadari boat	77	29	These boats, which belong to Kistna and Godavári Canals, were there measured to top of deck over gunwale some 3 feet, consequently the great disparity between former and present tonnage.
1,860	Do.	51	21	
2,046	Do.	52	21	
10		558	206	
1,206	Cargo boat	42	31	
1,633	Do.	25	22	
1,457	Do.	23	20	
1,401	Do.	19	16	
1,389	Do.	19	16	
1,692	Do.	33	29	
1,148	Do.	28	23	
* 1,672	Do.	9	12	
632	Do.	25	20	
1,066	Do.	25	21	
1,520	Do.	23	19	
1,176	Do.	36	27	
910	Do.	26	20	
857	Do.	33	24	
1,327	Do.	19	14	
1,452	Do.	17	13	
1,099	Do.	38	28	
923	Do.	32	24	
1,458	Do.	36	27	
1,324	Do.	28	21	
1,037	Do.	36	27	
1,445	Do.	37	25	
1,311	Do.	39	27	
1,474	Do.	20	16	
1,578	Do.	18	15	
1,231	Do.	16	11	
888	Do.	17	14	
1,189	Do.	40	28	
1,192	Do.	40	29	
1,403	Do.	20	16	
1,038	Do.	36	23	
1,380	Do.	31	24	
1,201	Do.	34	23	
1,313	Do.	36	25	
1,146	Do.	35	26	
1,027	Do.	37	27	
1,224	Do.	34	26	
1,059	Do.	35	25	
1,409	Do.	37	25	
884	Do.	32	21	
1,546	Do.	32	27	
999	Do.	33	24	
949	Do.	27	22	
1,368	Do.	36	25	
1,219	Do.	30	22	
1,376	Do.	30	23	
1,102	Do.	34	25	
1,281	Do.	40	27	
1,239	Do.	29	21	
1,040	Do.	36	25	
1,888	Do.	15	12	
955	Do.	32	23	

Statement showing the former and present Tonnage of Boats, &c.—*cont.*

Boat Number.	Description of Boat.	Tonnage as per original Registry.	Present Tonnage as per Buckingham Canal Rules.	Remarks.
1,181	Cargo boat	40	28	
1,547	Do.	34	28	
1,125	Do.	36	26	
1,120	Do.	33	25	
1,283	Do.	37	26	
1,207	Do.	40	30	
1,600	Do.	31	27	
1,014	Do.	30	22	
1,391	Do.	18	14	
1,461	Do.	25	21	
1,913	Do.	31	22	
976	Do.	21	17	
1,079	Do.	24	18	
1,147	Do.	20	15	
1,388	Do.	25	19	
1,033	Do.	33	23	
1,357	Do.	30	22	
1,435	Do.	38	29	
973	Do.	28	22	
1,977	Do.	39	29	
1,430	Do.	33	25	
2,005	Do.	35	26	
1,611	Do.	38	30	
1,241	Do.	15	11	
1,234	Do.	20	15	
1,392	Do.	16	13	
1,545	Do.	35	29	
2,001	Do.	33	26	
1,293	Do.	39	27	
1,463	Do.	19	16	
1,259	Do.	20	15	
1,212	Do.	20	13	
1,226	Do.	19	14	
1,377	Do.	19	15	
1,006	Do.	17	14	
1,188	Do.	19	15	
1,237	Do.	21	16	
1,198	Do.	31	21	
1,144	Do.	20	16	
1,065	Do.	22	18	
1,115	Do.	19	16	
1,264	Do.	22	16	
1,295	Do.	24	17	
1,204	Do.	21	15	
96		2,730	2,058	
* 1,793	Top boat	6	9	
1,949	Do.	17	13	
2,025	Do.	11	8	
1,987	Do.	14	10	
4		48	40	

CHEPAUK,
20th December 1879.

(Signed) H. M. VIBART, Major, R.E.,
Ag. Supg Engineer, Third Circle.

THIRD CIRCLE.

STATEMENT of the Result of Experiments to test "Load Line" carrying capacities of Boats as compared with measured Tonnage as per Buckingham Canal Rules.

Boat Number.	Description of Boat.	Extreme Length.	Extreme Breadth.	Midship Depth.	Registered Tonnage.	Draught or Load Line marked.	Tonnage capable of being carried up to Load Line.	Draught above the Load Line if the full tonnage of the boat is shipped.	Entire draught required to load the registered tonnage of Column 6.	Remarks.
		FT. IN.	FT. IN.	FT. IN.		FT. IN.		FT. IN.	FT. IN.	
1,525 C./21	Madras top boat.	35 6	6 11	2 5	6	1 5	4½	0 5	1 10	In the case of all those boats the midship depth of which does not allow of 1 foot clear height of gunwale above water level, the load line has been marked 1 foot below gunwale without reference to the 2½ feet draught of the rules, as it has been frequently seen that boats loaded lower in the water too frequently sink in the open parts of the lake in adverse winds or if there is much of a swell. These boats could not be tested above the "load line," as they were very leaky and one of them broken up.
1,742		36 3	6 10	2 6	6	1 6	4¼	0 5	1 11	
1,766		38 2	7 2	2 6¼	7	1 6¼	4½	0 5½	1 11¾	
1,682		38 6	7 0	3 6	7	1 6	4¼	0 7	2 1	
2,000 C./155		40 9	6 11	2 8	8	1 8	6	0 5	2 1	
1,979		42 6	6 11	2 9	8	1 9	6¾	0 4	2 1	
1,734 C./32		42 5	7 7	2 6½	9	1 6½	5¾	0 7	2 1½	
1,998		43 9	7 4	2 10	9	1 10	7	0 6	2 4	
1,987		46 3	6 11	2 11½	10	1 11½	9¾	0 1½	2 1	
2,038		42 9	7 6	2 11	10	1 11	8	0 7	2 6	
2,001	Madras cargo boat.	54 3	12 8	3 7½	26	2 6	26	..	..	
1,357 C./252		56 3	11 11	3 4	22	2 4	22	..	..	
1,311		57 9	13 0	3 6	27	2 6	27	..	..	
1,412		47 3	11 8	3 5½	22	2 5½	22	..	..	
1,146 C./338		56 3	12 3	3 5½	26	2 5½	26	..	..	
K. 1,986 M. 1,948	Kistna and Godávari cargo boat.	29 7	6 1	2 10	9	1 10	7	0 6	2 4	
K. 2,006 M. 1,877		40 11	7 8	3 6	19	2 6	12½	0 8	3 2	
K. 1,567 M. 2,093		33 0	6 1	3 0	10	2 0	7	0 8	2 8	
C./5 1,847	Kistna and Godávari passenger boat.	58 3	9 5	3 10½	27	2 6	17	0 7	3 1	
1,578 F./45		66 3	9 5	3 8	29	2 6	22½	0 10	3 4	
1,860 F./6		58 6	8 10	3 4	21	2 6	13	..	..	
K. 204 M. 2,097	Deck boats, barrel-shaped.	27 4	7 7	3 11½	12	2 6	6½	..	..	
K. 2,210 M. 2,086		38 4	7 8	5 6	28	2 6	10¾	..	..	
K. 2,142 M. 2,094		32 2	8 0	4 4	16	2 6	9¼	..	..	
K. 2,301 M. 2,099		34 0	8 2	5 3	25	2 6	9¾	..	..	

CHEPAUK,
21st December 1879.

(Signed) H. M. VIBART, Major, R.E.,
Ag. Supg. Engr., Third Circle.

No. 34-A. From Major H. M. VIBART, R.E., Acting Superintending Engineer, Third Circle, to the Chief Engineer, Public Works Department, dated Chepauk, 24th December 1879, No. 7,527.

IN continuation of my letter, No. 7,457, dated 22nd December 1879, I have the honor to enclose copy of a further statement submitted by the Executive Officer, Buckingham Canal Division, showing the former and present tonnage of boats plying on the canal as ascertained from 26th November to 11th December 1879.

No. 4.—Statement showing the former and present Tonnage of Boats plying on the Buckingham Canal.

Boat Number.	Description of Boat.	Tonnage as per original Registry.	Present Tonnage as per Buckingham Canal Rules.	Remarks.
1,414	Cargo boat	28	23	
1,100	Do.	19	15	
1,092	Do.	38	27	
1,122	Do.	35	25	
969	Do.	29	23	
1,774	Do.	32	27	
980	Do.	35	24	
1,078	Do.	37	27	
1,228	Do.	20	14	
1,243	Do.	23	15	
1,296	Do.	23	17	
1,054	Do.	30	23	
1,517	Do.	23	19	
1,516	Do.	23	20	
1,055	Do.	26	19	
1,173	Do.	31	22	
1,126	Do.	32	25	
1,287	Do.	38	26	
865	Do.	27	20	
1,268	Do.	20	14	
1,184	Do.	30	20	
1,410	Do.	25	19	
1,242	Do.	33	23	
1,494	Do.	24	20	
1,052	Do.	20	15	
1,090	Do.	29	21	
854	Do.	23	18	
1,075	Do.	26	20	
985	Do.	31	22	
833	Do.	30	22	
1,091	Do.	30	22	
1,191	Do.	35	23	
1,612	Do.	30	27	
1,072	Do.	28	22	
1,108	Do.	31	23	
1,232	Do.	16	12	
1,029	Do.	32	23	
1,413	Do.	18	14	
1,383	Do.	21	17	
1,223	Do.	30	22	
1,539	Do.	25	22	
1,568	Do.	26	21	
1,278	Do.	21	17	
1,297	Do.	21	17	
1,314	Do.	26	20	
1,447	Do.	18	13	
1,056	Do.	28	22	
1,110	Do.	18	11	
1,026	Do.	23	19	
1,467	Do.	25	20	
495	Do.	32	23	
981	Do.	30	24	
1,499	Do.	24	20	
821	Do.	32	23	
1,369	Do.	32	24	
1,398	Do.	18	14	
1,015	Do.	31	23	

No. 4.—Statement showing the former and present Tonnage of Boats, &c.—*cont.*

Boat Number.	Description of Boat.	Tonnage as per original Registry.	Present Tonnage as per Buckingham Canal Rules.	Remarks.
1,696	Top boat	5	8	
1,844	Dingu boat	28	21	
1,846	Rahadari boat	67	22	These boats, which belong to Kistna and Godávari Canals, were there measured to top of deck over gunwale some 3 feet 9 inches, consequently the great disparity between former and present tonnage.
1,885	Do.	68	24	

In the cases where difference is 2 tons and under, those boats are not brought on the statement.

PEDDA GANJAM,
17th December 1879.

(Signed) S. OTTMANN,
Executive Officer in charge,
Buckingham Canal Division.

No. 34-B. From Captain A. AWDRY, R.E., Superintendent of Works, Buckingham Canal, to the Chief Engineer, Public Works Department, dated Madras, 28th February 1880, No. 3,962.

WITH reference to your No. $\frac{4,003}{1}$ of yesterday's date, I have the honor to inform you that the measurements of the boats did not in my opinion extend over a sufficient number of boats to make it advisable to assume a co-efficient on the data collected. I am therefore having some more boats of each class measured and will report the result at an early date.

No. 34-C. From the same Officer, dated Chepauk, 13th May 1880, No. 478.

I HAVE the honor, with reference to your No. 4,003 of the 27th December, to inform you that as I did not consider enough boats had been tested to obtain a true co-efficient for application to the registered tonnage arrived at under the rules for the canal, I ordered Mr. Ottmann to test more boats of each class so as to bring the number tested of each kind up to at least twenty.

2. The testing has been going on for some time, but there has been great difficulty in obtaining some classes of the boats for the purpose, so the full number has not even yet been tried for two classes of boats; as however I have received further calls from your office for my report, I can no longer delay it, but must submit it on the data already collected.

3. In regard to the "Madras cargo boat," only five had originally been experimented on, so fifteen more had to be; these have now been tested, and it is found that the twenty boats taken together will in reality carry (when loaded to a load line not more than $2\frac{1}{2}$ feet above the lowest point of the bottom nor less than 1 foot below gunwale) an actual gross load of 461 tons, against 421 tons as arrived at by the canal rules. From this it appears that the co-efficient to be applied to the calculation by rule of this class of boat is 1·09, but I do not recommend the application of a co-efficient to enhance the tonnage already laid down by the rules: it would rather be preferable to mark the load line on this class of boat with a 13-inch free board as they are open boats; however I am inclined to keep the 12-inch free board and let the boatmen take the risk of sinking if they carry the registered load, as there is little or no danger to life, but only to property, in over-loading.

4. Of the "Madras top boats," ten were tested before and ten more have now been tested. The results of the first testing gave 80 tons registered against 61 tons which could actually be carried by the boats if they are to have a free board of 1 foot; none of these boats were over 2 feet 11½ inches in maximum depth; so allowing 1 foot free board, none of them have nearly the maximum draught of 2½ feet allowed by the rules; the shape of these boats in section is much more curved below than above, so that each inch of extra draught makes a very considerable difference in a boat's carrying capacity. The boat-builders are now building these boats deeper than formerly, so that of the ten boats recently tested four (like the "cargo boats") can carry as much as or more than the registered tonnage, the result of the ten boats being that the four largest ones registered at 38 tons will carry 38½ tons, while six smaller boats registered at 42 tons will only carry 33 tons. I therefore recommend that, in view to encourage the boatmen to incur the slight extra expense of the addition of a higher free board which will make their boats much safer and better, the rule should be admitted as correct for all top boats and 1 foot of free board allowed in marking the load line. The total number of top boats tested is 20, giving a registered tonnage of 161 tons, but an actual of 132½ tons, so that if any reduction is to be made and the free board kept at 1 foot the co-efficient for top boats should be ·82; however, as stated above, I do not recommend the application of a co-efficient to the registered tonnage of these boats, and I believe that the free boards of all will soon be raised.

5. There has been difficulty in obtaining "Kistna and Godávari passenger boats" (rahadari boats) and "decked (barrel-shaped) cargo boats;" only fifteen of the former have been tested and ten of the latter, but the "barrel-shaped boats" are (when the depth is measured to the gunwale instead of to the highest point on the curved deck) so like the "Kistna and Godávari cargo boats" that a fair co-efficient can probably be obtained for. Of the cargo boats, seven extra boats, making 27 in all, have been measured.

6. The "Kistna and Godávari cargo boats" results are that 27 boats registered to carry 477 tons can carry (when drawing 2½ feet of water) 382½ tons, giving a co-efficient of ·8 to be applied to the registered tonnage as arrived at by the rules.

7. The fifteen "Rahadari boats" tested gave an aggregate tonnage of 235¼ tons, but they are registered at 333 tons; these boats are not very deep and carry a large number of passengers, so the free board should not be cut lower than 12 inches when marking the load line. The co-efficient for these boats is ·7.

8. The ten "barrel-shaped boats" show a registered tonnage of 201 tons, but the measurement for depth should, I think, not be taken into the upward curved of the deck, but should only be taken as high as the underside of the deck at the gunwale. The carrying power of these boats to load line is only 117¾ tons. I think that they should be measured in the manner stated above, and have the same co-efficient of ·8 applied to them as is used for the "Kistna and Godávari cargo boats."

9. In conclusion I have the honor to recommend that it should be laid down that the load line should, besides being not more than 2½ feet above the bottom of the boat, be not less than 1 foot below the lowest point in the gunwale, and that for measurement of depth of decked boats the distance of the underside of the deck planking at the gunwale be taken from the upper surface of the limber strake. For Madras "cargo" and "top boats" the measurements as now made may be assumed to be correct, while for all classes of Kistna and Godávari boats (which being intended for deeper water have more curve at the bottom than the Madras boats) a co-efficient of ·8 be applied to the measurements arrived at by rule.

10. I have also the honor to request instructions as to whether Government would wish action to be taken to prevent boats passing along the canal loaded beyond their load lines, or whether they may be allowed to pass and take the risk of sticking on the bottom if of deep draught, or being swamped if of too low free board? I have at the same time the honor to inform you that I should prefer not to have to allow Toll Superintendents and others to harass boatmen by any restriction of depth of draught or free board being laid down.

11. The question as to payment for licenses for budgerows was raised by me in my Nos. 4075 of 10th March and 4253 of 22nd March, and referred back with your Nos. 851 of 15th March and 1,103 of 13th ultimo for further information, so the matter may well be brought forward now while I am addressing you about the rules. I would propose that Rule X of the Kistna and Godávari Navigation Rules published in G.O., No. 481 I., of the 1st September 1879, be made applicable to the case of vessels (such as budgerows) not plying for hire, and that the license for them should extend throughout the whole Buckingham Canal, but that in the case of vessels (such as budgerows) plying for hire the Kistna and Godávari Rule VII for "first-class vessels" be made applicable, the license of Rs. 4 per ton being a license for the whole Buckingham Canal, and not for only one section of it.

12. I have the honor to return the file of papers forwarded to me with your No. 4,003 of the 27th December, together with a statement showing the particulars of all the boats which have been tested.

No. 34-D. From Captain A. AWDRY, R.E., Superintendent of Works, Buckingham Canal, to the Chief Engineer, Public Works Department, dated 1st June 1880, No. 705.

WITH reference to the note by His Grace, dated 20th ultimo, on the tonnage and load line question, forwarded for modification of my No. 478 of 13th ultimo, I have the honor to offer the following observations.

2. With regard to the tonnage which boats can safely carry, it will be necessary for Government to decide on the amount of free board to be allowed in calculation of the tonnage, for in closed reaches of the canal in calm weather a boat will be perfectly safe with 6 inches of free board, while the same boat would not be taken across an open reach of the canal in a high wind with 2 feet of free board. One foot is, I think, a fair minimum free board to allow; the boatmen themselves can judge whether if they have left less it will be safe for them to travel in the weather at the time.

3. If a free board of 12 inches is decided on by Government, the measurements of boats already made will be correct according to the rules, for in taking the depth for the calculation of their tonnage a free board of 12 inches has been allowed. I gather from His Grace's note that my paragraph 10 is generally approved of, but that the right to punish a boat which sinks or sticks and obstructs traffic from having too small a free board or being over-loaded should be retained, but only enforced by authority superior to the Toll Superintendents.

4. Dangerous over-crowding of passengers would, under all circumstances, be dealt with according to rule at once.

5. With regard to the co-efficients to be applied, I cannot say that I am satisfied that in *every* case there will be no hardship; they are arrived at by striking averages, and in the nature of averages some boats will carry more and some less. The cases pointed out by His Grace would not be covered by the co-efficients, although *taking the average* the co-efficient is the correct one.

6. The course which I have the honor to suggest (instead of using co-efficients) as being *absolutely* fair is as follows:—

(1.) The registered tonnage to be, as now, arrived at by the calculation in the rules, the free board being 12 inches, and no co-efficient being applied.

(2.) Arrangements to be made for actually testing by weights the capacity to load line of any boat brought for the purpose to the basin, a fee of 8 annas per actual ton carrying capacity arrived at being charged. (This fee has been suggested as being the actual cost* of the testing done already.)

		A.	P.	
*Cost .. .. Rs. $\frac{638\frac{8}{16}}{1,329}$ =	7	8	per ton.
Alteration of painting of boat, say	0	4	
Total ..	8	0	

(3.) The boat to be entitled to a refund of surplus license fee and extra tolls paid for it during the calendar year in which it was tested, *i.e.*, back to the commencement of the period of the license under which it is then plying.

This method appears to me to have the merit of absolute fairness and justice, and with the diversity of build and carrying capacity even in boats of the same class affords, as far as I can see, the only really satisfactory solution of the difficulty.

7. Where such has not already been done, all boats which have been tested will at once have extra tolls and license fees refunded to them back to the commencement of the license period in which they were tested, but many refunds have already been made.

No. 35. ORDER THEREON, 14th June 1880, No. 1,388 W.

THE proposal to fix 12 inches as a minimum free board and the suggestions made in the 6th paragraph of the last of the letters above recorded are approved.

2. The fee should be remitted if the boat proves to have been over-measured.

3. The remarks made in the 10th paragraph of the letter of the 13th May, No. 478, are also generally concurred in. Where it is desirable to punish boat-owners for over-loading, or allowing too small a free board, the necessary action must be taken by competent authority.

4. Revised draft rules should be submitted by the Superintendent for publication.

(True Extract.)

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

To the Superintendent of Works, Buckingham Canal.

Exd. A. F. Goodall.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of (1880) Madras.

PUBLIC WORKS.

To

THE SUPERINTENDENT OF WORKS,
BUCKINGHAM CANAL.

Dated June, 14th.

Issued

Read. *Encl.*

G. O., 14th June 1880, No. 1,388 W.

JUNE.

Nos. 20-21.

Tonnage and Load Line of Boats on the Buckingham Canal.—Passing orders on letters from the Superintendent of Works regarding the —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

9th August 1880, No. 1,895 W.

Buildings and Roads.
Civil Works.

Read the following paper :—

No. 26. From Captain A. AWDRY, R.E., Superintendent of Works, Buckingham Canal, to the Chief Engineer, Public Works Department, dated Chepauk, 10th July 1880, No. 1,057.

THE following are the revised draft rules for the Buckingham Canal which I have the honor to recommend with reference to G.O., No. 1,388 W., of the 14th June 1880. Marginal notes in red ink have been put to facilitate observation of the changes.

2. With reference to Bye-law XIV, I have the honor to suggest that between the words "three months" and "for any" it would be well to insert the words "or levy a fine not exceeding five rupees in each case," as there is now no other way whatever for the Executive Engineer to punish than by the very serious penalty of suspension of license, which is too heavy for ordinary offences against the rules and bye-laws.

3. I find that applications are constantly made for duplicates of licenses lost through carelessness, and I therefore recommend the addition of the following to Schedule A :—"The fee for a duplicate license will be two rupees."

The amount of fee is the same as in the Kistna, where the levy of it has had the effect of making the boatmen keep their licenses in little tin boxes which cost perhaps 2 or 3 annas, but save them from being lost and from becoming so dirty as to be almost illegible as some of the Buckingham Canal ones have become.

RULE VII.—The maximum dimensions of vessels brought on the Canal hereafter will be limited to 90 feet in length, 13 feet beam, and 2½ feet draft; 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 draft of water will be limited in all cases to 2½ feet, which draft 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 6½ 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.

From "which draft" down to "submerge this painted band" has been added to the original rule.—A. A.

RULE 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 on one side to 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 under-estimated 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.

From "but the carrying capacity" to the end of this Rule is new, and is merely an addition to the old Rule.—A. A.

RULE IX.—Vessels adopted 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 lbs. 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 40 lbs. for each passenger on board.

In this Rule there is an insertion of the words "under cover" in the first part and additions from "first-class passenger vessels" to the end to meet the case of budgerows.—A. A.

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 tolls 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.

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.

(Signed) A. AWDRY, Captain, R.E.,
Superintendent of Works,
Buckingham Canal.

No. 27. ORDER THEREON, 9th August 1880, No. 1,895 W.

THE revised rules submitted with the foregoing letter, as also the additions to Bye-law XIV and to Schedule A suggested by the Superintendent, are approved, and will be published in the Fort St. George and Local Gazettes.

(True Extract.)

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

To the Superintendent of Works, Buckingham Canal.
" Superintendent, Government Press.
" Revenue Department.
" Board of Revenue.
" Superintendent of Works, Kistna.
" " " Godávari.

Exd. A. F. Goodall.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of (1880) Madras.

PUBLIC WORKS.

To

The SUPERINTENDENT OF WORKS,
BUCKINGHAM CANAL,

&c., &c., &c.

Dated August, 9th.

Issued

Read. Encl.

G. O., 9th August 1880, No. 1,895 W.

AUGUST.

Nos. 26-27.

Buckingham Canal.—The revised rules for the — submitted by the Superintendent, approved and ordered to be published in the *Fort St. George Gazette*.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

22nd December 1880, No. 818 I.

Irrigation.
Account.

Read the following paper :—

No. 33. From A. A. JOPP, Esq., Director-General of Stores, to the Joint Secretary to Government, Public Works Department, Irrigation Branch, dated India Office, London, 19th November 1880.

With reference to your letter dated 11th September, I have now the honor to enclose, for your information and for the guidance of the officers who receive Government Stores at Madras, a copy of the contract entered into with Messrs. McDiarmid, Greenshields and Company, for the conveyance of the steamer for the Godávari Delta to Madras per steam ship *Duke of Buckingham* sailing on the 20th instant.

2. In regard to the suggestion in your letter that freight might be obtained by sailing vessel, I may observe that few sailing vessels could take such large pieces, and that an advertisement for tonnage produced one offer of a sailing vessel to convey the steamer in sections to Cocanada for £500, "if the vessel could take it." I also ascertained that no very material reduction of this amount would be made for delivery at Madras, as in either case special tackle would have to be hired or purchased by the owner for lifting such large pieces. It will be observed that Messrs. McDiarmid, Greenshields and Company's offer compares very favorably with that of the British India Steam Navigation Company, seeing that freight to Madras is usually higher than to Calcutta, especially for large or heavy pieces, and it is considered that as advantageous an arrangement has been made as was possible under the circumstances.

From Messrs. McDIARMID, GREENSHIELDS and Company, to the Director-General of Stores, India Office, dated 112, Fenchurch Street, 13th November 1880.

We have to acknowledge receipt of your letter of yesterday's date intimating your acceptance of our offer to convey the launch whole on the deck of the steam ship *Duke of Buckingham* from London to Madras for the extra sum of £60, instead of in sections below as at first arranged, and we now beg to confirm this amended arrangement.

No. 34. Order thereon, 22nd December 1880, No. 818 I.

The General Superintendent, Public Works Stores will, in communication with the Master Attendant, arrange on the arrival of the steam ship *Duke of Buckingham* for the transfer of the steamer from the harbour at Madras to the Buckingham Canal, and for its despatch thence to Dowlaishweram by the canal. As the canals close on the 15th March, it will be necessary that the steamer should reach Dowlaishweram before that date.

(True Extract.)

(Signed) JOHN MULLINS, Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the General Superintendent of Public Works Stores.
" Superintendent of Works, Godávari.
" Master Attendant, Madras.
" Chief Engineer for Irrigation.

Exd. E. C. Shunker.
Spare Copies

IRRIGATION.
ACCOUNT.

Govt. of [1880] Madras.

PUBLIC WORKS.

To

The GENERAL SUPERINTENDENT,
or PUBLIC WORKS STORES,
&c., &c., &c.

Dated December, 22nd.

Issued

Read. *Encl.*

G. O., 22nd December 1880, No. 818 I.

DECEMBER.
Nos. 33-34.

Steamer for the Godavari Delta.—Instructions issued for the transfer of the — on its arrival at Madras to the Buckingham Canal and for its despatch thence to Dowlaishweram.

PUBLIC WORKS STORE DEPARTMENT,
Madras, 28th January 1881.

No. 1707 S.

From

THE GENERAL SUPERINTENDENT,
PUBLIC WORKS STORES, &c.,

To

THE *Deputy Chief Engineer D.P.W.*
Madras

SIR,

Enclosures.

With reference to para 2 of the accompanying Copy of letter No. 2843 dated 27th January 1881, from the Superintendent of Works Buckingham Canal, I have the honor to request that the Sanction of Government may be obtained for exempting the Steam Launch from payment of tolls on the Buckingham Canal or until She is handed over to the Superintendent of Works Godavery.

I have the honor to be
Sir
Your Most Obt. Servant

per Buddeley *D.M.C.*
Genl Supt P.W. Stores

No 2843.

Office of Supt of Works.
Buckingham Canal
27th January 1881.

From
The Superintendent of Works
Buckingham Canal.

To
The General Superintendent
Public Works Stores & Workshops
Madras.

Sir

I have the honor to forward an order to the Toll Superintendent on the Buckingham Canal to allow the Govt launch to pass free through their Toll gates as requested in your No 1685 S. dated 26th January 1881, I send this order to cancelline.

2. As the Canal Rules do not admit of any exceptions I have the honor to request that you will take out a license for this Vessel in question and pay Tolls for her unless you obtain an order of Govt specially exempting her. The amount of License and Toll can be remitted hereafter to my office instead of being paid at the Toll Station.

I have the honor to be
Sir
Your most obedient Servant
(Signed) A. Audry Capt RE
Supt of Works B Canal

(True Copy)
W C Brudenell Lieut RE
General Supt Pub Works

Am Cayo

L.B. No. 180/22. 8-2-93.
" " 1388 W. 4-6-88
" " 1895 W. 9-8-80
" " 848 S. 22-12-80

Public Works Store Department.

From

The General Superintendent,

P. W. Stores, &c.,

Madras,

To The Deputy Chief Engineer
P.W.D.
Madras

No. 1707 S.

Dated 28th
Despd. 31st } January 1881.
Recd.

No. of Enclosures /

Requesting that the Sanction of Govt. may be obtained for exempting the Steam Launch from payment of tolls on the Buckingham Canal or under which she is handed over to the Superintendent of Works Godavery.

C. 2-2. 2.2.

Public Works Department.

Letter from the General Superintendent P.W. Stores No. 1707 S dy 28th January 1881.

FOR ORDERS.

The proposal to exempt the boat in question from the payment of tolls does not appear sound.

2. The tolls are a legitimate item in the cost of carriage, a considerable saving in which is made by the use of the Canal, and it is only reasonable that the latter should receive credit for the assistance which it gives - especially as the Canal belongs to one head of

service (Provincial)
and the launch to another
(Irrigation)

FOR ORDERS.

Major RE
for Secretary to Govt. P.W.D.

No 3726

PUBLIC WORKS DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 10 Feb 1881

Read the following:—

From the Genl Supt. P.W. Stores &c No 1709 of 28th January 1881.

The Govt. do not consider it desirable to exempt the steam launch from payment of tolls on the Buckingham Canal.

To The Genl Supt. P.W. Stores &c
Supt. of Works B Canal

/57 + /58

dan 372 Ds. v.u. Duy/81