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Report on important

Pub. works 1853

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SELECTIONS

FROM

THE RECORDS

OF THE

MADRAS GOVERNMENT.

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No. XV.

REPORTS

ON

IMPORTANT PUBLIC WORKS,

FOR

1853.

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1853.

செப்பனியுவர் பெயர் A. MANI

செப்பனியுதற்காக எடுத்த
கொள்ளப்பட்ட நாள். May 1991

செப்பனியு - டி.பி.வ. நாள்
June 1991

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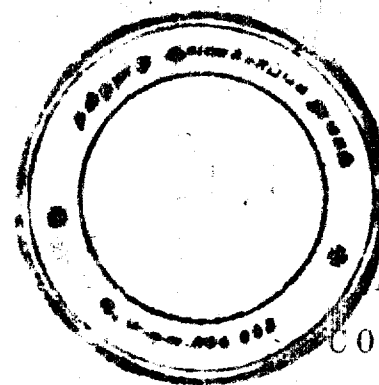
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Department of Public Works,
Madras, 3d May 1855.

No. 372.

FROM MAJOR J. H. BELL.

*Offg. Secretary to the Board of Revenue,
Department of Public Works.*

TO J. D. BOURDILLON, Esquire,

*Secretary to Government,
Public Works Department.*

SIR,

1. I am directed by the Board of Revenue to submit the accompanying reports from the Civil Engineers on important works executed in 1853.

Ninth Division.

December 20th 1854.

2. A large part of the report from this division is upon works in the Road Department.

3. In this Department some improvement was commenced to the irrigation in Ganjam by the enlargement and completion of the Poltalagana Hoondali Channel at a cost of Rupees 1,786-13-8, by which a considerable supply of water was afforded to crops which would otherwise have perished from drought.

4. In Vizagapatam the Shadda Nuddee and Marlala Gedda Anicuts, constructed some years ago at the recommendation of Captain Collyer, were lengthened to afford more water-way, at a charge, for the one of Rupees 2,537-1-11, and for the other of Rupees 3,372-13-8. These improvements, undertaken for the sake of safety to the Anicuts and embankments, did not add directly to the efficiency of the works for supply; but the Civil Engineer observes that in this latter respect their value was abundantly proved during the year under report, one of great drought, which would have been without remedy but for that which the works afforded.

5. Among the road-works of the division in 1853 may be mentioned two important branches connecting Vizagapatam with the Trunk Road at Ankapilly to the south and Vanoolawulsah to the north. The outlay on the first branch was Rupees 3,086-3-7 and on the second

7,065-14-4. The second was brought to a more complete state than the first, and was so much improved, that it was used by 300 to 400 carts per diem, though in its natural state a cart was scarcely ever seen upon it.

6. The Chicacole and Calingapatam road, connecting a large town with its port, is another short line of importance which was partially formed at a cost of Rupees 7,800. The traffic averages 150 carts daily.

7. The new first class road between Berhampore and Russelcondah and its continuation from Berhampore to the Port of Gopalpore were commenced in 1853; but as the progress made was small, these roads will be reported upon hereafter.

8. The Civil Engineer states that the irrigation in Vizagapatam is considerably improved, but that Ganjam is backward in this respect. Large projects of communication have been undertaken and partly executed in both districts, and will, when completed, render them more accessible from the interior of the country, which is now almost debarred from intercourse with the coast by the difficulties of hilly tracts.

Godavery Division.

9. In this division the Godavery project continued to be the almost exclusive object of the attention of the Civil Engineer's Department.

10. Lieutenant Haig, by whom the report is prepared, was not in charge of the division in 1853, but as one of the principal Assistants, was thoroughly acquainted with the design and progress of the general system of works.

11. At the close of 1852, he observes that although the Anicut was finished, and many considerable channels had been opened in the three divisions of the Delta, and a communication established by means of the great aqueduct with the Nuggaram Talook, the distribution of the water had commenced only under the Samulcottah and Cocanada (Thooliah Bagah) channels, and the river embankments were very incomplete. On the other hand several considerable locks for rendering the channels navigable were completed or in progress, and the Cocanada channel was extensively used for navigation, though still greatly in need of improvement.

12. At the opening of 1853, the Civil Engineer was aided by a large and efficient executive staff, and the voluntary system of labor had just then finally superseded the practice of coercion which was entirely abolished. Lieutenant Haig justly extols the beneficial princi-

ple and results of this change of system; but the retention of that of advances with the perplexity and loss which it entails, not to mention its encouragement of improvidence and dishonesty, must be considered a drawback which it is to be hoped will also disappear in due time.

13. Lieutenant Haig divides the operations of the year into three parts, namely those which were performed before, during, and after the freshes.

14. The first were principally the extension of the main channels on both banks of the river and the opening of minor branches.

15. On the left bank of the river, the Coringa channel, a branch from the Kowlaiswarum or Bank channel, was extended and the Dracharam channel the principal branch of the Coringa channel was opened. The Bank channel was also extended, and several branch channels opened from it. These works are near the course of the left arm of the Godavery. Between them and the Cocanada channel the irrigation of an extensive tract was provided for by fresh branches from that channel. The Samulcottah channel, which is the farthest from the river, and marks the limit of the Delta on that side, was considerably enlarged.

16. On the right bank the Oondee and Palcole channels, which occupy the central part of the tract, the Yellamunchelly channel which runs near and parallel to the river, and the Venkiah channel which extends towards the farther end of the Delta on this side were enlarged or completed, and the Attilee channel for irrigation of lands nearer the coast was opened.

17. In the Delta between the two arms of the river little was done in furtherance of the irrigation; the strength of the department in that quarter being occupied with the repair of the great aqueduct which had been damaged in 1852, and the river bunds. In the minor Delta or Nuggaram Talook the channels were considerably extended.

18. At the close of the first period it was apparent that the monsoon had entirely failed, and that the most vigorous exertions were required to distribute water for the salvation of a great extent of crop. When, therefore, the freshes began to set in, rough branches were opened from the existing ducts, the old drainage channels were filled with water and bunded across to raise it to the proper level; the country was every where flooded by cuts in the banks of the main channels; and where no means existed for throwing in water from the Anicut, exten-

sive use was made of the high freshes of the river admitted through the embankments.

19. The results of these measures were highly gratifying; an immense extent of produce ready to perish was not merely saved, but increased beyond the average yield; and in parts where the first crop was lost, a fine second crop was raised. But of these results the Government has been already fully and particularly informed by the Commissioner of the Northern Circars. Lieutenant Haig states that the lowest estimate of the amount of saving effected by the works of irrigation is 28 lakhs, and the highest above 50 lakhs. The former sum alone is about the whole cost of the Godavery project to the present time.

20. During the third period of the year the Samulcottah channel was farther enlarged, the Cocanada channel was much improved for navigation; and the channels of irrigation from its right bank were multiplied. The head of the channel was also greatly increased in capacity for the admission of water in proportion to the additional tracts of land to be supplied. Several other channels on the left bank of the river were attended to; locks were completed, and the drainage was improved. The great aqueduct, which was again much damaged by the freshes, was repaired; and many channels were extended and improved in the major and minor deltas, promoting a large increase of Sugar-cane cultivation in the latter, the soil of which is peculiarly favorable for the plant.

21. The drainage of the Masulipatam lands under the Colair Lake was completed to a considerable extent. Some improvement was effected to the Coringa bar by dredging.

22. During the year a large amount of work was performed in the Work-shop and Foundry, including repairs to the existing plant; construction of lock-gates, sluice-shutters, ferry-boats, and wooden and iron boats for use in connexion with the works; railway wheels for the Krishna Anicut works; a shaft for the *Hugh Lindsay*; a large hand dredge, and a steam boiling engine, &c.

23. The operations of the year were such as greatly to advance the objects of the Godavery project by opening ducts for irrigation to nearly every part of the Delta. The systematic distribution of the water remained to be attended to, and the extension of the means of uninterrupted communication, which at the end of 1853 were still limited to the Cocanada channel.

24. The Civil Engineer adds some remarks upon the necessity of a better organization of the conservancy of the works, and of a know-

ledge of the local language on the part of the European subordinates. On this subject there cannot be a difference of opinion; and when the subordinate department is re-organized, as it must be under the new arrangements about to be made in the Department, it will be expedient to regulate promotion to a certain extent, with reference to ability to communicate with the people as well as to other qualifications.

25. In the latter part of the report the more important works of the year are described in detail, which does not require to be reproduced by the Board. The excess of expenditure above estimate in particular cases has been explained in other reports. The Attilee Channel, the Board regret to observe, failed in its purpose during 1853, on account of a defect in the levels.

26. It will be seen that the cost of the Civil Engineer's Establishment for the year under-report was under 11 per cent upon the expenditure, a gratifying proof of the efficiency as well as economy of the superintendence.

Krishna Division.

November 16th 1854.

27. The Civil Engineer notices the timely repairs executed to some important tanks which were breached in 1851, as having been the means of saving a considerable amount of revenue. He also mentions the partial restoration of the Cuncherla Tank, a large reservoir in ruins for a long period; but this work which promised to be highly profitable, has been since suspended in consequence of an accident caused by disobedience of orders on the part of Mr. Assistant Surveyor Bance, who has been punished by the Board.

28. The Krishna Anicut works, for which extensive preparations had been made in 1852, were this year commenced and vigorously prosecuted. The Head and Anicut Sluices and the Locks were built, and their flanks guarded from the river-floods by masses of stone to form part of the Anicut which was to be undertaken in 1854. Two unseasonable freshes, great deficiency of labor, and epidemic sickness were hindrances to rapid progress; but the full amount of expected work was completed, and every thing prepared for the operations of the succeeding year.

29. Nothing was done in 1853 to the channels from the Anicut except the partial opening of the communications between it and the old Boodeznair and Poolairoo the former in the direction of Ellore, and the latter of Masulipatam.

30. The Civil Engineer observes that considerable efforts have been made of late years to improve the irrigation in his Division especially in Guntoor, where some of the best western tanks have been restored or rendered more efficient, and those irrigating the low lands near the coast have been well supplied by ducts from the Krishna. While great partial benefit has thus been obtained, the districts in general have not participated in it; and inundations from the river have often ruined the produce raised by means of its supply of water. The Anicut, therefore, and its dependent system of irrigation, drainage and embankment will, it is believed, in time effect a prodigious change in the character and condition of these fertile provinces.

31. Little was done to the communications in this Division during 1853. The road from Guntoor to the seaport of Nizampatam, an important line, was commenced between Guntoor and Munchallah; but only Rupees 2,711-4-3 was expended upon it.

32. The Civil Engineer gives a sketch of the lines of communication traversing the Division, all which are in their natural state, or if otherwise, in bad order. The Masulipatam and Hyderabad road is the principal line under the control of the Board. An estimate for the part between Ebrampatam and the frontier has been sanctioned; but a survey for a low-speed Railway in lieu of a common road is in preparation. The communication between Ebrampatam and Masulipatam will be in the first instance by the Canals now under formation or to be soon commenced; but a road will be eventually required.

33. The Masulipatam Fort and Pertah Canal was cleared out and put in order this year. It will eventually be connected with the Krishna Canals, and will then be kept in better order by the tidal-current, besides being much increased in importance.

34. The Masulipatam Port, which will rise greatly in value and importance as the great Anicut project is developed, is in a deteriorated state; and its improvement will be proposed in connexion with the Canal works when these are completed.

35. The Nizampatam Port in Guntoor is also expected to become one of considerable resort, when the works of irrigation and communication of that district are perfected.

Second Division.

February 3d 1855.

36. The report from this division contains nothing of importance.

37. Several considerable works, namely—
 The bridges over the Boogga and Halla rivers at Cuddapah.
 The Nundy Cunnama Ghaut.
 The Pennair Anicut at Nellore.
 The Beerapairoo Bridge

were commenced; but the expenditure upon them was trifling, and they will therefore form the subject of future reports.

38. Of the remaining works mentioned by the Civil Engineer the Board observe that the estimate for defences to the left bank of the Panpugnee river near Appiapully was mostly expended, but that the Civil Engineer had not been able to judge of the results.

39. The road from Cuddapah to Chennoor, a piece of very difficult ground was partially formed during 1853, but does not appear to have come into use.

40. It will be seen that with so little an amount of important work performed there is little room for the exhibition of special superintendence; and there were in fact scarcely any Subordinate Officers in the division till towards the end of the year.

Third Division.

February 14th 1855.

41. The expenditure of the year on large works was very considerable, especially in Bellary where the restoration of the great tanks breached in 1851 and again in some instances damaged in 1852 was vigorously prosecuted.

42. The road work, which was also in the whole considerable, was principally in Canara. Several public and revenue buildings were under construction in Bellary and Kurnool.

43. The Civil Engineer divides the road improvements into groups eight in number, seven of which are in Canara from North to South, and each of these connected with one or more of the new ghats opened or projected of late years.

44. In the first group the work of the year was confined to the formation of the road from Hullial to the Dharwar frontier at Mavin-koppa at a cost of Rupees 3,184-6, and the commencement of work at the Singawarree Ghat to connect Hullial with the Sedashaneghur River. These works were under the charge of Lieutenant Thornton and Mr. Assistant Surveyor Beahen.

45. The second group embraces the Arbyle Ghat and its branches. Upon the improvement of the ghat Rupees 3,290-7-1 was expended, on the branch to Ankola Rupees 4,067-9-8, and on the branch from Yella-

poor to Kirwatty on the Dharwar frontier Rupees 1,772-10-6. The last mentioned work was also under Lieutenant Thornton.

46. The trade by the Arbyle Ghat is very great. It relieves the Devamunny Ghat of a large amount of the downward traffic from the cotton country, and is much used by return carts and bullocks. Estimates for bridging this important line are now under execution. The Civil Engineer urges the necessity of the formation of the Dharwar lines, with which the new roads in this part of Canara are connected.

47. In the third group are comprised the Devamunny and Neelcoond Ghats and their respective communications with the seaport of Coompta, and the Dharwar frontier. The expenditure of the year amounted to Rupees 6,020-13-8 under the superintendence of Lieutenant Babington, for the Devamunny, and Rupees 1,211-5-7 for the Neelcoond Ghat, with smaller sums upon branch roads. The former Ghat was finally completed with bridges throughout, and an improved trace of the Neelcoond Ghat was partially executed.

48. The Civil Engineer observes that, while there was a large decrease of cotton exported from Coompta in 1853 below that of 1852, in other produce there was satisfactory progress, and the return traffic from the coasts very largely encreased. Indeed there can be no doubt of the vast importance of the communications in this part of Canara, which not many years ago was with great difficulty passable even by bullocks, which yet were used in considerable numbers on account of the urgent demands of the cotton trade.

49. The Gairsappah Ghat is the only work of the year in the fourth group, and it was traced and opened for bullocks under Lieutenant Walker's personal superintendence at a cost of Rupees 4,462-6-2. This line communicates with the navigable river of Honore, and promises to be one of the most important in the district, as it will supply a large part of Mysore with salt in return for grain. The new trace receives, it is believed, the traffic of three old natural ghats which debouche upon the Honore river. The farther development of the utility of this Ghat and of that of Coloor, the next to the southward, depends much upon the opening of communications in Mysore. There is every disposition on the part of the authorities to establish such communications; but the want of superintendence is a great hindrance.

50. The fifth group embraces the Bellary roads from Bellary to Humsagur and Bellary to Hirzyhal, the former being part of the line to Dharwar, and the latter a short link of the new line to Bangalore

opened by the Mysore Commissioner. On these portions works to the amount of Rupees 8,315-3 and 8,397-10 were respectively executed in 1853, the former under the superintendence of Captain Gage.

51. In the sixth group, the Agoombee Ghat and its feeders, no work of any consequence was performed during the year. Bridges are much required on these roads.

52. In the seventh group which includes the Munzerabad Ghat and the road from its foot to Mangalore, some bridges were built during the year by Lieutenant Roberts, but the Ghat is still in want of several bridges to render it a good carriage communication, and these will be erected as soon as an Officer can be spared for the purpose.

53. But little work was done on the Jalsoor and Cassergode road headed the eighth group. Bridges for this road are under execution.

54. The principal works of irrigation were the repair of Singanamulla and Daroojee tanks on which Rupees 26,577-14 and 26,269-10 were respectively expended, the former work under Assistant Overseer Palmer, and the latter under the Civil Engineer Major (Lieutenant Colonel) Henderson C. B. The reports received by the Board on these repairs shew that they were performed with great care; and as the Cullingulabs have been much enlarged, there is reason to believe that the tanks have been guarded as much as possible against future accidents.

55. Mr. Beahen of whom unfavorable mention is made by the Civil Engineer was degraded some time ago for neglect of duty, and has since resigned his situation in the Department.

Fourth Division.

March 9th 1854. 56. The number of large works in this division is inconsiderable.

57. A commencement was made with the extension of the northern water-communication from Pulicat to Doorgarazpatam, but the expenditure was only Rupees 925-10-8.

58. The Cheyar Anicut, built in 1852 having been much damaged by high freshes, was repaired and strengthened under Assistant Overseer Lincoln at a charge of Rupees 4,954-7-9; and the Anicut has been placed, it is believed, in great security for the future.

59. The Ponnay Channel for the supply of the Perancanjee and other tanks was opened at a cost of Rupees 9,807-4-6, and the Perancanjee tank was repaired and improved at a cost of Rupees 2,848-12-8.

These works were under the charge of Mr. Assistant Surveyor Bush, and were very efficiently performed. They form but a small part of a project of extensive irrigation from the Ponnay to be supported by an Anicut for which sanction has lately been received.

60. On the Chittoor and Kincumbady Road, an important line, but little work was done in 1853. The road from Vellore to the junction of the Arcot and Chittoor Road was efficiently completed under the supervision of Mr. Sullivan, the Head Assistant Collector.

61. The Civil Engineer notices the fact of the favorable returns of revenue from the Cheyar Anicut. These were lately reported by the Collector in a letter submitted by the Board under date the 15th January 1855.*

Fifth Division.

November 30th 1854.

62. The expenditure in this division also on works worthy of notice is of small amount.

63. The Vellar Anicut, which was breached in March, was repaired under the Civil Engineer, Captain Ouchterlony's superintendence at an outlay of Rupees 12,122-7-6. These repairs, notwithstanding their heavy cost, were no more than a temporary expedient for the preservation of a large revenue dependent on the Anicut; and the entire reconstruction of the ruined portion of the Anicut has since been sanctioned.

64. The new Cuddalore Dispensary is much approved by the Medical officer in charge. It is on the standard plan and its cost was Rupees 2,665-12.

65. The Civil Engineer in the latter part of his report mentions several projects required for the improvement of the division. Of these the chief is the restoration of the Nerinjipett Anicut which has been submitted to the Board, and has been referred back to the Civil Engineers of the Fifth and Seventh Divisions and the Collectors of Salem and Coimbatore for the supply of more detailed information. The opinions of the Civil Engineer Sixth Division and the Collectors of Trichinopoly and Tanjore have also been requested, as the execution of the project will affect the supplies of water to these districts.

66. Several considerable road projects for South Arcot have been sanctioned, and are under execution. In Salem there are already numerous good roads, and the principal communication now in hand is between the Shervaroy Hills and the low country.

* See Appendix.

Sixth Division.

December 29th 1854.

67. The expenditure in this division on irrigation works was confined to repairs, chiefly of the works injured by the storm of March 1853; but several considerable bridges and other works were undertaken and partially completed.

68. Of these may be mentioned

Expenditure in 1853.

Anicut and Bridge across the Adapar.	3,843	4	0
Bridge over the Maharajahsanoodrum on the Trichinopoly and Adrampatam Road. }	5,624	0	0
Bridge over the Cunnamar on the Manargoody and Adrampatam Road. }	4,799	2	0
Bridge across the Paumary on the Tritapoonady and Mootoopettah Road. }	5,455	9	0
Extending the Negapatam Jetty &c.	3,171	4	0
Improving Totium china Voykal.	8,934	12	0
Repairing Trichinopoly and Coimbatore Road.	5,413	5	0
Repairing Trichinopoly and Combaconum Road. }	4,182	12	0
Bridge over the Vuddawar on the Manargoody and Wodiarpollum Road. }	2,120	3	0

69. These were all ordinary improvements, and do not require particular remarks. Many were arrested by the storm.

70. A more important one was the opening to a considerable extent of the new line of communication between Trichinopoly and the Salem District, the total expenditure on which for the year was Rupees 35,341-14-7. This line is carried from the northern end of the Coleroon Bridge opposite Trichinopoly along the bank of the Iyen Voykal to the upper Anicut where it crosses the Iyar, and proceeds to Moosery by the bank of the Covery and from thence to Totium and the Salem boundary. A bridge over the Iyar was nearly completed, when the great storm of March occurred and destroyed the works.

71. The improvement of the Trichinopoly and Madura Road, another line of great traffic, was also undertaken in this year with an outlay of Rupees 3,245-15.

72. The Tranquebar project for the improvement of the port and its connexion with the interior by rendering the Veerasholam more easily

navigable, and with Trimulwassel by a canal to form part of the coast line, was commenced this year; but little progress was made except with the Veerasholum works which were for the most part completed, and produced considerable effect. The expenditure was Rupees 5,879-10 and a further sum of Rupees 3,091-14 was expended on the Sandana channel from the Veerasholum, both for the improvement of its irrigation, and to aid in the general object of opening the navigation of the parent stream.

73. Additions were made to the beach defences at Tranquebar at a charge of Rupees 5,790-12. The works were damaged by the hurricane of March; and in the South West Monsoon the violent set of the current required fresh expedients to resist its destructive action.

Seventh Division.

(No Report.)

Eighth Division.

January 10th 1855.

74. The Civil Engineer gives a list of the more considerable items for the improvement of the irrigation, but none of these are of much importance and all were performed on ordinary Estimates.

75. Of road works the first mentioned is the improvement in different places of the great southern road from Trichinopoly through Madura and Palamcottah to Travancore, upon which Rupees 10,128-9 was expended, besides the cost of ordinary repairs. This line has been greatly improved of late years, and many of the rivers intersecting are bridged, or in course of being so.

76. On the different cotton roads the expenditure of the year under the charge of of Captains Hickley and Paxton, Lieutenants Helbert and Alven and Ensign Payne was Rupees 29,112-3.

77. Several other road improvements of minor importance are enumerated and described by the Civil Engineer.

78. The expenditure on buildings was not of any importance.

79. The Civil Engineer remarks upon the necessity of greater care of the works of irrigation in his division, which, through the neglect of the Meezassidars and ryots, require general repair more often than they ought to do. The water is also greatly wasted; and this it is needless for the Board to add, is a universal evil, for which there is no apparent remedy but the sale of the water in lieu of the extra taxation of the Nunjah land. Such a fundamental change of system would be equally

sound in principle, and beneficial in result; but whether it is practicable or not is a question which would require long and patient investigation to determine.

80. Many road improvements are yet required in the division, and the estimates, when received, will be duly considered by the Board. The Civil Engineer adds some useful information regarding the Ports, but does not recommend any improvements, except a jetty for the Port of Tuticoreen.

81. With the exceptions mentioned in paras 27 and 55 the Board have no unfavorable reports to make upon the conduct of any persons of the Department. The particular employment of each Officer and Subordinate has been exhibited, but not in all cases with precision because of the application of their labors to inspections over tracts of country rather than to special works of importance.

I have the honor to be, &c.

J. H. BELLI.

Officiating Secretary Department Public Works.

REPORT OF IMPORTANT WORKS EXECUTED IN THE SUB-DIVISION *
DURING THE YEAR 1853.

The principal works executed during the past year in the Sub-Division were as follows:—

Irrigation.

The extension of the Irrigating Channel and the Masonry works connected with it in the Hoondah of Paltalagam in the District of Ganjam.

Extension of the Shadda Nuddée Anicut in the District of Vizagapatam.

Do. of the Marlala Gedda do. in the do. do.

Trunk Road Department.

The completion of 2 Bridges over the Eimlipatam river, near the village of Chittivulsah.

The commencement of a Bridge of 10 arches of 30 feet span over the river at the Town of Anakapilly.

Extensive repairs including several small Masonry works, to the Trunk Road, between the towns of Toonee and Yellamunchilly.

Branch Roads.

One from the town of Vizagapatam to the junction of the Trunk Road on the North, near Yamoolavulsah.

One from the same place to the junction of the same work at Anakapilly in a Westerly direction considerable repairs, and Masonry works, to the road from the town of Chicacole, to the Port of Calingapatam.

Repairs to the road from Berhampore to Gopaipore.

Commencement of road from Berhampore to Russelcondah.

Ganjam District.

Paltalagam Hoondah.

Irrigation Channel, Calingulah and Sluices.

Estimate Rupees 3,551-0-0; Cost Rupees 1,786-13-5

Superintended by Lieutenant Ross Assistant Civil Engineer, whose salary was Rupees 1,896-0-0.

* Now called the Ninth Division.

In the Ganjam District the only new irrigation work of consequence was the enlarging and completion of the Paltalagam channel. The Masonry works were not sanctioned sufficiently early to enable them to be carried out; so the best temporary arrangement that could be effected was made. The Ganjam District this year was visited with a very severe hurricane, which did extensive damage, and amongst others breached the embankments of this channel; but not before every tank was fully supplied, and the crops dependent on it were thereby preserved, as no rain fell after that visitation; and had not the tanks been then filled, every blade of cultivation must have perished.

The Calingulah will be finished this season.

Vizagapatam District.

Survasiddy Talook.

Cassimentta Village.

Shadda Nuddée Anicut.

Estimate Rupees 2,284-4-8; Cost Rupees 2,537-1-11

Superintended by Assistant Supervisor Robertson, whose salary is Rupees 75.

Survasiddy Talook.

Teroorapilly Village.

Marlala Gedda Anicut.

Estimate Rupees 3,616-8-10; Cost Rupees 3,372-13-8

Supervised by Assistant Surveyor Georges whose salary is Rupees 141-4-0.

These two works though individually of small amount, deserve to be noticed on account of the effect produced by them.

They are the principal irrigation works constructed in the Vizagapatam District during the past year. The extraordinary floods of 1852, rendered these works necessary and the completion of them has been productive of most happy results this year, as it is only through these means combined with other subsidiary works, that any cultivation has been preserved in the Survasiddy Talook this year: and the amount of produce saved from destruction by the failure of rain, and by storing the little water which was brought down in successive small freshes, has many times covered the amount of all the money laid out on them, from first to last. One of the principal objects for which Captain Collyer planned the latter work was realized this year, viz. supplying in years of scarcity of rain, with the drainage water running along it, such villages, as ought to be supplied by the Pundeirôo river, which is apt to fail

almost entirely as it did this season, having proved only sufficient for the upper villages dependent on it.

The work consisted in lengthening both Anicuts one 30 feet, the other 30 feet, restoring the injured wing walls and breached embankments.

Trunk Road Department.

Vizagapatam District.

Bridge at Chittivulsha.

Large bridge estimate Rupees 9,042-0-0 Cost Rs. 11,581-3-9

Small do. do. Rupees 3,688-3-9 do. Rs. 2,361-9-6

Superintended by Assistant Supervisor Robertson, salary Rs. 75.

On the 1st work it is not necessary to enlarge, as the particulars of these Bridges were detailed in my Report for 1852. It is only necessary to state that the Arches of the two Bridges 11 in one, and 3 in the other, were turned this year, and the Bridges opened for traffic. The centering used was that designed by the late Captain Best, and the Masonry on the Arches was so good that there was not the slightest sinking to be detected in any one of them.

The centering has since been transferred to the Anakapilly Bridge. The cost of these two Bridges was Rupees 13,942-13-3. This includes the repair of the damages sustained in 1851, the addition of two Arches, retaining walls and flooring in the large Bridge.

Bridge of 10 Arches over Anakapilly River.

Estimate Rupees 10,567-8-0; Cost Rupees 5,000-0-0

Superintended by Assistant Supervisor Robertson whose salary is Rupees 75.

This is a most important work, as it will overcome what has hitherto been a most serious obstacle to traffic. The Anakapilly River, flows from 9 to 13 feet deep in the height of the freshes, and runs so rapidly, that no commodious ferry boat can safely navigate it. The only means of crossing it are on rafts composed of 2 Palmyra trees. The consequence is Bandies had to be not only unloaded, but the wheels taken off the axles, and conveyed separately from the cart, and I have seen a train of 40 and 50 Bandies, detained during days of successive heavy rain at this River, their contents being exposed to the weather the whole time. The work having been commenced late in the season, and interrupted by small freshes was only completed as far as one abutment and 8 piers. There was a fresh of about 10 feet in the River, and the work sustained no injury.

The dimensions of the work are as follow: 10 segmental Arches of 10 feet span each, and a rise of $\frac{1}{4}$ th, 9 piers 4'-6" thick, and 9'-0 high.

Abutments 6'-0" thick and 9'-0" high; wing walls 28 feet long, 3 feet thick at top, 6'-0 at bottom, and 18 feet high.

The foundations were laid in strong gravelly soil 6 feet deep. The utility of this work will be seen from the return of traffic which I have had taken for some time; by which it appears that 140 Bandies, 480 Bullocks and 1,200 persons, cross this River daily.

Extensive repairs to Trunk Road from Toony to Yellamunchilly.

Estimate Rupees 47,906-0-5; Cost Rupees 11,782-0-0

Superintended by Lieutenant Magrath—salary Rupees 150-0-0; and by Road Maistry Raumiah, salary Rupees 28-0-0.

This work consists of extensive repairs to the Trunk Road between the towns of Toony and Yellamunchilly including the construction of several small Masonry Works. Lieutenant Magrath was appointed for the especial superintendence of this work, and his attention was directed to the worst portions of this Road, and to bridging the most impassable Nullahs. Though he was not appointed till late in the season, and was unable to commence work till the beginning of May, yet by his unremitting attention and diligence at his work he was enabled to perform the Earthwork to 7 miles of Road, completely to finish 5 miles more with metal and gravel, and to build the following Masonry Works.

1 Bridge of 5 Arches 4 yards span each.

1 do 4 do 3 do do

1 do 3 do 3 do do

1 do 2 do 3 do do

1 do 2 do 2 do do

1 Tunnel 1 do 2 do do

14 do 1 do 1 do do

1 do 1 do 4 feet do

3 do 1 do 2 do do

and 292 yards in length of Road Dams at a total cost of Rupees 8,974-11-0.

Almost the whole of the above were finished by the month of August, and the road in consequence rendered of much service. No less than four Regiments passed along this road between September and February, and the convenience of it may be imagined when I state that

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they all passed without difficulty, over places where 3 years ago, it took my own bandies 5 days to traverse 7 miles. Great credit is due to Lieutenant Magrath and the Road Maistry T. Raumiah, for their indefatigable perseverance in accomplishing the work, before the setting in of the heavy rains of the Monsoon. In the sum stated as the amount of the estimate, the bridges for the Toony and Anakapilly rivers are included, the latter of which has been treated as a separate work on account of its size. The former is only just commenced, and the remaining work required to the road will be finished this year. The traffic along this road has been taken at two places, one near Toony, the other at Anakapilly; at the former it averages about 60 Bandies, at the latter 140 Bandies, and 480 Bullocks daily, the latter place is 20 miles from the port of Vizagapatam.

Branch Roads.

From Vizagapatam to Vamoolavulsah.

Estimate Rupees 7,065-14-4; Cost Rupees 7,065-14-4

Supervised by the Principal Assistant Collector.

This is a most useful work connecting the town of Vizagapatam by a pass through the Hills which bound it on the north, with the Trunk Road, at a village called Vamoolavulsah, situated 4 miles south of the bridge over the Bimlipatam River, and thus with the road to Vizianagram. The estimate provided for rendering the present impassable places good, and bridging a few Nullahs leaving the 3 large Rivers requiring bridges to be estimated for at a future time. The opening of this Road has proved of the most essential service to the Town of Vizagapatam this year. It was with great difficulty that a bandy ever passed along this road, but since the repairs have been carried out, from 300 to 400 Bandies per day have been continually passing chiefly laden with grain and oil seeds from the north; an estimate has since been prepared for bridging the rivers and making such parts good as still require to be put in order. The first seven miles of this road was executed under the special superintendence of the Principal Assistant Collector, and the work was well and carefully performed.

New Road from Anakapilly to Vizagapatam.

Estimate Rupees 8,722-8-5; Cost Rupees 8,086-3-7

Superintended partly by Assistant Supervisor Robertson, Salary Rupees 75-0-0 and partly by Assistant Surveyor Georges, Salary Rupees 141-4-0.

This is a very important work, as the Town of Anakapilly lies nearly due west of the port of Vizagapatam, and is a depot for all kinds of grain and merchandize. The whole of the sum put down as expenditure was not actually for work performed, a great part of it having been advanced at the latter end of the year, to contractors who have only been able to finish their contracts during the present year. The road was of much service in the monsoon wherever it was completed. There is only one bridge of any size on this line, and that was not commenced until the present year.

GANJAM DISTRICT.

Road from Chicacole to Calingapatam.

Estimate Rupees 10,946-9-0; Expenditure Rupees 7,800-0-0

Supervised by Lieutenant Ross, Salary Rupees 190-0-0.

This is a communication of much importance, as it is a road leading direct to the port of Calingapatam, and along the last 4 miles of it especially a large amount of traffic is carried. From so few maramut works having hitherto been done in the Ganjam District, it has been more difficult to get work executed, as the people are new to the work; they are distrustful of being paid for their labour, and consequently unwilling to engage. Works therefore have not proceeded so rapidly here, as in Vizagapatam, and the road was therefore not completed by the end of the year, which I had hoped it would have been; the principal masonry works having been left till this season. The traffic into Calingapatam from statements I have had taken averages 150 Bandies daily. The remaining work will be finished this year, and when done, the road will be open to traffic between the two places without there being any serious obstacles. The estimate only provided for making the worst places passable, and bridging the worst Nullahs. It will be desirable hereafter to spend about 2 or 3,000 Rupees more in laying surface material on such parts as have not been included in the present estimate.

Repair of Road from Berhampore to Gopalpore.

Estimate Rupees 5,302-5-8; Expenditure Rupees 1,602-9-0

Superintended by Assistant Surveyor Walker, Salary Rupees 103-8-8.

These were necessary for completing the communication with the large Town of Berhampore and the shipping Port. The work has progressed more slowly than I had hoped from the same cause as that mentioned above. It will however be finished during the present season.

New Road from Berhampore to Russelcondah.

Estimate Rupees 1,42,246-0-0; Expenditure Rupees 3,771-8-7

Superintended by Assistant Surveyor Walker, Salary Rs. 103-8-8.

The sanction for this arrived too late to allow of much work being down before the end of the year; as but few work people could be obtained on account of their being required at their cultivation. I raised the rate of wages by $\frac{1}{3}$, which induced more people to come, than otherwise would have done so, but the Superintendents appointed to the charge of the road did not arrive till the beginning of the present year, so that work could only be carried on at one part at a time.

The total amount of work executed under the special superintendence of the Engineer Department in the Sub-Division during the past year was of

Occasional Works.....	Rupees 47,000
Ordinary do.....	„ 5,000
Expenditure in the Road Department.....	„ 25,700
	<u>Total 77,700</u>

The strength of the Establishment was as follows.

	Salaries.
1 1st Assistant Civil Engineer for 12 months.....	Rs. 3,407-13-5
1 2d Assistant do for 10 do ..	1,896-0-0
1 Assistant Revenue Surveyor.....	„ 1,667-0-0
1 Sub Assistant do.....	„ 1,536-8-0
1 Assistant Supervisor.....	„ 900-0-0
Office Establishment.....	„ 1,582-1-4
	<u>Total „ 10,989-6-9</u>

The manner in which the different Individuals were employed, was as follows.

My own time was fully occupied in visiting the different works in progress from one end of the division to the other, that is from Toony to Ganjam.

Lieutenant Ross for a short period accompanied me in order to learn his duties. I afterwards detached him to the Sub Collectorate of Ganjam, to look after the irrigation and road works there, and to examine fresh lines of road from Palcondah to the coast.

Assistant Surveyor Walker was employed in the inspection of ordinary works, the framing of estimates, the superintendence of the Gopal-

pore road, the survey of the lines from Kimeddy to the coast, and the completion of the Jail Hospital at Chicacole, and Beacon at Calingapatam until Lieutenant Ross joined.

Assistant Surveyor Georges was employed in superintending the execution of occasional and ordinary works in the Survasiddy Talook. The number of works inspected by Mr. Walker were 80, and the amount expended under his superintendence about 6,000 Rupees.

The number of works inspected by Mr. Georges were 283, and the amount of money spent under his superintendence was about 16,000 Rupees.

Assistant Supervisor Robertson was engaged first in completing the bridges at Chittivulsah, afterwards at the Anakapilly bridge, the branch road, and the Shadda Nuddee Anicut works. The amount spent under his superintendence was about 20,000 Rupees.

The present state of the division as regards the irrigation works is decidedly improved, both the amount of new works, and that spent in repairing the existing ones, having much increased over former years. The communications are also much improved especially in Vizagapatam, those in Ganjam are now in course of improvement, and after the money lately sanctioned for the employment of the people during the present year, shall have been laid out, the two districts will be tolerably accessible from the interior.

The Ganjam district still requires great attention to its irrigation works, for I have never yet had time to devote myself entirely to it, on account of the great distance I have to travel from one end to the other of the division, and the number of works under execution requiring constant inspection. Nothing has yet been attempted to the ports beyond the erection of a Beacon at Calingapatam, which has proved of much use to ships making the Port.

The total amount of money spent in the division during 1853, has much exceeded that spent in former years, and cannot but have had a beneficial effect. The amount which is being spent during the present year is still greater.

(Signed) F. H. RUNDALL, CAPTAIN,
Civil Engineer 9th Division.

Civil Engineer's Office, 9th Division, }
Camp at Waltair, 29th December 1854. }

Civil Engineer's Office, Godavery
Division, 21st November 1854.

FROM LIEUTENANT F. T. HAIG,
Acting Civil Engineer, Godavery Division,

TO THE SECRETARY TO THE BOARD OF REVENUE,
Department Public Works, Fort St. George.

SIR,

I have the honor to report in accordance with the Board's circular instructions, upon the important works executed in this Division in the year 1853, and upon the general progress made towards the completion of the Annicut project during that time.

2. In doing so it may be necessary for me to remind the Board, that from my having myself been employed during all the past year in a subordinate position, as an executive officer in charge of only a small part of the Delta, and having consequently had my attention confined almost exclusively to its concerns, I am in this respect to say nothing of other disqualifications, very unfavorably situated for the proper treating of my subject.

3. I shall however endeavor, to the best of my ability, to describe the operations of the year, and trace the history of the division as it advanced through another and very important stage of improvement.

4. The year was indeed in some respects a remarkable one, witnessing as it did one of those periodical failures of the rains which have hitherto been followed by famine or by great scarcity and distress whenever they have occurred; one which last year was so severely felt over the greater part of the Presidency, but which was destined to afford in this Division a striking proof of the value of the irrigation works which have been undertaken in it, and for ever to set at rest the question of their importance.

5. It is remarkable that as the peculiar benefits of irrigation were this year to be so strikingly manifested, and so urgently called for, so the works which confer them had by the commencement of the year reached such a stage of advancement, as enabled us within the required time to turn them most largely to account.

6. Many delays, some unavoidable, had interrupted the progress of the works, but by the close of 1852, it was so ordered that the heads of the main channels in each division of the Delta had all been opened, the last finishing touch had just been put to the Annicut, and the Aqueduct which connects the Naggaram Talook with the main land was ready waiting for the water to be sent over it. The heavy work was thus nearly done, though little more had been effected.

7. The only irrigation from the Annicut channels was that which had been carried on in the narrow strip of country under the Samulcottah channel, and in one insignificant part of that commanded by the Thooliah Bagah channel.

The rest of the Delta was still dependent as before on the local rains for its productiveness, and had only felt indirectly the benefit of the works which were being undertaken for its improvement.

8. In the *Western Delta* the Apparow or head of the main channel had been opened; the Nundamoor lock with its Calingulah at Chettypett had been built. The Kakarapurroo channel which carries the supply of water from the main trunk near Chettypett for about half the Delta, had been opened to a considerable size, and two important branches from it the Palecole and Yellamunchilly channels had been cut to a small section. The Peramella lock and Calingulah, the second set of important works on the principal line of navigation towards the Colair and Masulipatam, were partially built, and the channel called the Vinkiah Calwa leading to them from the Weyairoo had been in some degree improved.

A Calingulah at Mookamala was built, and its lock which connects the Kakarapurroo channel with the Nuckala and is intended as a link in a line of navigation to Narsapore, was also in progress. The Gosta Nuddy an important natural channel running southwards about half way between the Palecole channel and the Weyairoo through a very rich tract of country and already navigable throughout a portion of its length had been cleared and improved a little, and a lock of secondary dimensions built at its head.

9. Further to the Southwest in the widely extended plains that skirt the Colair lake, nothing had been done. That part of the country remained in its former state of neglect, alternately inundated by the floods that poured through it from the Godavery, the Kistnah and the hill Country, to the sea, and parched in the summer for want of a small portion of the water which overwhelmed it in the rains.

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10. The river embankment of this part of the Delta had been improved throughout a part of its length to near Yellamunchilly by the excavated earth of the bank channel being used for making up the old bank; but it remained generally in a very incomplete state.

11. In the *Central Delta*, the main channel, which conducts the water for the whole of this tract to where the three principal branches lead it off, had been opened to considerable section, though but to a small part of that which it must eventually have.

The Gorinkala a natural drainage channel into which the water was first thrown and which runs from near Rallee to Gunnarum, had been partially cleared and improved, and by it all the supplies of building and other materials sent from Dowlaiswaram for the Aqueduct had been conveyed. The Gunnarum or High level channel which conducts the water for the Nuggarum Talook to the Aqueduct had also been cut to a small size, and a small channel which has subsequently been greatly enlarged had been cut from the main channel near Oochilly towards the Eastern side of the Delta where it communicated with the Cowseca a large natural channel running down through the middle of this tract past Pullavella and Amlapoor to the Vynethaem Godavery.

12. The river embankment down the Western side of the Talook had been carried as far as 3 miles beyond Gunnarum, but was still in a very incomplete state. That on the East side of this Delta had scarcely been touched.

13. With the exception of one or two trifling branch channels, this was all that had been done in this part of the Central Delta.

14. In *Nuggarum* the main channel leading from the Aqueduct had been opened to a small section down to Nagoolunka, and from thence two branches to the Eastern and Western sides of the Talook were partially cut, as also one down the Centre towards Kuddaly.

15. In the *Eastern Delta* the Thooliah Bagah canal had been improved, and an additional lock built near Valagathodoo, but with the exception of a few small branch channels which watered the land near the Chintapilly lock no farther use had been made of it for irrigation. As a navigation canal it was of course of the highest value though still much in need of improvement. Parts of its course were tortuous, there were numerous shallows which necessitated the use of boats of only very light draught, and the towing path was untouched.

16. The Samulcottah canal had never yet had its originally small section enlarged to meet the increased requirements of the extend-

ing cultivation under its banks. It consequently only supplied water for about three-fourths of its length, and only about half of it was navigable for boats of light burden.

17. The only other channel that had been opened on this side of the river was the Cowlaiswaram or bank channel leading from the head sluice down the bank of the river as far as the village of Tatapoody. It had been cut to its full section but as it communicated at its lower end with only a small natural drain, water had once or twice been sent down it, and then only in small quantities.

18. Such was the state of the works at the close of 1852. The heavy work was, as I have said, mostly done, at least to a sufficient degree to enable us to turn all our available force to the work of distributing the water by subsidiary channels throughout the Delta.

19. The Anicut was finished, the covering of the last portion of it, the Muddoor branch, with cyclopean work, having been finished in the summer of 1852.

20. The iron posts for raising, by means of planks between them, the water to $2\frac{1}{2}$ feet above the crown of the Anicut had been partly cast, but none had been as yet fixed in their places.

21. The strength of the Department had been considerably augmented in the last half of 1852. At the opening of the year under review it consisted of:

- 1 The Civil Engineer.
- 10 Executive Officers.
- 10 Overseers and
- 3 Surveyors.

Besides the native maramut superintendent J. Achoota Naidoo, whose name must by all means be included as one of the most efficient and valuable members of the Department. Some of the Officers, and still more of the Overseers were rather inexperienced, but they were all turned to account.

22. The substitution of voluntary for forced labour had been introduced by Major Cotton towards the latter end of 1852. It was a most important and telling innovation upon the system that had hitherto been practiced.

23. Formerly coolies were always sent, a certain appointed number from each village, by the Amildar, under orders from the Officers in charge, to whatever works they were required for. The system commenced during the construction of the Anicut, much against the will

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of Colonel Cotton, who felt himself compelled to resort to it to secure a sufficient number of work people. It had been continued by the younger Officers when carrying on the subsidiary works long after even experience had shown that it might be dispensed with and a more wholesome system substituted. It was not till the close of 1852 that Major Cotton abandoned it, and ordered it to be discontinued throughout the works under the executive charge of the Engineer department.

24. The voluntary system once introduced, the people flocked in numbers to the works. In a few months the number of coolies employed amounted to 20,000.

25. The system followed was simply *to give advances* to all who asked for work, and when necessary to provide them with tools.

In one part of the Delta, that under my own charge, the advances were given too indiscriminately, and without a sufficient watch being kept on the amount of work performed by those who received them. The consequence has been that a good deal of money is still due from many who abused our liberality, and it is possible that we may not succeed in recovering the whole of it, though the greater portion has been already paid up.

This however, is a matter of very trifling importance compared with the great benefit that part of the district has derived from the rapid extension of the irrigation works, in consequence of the large numbers of people that were attracted by the large amounts of advances given.

26. I think the introduction of this system of voluntary labor especially worthy of record. It was indeed part of a complete and most beneficial change in the manner in which the works had up to that time been conducted, and to it is owing in great measure that we were enabled to command the great amount of labour required for the extraordinary exertions made that year to secure the crops endangered by the failure of the monsoon. The Engineer Department was from this time forward released from any dependence on or connexion with that of the Collector in the execution of the works. Supplies of materials were no longer procured through the Amaldars, but ready money was paid down at once to the ryots for whatever they were willing to dispose of at their own price.

27. The operations of the first half of the year consisted mainly in the extension of the irrigation channels dependent on the main or trunk lines, over the Delta. The central or Delta Proper, must however be excepted in this, the strength of the Department not being sufficient to enable the Civil Engineer to undertake more than a very

few trifling works of this class in it. The attention of the only European available for employment in it, the late Mr. Filler, having been wholly confined to the repairs of the Aqueduct and the improvement of the embankment on the Eastern side of this Delta.

28. In the eastern Delta, I had myself already, before the close of 1852, been placed along with Lieutenant Grove, and Overseers Eyles and Coles and Superintendent Shortt to carry out the subsidiary works dependent on the Cowlaiswaram or Bank channel for the irrigation of the Talook of Cota Rāmachendrapooram and part of that of Capavaram. By the middle of July the Coringa channel had been cut to some distance beyond Villah, and its main branch the Dracharam channel had been opened to a small section throughout the greater part of its length. The Yanam or Bank channel had been extended down near Koola and a number of branches from these channels had also been cut.

29. During the same time Mr. Overseer Smith had been engaged in extending the minor irrigating channels depending on the Samulcottah and Thooliah Bagah channels. The most important of these was one led off from the latter channel near Valagathodoo, and watering by these large branches all that part of the country between the Thooliah Bagah and the Cowlaiswaram channel which had not already been provided for by the works in progress under my own orders. The irrigation from the Vaindra sluice and its dependent channels had also been very largely extended so that the principal part of the country between the Thooliah Bagah, the Coringa channel and the Bay had more or less a supply of water.

To the north of the Thooliah Bagah, a branch from that channel near Thoospoody conducted the water to all that part of the country between it and the Samulcottah channel which had not yet been reached by it.

30. The Samulcottah channel had been enlarged considerably and now afforded water for a much more extended area than before.

Thus by the time when in consequence of the failure of the rains the crops all over those parts of the Eastern Delta which had hitherto not felt the benefit of the Anicut water, were in the greatest jeopardy, the channels had been extended through so considerable a portion of it that with few exceptions the water reached the crops in time to save them.

31. In the Western Delta the Oondy high level channel which carries water for about 200 square miles of the country bordering the Colair had been cut, and the Palcoole and Yellamunchilly (or bank) channels had been partially enlarged, and a large number of minor branches

from them opened. The Attilee channel, which waters the tract between the Pepparroo drain and the Gontairoo drainage channel, had also been cut to a small section. The Venkiah channel was finished; and from it a large body of water was thrown into the Weyairoo below Peranulla, to be turned to account for irrigation in the country bordering the Colair.

32. In the Rallee and Amlapoor Talooks little, as I have said, had been done, but in Nuggaram the channels had by the exertions of Mr. Rundall, been considerably extended.

An immense number of small branch channels too numerous to describe had also been cut in every part of the Eastern and Western Deltas and in Nuggarum.

Such, in general terms, was the progress made by the middle of the year when the greatest apprehensions, which were soon to be realised, began to be felt of a failure of the monsoon. The Civil Engineer now redoubled his exertions, to make the water from the Anicut available over the greatest possible extent of country. Additional branches to the channels were opened in every direction, however roughly, with or without levels as time and means would permit. All the old natural drainage channels had water thrown into them; and then by damming them at proper places, they were used for irrigating the land on their banks.

In Woondy especially this rough and ready means of spreading the water over the land was most fully and successfully carried out, the extremely level nature of the ground favoring its application.

33. In the Cota Ramachendrapooram Talook so urgent was the demand for water, that we were compelled instead of waiting to open minor branches, to cut the banks of the trunk lines and flood the country in every direction. A high fresh in the Godavery coming about the same time was the means of preserving a great extent of crop in the central Delta and in those parts of the other Deltas where the Anicut water was not available.

34. The land under the Samulcottah channel independent as before of the rains, had its usual fine crops of transplanted paddy; and ~~generally~~ wherever the water had reached, the dry rice crops, now irrigated for the first time much against all the prejudices of the ryots who would not hear of it before, yielded returns very decidedly above the average.

35. In the Oondy Talook and the country round the Colair Lake, such crops had scarcely ever been seen before. The details given me by the Collector of Masulipatam of the profits made by some of

the villages in that part of the Delta, shew that they must have been very great. In some instances the Sist did not amount to more than $\frac{1}{8}$ th or $\frac{1}{10}$ th of the estimated value of the crop.

36. And this was not all. The second crops were every where remarkably fine. As the branch channels extended, the ryots in those parts of the Delta which had lost the first crop were enabled with the help of the water to raise a second and most productive one. The Dalwa cultivation was never so largely undertaken before. The people roused to a full appreciation of the value of the water, and stimulated by the hope of great profits from the greatly increased prices of grain consequent on the scarcity in the surrounding Districts, exerted themselves to improve their own advantages to the utmost. In the Central Delta, by damming up the Cowseca channel in several places, the water was raised to the surface of large tracts of land in the Amlapoor Talook, and great quantities of the Gingely oil plant grown. Of this most valuable product indeed there was probably never so large a quantity raised before in the District.

37. The result altogether of this rapid extension of the irrigation works during the first half of the year, and the consequent application of the water to the soil over so large a portion of the Delta, was that the year was one of plenty; the out-turn of the crops generally being decidedly above that of average years; and considering how remarkably prepared the works generally had been to meet this extraordinary crisis, how they had just reached, in spite of many hindrances, a sufficient stage of progress to enable us to extend within so short a time the benefits or rather in this instance the blessings of irrigation over so large a portion of the Delta, it would be shameful indeed not to acknowledge with humble thankfulness the gracious over-ruling providence of God in the matter.

38. Widely contrasted with the general prosperity of the Delta was the state of things in the Talooks above the reach of the Anicut. The multiplied engagements of the Officers of the Department prevented any of them visiting this part of the country. But the loss of crops and cattle was very great, and the check to the gradually increasing prosperity of even that part of the District severely felt.

39. Varying estimates have been formed of the actual value of property saved in the Delta by the Anicut works this year. Nothing more than a mere approximation to the truth can of course be hoped for.

10 2

The Commissioner who visited the District in the summer, estimated the saving at (I think) 28 lacs. Mr. Taylor the Sub-Collector with better means of judging, thought the value of the crop saved not less than 36 lacs, but reckons that the total saving must exceed 50 lacs. Major Cotton considers both estimates as too low. I have not myself been able to go into the matter sufficiently to express an opinion. I know however, that my own estimate of the saving of property in the Cota Ramachendrapooram talook was considerably over that admitted by the Civil Authorities.

40. During the latter half of the year the works were gradually extended. At its close the progress made was as follows;

1. In the Eastern Delta,

The Samulcottah channel had been widened to a width of 14 yards at its lower end, and 25 yards at the water line at its head though there still remained parts of it unfinished.

41. The Thooliah Bagah had been much improved. The towing path was completed all along it. One or two bends had been cut off, and the navigation was open for a boat of increased burthen.

Returns of the traffic through the different locks were kept; that at Dowlaiswaram shewed a total for the year of 1853 boats of 18,000 tons of cargo valued at Rupees 6,60,000. At the other locks a record merely of the number of boats passing was kept, as it had been found that the lockmen made use of the authority formerly given them to inquire into the size, tonnage, cargo, destination &c. of the boats, to delay them in their passage, and even, as was suspected, to levy tolls. There is consequently no means of estimating the total traffic on this line, but it probably was not less than 22,000 tons.

42. The boats used are still principally the rude native Dhonies, in every way ill adapted for canal navigation. It must however be admitted, that in the present incomplete state of this canal, proper canal boats could only be worked during a part of the year. In the summer the water is so shoal in some parts of the line between the Valagathodoo and Chintapilly locks that even boats of light burden ground at times. Until another lock is built at Chintapilly this serious imperfection will not be remedied.

Boats of very large size belonging to the Anicut works, and to Messrs. Arbuthnot's Sugar factory, are however worked on this line to advantage, though at times with very light loads.

43. The average tonnage of the boats now plying in this canal may be taken at 15 tons.

The price paid for the conveyance of bulky goods by them is still as high as 5 to 6 pice per ton per mile. This however is a Monopoly charge mostly owing to the scarcity of boats. It includes also the compensation for loss by detention in loading and unloading, which in the case of grain, which constitutes the bulk of the cargoes, is considerable. We have at the present time as many as 120 of these common rude Dhonies carrying stone for us by contract for 3 pice per ton per mile, including all charges; and during the year under review there were about 80 of them working for us on the same terms. The profits even at this rate are considerable.

44. The irrigation channels subsidiary to the Thooliah Bagah on the south side had also been largely increased in number. The Valagathodoo or Mundapett branch with its 3 principal branches had rendered essential service during the drought and was altogether in length about 25 miles. In addition to this a number of new channels had been opened near Chintapilly and some at Covoer.

The towns of Cocanada and Jagornaikpooram whose tanks were all quite dry by the middle of summer had been supplied with fresh water for domestic purposes from the Covoer lock by means of a temporary wooden aqueduct across the Robertson Calva.

On the north side of the channel the Thoospoodee branch had been cut, and in connexion with it numerous smaller channels opened so that the country between the Samulcottah and Thooliah Bagah channels, was now well provided for. The head of the Thooliah Bagah from Vama-geery for some miles down had been enlarged considerably to carry the additional water required for the channels dependent on it newly opened this year.

45. The Coringa canal had been cut from Alamoer to several miles beyond Vellah, a length altogether of about 20 miles, to nearly its full section.

The lock and Calingulah at Alamoer were built.

The Nalloor and Kaulairoo Aqueducts which carry the canal over two important drains were finished with the exception of the towing path.

That at Vellah was in progress, branch channels at 5 or 6 points had been cut.

10 8

46. The Injeram channel (the principal branch of the Coringa canal) had been cut to a section of from 6 to 8 square yards as far as Oppoonvillee about 11 miles.

The Yanam branch channel was opened down to near Muskapilly and supplied several newly cut minor branches.

These branch channels of moderate size had been cut from the Cowlaiswaram or bank channel, to water the land between it and the main drain.

The Drainage of all this side of the river had also been considerably improved.

A lock and two Calingulahs had been built near Cowlaiswaram at the head of the Yanam branch channel.

No sluices had yet been built to the heads of any of the newly opened branch channels.

47. In the Central Delta the main channel had been widened a little to supply the water required for the increased extent of irrigation channels in Nuggaram.

The Aqueduct which had sustained serious damage in the floods of this year, had been repaired; 2 arches were rebuilt and the flooring partly strengthened.

The river embankment down the West side of the Talook had been made up to its full size as far as the village of Tanalunka and in some places even below that, and the irrigation channel for that side of the central Delta formed by the excavation for the embankment.

Some small branches had been opened in the south part of the Amlapoor Talook in connexion with the Cowseca channel.

The irrigation under the Gunnaram or Bank channel leading to the Aqueduct was much extended this year.

48. In Nuggaram the river embankment down the West side of the ~~Talook~~ was much improved and strengthened and that on the West made up for 5 or 6 miles in length to a considerable section.

The Razole, Kuddaly and Manapilly channels had been improved and numerous small branches from them opened.

The drainage had also been attended to and considerable improvements to it effected.

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GODAVERY DIVISION.

53

A large increase in the sugar cultivation had followed the introduction of water from the Anicut to this Talook. The water was first admitted the first week in January. I am sorry I am unable to give any details regarding the actual increase in the extent of sugar cane planted this year. Some inquiries made by Mr. Randall shewed that the number of sugar plantations had increased nearly fourfold since the commencement of the year, but subsequently some doubt has been thrown upon the correctness of this result.

49. In the Western Delta.

The Peramulla lock and Calingulah had been finished.

The Mookamala lock was built.

The Palcole and Yellamunchilly channels were improved, and a very large number of branches in connexion with them opened.

The Uttelae branch channel was opened and also the Vailpoor branch from the Gosta Nuddy.

The Oondy High level channel had been cut. This channel had rendered more essential service than any other carrying water as it does for so large a tract of country 200 square miles and supplying a number of natural channels which were all turned to use for irrigation. It had numerous branches.

50. The drainage of the low country surrounding the Colair had been commenced and some very important works in connexion with it were this year either completed or well advanced.

The Pippurroo drain was opened and bunded on either side down to the low country South of Gollalakodaroc.

The Ooppootair near Akeed had been bunded on each side down to near Calchindy and the cut direct from the corner of it then to the salt swamps near Buntromilly had been commenced. A direct cut across a very tortuous part of the Ooppootair from Chinakapavaram to Yailloopad had been opened by Lieutenant Goddard, and much use made of it in the summer for irrigation.

51. The Kakavapurroo channel which carries water for the Palcole and Yellamunchilly channels had been enlarged to meet the increased demands on it as had also the head of the main or Apparow channel from Vezaiswaram towards Chettypett.

The river embankment down to near Yellamunchilly had been strengthened.

52. Some small improvements had been effected in the Coringa bar when the Paumbam dredge worked for about two months in the latter part of the year with advantage.

To the mouth of the Coringa river I regret to say very little had been done. The other important works in progress prevented our sending down more than 963 tons of stone for this work.

53. The Anicut required some small repairs, and the cut stone covering was in a few places renewed where the old stone had been too soft to withstand the abrasive effect of the sand passing over its surface in the freshes.

The iron posts along it had been completed throughout its whole length, but for want of a sufficient quantity of planking stone and earthen dams were mostly used to keep the water up to the proper height above the surface of the Anicut.

54. The Workshops and Foundry at Dowaiswaram—had ample work during the year 1853.

Besides the current repairs to steamers, Boats, railways, kilns, locks, sluices, tools, &c. &c.—the work performed consisted chiefly of a small steamer with Engines for the Godavery Expedition—several sets of lock gates made and fitted—sluice shutters for the anicut and other works—numerous Ferry Boats for the Rajahmundry and Masulipatam Districts. Three Iron and several wooden boats added to the working flotilla 60 or 70 tons of railway wheels and other work for Bezvara. A main shaft for the steamer *Hugh Lindsay*, a large hand dredge for the district, a steam boiling engine, and a vast quantity of smaller work of nearly every description from castings of two or more tons to repair of Geneva watches including repair and adjustment of the levelling and other instruments of the department.

Also a great quantity of iron castings of all sorts for the sugar factories, shipping, dock yards—and individuals including the iron posts for the Anicut and some of the calingulabs.

55. I have thus sketched the general operations of the year and the result. The expenditure during this time reached a higher amount than it had ever attained before. The increased efficiency of the executive part of the department and the extraordinary call upon it in consequence of the failure of the monsoon account for this.

56. The distinguishing characteristic of this year's operations in contrast with those of preceding years, was the execution of a vast number of minor and subsidiary works for the extension of the Anicut

water throughout the length and breadth of the Delta, instead of, as formerly, the concentration of all our force upon the large and heavy works near the Anicut.

57. As I have already, in my letter accompanying the budget for this division for the year 1854-55, alluded to what appear to me to be at present the chief wants of the district in an Engineering point of view I need not do more than briefly notice them in this place.

The Anicut, the aqueduct, and the heavy works, such as opening the heads of the main channels, are all done. The water has now reached nearly every part of the Delta; so that but little comparatively speaking is still required to complete the system of irrigation. But our communications are still most imperfect. We have but one canal navigable for boats of any considerable burthen all the year round, and several of the principal lines of canal—those to Tenney, Ellore and Masulipatam amongst the number, have not yet been commenced. What we now want is the completion of our communications—the improvement and perfection of what we already possess and their extension.

58. The irrigation also has yet to be systematized. With the exception of the Samulcottah and Thooliah Bagah channels which have now been for two years under the supervision of Mr. Overseer Smith and where there is a proper methodical distribution of the water by means of sluices, the channels are mostly without sluices, other than temporary palmira spouts and for the most part every village takes just as much water as it wants, or thinks fit to waste, without regard to its neighbours.

59. The establishment for the proper conservancy of the works also needs better organization. At present the destruction of the banks of the smaller channels by cattle trampling them down and by dams thrown up whenever any particular ryot chooses for the purpose of raising the water to the level of his patch of land, to the certain ruin of the banks above and flooding of the country, is very great, and involves a considerable annual outlay for repairs which when a proper system of supervision has been introduced will not be necessary.

60. With regard to the state of the Engineer Department in this Division, I would mention that it appears to me extremely desirable that the European Overseers and Superintendents should be required to pass some such examination in the native languages as is insisted upon in the case of the Officers. The same degree of attainment need not be required of them, but I see more and more how important it is

that they should be made to acquire sufficient knowledge of the language colloquially to enable them to conduct all their ordinary business with the natives without an interpreter. At present there are not more than one or two that can do so, although many have been long enough in the district to have made themselves well acquainted with Teloo goo if they had tried. It is true that men of this class enter upon the study of a foreign language at a great disadvantage compared with educated men who have already learnt something of the structure of languages generally, and had their faculties trained in the acquisition of one or more of them. But the method of learning Teloo goo which Colonel Cotton introduced and which was followed in great measure by myself and one or two more of the officers, is especially adopted to uneducated men. It is so extremely simple that the most untutored intellect could find no difficulty in acquiring the *colloquial* use of any language by its means, if only application and the desire to learn be present. The mental powers are in fact never once taxed, or not *perceptibly* so, by this method. A language is learnt by it entirely by the tongue and by the ear. It is of all methods the most monotonous and trying to the patience, but for the purpose of acquiring the fluent use of any language colloquially, there is no other to be compared to it.

61. A certain standard of attainment, somewhat below that required of the officers of the department, might be fixed, and a certain time allowed within which Overseers and Superintendents should be expected to pass the required examination; and their promotion might even be made to depend in some measure upon the degree of proficiency attained, though there would be need for much more discrimination and much larger room for exception, in this respect, in their case than with officers.

62. At present almost every one of our Subordinate Europeans is, as I have said, quite ignorant of the language, and more or less at the mercy of *any intriguing native* who will take advantage of this when interpreting or writing Teloo goo letters for his master's signature, either to misrepresent for his own private purposes, or as is frequently the case to insult the native Revenue authorities by the style of his address. We have had frequent instances of this, and I believe that not a little of the ill-feeling, now happily somewhat mitigated, which so long subsisted between the two departments was to be traced to this cause.

63. I will now notice in detail a few of the most important works executed during this year.

The Vizaswaram Lock.

The Board have already been made acquainted with the cause for the re-building of this work.

The present lock was commenced in the month of February by Captain A. McNeill with Overseers Bevan and Hirst under his orders.

The length of its chamber was made 150 feet being 50 more than that of the other locks. This alteration in the original plan was made in order to admit Steamers of greater length than can enter the other locks, this lock being in fact in the line of the coast canal of this side of India, and requiring therefore to have its dimensions uniform with those proposed for other similar works on that line.

The Estimate was Rupees 17,876-5-0 but the actual cost has been Rupees 32,900-5-6. The cause of the excess has been explained by Major Cotton in his letter dated 26th October 1853. The work is completed and no further expenditure on it will be required.

Fixing posts on the Annicut.

Estimate.....	Rupees 22,362-4-8
Total Expenditure.....	22,077-11-6
Balance of Estimate.....	284-9-2

The expenditure on this work during the year 1853 was Rupees 8,062-3-0. About half the posts were cast in the preceding year and the remainder during the first half of that under view. The whole of the posts were also fixed during this year under the superintendence of the Manager V. Veeranah.

They were placed at 10 feet apart on 3 of the annicuts, and at 8 feet on the 4th. Sufficient Teak wood not being procurable the planks were made nearly all of Marjatee wood. The total number required was 1,181, of which 637 were made in 1853. The remainder have not since been prepared. Those already made are turning out very badly, and will evidently have to be replaced very shortly.

Peramilla Lock and Calingalah.

Estimate Rupees 9,117-5-5; Expenditure Rupees 31,082-3-3

This is the second work on the main line of navigation towards the Colair and Masulipatani. It was commenced by Lieutenant Goddard on the 1st April 1852, and by the beginning of July the foundations were built up to about 3 feet high. The breach in the Head sluice at Vizaswaram which flooded so large an extent of that side of the Delta

and which took place in this month greatly increased the expense of baling in consequence of the greatly increased springing of the water through the bottom of the excavation. It also delayed the progress of the building greatly. The baling in this way amounted to 3,000 Rupees. The quantity of masonry also exceeded that allowed for in the estimate.

The work was completed in the beginning of February 1853.—Overseers Smith and Olive were employed on this work under Lieutenant Goddard.

Mookamala Lock.

Estimate Rupees 5,640-2-11; Total Expenditure Rupees 10,876-14-8, of which 5,267-8-2 were expended in 1853. This work is built at the head of the Nukala channel which it connects with the Kakarapurroo channel. The lift is 10 feet. It was built by Lieutenant Fisher, who began it in April 1852 and finished it in March 1853. The estimate was framed on the original model, but like those for all the other locks it has been exceeded. The cost of baling was heavy.

Attilee Channel.

Estimate Rupees 9,334-2-0; Total Expenditure Rupees 3,777-12-3

This channel was cut to a section of 9 square yards for a length of 17 miles by Lieutenant Goddard in the year 1853. It branches from the Weyairoo a short distance above the Nundamoor lock, and carries water for the tract of country between the Gosta Nuddy and the Pipparroo Drain, in area 90 miles or 45,000 acres. It has a fall of 1 foot per mile, and an average section of 9 square yards. It will require to be considerably enlarged, but I am not at present prepared to say to what extent or at what cost. Owing to a defect in the levels taken in determining the line, this channel has not hitherto been of much use. I have not yet been able to examine it and see what is required to make it efficient.

Gostah Nuddy Lock.

Estimate Rupees 2,064-3-6; Expenditure Rupees 1,805-2-2

This lock was built under the superintendence of Lieutenant Goddard at the head of the Gostah Nuddy which it connects with the Kakarapurroo channel. It is intended to form one link in a line of communication by the Gosta Nuddy, an old drainage channel which passes through a very rich tract of country about half way between the Palcode and Weyairoo channels; the chamber of the lock is only 60 feet in length and 12 feet in width, being intended merely for the passage of boats of

a smaller size than those used on the main lines of Canal. When the accounts were adjusted in the present year it was found that a further sum of Rupees 1,500 was chargeable to this work; its total cost was therefore 3,861-18-0. The work was built in the month of December.

Gunnaram Aqueduct.

Expenditure Rupees 159,765-14-0

The work done consisted of repairs to the side walls where they had been damaged by the freshes, and strengthening the flooring under the arches and the loose stone apron, besides regulating the river bed below the work by means of groins. About half the expenditure was incurred for repairs of the flooring and enlarging the loose stone apron. The work was executed under the superintendence of the late Mr. Filler. About 2,000 Rupees were expended on embankments, in an attempt to complete the flooring under 11 of the arches which had been left in an unfinished state at the close of the first working season, but as the work was begun too late in the season and the leakage through the sand embankments was too great to be kept down by baling sufficiently to warrant our risking the exposure of the fresh masonry flow which was to have been laid to the danger of being soaked and destroyed by the salt water, the attempt was abandoned. Mr. Filler had only native superintendence under him. The expenditure was distributed over the whole year, but the most part of it was incurred in the months of April, May and June.

Thoospoodee Branch Channel.

Estimate Rupees 12,625-0-0; Expenditure Rupees 17,119-9-7

The expenditure though charged to this channel was incurred for widening the Samulcottah Canal, it having been determined that it was more advisable to water the ground which the Thoospoodee branch of the Thooliah Bagah was to have irrigated from the Samulcottah channel.

The work was executed under the orders of Mr. Smith. It was completed just in time to supply water for the main crop of about 15 villages. Thus enlarged the Samulcottah Canal carried water for about 16,000 acres.

Thooliah Bagah South Branch Channel.

Estimate Rupees 6,737-0-0; Expenditure Rupees 7,657-4-6

This channel branches from the Thooliah Bagah near Valagathodoo, and terminates about a mile north of the town of Mondapett. It then divides into three branches which with their subsidiary branches water

all the land to the south of the Thooliah Bogah channel which is not reached by the channels dependent on the branch channel—area about 20,000 acres. All these channels have to be enlarged. They were however completed in time to give water to a very large extent of crop which without their help would have perished. They were cut by Mr. Overseer Smith.

Widening head of Thooliah Bogah from Kemagery to Anaparty.

This work was also executed under the superintendence of Mr. Smith. An additional water section of 7 square yards was given to the channel to enable it to meet in some measure the demands on it from the newly opened branches just described. The total excavation was about 140,000 cubic yards.

This channel will require to be still more enlarged.

Coringa Channel.

Estimate Rupees 32,270-0-0

Expenditure 21,179-13-5 of which Rupees 17,504-8-5 was spent in 1853. This canal branches from the Cowlaishwarum or Bank channel at Alamoor, just below the lock constructed at that place. It has been cut, where the water is below the level of the ground to a width of 9 yards at bottom with slopes of $1\frac{1}{2}$ to 1, and has a fall of 6" per mile for the first 8 miles, 3" per mile for the next 5 miles and $1\frac{1}{2}$ " per mile for the last 9.

It has a second lock at Vellah, and the lock at Munjar completes the communication with the river at Coringa.

The Cowlaishwarum channel which is now included in the general term Coringa channel has a fall of 4" per mile as far as Alamoor.

This is one of the most important lines yet opened. It is still in progress and will probably not be open for navigation throughout its whole length until the end of 1854.

An additional low lift lock and Calingulah will be required near the village of Kadepoolunka, about 4 miles from the head of this canal to complete the line.

Alamoor Lock.

Estimate Rupees 6,000-0-0; Expenditure Rupees 9,826-4-3.

This lock is the first on the Coringa canal. It has a drop of 9 feet and was constructed under my own superintendence assisted by Mr. Eyles. Like all the locks its cost has far exceeded that estimated for, but it was a cheap work, and was built by Mr. Eyles with great care.

Alamoor Calingulah.

Estimate.....Rupees 1,654-12-1

Total Expenditure.....,, 3,668-10-1

Expenditure in 1853,.....,, 2,013-14-0

Commenced under the superintendence of Mr. Eyles in December 1852, and finished in February 1853.

The whole of the works included in the Estimate amounting to Rupees 1,76,074-1-10, of which this forms a part have been altered in plan from what was contemplated in the estimate. There was no distinct estimate for this work; the expenditure on it was therefore charged to the estimate for a Calingulah at Takee.

It has a waterway of 10 yards in clear width and discharges water for 140 square miles, some slight repairs are required for the cut stone apron, one of the stones in which has been shaken out of its place.

Nalloor Aqueduct.

Estimate Rupees 1,644-2-9; Expenditure Rupees 5,235-6-4

The expenditure has been incurred entirely in the year 1853.

This work was commenced by Mr. Grove in the month of February and finished in April. It has a width of waterway of 9 yards and a depth of 6 feet. It conducts the water of the Coringa Canal by 5 arches of 9' wide each over the main drain of this part of the country. The towing path has yet to be made. It is intended to build it on top of the side walls by widening them by a sort of cornice carrying a railing at each side.

The baling was heavy and expensive. The estimate was for a work of totally different dimensions and allowed for a much smaller quantity of masonry than the work actually contains.

This work has been exposed to a considerable trial but has stood without a crack which is the more remarkable, as its foundations are only 3 feet deep below the level of the flooring under the arches, and consist of loose rough stone laid on a mud bottom and filled in with sand.

Calairoo Aqueduct.

Estimate Rupees 1,600-0-0; Expenditure Rupees 2,967-6-9

This work which has the same waterway above as the last and answers a similar purpose, though built over a smaller drain and consequently having only three arches was commenced by Lieutenant Grove

in April and finished in July 1853. It still wants the towing paths. The estimate for it proved insufficient for a similar reason as in the case of the Nulloor Aqueduct.

Injeeram Channel.

Estimate Rupees 13,508-5-4; Expenditure Rupees 8,738-7-10

This channel branches from the Coringa Canal near Chelloor and is in length 11 miles. It carries water for a tract of country of 20,000 acres. Its fall is at present 10" per mile, but it is intended to reduce this by a Calingulah near its lower extremity to about 6" per mile. It was commenced by Lieutenant Grove in the latter end of May and was in progress for some months from that time, though about 9 miles of it were open for the water in the latter end of August. Its section is from 5 to 7 square yards—and it is even in its present state navigable for small boats.

Cowlaiswaram Lock and Calingulah.

Expenditure.....Rupees 1,949-3-9

There was no estimate for this lock, an item of 1,100 Rupees was allowed in the original estimate for a Calingulah at Cowlaiswaram, and the expenditure has been charged to it. The lock is built at the head of the Injeeram branch channel.

It is one of a kind first introduced by Colonel Cotton, and exceedingly well adapted for low lifts where the supply of water is unlimited and waste by lockage is of no consequence.

There are only about 100 cubic yards of masonry in it. The gates are placed in two cross walls at each end of the lock, and the sides and bottom of the chamber faced with rough stone packed. There is no side passage, but the gates are furnished with as many as 6 shutters in each pair and the time required to fill and empty the lock is in this way very small.

A lock of the dimensions of these, viz. with a chamber 100' long by 15' wide at bottom and a lift of 5 feet may be built for about 1,800 Rupees. Some alterations will be required, a mistake having been made in the width allowed between the buttresses immediately below the upper gates. These will require to be reduced a little in thickness by the chisel.

The lock was built under the superintendence of Mr. Eyles. It was commenced in the latter end of May and finished in July. The Calingulah is also of a very simple pattern, consisting merely of a cross

wall about 2 feet thick prolonged into the banks to form wing walls, and having an apron of large rough stone carefully packed.

The total cost of this lock and Calingulah (the latter having 5 square yards of waterway) has been 2,257-7-0. It was built at a time when rain hindered the work and made baling expensive and is rather an expensive one than otherwise.

Vellah Lock and Calingulah.

Estimate Rupees 13,090-0-8; Expenditure Rupees 7,793-14-1

This work was commenced by Lieutenant Grove in July 1853. It is situated on the Coringa channel, being the next in order to the Alanoor lock, and about the same in dimensions. The Calingulah has 6 square yards of waterway. The cost of the excavation was greatly increased by the difficulty of procuring coolies for it. This extended the time occupied in finishing it to about double what was necessary and the baling consequently was proportionately expensive. By the end of the year these two works were about half built. The estimate has been exceeded principally through the heavy cost of the excavation and baling.

Embankment of Ooppotair, &c.

The object of this work is to increase the capacity of the Ooppotair to enable it to carry off the large quantity of drainage that throw into it from the Colair and the upper country. It is intended to carry the water above ground in great measure, and for this purpose the banks are thrown at a distance of 200 yards apart. It was begun by Lieutenant Goddard in May 1853, and partially completed by the month of July. A good deal still remains to be done to complete it.

Raising and strengthening the embankment of the Vizaiswaram branch of the Godavery from Bobberlunka to Gunnarum.

Estimate Rupees 11,705-11-3; Expenditure Rupees 10,094-9-1

This work was executed under the superintendence of the late Mr. Overseer Filler, whose death in the latter end of the year was felt as so severe a loss to the department. The bank has been put in a very tolerable state of repair, but will require considerable additions especially in the lower part of this Delta. From 3 miles below Gunnarum down to the sea there is as yet no embankment whatever.

Improving eastern embankment of the Central Delta from Bobberlunka to Kothalunka.

Estimate Rupees 24,101-15-5; Expenditure Rupees 14,801-5-2

This work was also executed under Mr. Filler's superintendence.

By the end of the year the embankment was complete to a large section nearly the whole way from Yanoogamal to Kothahanka, the earth excavated in forming the bank channel being thrown on to the bank. From Yanoogamal up to Bobberhunka a good deal yet remains to be done to the embankment. The encroachments of the river at a few points have also to be guarded against by means of groins.

Erecting groins on the left bank of the Dowlaiswaram branch of the Godavery at Kolla and Veeravillepalem.

Estimate Rupees 6,206-9-0; Expenditure Rupees 6,306-12-9

In the year 1852, the set of the current of the river during the freshes, upon the river bank at Koolla was so great that about 500 yards of the main land was swept away and with it about 1 mile in length of the old embankment. The groins made in the year 1853, were thrown out for the purpose of protecting the bank against any further encroachments. They consisted principally of palmira trees placed up right in rows projecting out into the river for a distance of about 30 yards protected at bottom by a pile of loose stone thrown round their butts.

They have stood very well, and have been of great use in protecting the bank.

Mr. Eyles superintended their construction.

Improving the Port of Cocanada.

Estimate Rupees 17,887-13-4; Expenditure Rupees 4,610-0-0

Sanction was received for this work in the month of July. Up to the end of December only 1,583 tons of stone had been sent from Dowlaiswaram for carrying out groins into the sea at the mouth of the Cocanada river. I regret I cannot report any decided improvement in the state of the entrance to the river. A considerable portion of the expenditure is for a large dredge to be worked by human power for deepening the water on the Coringa bar.

Repairs of the Anicut.

These amounted this year altogether to Rupees 15,974-15-0. They were of the usual nature, replacing some parts of the cut stone covering and making up the loose stone apron wherever it had been at all disturbed during the season of the freshes. The work was executed under the superintendence of the manager V. Veerannah.

Repairing river embankment of the Eastern Delta from Tatapoody to Kota.

This work was superintended by Mr. Eyles. The bank was considerably enlarged and improved throughout its whole length. At Koolla,

a new bank about 2 miles in length was made round the breach made in the preceding year by the freshes. The embankment requires extension from Kota towards the sea.

There are a few more works of importance, but they do not require particular notice.

One or two of the officers employed on important works during the year under review having since left the division, I find it impossible to give as full details for each work as I should wish, regarding all the points on which the Board require information.

With respect to para 4 of your letter dated 16th ultimo, desiring that to every important work reported upon, the names of the Officers and their subordinates employed thereupon should be appended; it is necessary that I should explain that in the statement herewith forwarded, I have included a column which shews in the case of each work only the amount of the salaries of the Officers and their European subordinates for the time the work was in progress. This appears to me to be all that is necessary, if, as I suppose, the object is to ascertain the cost of European superintendence in the execution of our works.

I have the honor to be, &c.

F. HAIG, LIEUTENANT,
Acting Civil Engineer Godavery Division.

Rajahmundry District,
Camp at Dowlaiswaram,
21st November 1854.)

Statement shewing the amount of Expenditure on Public Works dur

Years	Irrigation works.			For constructing and repairing Revenue Buildings.	For constructing and repairing Boats.	For constructing and repairing Judicial Buildings.	For constructing and repairing Travellers Bungalows.
	Amount of actual expenditure.	Amount advanced for the works in progress.	Total.				
1844.	29,449 15 3	0 0 0	29,449 15 3	328 10 10	1,797 3 5	1,163 1 2	68 12 5
1845.	36,182 14 7	0 0 0	36,182 14 7	314 2 8	1,956 3 4	136 10 3	52 8 10
1846.	54,068 2 6	0 0 0	54,068 2 6	102 10 2	1,578 3 0	103 7 4	803 14 8
1847.	4,41,241 8 2	7,419 0 0	4,48,660 8 2	73 11 11	20 3 0	40 10 0	55 14 11
1848.	1,59,579 5 8	30,890 0 0	1,90,469 5 8	65 14 10	0 0 0	465 1 5	1,335 13 8
1849.	2,00,988 2 5	4,966 2 0	2,05,954 4 5	873 10 10	2,098 0 3	970 2 9	224 3 10
1850.	2,43,405 15 4	54,994 0 0	2,98,399 15 4	848 0 1	498 1 2	130 4 0	69 6 1
1851.	1,36,677 8 6	1,12,280 0 4	2,48,957 8 10	41 11 1	1,027 8 0	133 14 8	44 10 4
1852.	4,38,500 9 2	0 0 0	4,38,500 9 2	0 0 0	341 13 3	161 13 0	0 0 0
1853.	5,18,517 2 9	0 0 0	5,18,517 2 9	1,946 14 6	4,285 5 5	1,276 5 5	292 1 11
Total	22,58,611 4 4	2,10,549 2 4	24,69,160 6 8	4,595 6 11	13,542 8 10	4,381 6 0	2,947 6 8

Rajahmundry District,
Camp at Dowlaishwaram,
21st November 1854.

ing the past 10 years from 1844 to 1853 in the Godavery Division.

For repairing Salt Pans.	For making and repairing Roads.	For constructing and repairing Marine Buildings.	For constructing and repairing Ecclesiastical Buildings.	Expenditure for the Godavery Exploration.	For erecting Groins to River Bank.	For improving Ports.	Cost of the Civil Engineer's Establishment.	Civil Engineer's Department Establishment.			
								Officers.	Surveyors.	Overseers.	Maistries.
0 0 0	300 10 9	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	17,223 14 0	2	3	0	2
0 0 0	894 13 0	82 14 6	0 0 0	0 0 0	0 0 0	0 0 0	20,858 0 0	2	3	0	2
0 0 0	3,206 1 11	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	26,309 6 0	4	4	0	4
0 0 0	11,485 15 5	1,493 0 0	0 80 14 8	0 0 0	0 0 0	0 0 0	33,113 12 6	8	4	6	8
0 0 0	3,349 15 11	1,032 3 7	0 0 0	0 0 0	0 0 0	0 0 0	42,635 3 0	8	5	7	8
0 0 0	6,092 13 2	1,199 0 9	0 0 0	0 0 0	0 0 0	0 0 0	37,336 5 11	6	2	9	6
701 12 4	260 8 10	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	39,553 4 8	9	3	10	9
0 0 0	165 3 5	26 8 4	16 3 4	0 0 0	0 0 0	0 0 0	46,471 4 4	7	4	6	7
0 0 0	0 0 0	761 4 19	0 0 0	0 0 0	0 0 0	0 0 0	48,839 8 0	11	4	4	11
0 0 0	3,555 0 0	962 4 2	0 0 0	3,232 2 8	7,579 14 3	3,487 3 9	56,816 9 3	11	3	10	11
701 12 4	29,312 12 5	5,562 4 2	297 8 0	3,232 2 8	7,579 14 3	3,487 3 9	3,75,359 3 8				

F. HARG, LIENT.

Acting Civil Engineer, Godavery Division.

List of Important Works executed during

District.	Talook.	Name of Work.	Amount expended during the year 1853.			Total amount expended up to the end of the year 1853.		
Masulipatam and Rajahmundry.	Ralunghy...	Rebuilding Vizaiswaram Lock..	31,283	0	1	32,900	5	6
	Ralunghy, Tanookoo, &c.	Fixing iron posts on the Annicut	8,062	3	0	22,077	11	6
		Clearing and widening the present Channel by river bank or Yalamunchly channel and constructing sluices.	2,469	1	8	12,417	15	11
		Clearing out Venkiah Calwa....	5,982	14	0	12,125	8	10
	Ralunghy...	Settepettah Calingulah.	553	15	11	7,723	14	6
	Pentapaud..	Purunilla Lock and Calingulah.	10,279	1	0	31,082	3	3
	Tanookoo...	Moockamala Lock	5,267	8	2	10,876	14	8
	Ralunghy...	Nundamoor Lock.....	640	2	1	9,751	14	11
	Tanookoo...	Atteelee Channel	3,777	12	3	3,777	12	3
	Do.	Branch channel from bank channel.....	1,244	13	4	1,244	13	4
Rajahmundry.	Do.	Increased section of Kakrapurroo channel.....	2,357	10	3	2,357	10	3
	Ralunghy...	Gostanady Lock.....	1,806	2	2	1,806	2	2
	Do.	Do. Calingulah.	779	13	5	779	13	5
	Nugguram..	Gunnaram Aqueduct.....	18,364	5	4	1,59,765	14	0
	Raullee..	Enlarging head of Raully main channel	4,481	8	4	4,481	8	4
		For cutting branch channel from Raullee to Gunnavaram.	4,191	5	7	20,551	12	3
		Waste channel from Bellumpoody to Polavaram.....	1,315	2	4	1,315	2	4
	Nuggaram..	For cutting branch channel below the Gunnavaram Aqueduct.....	10,969	11	7	25,051	7	4
	Bicavole and Capawaram.	Excavation below Velagathodoo lock &c.....	8,594	6	1	12,961	12	1
		Thossepoody branch channel north of Thooliah bagah.	16,787	13	7	17,119	9	7
		For constructing an aqueduct at Vatlapalem.	1,128	3	2	1,128	3	2
		Thooliah bagah South branch channel.....	7,657	4	6	7,657	4	6
	Rajahmundry Capawaram.	Widening the head of Thooliah bagah from Vama gherry to Anaparty calingulah	8,290	9	5	9,324	9	4

the year 1853, in the Godavery Division.

Balance of Estimate.	Probable remaining cost.	Names of Executive Officers.	Amount of pay for the year 1853.		
300	0	Captain A. McNeill, 2d Assistant Civil Engineer	2,295	0	0
		Mr. Bevan, Assistant Overseer	527	5	0
		„ Hirst do. do.	527	5	0
284	9	V. Veeranna, Annicut Manager.....	1,200	0	0
		Lieut. Chambers, 1st Assistant Civil Engineer	3,495	0	0
		Mr. Welley, Assistant Overseer.....	527	5	0
		Mr. Bignell, Assistant Overseer	527	5	0
		Lieut. Chambers, 1st Asst. Civil Engineer	3,495	0	0
		„ Goddard, 1st Asst. Civil Engineer	3,495	0	0
		„ Fisher, 2d Asst. Civil Engineer...	2,295	0	0
		„ Goddard, 1st Asst. Civil Engineer	3,495	0	0
5,556	5	„ Do. Do. Do.	3,495	0	0
4,365	2	Lieut. Chambers, 1st Asst. Civil Engineer	3,495	0	0
1,317	5	„ Do. Do. Do.	3,495	0	0
856	1	„ Goddard, 1st Asst. Civil Engineer.	3,495	0	0
166	2	„ Do. Do. Do.	3,495	0	0
9,224	1	Mr. Filler, Assistant Supervisor.	900	0	0
8,018	7	Captain Tweedie, 2d Asst. Civil Engineer	2,295	0	0
692	14	{ Mr. Filler, Assistant Supervisor.	900	0	0
		{ „ Cowling, Assistant Overseer.....	527	5	0
		Mr. Filler, Assistant Supervisor.....	900	0	0
7,838	7	„ Do. Do. Do.	900	0	0
		„ R. Smith, Assistant Overseer	527	5	0
		„ Do. Do. Do.	527	5	0
515	15	„ Do. Do. Do.	527	5	0
		„ Do. Do. Do.	527	5	0
		„ Do. Do. Do.	527	5	0

List of Important

District.	Talook.	Name of Work.	Amount expended during the year 1853.	Total amount expended up to the end of the year 1853.
Rajahmundry.	Kota Ramachendrapooram.	Channel at Ramachendrapooram or Coringa channel sluices &c.....	17,504 8 5	21,179 13 9
		Widening channel below the lock at Alamore and strengthening the banks above it.....	6,382 5 3	6,382 5 3
		Alamore lock	9,826 4 8	9,826 4 8
		Do. Calingulah	2,013 14 0	3,668 10 1
		Yanam branch channel	8,453 10 2	8,453 10 2
		Moolastanam branch channel.....	1,395 15 1	1,395 15 1
		Excavating drainage channels &c.....	5,343 4 10	5,343 4 10
		Nulloor Aqueduct.....	5,235 6 4	5,235 6 4
		Kalaroo Aqueduct	2,967 6 9	2,967 6 9
		Channel from Takee to Injee-ran.....	8,738 7 10	8,738 7 10
		Cowlaishwaram lock and Calingulah.....	1,949 3 9	1,949 3 9
		Koottah lock and Calingulah	1,804 3 9	1,804 3 9
		Cowlaishwaram Culverts	1,743 4 0	1,743 4 0
Masulipatam & Rajahmundry.	Kykaloore and Woondoe.	Vellah lock and Calingulah	7,793 14 11	7,793 14 11
		Clearing channel from Wvairoo and Peppura by Bheemawaram to the salt swamp.....	22,137 13 0	22,137 13 0
	Kykaloore.	Outlet of Colair	4,117 0 4	4,117 0 4
		Colair Calingulah	2,260 9 9	2,260 9 9
Rajahmundry.	Raullee.	Embankment of Oopootair near Yaloorpand to Mul-lumpoody, in the salt swamp.....	5,622 6 10	5,622 6 10
		Branch channels from the high level channel near Paravalee and Vippurroo, and erecting sluices.....	4,016 11 5	4,016 11 5
		Raising and strengthening the Western embankment of the Vizaiswaram branch of the Godavery from Bob-burliunkah to Gunnavaram.....	10,094 9 1	10,094 9 1

Works executed, &c. (continued.)

Balance of Estimate.	Probable remaining cost.	Names of Executive Officers.	Amount of pay for the year 1853.
11,090 2 3		Lieut. Grove, 2d Asst. Civil Engineer...	2,295 0 0
		Lieut. Haig, 1st Asst. Civil Engineer ...	3,495 0 0
		{ Lieut. Haig, 1st Asst. Civil Engineer.	3,495 0 0
		{ Mr. Eyles, Assistant Overseer	527 5 0
		Lieut. Haig, 1st Asst. Civil Engineer ..	3,495 0 0
		{ Lieut. Haig, 1st Asst. Civil Engineer.	3,495 0 0
		{ Mr. Coles, Assistant Overseer	527 5 0
		Lieut. Haig, 1st Asst. Civil Engineer ...	3,495 0 0
		" Do. Do. Do. #	3,495 0 0
		" Grove, 2d Asst. Civil Engineer ...	2,295 0 0
		" Do. Do. Do.	2,295 0 0
1,469 13 6		{ Mr. Eyles, Assistant Overseer	527 5 0
		{ Lieut. Grove, 2d Asst. Civil Engineer.	2,295 0 0
		Mr. Eyles, Assistant Overseer.....	527 5 0
		" Do. Do. Do.	527 5 0
		" Do. Do. Do.	527 5 0
		Lieut. Grove, 2d Asst. Civil Engineer ...	2,295 0 0
112 3 0		{ Capt. Molony, 2d Asst. Civil Engineer	2,295 0 0
		{ Lieut. Goddard, 1st Asst. Civil Engr.	3,495 0 0
		Lieut. Goddard, 1st Asst. Civil Engineer	3,495 0 0
1,309 6 3		Mr. Bignell, Asst. Overseer.....	527 5 0
11,252 9 2		{ Capt. Molony, 2d Asst. Civil Engineer	2,295 0 0
		{ Lieut. Goddard, 1st Asst. Civil Engr.	3,495 0 0
99 9 11		Mr. Bevan, Assistant Overseer	527 5 0
1,611 2 2		{ Mr. Filler, Assistant Supervisor	900 0 0
		{ " Cowling, Assistant Overseer	527 5 0

List of Important

District.	Talook.	Name of Work.	Amount expended during the year 1853.			Total amount expended up to the end of the year 1853.		
Rajahmundry.	Raullee.	Raising and strengthening the Eastern embankment from Bobburienkah to Kottalunkah.	14,801	5	2	14,801	5	2
	Kota Ramachendrapoorum.	Erecting groins to the left bank of Godavery at Koollah and Veeravallepoliem.	6,306	12	9	6,306	12	9
	Biccavole.	Repairing Samulcottah channel near Biccavole.	3,982	0	8	3,982	0	8
	Cocanada & Coringa.	Improving the Port of Cocanada and Coringa bar.	4,610	3	0	4,610	3	0
	Tanookoo &c.	Excavating branch irrigation channels on the Western side of Godavery River.	5,933	8	1	5,933	8	1
	Coringa.	Repairing Neelapilly road.	2,172	12	4	2,172	12	4
	Raullee.	Widening Raullee main channel from Head sluice to Oochellee.	3,626	2	0	3,626	2	0
	Amalapoora.	50 Miles of smaller irrigation branches in Raullee and Amalapoora Talooks.	1,980	8	3	1,980	8	3
		Godavery expedition.	6,845	12	4	6,845	12	4
		ORDINARY WORKS.						
		Repairing Godavery Annicut.	15,974	10	0			
		Protecting the intermediate lunkahs with groins &c.	6,669	11	3			
	Biccavole, & Capawaram Do.	Repairing Thooliah bagah channel.	11,021	12	2			
		Repairing Samulcottah channel.	6,950	5	8			
	Raullee.	Repairing Raullee channel.	10,140	12	2			
	Naggaram.	Clearing and extending old drainage channel near Aud-doorroo.	2,242	7	8			
	Kota Ramachendrapoorum.	Repairing drainage channels from Kundrika to near Muskapilly in Kotaramachendrapoor Talook.	4,006	2	1			
		Repairing river embankment from Tantapoody to Kota.	12,266	2	7			
		Erecting 4 groins to the river embankment near Pedamullum, Beemalapoora, and Boorogapillee.	2,497	12	6			

Works executed, &c. (continued.)

Balance of Estimate.	Probable remaining cost.	Names of Executive Officers.	Amount of pay for the year 1853.		
9,300	10 3	{ Mr. Filler, Assistant Supervisor.....	900	0	0
		{ „ Cowling, Assistant Overseer.....	527	5	0
		Mr. Eyles, Assistant Overseer.....	527	5	0
		„ R. Smith, Assistant Overseer.....	527	5	0
13,277	10 4	Lieut. Moberly, 1st Asst. Civil Engineer.	3,495	0	0
4,049	13 3	{ Mr. Bevan, Assistant Overseer.....	527	5	0
		{ „ Willy, Assistant Overseer.....	527	5	0
3,885	9 5	Lieut. Moberly, 1st Asst. Civil Engineer.	3,495	0	0
8,092	10 0	Capt. Tweedie, 2d Asst. Civil Engineer.	2,295	0	0
3,019	7 9	Mr. R. Smith, Assistant Overseer.....	527	5	0
3,154	3 8				
		V. Veerannah, Annicut Manager.....	1,200	0	0
		Do. Do. Do.	1,200	0	0
		Mr. R. Smith, Assistant Overseer.....	527	5	0
		Do. Do. Do.	527	5	0
		„ Filler, Assistant Supervisor.....	900	0	0
		Mr. J. Randall, Superintendent.....	1,200	0	0
		Lieut. Grove, 2d Asst. Civil Engineer...	2,295	0	0
		Mr. Eyles, Assistant Overseer.....	527	5	0
		{ Mr. Bevan, Assistant Overseer.....	527	5	0
		{ „ Willy, Assistant Overseer.....	527	5	0

List of Important

District.	Talook.	Name of Work.	Amount expended during the year 1853.			Total amount expended up to the end of the year 1853.		
Rajamundry.	Tanookoo and Mogultoor.	Repairing Godavery embankment near Oosolocmurroo, Kakarapurroo and Siddantum.	2,114	15	10	.....	.....	.....
	Ralunghy.	Repairing Godavery embankment from Vizaiswaram to Teepurroo.	2,165	10	2	.....	.....	.....
Masulipatam.	Kykalore.	Clearing Valococodoo near Chanamillee, Goommooloor Coodoo and Kollapurroo Coodoo.....	3,050	0	0	.....	.....	.....
		EMERGENT WORK.						
	Ralunghy.	For making up a dam for closing the breach in Vizaiswaram head sluice.....	3,870	0	0	.....	.....	.....
		Total.....	4,18,914	14	1	5,93,270	1	7

Camp at Dowlaiswaram, }
21st November, 1854. }

Works executed, &c. (concluded.)

Balance of Estimate.	Probable remaining cost.	Names of Executive Officers.	Amount of pay for the year 1853.		
.....		{ Mr. Bevan, Assistant Overseer.....	527	5	0
.....		{ „ Willy, Assistant Overseer.....	527	5	0
.....		{ Mr. Bevan, Assistant Overseer.....	527	5	0
.....		{ „ Willy, Assistant Overseer.....	527	5	0
.....		Capt. Molony, 2d Asst. Civil Engineer..	2,295	0	0
.....		Mr. Hirst, Assistant Overseer.....	527	5	0
1,10,860	8 3				

F. HAIG, LIEUTENANT,
Acting Civil Engineer Godavery Division.

Return of the Value of Exports by Sea from the Rajahmundry District from the years 1843-44 to 1853-54.

Official years.	Coringa.			Cocanada.			Nursapore.			Total.		
	Grain value.	Other articles value.	Total value.	Grain value.	Other articles value.	Total value.	Grain value.	Other articles value.	Total value.	Grain value.	Other articles value.	Total value.
	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.
1843-44....	1,60,696	1,48,369	3,09,065	1,16,059	38,669	1,54,728	39,986	49,999	89,985	3,16,741	2,37,037	5,53,778
1844-45....	2,45,624	1,62,857	4,08,481	1,73,770	52,306	2,26,076	54,597	41,344	95,941	4,73,991	2,56,507	7,30,498
1845-46....	26,15,505	1,68,698	4,30,203	2,76,623	1,08,555	3,85,178	44,428	47,965	92,393	5,82,556	3,25,218	9,07,774
1846-47....	3,10,568	4,43,727	7,54,295	3,57,331	1,09,014	4,66,345	29,104	1,06,592	1,35,696	6,97,003	6,59,333	13,56,336
1847-48....	2,75,358	4,24,321	6,99,679	1,78,436	1,27,743	3,06,179	33,576	57,804	91,380	467,370	6,09,868	10,97,238
1848-49....	3,10,522	3,45,244	6,55,766	1,91,959	1,20,201	3,12,160	34,065	50,065	84,130	5,36,546	5,15,510	10,52,056
1849-50....	2,59,681	3,72,382	6,32,068	98,045	1,61,639	2,59,684	30,774	46,191	76,965	3,88,500	5,80,217	9,68,717
1850-51....	1,41,679	5,18,847	6,60,526	2,50,930	2,89,762	5,40,692	56,267	47,150	1,03,417	4,48,876	8,55,759	13,04,635
1851-52....	3,21,103	3,10,274	6,31,377	3,58,868	2,05,729	5,64,597	62,884	47,756	1,10,640	7,42,855	5,63,759	13,06,614
1852-53....	2,38,796	3,45,433	5,79,229	4,46,467	4,58,279	9,04,746	66,525	82,478	1,49,003	7,46,788	8,86,190	16,32,978
1853-54....	2,96,949	4,01,941	6,98,890	6,05,429	1,67,246	7,72,675	1,00,727	77,104	1,77,831	10,03,103	6,46,291	16,49,396

Civil Engineer's Office, Godavery Division, Rajahmundry }
District, Camp Dowlaishwarum, 21st November 1854.

F. HAIG, LIEUTENANT,
Acting Civil Engineer Godavery Division.

Return of the Value of Imports by Sea into the Rajahmundry District from the years 1843-44 to 1853-54.

Official years.	Coringa.			Cocanada.			Nursapore.			Total.		
	Grain value.	Other articles value.	Total value.	Grain value.	Other articles value.	Total value.	Grain value.	Other articles value.	Total value.	Grain value.	Other articles value.	Total value.
	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.	C. Rs.
1843-44....	31,403	38,687	70,090	32,150	2,453	34,603	2,942	6,015	8,957	66,495	47,155	1,13,650
1844-45....	1,81,980	1,09,704	2,91,684	1,076	11,108	12,184	751	27,023	27,774	1,83,807	1,47,835	3,31,642
1845-46....	2,58,939	97,443	3,56,382	78	11,884	11,962	6,064	14,341	20,405	2,65,081	1,23,668	3,88,749
1846-47....	1,71,976	1,34,084	3,06,060	28,852	26,782	55,634	604	49,067	49,671	2,01,432	2,09,933	4,11,365
1847-48....	3,31,178	2,31,750	5,62,928	7,230	26,294	33,524	8,547	31,586	40,133	3,46,955	2,89,630	6,36,585
1848-49....	57,308	3,32,243	3,89,551	.....	16,099	16,099	4,181	31,071	38,252	61,489	3,82,413	4,43,902
1849-50....	1,73,972	1,11,160	2,85,132	.....	30,317	30,317	150	15,528	15,678	1,74,122	1,67,005	3,31,127
1850-51....	1,15,272	1,09,501	2,24,773	.....	25,920	25,920	5,225	45,876	51,101	1,20,497	1,81,297	3,01,794
1851-52....	1,00,090	1,59,724	2,59,814	.....	37,336	37,336	467	50,786	51,253	1,00,557	2,47,846	3,48,403
1852-53....	45,349	1,08,046	1,53,395	.....	36,239	36,239	400	47,932	48,332	45,749	1,92,217	2,37,966
1853-54....	35,979	1,32,750	1,68,729	15,774	41,272	57,046	1,183	37,588	38,771	52,936	2,11,610	2,64,546

Civil Engineer's Office, Godavery Division, Rajahmundry }
District, Camp Dowlaishwarum, 21st November 1854.

F. HAIG, LIEUTENANT,
Acting Civil Engineer Godavery Division.

Statement showing the number of Boats passed through the main Canals
from the Anicut during the year 1853.

Months.	Theolia bagah channel.		Samul- cettah channel.		Raullee channel.		Apparow channel.		Total.	
	Boats.	Rafts.	Boats.	Rafts.	Boats.	Rafts.	Boats.	Rafts.	Boats.	Rafts.
In January.....	99	69	...	...	...	...	...	...	99	69
„ February.....	120	291	...	...	...	...	...	...	120	291
„ March.....	154	247	...	...	...	...	...	...	154	247
„ April.....	258	310	...	...	100	30	350	145	708	485
„ May.....	302	129	25	2	136	36	365	351	828	518
„ June.....	373	314	25	4	115	68	125	97	638	483
„ July.....	360	55	79	17	38	3	21	0	498	75
„ August....	386	174	62	15	16	0	21	0	485	189
„ September....	292	13	56	1	25	0	107	11	480	25
„ October.....	702	15	35	0	45	0	196	4	978	19
„ November....	631	39	64	1	44	2	294	24	1,033	66
„ December....	1,137	144	66	13	205	23	318	74	1,726	254
Total...	4,814	1,800	412	53	724	162	1,797	706	7,747	2,721

Rajahmundry District,
Camp at Dowlaiswarum,
21st November 1854.

F. HAIG, LIEUTENANT,
Acting Civil Engineer Godavery Division.

Civil Engineer's Office, Camp
Bezoarah, 16th November 1854.

No. 376.

FROM CAPTAIN C. A. ORR,
Civil Engineer in charge Kistnah Division,

TO THE SECRETARY TO THE BOARD OF REVENUE,
Department of Public Works,
Fort Saint George.

SIR,

The principal works under execution in the Kistnah Division during
the year 1852-53 were,

Of Irrigation.

I. The restoration of the Cuncheria Tank in the Innagondah
Talook.

This large reservoir, on which at one time must have depended
cultivation yielding many thousand Rupees of Revenue, having been
breached as it is said about a century ago, has been allowed to remain
neglected and useless ever since, till in 1848 Mr. Assistant Revenue
Surveyor Bance recommended its restoration on an estimate which he
framed to the amount of Rupees 515-14-8. So small an outlay, com-
pared with the promised results, of course met with immediate sanction,
and the restoration of the tank was undertaken in 1851. As might
have been expected the work was found to be under estimated, and a
considerable amount in excess having been expended, without even then
fitting the tank for retaining water, and further damage occurring on its
partially filling, a supplemental estimate became necessary. The Board
of Revenue feeling dissatisfied with the explanation offered, directed
Lieutenant Steele to inspect the work personally, and to provide an
estimate for all that should be necessary. He did so, and the Govern-
ment sanctioned his estimate amounting to Rupees 2,771-0-9 condition-
ally on my approving of it after a personal examination of the work.
Having taken an early opportunity of inspecting the tank, and having
satisfied myself of the general sufficiency of the estimate I requested
the Collector to order the work to be proceeded with; recommending

that as a precautionary measure the construction of the Calingulah, proposed to be erected in a breach near one extremity of the bank, should be deferred for two years, as the large mass of earth forming the filling in of the main branch would require time to settle and become consolidated.

The outlay and expected results are.

Expenditure prior to 1852.			Expenditure in 1852-53.			Total Cost.		Required to complete.			Expected increase of Revenue.			
683	6	2	1,144	15	5	1,828	5	7	1,458	8	5	3,600	0	0

and I have little doubt that though no revenue can be collected for a year or two; not only will an increase of Rupees 3,600 be eventually obtained but probably much more.

II. Restoring the two large tanks of Copparum in the Martoor Talook.

Both these tanks having been extensively breached in a storm that passed over this part of the country in 1851, their repair under estimates of Rupees 2,059-10 and Rupees 1,252-10 respectively was commenced in 1852, and an outlay during the year of Rupees 2,613-8 was incurred, leaving Rupees 688-12 to be expended the following season. The result has been the collection the first year of Rupees 1,217-5-8 which, and all future revenue, would have been lost but for the timely restoration of the Reservoirs.

III. Restoring the Mangooloor tank in the Nursarowpet Talook.

This tank likewise having been severely injured in the same storm, its restoration was recommended on an estimate made by an Assistant Surveyor and corrected by me, and the greater portion of the work was performed in 1852, at an outlay of Rupees 1,139-7-2, leaving a balance of Rupees 474-5-10 for the completion of the repairs next season. The return obtained immediately has been Rupees 713-0-3.

IV. The construction of the Kistnah Anicut.

The Government having in March 1852, determined upon proceeding with the construction of an Anicut across the Kistnah, for which the sanction of the Court of Directors had been given some time previously, I was nominated to the charge of it, and arriving at Bezoarah at the

end of that month was soon afterwards joined by several Officers as Assistants, and by a detachment of Sappers under Lieutenant Rawlins. The season was of course too far advanced to admit of any thing but preparations being then undertaken. These were set on foot at once, and carried on so satisfactorily as to allow of operations being commenced on the river subsiding sufficiently about the middle of December. The construction of the Sluices, Locks &c. in each flank of the work was then begun, and extensive quarries having in the meantime been opened in the hills on both sides of the river—rails having been laid,—and very efficient arrangements for the plentiful supply of timber, fuel, lime and all other materials having been completed—such good progress was made with the work marked out for execution during the season, notwithstanding the occurrence of two unseasonable freshes and a great deficiency of labour, that on the total dispersion of the people by the breaking out of Cholera in April, the four large Head and under sluices, and the Bridge and Lock at Bezoarah, were so far advanced that their completion might be proceeded with throughout the following Monsoon with such workmen as could again be brought together. The foundations of the Lock at Sectanagram on the southern flank of the Anicut were also raised and portions of each end of the Anicut were commenced.

The annexed statement shows the extent and cost of the work done.

Description of work.	Estimated.		Work done up to the end of June 1853.		Pay of Officers with their Establishments and that of Overseers, &c.	
	Cubic yards.	Amount.	Cubic yards.	Amount.	Names.	Amount per annum.
Rough stone	2,28,602	1,57,163 14 3	34,300	23,375 0 0	Captain Orr	11,636 0 0
Masonry	73,231 1/2	2,58,796 13 6	36,255	1,12,443 7 5	Lieut. Humfrays	4,167 0 0
Earthwork	7,73,000	49,437 8 0	5,38,414	35,063 0 1	" Scott	2,967 0 0
Plant		1,11,407 0 0		89,877 15 6	" Walker	2,967 0 0
Superintendence		85,936 0 0		27,911 11 8	" Lane	2,967 0 0
Sundries &c		1,03,800 0 0		12,353 3 5	Overseer Finnigan	707 5 0
					Asst. Do. Porter	527 5 0
					Do. Sage	527 5 0
Total	7,66,541 1/2	4 2		3,01,644 6 1	Total Rupees	26,465 15 0

As the completion of the two under sluices will afford the means of discharging the River during the process of constructing the Dam itself next season, there will not be any great difficulty in carrying it across the stream; and when that has been done, it will be easy, with the ample means at our disposal, to deposit so much material as will render it safe to raise the work at once to a level sufficient to throw a supply of water into the Delta, throughout the subsequent freshes. In the third season the work may be raised to its full height of 20 or 21 feet; but a great quantity of stone in excess of that allowed in the Estimate will no doubt be requisite, as the current of the River through the gorge where the work is to be placed has been under-measured, and the danger of still further contracting that passage by an anicut of such an unprecedented elevation has not I think been fully appreciated by the Committee that drew up the project.

A cutting to connect the Boodoomair, one of the old irrigating channels, with the Anicut was likewise well advanced this year at an outlay of Rupees 35,683-0-1 which has been included in the cost of the Anicut given above, as an allowance was made for it in the estimate.

A new head to connect the Poollairoo, another of the old channels, and which is already capable of distributing water over a very extensive area of the Delta, was commenced this season under an Estimate of Rupees 68,462-6-1, sanctioned by Government on the 3d March 1853, but no progress worth mentioning was made with it owing to the prevalence of sickness among the people.

2. The Officers, and the greater part of the Establishments attached to them have been principally employed either in superintending the works in progress at the Anicut, or in surveying and levelling. Lieutenant Lane and Revenue Surveyor Ottmann and Assistant Surveyor Bance were alone employed in supervising the Ordinary Maramut. Besides the Civil Engineer, Lieutenants Humfrays and Scott and Overseers Finnigan, Porter and Sage were engaged at the Anicut, while Lieutenant Walker was in charge of the cutting to the Boodoomair, and Sub-Assistant Revenue Surveyors James and Ross and occasionally Lieutenant Scott were fully occupied with the Surveying and Levelling of the Delta, for the determination of the directions of the channels for the distribution of water.

3. The following is a classified statement of the expenditure on Public Works exclusive of the Anicut &c., during the ten past years showing the cost of the Civil Engineer's Establishment.

Years.	Works of Irrigation.			Works not of Irrigation.			Cost of Civil Engineer's Department.		
				Buildings, &c.	Roads, Bridges, &c.				
1844.....	26,717	14	7	1,662	15	7	6,598	14	3
1845.....	23,589	4	9	7,499	4	9	6,931	12	4
1846.....	54,943	4	2	7,808	10	7	1,550	13	7
1847.....	40,215	11	6	4,667	1	6	2,999	10	10
1848.....	36,933	14	0	8,319	2	6	6,344	4	5
1849.....	47,206	1	9	2,638	14	11	12,337	15	0
1850.....	66,099	9	2	10,680	12	2	9,807	7	7
1851.....	65,751	11	7	7,701	2	0	8,211	7	9
1852.....	40,293	13	3	8,133	10	1	5,508	13	4
1853.....	32,505	3	6	2,061	14	5	12,202	6	2
Total.....	4,34,256	8	3	61,173	8	6	72,593	9	3
							39,686	7	9

4. The maintenance of Public Works having been still less cared for by the Zemindars in whose possession most part of this country was for such a length of time, even than by our own Government, the irrigation works of this Division are generally speaking in a state of great inefficiency, notwithstanding that of late years more attention has been paid to them, and that considerable efforts have been made to restore the ancient prosperity of the Delta of the Kistnah by improving the many old channels of which traces remained, and by excavating new heads for their better supply from the river. The uneven and undulating surface of the country to the westward offers the usual average facilities for the formation of rain water tanks, and many of them there exist, though none are of any notable magnitude, and the aggregate amount of irrigation carried on by them is inconsiderable compared with the extent of dry cultivation. A good deal has been effected especially in Guntoor during the last few years to restore and repair the more promising of these reservoirs, and by the construction of Calingulabs and Sluices to improve their efficiency, but much remains to be done as soon as more time can be spared to them by this Department from the supervision of more important works projected and in progress for the irrigation of the Delta.

5. Turning to the eastern portion of the Division we have a large level tract bounded on one side by the sea and on the other by a line following almost exactly the High Northern Road from near Inukole on the south to Ellore on the north. Nearly the whole of this area being comprised within the Delta of the Kistnah, is composed of rich alluvial land, requiring only irrigation to enable it to yield the most abundant crops of every tropical produce. Many tanks are scattered over its sur-

face for the storage of rain water, or of the overflow of the River floods, which are guided into them by numerous small channels that at one time must have been most effective, as there are all the indications, throughout the Masulipatam portion of the Delta especially, of the country having been formerly thoroughly irrigated, and of a high state of prosperity having then existed. Neglect and a gradual change of the levels of the surface of the Delta, seem to have destroyed the efficiency of those channels, leading to the diminution of irrigation—to the liability of devastating famines, and to the consequent deterioration of the condition and numbers of the people, who are now comparatively few and in a sadly depressed state, since the greater number of the Zemindary Estates have reverted to Government, much has been done to restore the old channels, such as the Boodomair and the Poollairoo, with its numerous branches, and to open new heads of supply for them to the River. Other and new channels have also been formed, such as the Toongabudra, Moonunghy, &c. &c. for the supply of many tanks that previously were dependant solely upon the precarious local rains. The results of all these operations have been extremely advantageous both to the villages that benefitted by them, and to the Government; but their influence being necessarily confined to the more low lying portions of the Delta, the relief afforded has been partial, and uncertain, for as the heads of the channels are on a level to enable them to receive water for a few days only each season when the River is in flood, and are unprovided with the means of regulating the supply, it often happens that the quantity obtained is either deficient or so overwhelming as to destroy the banks of the Channel, and those of the Tanks with the crops under them, and to lay all the lower lands under water so long as to prevent their cultivation altogether. An Anicut at Bezarah, with regulating sluices at the Heads of the main Channels leading off from either of its flanks will effectually irrigate the whole surface of the Delta consisting of fully 1,200,000 acres, after deducting liberally for all unculturable lands; and as the construction of that work is in progress, the restoration of these districts to more than their ancient prosperity is a matter merely of time; for with a certain command of water for irrigation, and the cheapest of all carriage by navigable Canals, a more profitable species of cultivation will be introduced.

Roads and Bridges.

V. The improvement of the District road from Guntoor to Munchallah was commenced on an Estimate of Rs. 8,622-1-0 for the earth-work and gravelling alone, and Rs. 2,711-4-3 were expended leaving Rs. 5,910-12-9 to be laid out next season. Estimates amounting to

Rs. 4,278-5-0 will be submitted for four large Tunnels and one inverted arch to complete the improvement, which is one of importance because this road, leading from Guntoor and the western parts of the District, towards the large towns of Sandole, Ponnor and Baupudah, and the sea ports of Nizampatam and Epoorpallium, bears a very considerable traffic as shewn in the annexed statement.

Period.	Palanquin or Bhoolie.	Horses.	Carts.		Beasts of burden.		Coolies with loads.	Passengers.
			Laden.	Unladen.	Laden.	Unladen.		
From 26th January to 26th July 1852.....	135	1,015	5,058	4,639	9,482	8,537	5,105	30,596
Average per month deducting fractions.....	22	169	843	773	1,560	1,422	850	5,059
Average per day.....	0	5	28	25	52	47	28	169

Large quantities of Pulse and such descriptions of grain, are conveyed in one direction for exportation, and Rice, Salt, &c. in the other for internal consumption. It was contemplated to extend the road hereafter to the above large towns and seaports, but it is probable that throughout that part of the District the Channels to be formed in connexion with the Kistnah Anicut, will afford such facilities of communication as will render any extension of roads there unnecessary.

VI. Forming a raised road with tunnels across the irrigated land under the Sandole Tank.

This, though forming the subject of a separate estimate may be considered as an improvement connected with that just described, this being a continuation of the road from Guntoor onwards from Munchallah, through Sandole towards Nizampatam. The irrigating channels and rice fields of Sandole offering a serious impediment to the large traffic towards the Coast, an estimate for constructing a raised road with the necessary tunnels, was sanctioned to the extent of Rs. 1,300-3-0, Rs. 814-8-10 have been expended and the remaining work will be executed immediately to the value of the balance Rs. 545-10-2.

6. Although traversed by three highly important lines of communication it can scarcely be said that this Division possesses any thoroughly made Roads, for whatever has been done to improve them has been in a disconnected unsystematic manner, and sufficient care has never been taken to maintain those detached portions that have from time to time been put in good order. Much labour has been expended on that part of the high Northern Road (Trunk No. 6) from Incole through Guntoor to the bank of the Kistnah at Seetanagrum, but from want of due

care, and from its particular liability to injury during the monsoon in consequence of its intersecting the drainage of the country, it has sustained so much damage of late years though raised, metalled and bridged, as to be now much out of repair. The continuation of the same road from Bezarah, on the north bank of the Kistnah, to Ellore, though at one time partly made, is now in a wretched state, and almost totally impassable for loaded carts in wet weather. Trunk Road No. 7 branching from No. 6 at Ongole towards the frontier in the direction of Hyderabad, is partially made and bridged, but is also very imperfect during the rains. The most important line both in a Commercial and Military view is perhaps that from Masulipatam towards Hyderabad as far as the frontier of that state, a distance of about 120 miles. This Road was made many years ago at a vast expense by the old corps of Pioneers, but having been totally neglected ever since, it has at length fallen into such a state of utter ruin as no longer to deserve the name of road. The Government has called for an Estimate for its thorough repair and one is in course of preparation.

7. The principal cross roads are,

- 1st. The lower coast road, from Ongole via Bauputlah &c. to Masulipatam and onwards to Nursipoor.
- 2nd. From Guntoor towards Cumbum, by Ferringapooram, Nursarowpet, Innacondah &c.
- 3rd. From Guntoor towards the coast and seaports of Nizampatam, and Epoorpallium through Chabrole, Ponnor &c.
- 4th. From Masulipatam to Ellore.

Portions of all these roads have been made and many Bridges erected on them, but none of them are complete or in such order throughout as to influence in any beneficial degree the cost of carriage upon them.

VII. Clearing out the Masulipatam Pettah canal.

This canal with a small Basin at its upper end, was formed for the purpose of enabling Merchandise to be conveyed in boats direct from the vessels in the Roads to the immediate vicinity of the warehouses of the town. A Lock was erected at the lower extremity with a view to retaining water in the canal and Basin at the level of High Tide, that boats might always be afloat in them, and to obtaining a scour to assist in keeping them clear of deposit. The Lock being constructed entirely of Brick even to the quoins of the gates, soon got out of order and has for a length of time been in total disuse. The canal therefore is filled and emptied by every tide; which leaves at each ebb a quantity of silt

to accumulate, till, with the assistance of the sand swept in by the winds and rain, the canal becomes choked and requires clearing out from time to time to admit of boats traversing it at even high tides. The cost of these periodical clearances nearly absorbing the tolls the Government have had it in consideration to abandon the work, but on the urgent representation of the Collector suspended their decision; and as it was thought necessary both by that Officer and myself that it should be again cleared and put in working order, an Estimate of Rupees 2,542-8-0 was prepared and carried out under the immediate direction of Lieut. Lane Assistant Civil Engineer.* As a profitable speculation this canal has been a failure, but its abandonment for that reason now, would be a severe blow to the already languishing trade of the port, for the warehouses of the merchants being mostly situated at the Pettah, the land portage of goods to and from them, would entail expense and risks that are now saved. A proposition has been submitted for re-opening the Chinnapooram canal from the Kistnah, and connecting it by a cut of a few miles with the Basin at Masulipatam; and if that improvement be carried out, there will probably be such a tidal current through the canals as will keep them both free from deposit, and thereby diminish the cost of future maintenance. At all events when the Basin shall have been connected, as it will be in a few years, with irrigating and navigable channels from the Kistnah at Bezarah, and probably with one from the Godavery, the Pettah canal will have become of too much importance to allow of the question of its abandonment being entertained.

8. With their agriculture in so backward a condition, and without roads, these districts cannot be expected to possess a flourishing external trade though Masulipatam the principal port formerly enjoyed one of considerable extent, and is well situated for an emporium of commerce, were the country prosperous and the means of internal communication improved. The port has very greatly deteriorated during the last half century in consequence of the volume of water, which caused a scour sufficient to keep a depth of from 8 to 10 feet always on the bar, having been diminished so as no longer to have that power, by the embanking of the marshes, and by the filling up of the upper portion of

* Whose salary while so employed amounted to Rs. 495 0 0

For April with Establishment.....	„	246	0	0
For May do.....	„	249	0	0

Total „ 495 0 0

the inlet, called the Masulipatam river as the effect of the more effectual exclusion of the overflow of the Kistnah by its embankments. What is required to restore the Port to something like its former state seems to be the opening of a shorter passage to the sea than the present very indirect outlet, and the establishment of a scour through it. The proposed re-opening of the Chinnapooram Canal will probably cause an increased action of the tide, which may do some good, but no effectual change can be made till the completion of a Canal from Bezoarah to Masulipatam gives a command of water with which occasionally to effect a thorough scour.

9. The Port must rise into importance as the condition of the adjoining districts become improved by the extension and increased value of cultivation, and as water communications are opened throughout them. Large quantities of grain, Pulse and other more valuable exportable produce for which there is a large foreign demand, being then brought for shipment it will be necessary to undertake the improvement of the harbour; and as the measures required appear to be similar to those now being adopted at Cocanada, the effect of these will be a good guide.

10. The following table shows the annual value of the imports and exports at the Port of Masulipatam for ten years.

	Years.	Rice and other Agri- cultural produce.		Salt.	Sugar.	Yarn.	Piece Goods.	Sundries.	
Exports.	1843	33,289	8	0	0	323	27,507	8,974	8
	1844	60,579	4	0	0	1,688	37,031	10,796	0
	1845	92,471	0	0	0	311	14,855	11,273	0
	1846	29,181	0	0	0	739	56,303	12,032	5
	1847	62,056	0	0	0	399	17,709	20,436	0
	1848	91,309	0	0	431	3,418	12,036	40,615	0
	1849	21,508	0	0	0	1,883	19,590	32,295	0
	1850	17,058	0	0	150	4,588	14,974	43,814	0
	1851	31,144	0	0	0	1,048	20,350	43,444	0
	1852	1,90,649	0	0	0	6,500	39,522	62,929	13
	Total	6,29,244	12	0	581	20,897	2,59,877	2,86,699	10
Imports.	1843	2,28,035	0	96	170	0	52,717	44,935	0
	1844	2,98,174	0	4	625	434	52,058	86,855	8
	1845	77,829	0	19	217	281	54,421	1,63,628	0
	1846	65,428	0	81	317	0	43,504	45,839	0
	1847	1,40,126	0	3	4,912	1,922	57,463	1,75,279	0
	1848	89,714	0	51	3,434	393	2,47,261	1,22,021	0
	1849	1,72,246	0	115	1,281	0	2,33,451	2,05,511	0
	1850	77,865	0	42	1,650	0	1,79,418	64,664	0
	1851	19,114	0	1,093	4,328	0	2,03,754	53,511	0
	1852	3,469	0	1,488	4,592	210	1,68,798	28,961	0
	Total	11,72,000	0	2,992	21,726	3,210	12,92,815	9,91,204	8

11. Another Port of some consequence is Nizampatam, situated to the southward of the Kistnah on a rather extensive backwater connected with the sea by a passage which is kept deep by the effect of the overflow of the River and the drainage of a large area of country escaping through it. The Roadstead being however more exposed than Masulipatam or Cocanada, and no large commercial town existing in the neighbourhood, this port has hitherto been resorted to by native craft only. With the expected increase of cultivation consequent on the construction of the Kistnah Anicut, and the amelioration of the condition of the people that must follow, a valuable trade will probably spring up if facilities be afforded it, and therefore one of the main line of irrigating and navigable Canals will be carried from the Anicut to Nizampatam, and the improvement of that harbour be kept in view.

12. The following table shows the annual value of the imports and exports at the Port of Nizampatam for ten years.

	Years.	Rice and other Agricultural produce.		Salt.		Sugar.		Sundries.	
Exports.	1844	17,707	7 2	.....	.....	.....	.....	532	2 0
	1845	4,516	5 8	.....	.....	.....	.....	1,455	4 0
	1846	22,412	5 1	.....	.....	.....	.....	1,885	5 3
	1847	10,983	2 1	.....	.....	.....	.....	473	11 6
	1848	23,239	8 0	.....	.....	.....	.....	2,409	9 2
	1849	22,596	8 2	1,614	.....	.....	.....	8,559	4 10
	1850	40,261	0 11	.....	.....	.....	.....	2,323	0 6
	1851	11,642	10 4	252	.....	.....	.....	6,160	14 0
	1852	45,519	10 5	420	.....	.....	.....	1,205	0 6
	1853	63,228	11 11	250	.....	.....	.....	3,325	5 9
	Total.	2,62,107	5 9	2,536	.....	.....	.....	28,329	9 6
Imports.	1844	352	2 0	.....	.....	.....	.....	62	3 6
	1845	75	7 5	.....	.....	.....	.....	1,851	8 0
	1846	3,429	13 10	.....	.....	.....	.....	1,485	14 6
	1847	3,234	11 8	.....	.....	.....	.....	904	12 0
	1848	198	7 5	.....	.....	3 8	.....	2,754	6 1
	1849	1,759	4 6	.....	.....	660	.....	13,446	6 9
	1850	8,390	14 8	.....	.....	.....	.....	4,840	12 0
	1851	28,101	15 7	.....	.....	.....	.....	1,033	4 0
	1852	25,251	11 4	.....	.....	.....	.....	5,083	5 8
	1853	11,102	7 11	.....	.....	.....	.....	7,618	1 0
	Total.	81,897	0 4	.....	.....	663 8 0	.....	39,080	9 6

13. The other ports such as Epoorpollum, Chinna Ganjam &c. are unimportant, as they are frequented only by native craft, and have little or no commerce but the export of salt.

I have the honor to be, &c.

(Signed) C. A. ORR, CAPTAIN,

Civil Engineer in charge Kistnah Division.

Bezoarah,
16th November 1854. }

No. 110. *

FROM CAPTAIN A. BOILEAU,

Civil Engineer 2nd Division,

TO MAJOR J. H. BELL,

Secretary Board of Revenue Department Public Works.

SIR,

With reference to the Board's letter No. 835 of the 16th October last, I have now the honor to submit a report on the important works commenced upon or completed during the year 1853.

2. I am aware that the report is very meagre and incomplete; this results chiefly from my not having been in the Division during the year upon which I am reporting and further from my having seen such a small part of it since I have been in it.

3. I must beg therefore the Board will allow me to defer reporting on Paras 4, 6 and 7 of the memo which accompanied their proceedings of the 17th March 1853, till I send in the report for 1854, which is due this month, more particularly as in a letter to Government No. 740 dated 16th November 1854 and forwarded for the Board's information on the 8th December 1854, Paras 6 and 7 were treated of as fully as my knowledge of the present state and wants of the Division enabled me to treat of them.

4. The Collectors of Cuddapah and Nellore have been applied to for information, which they alone can give to enable me to send in a full report for 1854, which I shall make every endeavour to submit on the receipt of the same.

I have the honor to be, &c.

A. BOILEAU,

Civil Engineer 2d Division.

Civil Engineer's Office 2nd Division,
Cuddapah, 1st February, 1855. }

REPORT ON THE IMPORTANT WORKS EXECUTED IN THE SECOND DIVISION
DURING THE YEAR 1853.

Bridges across the Ralla and Booga Rivers
Cuddapah District
Chennoor Talook
Limits of Cuddapah.

Expended during (and up to the end of) 1853 Rs. 238 5 10
Balance of Estimate..... „ 24,897 15 7

These Bridges are situated on the high Road between Bellary and Madras, and when completed will afford the means of keeping up at all seasons a communication now often interrupted between the town and Cantonment of Cuddapah. The works will probably be completed in 1855 and to render them perfect a considerable improvement requires to be made in the course of the Ralla River above the Bridge.

Ensign Campbell was the executive Officer employed on starting this work. His salary from the 19th November to the 31st December 1853 was Rupees 168-0-0.

Nundy Cannama Ghaut
Cuddapah District
Cumbum Talook.

Expended during (and up to the end of) 1853 Rs. 699 2 10
Balance of Estimate and probable remaining cost „ 47,699 2 8

This pass which is intended to open a communication for carts through the Nulla Mulla Range of Hills lying between the Districts of Kurnool and Cuddapah, was traced by the Acting Civil Engineer Lieutenant Walker, and ground was taken in the month of November by Lieutenant Marsack, Assistant Civil Engineer, who assumed charge of the work. The road will probably be open across the Hills for bandies by July 1855.

This pass at present forms the sole obstruction of any magnitude to the traffic between the Bellary, Cuddapah, and Kurnool Districts, on the one side and the Northern Circars on the other, so that to derive full advantage from it the roads from Bellary via Gooty and Banagunpully to Gazerpully on the west, and from Giddalore to Cummum and Guntoor on the east must be made, being for the most part barely practicable at present.

The salary for the Officer employed during this year on this work amounted to Rupees 383-0-0 for the time that he was employed thereon.

Constructing 3 Vaugaries and a Dyke to the
Paupugny River near Appiapully
Cuddapah District
Camalapoore Talook.

Expended during (and up to the end of) 1853.... Rs. 2,752 9 11
Balance of Estimate and probable remaining cost „ 833 8 1

These works were intended to arrest the action of the River which is setting dangerously to the northward, its proper course being about north east into the Pennair. I have not been able to judge of their effects not having visited the locality since they were completed. They should I think have been placed higher up the River than they are and where the erosion of the bank commences. On a visit shortly to be made I shall be able to judge of what subsidiary works are necessary which will be entered in the Report for 1854.

New Road from Cuddapah to Chennoor (5 Miles)
including a Bridge of 2 Arches.

Expended during the year 1853..... Rs. 3,142 14 10
Total amount up to the end of the year..... „ 3,552 5 8
Balance of Estimate..... „ 2,883 4 8

This is an important piece of road in as much as it leads directly from the town of Cuddapah and forms a starting point for 3 lines of road viz., that to Kurnool, to Cumbum and to Nellore via Budwail. An embankment was made for the greater part of the way and a few inches of the kunkur stone put on as metalling. In continuation of it, it is absolutely necessary that these lines be all made to complete the advantages proposed by its construction.

The work was carried out under the directions of the Collector.

Constructing a Moonsiff's Court at Cuddapah.

Amount expended during the year 1853..... Rs. 734 13 8
Total amount up to the end of the year..... „ 834 13 8
Balance of Estimate „ 75 2 4

Constructing a Moonsiff's Court at Cuddre
Cuddapah District
Poolervaindla Talook.

* Amount expended during the year 1853..... Rs. 200 0 0
Total amount up to the end of the year..... „ 800 0 0
Balance of Estimate..... „ 97 0 0

*Constructing Calingulah &c. to the tank of Malakavamoolah**Cuddapah District**Poolevendla Talook.*

Amount expended during (and up to the end of the

year) 1853.....	Rs. 549	1	0
Balance of Estimate.....	„ 345	5	0

Annicut across the Pennair River at Nellore.

Amount expended during (and up to the end of)

1853.....	Rs. 7,406	4	7
Balance of Estimate and probable remaining cost „	90,317	11	7

A mere commencement was made of this work this year, wells being sunk for a few yards in length and a 3 feet wall being built on them with a rear apron to protect the work.

The Annicut will be finished in 1855. Considerable improvements will have to be made in the tanks and channels to be supplied by the river from the Annicut; the former being for the most part in a state of disrepair, and the latter requiring to be enlarged, extended and provided with regulating works. When this has been done new channels on high levels north and south will be recommended.

Improving the large Tank of Gungapatam
Nellore Talook.

Amount expended during (and up to the end of)

1853.....	Rs. 2,211	0	4
Balance of Estimate.....	„ 1,478	9	8

*The undermentioned works were also constructed**Nellore Talook.*

Sluices and Calingulah to Jummepolliam Tank.....	Rs. 871	4	0
do. do. to Enamadoogoo Tank.....	„ 871	4	0
Sluices to Lacoontapaud Tank.....	„ 236	0	0
Calingulah and sluices to Moodevurtypolliam Tank....	„ 887	4	0

PORTION OF HIGH ROAD BETWEEN NELLORE AND CUDDAPAH.

*Nellore District.**Nellore Talook.**Limits of Damaramadoogoo.*

Amount Expended during the year 1853.....	Rs. 1,226	0	11
Total amount up to the end of the year.....	„ 2,668	10	5
Balance of Estimate.....	„ 26	4	7

CONSTRUCTING A BRIDGE OF 5 ARCHES ACROSS THE BEERAPAIROO

RIVER NEAR SUNGUM

*Nellore District.**Sungum Talook.*

Amount Expended during (and up to the end of) 1853 Rs.	582	10	3
Balance of Estimate.....	„ 5,144	12	9

A mere beginning was made to this work this year. I reserve it to enter in the next report merely observing that the site of the work is on the high road between Cuddapah and Nellore, and that the River to be bridged at present forms a serious impediment to the transit of goods.

The work will be completed in 1855. It was commenced under the superintendence of the Talook authorities.

In addition to the works above specified Tahsildars' Cutcheries were constructed in the Talooks of Buddapoodu and Davagoodoor, and a salt Cutcherry in the Paukala Division; the cost of these buildings respectively was Rs. 2,671-14-11; Rs. 1,626-7-4 and Rs. 842-11-8. A Paddy Godown was attached to the Nellore Jail, and its construction amounted to Rupees 628, while a record room was added to the Principal Sudder Ameen's Court at a cost of Rupees 921-8-0.

The Post Office at Nellore was also rebuilt for..... Rs. 470 0 0

A Bridge over the Jaffer Saib channel was enlarged at an expenditure of Rupees 699-12-0 and Rupees 330 were disbursed in rebuilding a Bridge across the Survapully channel which had been destroyed in the flood of 1852.

With regard to the employment of the different Members of the Department it appears that Major DeButts and Lieutenant Bean, were principally employed in framing Ordinary Estimates in superintending the construction of the Pennair Annicut. Lieutenant Moberly was but a short time in the Division in this year. Lieutenant Walker assumed charge in October and after marching down from the North and making some arrangements for recommencing the work at the Pennair Annicut which had been stopped for the season, proceeded to plant Executive Officers and point out the duties required of them in commencing the opening of the Dorenall pass, the Nundy Cannama Ghât and the Cuddapah Bridges, taking en route such irrigation works as came in his way.

Mr. Walton was well employed in the ordinary duties of preparing Estimates and in both Districts examining works when completed.

Mr. Rozario only joined the Division in April, and was at first a good deal employed at the Pennair Annicut; he then made a few Ordinary Estimates and proceeded to Madras on leave, and after undertaking a small survey and examining a few works, fell sick and remained so the rest of the year.

The number of works inspected by the Department appears to have been 414.

A. BOILEAU,
Civil Engineer 2nd Division.

Civil Engineer's Office, 2nd Division, }
3rd February, 1855.

Civil Engineer's Office, 3d Division,
Canara District, Ankola Talook,
Sedashghur, 14th February 1855.

FROM LIEUT. G. W. WALKER,
Civil Engineer 3d Division.

TO MAJOR J. H. BELL,
Secretary to the Board of Revenue, Department Public Works.

SIR,

I have the honor to forward herewith the Annual Report of Important Works in progress in the 3d Division during the year 1853.

I have the honor to be, &c.

GEORGE WARREN WALKER,
Civil Engineer 3d Division.

REPORT OF IMPORTANT WORKS UNDER EXECUTION IN THE THIRD DIVISION DURING THE YEAR 1853.

The following statement exhibits in a Tabulated form for each of the principal works of the Canara, Bellary, and Kurnool, Districts, the Expenditure during the year 1853, the total on each work up to the end of 1853, the balance unspent, or probable remaining cost, and lastly the probable date of completion.

The following is a brief abstract,

	No.	Cost during 1853.
Roads.....	18	Rupees 50,602 3 10
Travellers' Bungalows.....	4	do. 4,149 0 0
Detached Bridges.....	1	do. 177 7 0
Public Buildings.....	7	do. 12,377 0 0
Works of Irrigation.....	10	do. 90,690 5 5
Total cost during 1853.....		Rupees. 1,57,996 0 3

Statement of Important Works under execution

Number.	District.	Amount expended in 1853.
	<i>Roads.</i>	
1	Making a 1st class road from the town of Hullihul to the village of Mavinkoppa on the Dharwar frontier.....	3,184 6 2
2	Formation of a road from Hullihul to Borebunder via the Shingawaree Ghaut.....	1,447 8 11
3	Formation of a road from Yellapoor to Kirwatty.....	1,772 10 6
4	Improvement of the Arbyle Ghaut.....	3,290 7 1
5	Formation of a road between the foot of the Arbyle Ghaut and the town and Sea Port of Ankola.....	4,067 9 8
6	Formation of a road from Sanekutta to Tuddry.....	491 0 5
7	Formation of a cart road from Sirey via Ambenhully and the Devamunny Ghaut to Coompta.....	6,020 13 8
8	Formation of a road from Eckumby to Samusghee.....	529 11 4
9	Improvement of the Neelecoond Ghaut.....	1,211 5 7
10	Improvement of the road from the town of Coompta to the Sea Coast.....	552 11 6
11	Opening the Gursoppah Ghaut including trace.....	4,462 6 2
12	Bellary.	
13	Bellary and Humpsaugur road.....	8,815 3 0
14	Heerihall road.....	8,597 10 0
15	Formation of a road from Perdoor to Oodipy and Mulpay.....	248 10 11
16	Formation of the road and construction of bridges across the Munzerebad Ghaut.....	5,161 2 5
17	Formation of a road from Oopinungaddy to Panimangalore.....	498 5 4
18	Constructing a road from Buntwal to Mangalore including a bridge.....	141 2 1
	Formation of a road from Jalsoor near Soolia to Cassergode.....	399 7 1
	Total.....	50,632 3 10

in the Third Division during the year 1853.

Total expenditure up to 31st Dec. 1853.	Balance of estimate or probable remaining cost.	Probable time to complete.	Executive Officers and amounts of salaries while employed.
3,184 6 2	0 0 0	Completed..	{ Lieut. Thornton, Madras Arty. 3 months at Rs. 150...Rs. 450 3 do. at Rs. 190...Rs. 570
1,447 8 11	9,402 7 1		{ Rupees... 1,020 Asst. Surveyor M. H. Beahen, 2 months at Rs. 141.4. Rs. 282-8
5,121 13 8	29 15 4	Completed..	{ Lieut. Thornton, 2 months Rs. 300
3,290 7 1	459 8 11	Completed..	
4,067 9 8	2,646 13 1		
2,702 3 7	0 0 0	Completed..	
76,729 10 10	358 14 4	Completed..	{ Lieut. Babington, 4th Regt. N. I. 12 months at Rs. 100. Rs. 1,200
4,085 1 1	1 3 5	Completed..	
1,211 5 7	3,788 10 5		
1,552 11 6	515 15 6		
4,994 14 8	5 1 4	Completed..	{ Lieutenant Walker, Engineers. 6 months at Rs. 290. Rs. 1,740
16,095 3 0	31,319 13 0	Dec. 1856.	{ Capt. E. Gage, 15th Regt. N. I. 7 months at Rs. 133-5-4 per month..Rs. 933-5-4.
15,421 10 0	10,922 6 0	Dec. 1855.	
5,703 5 2	284 8 5	Completed..	
84,488 1 3	8,428 11 2		{ Lieut. R. A. Roberts, Engineers. 5 months at Rs. 290...Rs. 1,450
408 5 4	9,491 10 8		
141 2 1	3,164 9 9		
9,731 3 0	1 0 0	Completed..	
2,40,376 10 7	80,821 4 5		

Statement of Important Works under execution

Number.	District.		Amount expended in 1853.		
<i>Travellers' Bungalows.</i>					
1	Bellary	Heerihall Travellers' Bungalow.....	2,079	0	0
2	Kurnool	Constructing a Travellers' Bungalow at Yeldoorty....	270	0	0
3		Constructing a Travellers' Bungalow at Dhone.....	1,300	0	0
4		Constructing a Travellers' Bungalow at Kurnool.....	500	0	0
		Total.....	4,149	0	0
<i>Detached Bridges.</i>					
1	Bellary.	Constructing a bridge across the surplus Calingulah of the Anantapoor Tank in the road from Bellary to Bangalore.....	177	7	0
<i>Public Buildings.</i>					
1	Bellary.	New Hoozoor Cutcherry at Bellary.....	3,150	5	0
2		Bellary new Talook Cutcherry.....	2,451	0	0
3		Goodlium Talook Cutcherry.....	0	0	0
4	Kurnool.	Constructing a Talook Cutcherry at Chagulmurry....	500	0	0
5		Constructing a Talook Cutcherry at Ramalcotta.....	1,000	0	0
6		Constructing Civil Dispensary at Kurnool.....	1,775	2	7
7		Rebuilding the Town wall at Kurnool.....	3,500	0	0
		Total.....	12,377	1	7
<i>Works of Irrigation.</i>					
1	Bellary.	Singanamala Tank.....	26,577	14	0
2		Darojee Tank.....	26,269	10	0
3		Hunsce Tank.....	4,327	14	0
4		Anantapoor Tank.....	5,332	5	0
5		Avinmudgoo Tank.....	4,853	0	0
6		Dharmaveram Tank.....	2,026	13	0
7		Cotnoor Tank.....	3,066	14	0
8	Kurnool.	17 other works varying from Rs. 2,000 to Rs. 4,000 each	17,362	12	0
9		Improving Cotacheroo Tank.....	332	3	5
10		Repairing Cooroocoonta Machaveerapah Tank.....	541	0	0
		Total.....	90,690	5	5

in the Third Division during the year 1853.

Total expenditure up to 31st Dec. 1853.			Balance of estimate or probable remaining cost.			Probable time to complete.	Executive Officers and amounts of salaries while employed.
2,288	0	0	44	0	0	Dec. 1854.	
1,729	5	8	0	0	0	Completed.	
1,800	0	0	0	0	0	do.	
500	0	0	1,404	0	0	do.	
6,317	5	8	1,448	0	0		
796	0	0	1,579	6	0	July 1855.	
8,398	15	0	880	5	0	Dec. 1855.	
4,064	0	0	2,243	0	0	Do.	
0	0	0	3,503	0	0	Do.	
500	0	0	1,602	8	0	Do.	
1,000	0	0	1,102	8	0	Completed.	Assistant Overseer C. Palmer, 7 months at Rs. 43-15-1 Rs. 307-9-7 Lieut. Col. Henderson, Engrs. 12 months at Rs. 820. Rs. 9,840 Asst. Overseer Palmer, 5 months at Rs. 43-15-1...Rs. 219-11-5 Asst. Overseer Milton, 6 months at Rs. 43-15-1...Rs. 263-10-6 Asst. Overseer W. Milton, 6 months at Rs. 43-15-1...Rs. 263-10-6.
3,675	2	7	0	0	0	Do.	
3,500	0	0	3,325	0	0		
21,138	1	7	12,656	5	0		
52,028	14	0	8,471	2	0	Completed.	
39,144	13	0	5,335	3	0	Do.	
13,144	6	0	3,210	0	0	Do.	
13,030	13	0	956	3	0	Do.	
6,603	5	0	1,324	11	0	Do.	
5,938	3	0	2,164	15	0	Do.	
3,066	4	0	3,551	2	0	Dec. 1855.	
33,329	12	0	10,536	6	0	Do.	
4,532	0	5	0	0	0	Completed.	
1,500	0	0	631	1	3	Dec. 1854.	
1,72,318	9	5	36,180	11	3		

Almost the only works that have been systematically undertaken, as part of a general plan of operations, are the Canara Roads, 16 out of the above 18, and the statement of benefits arising from public works within the Division must be confined chiefly to them.

Roads.

These may be grouped together for more convenient consideration as follows, viz :

- 1st Group—The Dharwar and Sedashegur Line comprising Nos. 1 and 2 of the List.
- 2d Group—The Arbyle Line—comprising Nos. 3, 4, 5, and 6 communicating between Hooblee and the Ports of Ankola and Tuddry.
- 3d Group—Nos. 7, 8, 9, 10,—The Devamunny and Neelcoond Lines—The feeders of the Coomptah Trade.
- 4th Group—No. 11—The Gairsoppah Ghaut leading to the Port and River Navigation of Honore.
- 5th Group—Nos. 12 and 13—Bellary Roads, remotely connected with all the above.
- 6th Group—No. 14—From Agoomby Ghaut to Oodapee and its Port Mulpy.
- 7th Group—Nos. 15, 16, 17—Munjerabad Line—The direct communication from Bangalore to Mangalore.
- 8th Group—No. 18—Branch of the great Military Road from Mercara to Mangalore, opening it to the nearest point on the Sea Coast.

1st Group. Attention was first directed to the Northern line through Soopah when the Collector and Assistant Civil Engineer visited that Talook together early in the season of 1847-48. A Road from Hullial, an important town on the frontier of Dharwar, to the Head of the navigation of the Sedasheghur River, was thought worthy of being undertaken on local grounds alone, its effect in opening up the most out-of-the-way and neglected part of the District being calculated to be greatly conducive to its prosperity. The Sunaky or Sunkeachy Ghaut, the only one then in use by laden cattle (chiefly for carriage of Raggy, the produce of Coomry cultivation) was examined, but not promising well, a pass used only by foot passengers and called indifferently the Unshy or Singawurree Ghaut, from the villages above and below, was fixed on as the most improvable line. With a view to its chiefly coming into use for carriage of Timber, a slope as steep as 1 in 12 it was thought might be adopted to advantage, and the line from its head was proposed to be taken within a very short distance of the Forest of Goond known to contain much fine Teak difficult of access. Rough Estimates were framed for cutting a 12 foot track throughout, at a cost of about

Rupees 10,000, but held back until progress should have been made with the Arbyle line and its branches, in the same Talook, then also brought to notice for the first time.

The project lay by until this year, when the connection between Hullial and Dharwar having been completed, its extension westwards was commenced under Lieutenant Thornton the same executive Officer who had been employed on the branches of the Arbyle line, Assistant Surveyor Beahen being placed at his disposal for the Ghaut trace. The disturbances in Goa had produced a feeling of insecurity among the inhabitants of the bordering Jungles into which the insurgents when hard pressed were said to retreat; and the Magistrate of Canara considered it necessary that the country should be made more accessible to troops, this being the second time within a few years that troops had been despatched from Hurrayhur to secure the Goa frontier. Since first projected, the idea of making use of the Ghaut for transport of the Goond Teak had been abandoned, further inquiry having shewn the possibility of floating it down from a much higher point of the Cauly Nuddy than Cadara the termination of the Ghaut. Another line therefore which the Assistant Civil Engineer had the foresight to examine in 1848, passing through Mopye and Goondaray, was finally adopted as likely to benefit the trade with Goa by the Coondol and Doacorpen, as well as the Coessay Ghauts; and with a view to facilitate the use of laden carts, the maximum slope to be used on the new Ghaut was reduced from 1 in 12 to 1 in 16.

Work was commenced in 3 places at once, at the Ghaut, Potellee, and Hullial, some Bridge work remaining on the Dharwar frontier at Mavincope, making it convenient to the executive Officer to commence his operations from the east, leaving the Ghaut trace chiefly to the Surveyor. Sickness however broke out in the camps, and the progress made up to the end of the year was not very great,—a subsidiary line to connect the Military outpost of Jugglepett, and Peishkar's Cusbah of Soopah sanctioned together with the main line could not be commenced.

The results obtained hitherto therefore were confined to the connection of Hullial with the open country of Dharwar by a decent cart Road, the benefits of which told chiefly on the town of Dharwar itself, supplies of Timber, Firewood, Charcoal, Straw, &c. being conveyed to it from the frontier Jungles and Villages laid open by the line within Dharwar limits.

2d Group. The opening to cart Traffic during dry weather of the *Arbyle Ghaut and Road*, having proved eminently successful and encouraging, progress has been made in every successive year in extending its

benefits in all directions. This year Rupees 75 a mile was judiciously laid out in widening the main line from Yellapoor to Heeraygooty to 6 yards throughout, the original outlay of Rupees 6,000 having only sufficed to cut to an average width of 4 yards; monsoon repairs were likewise carefully attended to, and efficiently performed. Access to the port of Tuddry was completed, and progress made in bridging 9 miles of approach to Ankola which from the rugged nature of the ground more especially required to be so completed. Above, the direct connection with Hooblee, as far as Kirwutty on the Dharwar frontier, was completed under Lieutenant Thornton.

The annexed statement of traffic furnished me by the Collector will shew the effect of these improvements, whose cost and original outlay have been ridiculously small compared to the mileage acted on.

		Kirwutty and Yellapore Road.			Arbyle Ghaut Road.		
		1852	1853	Increase.	1852	1853	Increase.
Imports.....	Carts....	0	68	68	85	241	156
	Bullocks..	8,712	18,660	9,948	18,804	33,306	14,502
Exports....	Carts....	10	850	840	79	1,251	1,179
	Bullocks..	11,422	39,468	28,046	18,823	33,079	14,256
Total.....	Carts.....	10	918	908	164	1,499	1,335
	Bullocks..	20,134	58,128	37,994	37,627	66,385	28,758

Deduction of the Kirwutty Traffic from that on the main line will shew the amount of Imports and Exports by the Moondagode and Hullial branches which with the first named converge at Yellapoor. There is an apparent discrepancy in the return of Export bullocks for 1853, making the return traffic on the Kirwutty Road greater than that by the Arbyle Ghaut, or a part greater than the whole, which I have detected too late to make inquiry about. Whether the figures of the two have been accidentally transposed or a clerical error has raised the former 10,000 over its due, I know not; the statements can only be depended on relatively for the 2 years, not absolutely—an excess there should be of return traffic over imports especially carts—the Arbyle line acting as a surplus vent of the stream of trade which the Devamunny Road cannot adequately accomodate—Empty carts frequently return to Hooblee by the Arbyle line the want of bridges on which is not so much felt as when they are loaded; Cotton bullocks, which never carry return loads, do the same; other cattle use the Burgny Salt Depots to load at to avoid delay at the great magazines of Oopin-putnam (now Kuttogaul); timber also affords a return load for some carts.

It is evident therefore that the sanction of Rupees 32,000 received in October of this year, for constructing timber platform bridges on

Masonry Piers and abutments, with smaller Masonry drains, on the main line between Meerjan and Yellapoor, has been granted very opportunely. When some progress has been made with the work, it will be desirable similarly to complete the Ankola junction below the ghaut, and the Moondagode and Hullial feeders above, also to bridge the Gungawully River omitted on account of its magnitude from the list originally submitted for sanction. And above all an Executive Establishment for the new work and maintenance of what has already been done, should be organized without delay, and the Revenue Department relieved of duties which it is totally incompetent to carry on.

Our information as to what has been done in extension of these lines by our Dharwar neighbours, is singularly defective, except as to the Hullial branch, which as mentioned in reporting of the last group of roads has been connected with Dharwar. The Kirwutty line was taken in hand conjointly with its extension by Misreecope and Kulghutghee to Hooblee, the greater length of which portion has apparently prevented its progress from keeping pace with the work in Canara limits as being by far the most important feeder of the Arbyle Ghaut with reference to the Cotton Trade, the speedy connection of Kirwutty with Hooblee cannot be too strongly urged on the notice of the local authorities at Dharwar as well as on the Bombay Government. Moondagode is already connected with Hooblee and Dharwar by a 1st class bridged and metalled road, but cotton that has got so far South on the Sirey Road is not likely to leave it for the Arbyle line. A projected cross road from Turrus to the frontier near Kirwutty of which I have heard may divert some of the Cotton Traffic from one line to the other. But further particulars on this head must be deferred for next year's Report, to complete which I hope soon to be furnished with more materials from Dharwar.

The 3d Group is connected with our most important Trade, that of the Port of Coomptah, the only one from which cotton has hitherto been shipped in large quantities. Of the extent and value of the commerce affected by these communications the annexed Table of Exports, with which the Collector has been good enough to supply me, will enable any one to judge. The statement affords satisfactory indication of progress, as it shews the value of the trade to have doubled from 1852 to 1853, exclusive of the single article of Cotton the fluctuations in which depend solely on the price given at home, and the export of which in 1852 amounted in value to 40 Lakhs of Rupees, the highest sum it was ever known to have reached.

*Comparative Statement of Exports, from Coompta, during the Fuslies
1262 and 1263.*

Goods.	Fusly 1262.		Fusly 1263.		Increase.		Decrease.	
	Quantity.	Value. Rs.	Quantity.	Value. Rs.	Quantity.	Value. Rs.	Quantity.	Value. Rs.
Rice.....Corgs.	3,601	2,30,594	4,621	3,31,593	1,020	1,00,999	.....	.....
Betelnuts.Candies.	1,843	63,604	3,006	1,18,963	1,163	55,359	.....	.....
Pepper do.....	1,535	94,906	4,951	3,46,493	3,366	2,51,587	.....	.....
Sandalwood do.....	.....	.....	232	5,921	232	5,921	.....	.....
Cardamoms do.....	113	83,900	126	97,298	13	13,398	.....	.....
Cotton do.....	66,876	40,88,994	28,319	17,05,701	.....	.....	38,557	23,83,293
Coffee do.....	.....	.....	93	8,552	93	8,552	.....	.....
Catechu do.....	.....	.....	100	4,611	100	4,611	.....	.....
Turmeric do.....	597	12,895	634	18,817	37	5,922	.....	.....
Wheat...Corges.	274	14,354	262	14,596	.....	242	12	.....
Jaggery .Candies.	4,058	84,331	7,946	1,62,889	3,888	78,558	.....	.....
Wax do.....	51	13,721	36	9,512	.....	.....	15	4,209
Horns.....No....	24,489	2,183	18,387	1,703	.....	.....	6,102	480
Coir.....Candies.	131	1,854	132	1,925	1	71	.....	.....
Silk do.....	.....	.....	26	42,732	26	42,732	.....	.....
Iron do.....	602	18,010	630	21,345	28	3,335	.....	.....
Piece goods	.....	.....	.....	.....	.....	.....	.....	.....
Pieces	23,898	37,446	33,584	50,541	9,686	13,095	.....	.....
Saveh Rice Corges.	.....	.....	30	2,200	30	2,200	.....	.....
Indigo...Candies.	17	8,424	51	39,411	34	30,987	.....	.....
Magdoomee	.....	.....	.....	.....	.....	.....	.....	.....
Sugar.....do...	1,657	39,724	3,705	94,745	2,048	55,021	.....	.....
Sandalwood Ma-	.....	.....	547	1,652	547	1,652	.....	.....
nufactures.No....	.....	.....	.....	.....	.....	.....	.....	.....
Wild. Mace..	.....	.....	.....	.....	.....	.....	.....	.....
Candies.	.....	.....	48	1,910	48	1,910	.....	.....
Saltpetre... do....	216	4,862	100	2,625	.....	.....	116	2,237
Gunny Bags No....	.....	.....	46,050	4,938	46,050	4,938	.....	.....
Gall Nuts Candies.	449	2,314	1,731	10,769	1,282	8,455	.....	.....
Cadsigne Chekeh	.....	.....	.....	.....	.....	.....	.....	.....
Bark of Wild	.....	.....	.....	.....	.....	.....	.....	.....
Mimosa Abster-	.....	.....	247	1,053	247	1,053	.....	.....
gens....Candies.	.....	.....	.....	.....	.....	.....	.....	.....
Sandalwood Oil	.....	.....	.....	.....	.....	.....	.....	.....
Candies.	1	2,968	.....	.....	.....	.....	1	2,968
Betel Leaves No...	83,02,500	1,226	.....	.....	.....	.....	83,02,500	1,226
Cotton Seed.	.....	.....	.....	.....	.....	.....	.....	.....
Candies.	222	1,755	.....	.....	.....	.....	222	1,755
Silver Horse Orna-	.....	.....	.....	.....	.....	.....	.....	.....
ments...Candies	.....	1,200	.....	.....	.....	.....	.....	1,200
Bagger Betto	.....	.....	.....	.....	.....	.....	.....	.....
(fruits)...do....	443	1,253	.....	.....	.....	.....	443	1,253
Shark Fins...do....	14	1,477	.....	.....	.....	.....	14	1,477
Junglewood	.....	.....	.....	.....	.....	.....	.....	.....
Planks...Guz....	11,161	1,119	.....	.....	.....	.....	11,161	1,119
Under 1000 Ru-	.....	.....	.....	.....	.....	.....	.....	.....
pees Sundries.	.....	7,662	.....	17,975	.....	10,313	.....	.....
Total.	.....	18,20,776	.....	31,20,470	.....	7,00,911	.....	24,01,217

In 1853 the final completion of the Bridge work on the Devamunny Road took place, it having been necessary to obtain Sanction for Rupees 5,000 additional to the original amount of Rupees 72,000, to bring it to a successful conclusion. The causes of excess were satisfactorily accounted for.

Small balances of Sanctions for the Sumusgee branch Road, and for a communication between the Town of Coompta and its Harbour were expended, but the latter remains unfinished until a decision is arrived at as to the eventual position of the Custom House, which it is desired to change. But its removal is dependent on, and must be subsequent to, other works recommended by the Civil Engineer and approved by the Collector, but which are considered to require better superintendence than can be provided by the latter's Department. In the meantime the pettiest additions that can be made to the accommodations of a port so notoriously deficient in the facilities necessary for its extensive trade, remain in abeyance.

The abovementioned improvements were suggested in a Report on Coomptah communications prepared at the request of the Bombay Government, the only one of which that has been acted on is the improvement of the Neelcoond Ghaut increasing its efficiency as an auxiliary to the Devamunny line whose inadequacy to the increasing traffic could not fail to be perceived. The Trace for a Cart Road at Neelcoond, worked by Lieutenant (now Captain Collyer of the Engineers, when employed in the search which ended in final selection of the Devamunny line, was cleared and examined by the Assistant Civil Engineer of the Division in 1852, and its opening in the portions most likely to give effectual relief to the Bullock Traffic recommended. Sanction was not received till just before the monsoon of 1853, so that not more than a quarter of the small sum available was expended.

It is interesting and curious to watch the gradual development of the Coompta communications and how one improvement led to another, their progress failing to keep pace with the demand created by them. Attention was first called to the value of a trade which forced its way in spite of a thousand difficulties, through dense Jungles and down a precipitous Ghaut not wide enough in places to allow of two bullocks passing one another, and resembling the bed of a mountain torrent rather than a commercial road. A few thousand rupees were expended in widening and slightly altering the old line, and though laid out in as unscientific manner as could well be imagined had a magical effect on the trade, still further enhanced by improve-

ments to the more eastern portions of the line. The town of Sircy, made accessible to carts sprung into importance in the midst of the Soondah Jungles. Successively, the approach East of Sircy was completed and bridged, fresh feeders opened from the Dharwar and Mysore countries, a new Ghaut at Devamunny made use of by cart traffic when only 12 feet wide and unbridged, the same completed as a 1st class line throughout, another auxiliary opened at Arbyle, and evidently the rejected trace on the old Neelcoond Line brought into play—and yet there seems no end to our wants; we are always asking never satisfied, and never able to anticipate the demands for new outlets that the trade of the country is making.

In the accompanying statement of traffic on the Devamunny and Neelcoond Lines, it is evident that the returns under the head of Exports for 1852 relate only to laden carts and cattle, excluding those going back empty and thus viewed their general correctness is corroborated by the returns of Coompta trade already given. In 1852, no less than $\frac{3}{5}$ ths of the bullocks and $\frac{3}{5}$ ths of the carts would appear to have returned empty, while in 1853 those proportions were diminished to $\frac{1}{10}$ th and $\frac{2}{5}$ ths respectively of the down traffic; (Imports and Exports being terms used with reference to the Canara District, and conversely to their meaning at shipping ports.) The magnitude of the cotton trade in 1852, carried on by cattle which never take return loads, and the deficiency of miscellaneous traffic returnable in salt, cocoanuts, and other coast produce, contrast with the succeeding year, the trade of which therefore shews satisfactory progress in every other staple but that of cotton.

Comparative Memorandum of Traffic on the undermentioned Lines of Road in the Canara District during the years 1852 and 1853.

		Devamunny Ghaut & Road.			Neelcoond Road.		
		1852	1853	Increase.	1852	1853	Increase.
Imports.	Carts.....	9,346	14,741	15,395	0	0	0
	Bullocks..	77,656	60,572		8,080	16,585	8,505
Exports.	Carts.....	1,706	10,789	9,083	0	0	0
	Bullocks..	27,128	58,329	31,201	2,542	15,813	13,271
Total..	Carts.....	10,422	25,530	15,108	0	0	0
	Bullocks..	1,04,784	1,18,901	14,117	10,622	32,398	11,776

4th. The *Gairsoppah Ghaut* is an entirely new undertaking of this year's date. The eventual necessity for a carriage Ghaut at this

position was pointed out 40 years ago by Major F. Cotton in his Report upon the Canara Ghauts, and the project was not dropped by successive Collectors and Engineers, though kept in abeyance for a time till other works of more immediate importance had advanced, and till efficient means of executing a scientific trace were available. At last operations were commenced in November 1852, and the Officer in charge soon seeing his way clearly, demanded and received an addition of Rupees 4,000 to the original sanction of Rupees 1,000, so as to make the most of the first season by widening for Bullocks traffic portions of the new line as fast as traced. Simultaneously a sum of Rupees 1,200, was placed at his disposal by the Mysore Authorities for connecting the road with the Nugger Division at Talgoopah, its object as far as regarded Canara purposes merely, being attained by its connection with the Siddapoor Road near the famous falls.

The village of Gairsoppah is at the head of 18 or 20 Miles of Navigation of great value, the River named indifferently after it, or the Port, of Honore being tidal up to that point, and of considerable magnitude and depth so far. This commanding position having been taken advantage of, for the establishment of large salt Depots, a vigorous trade in that commodity sprung up on the 3 ghauts terminating at that point, in return for large quantities of grain the produce of the Nugger Division of Mysore. These are the Hossulmukky ghaut on the North of Canara Bank of the River, and the Hinney and Govindaugherry ghauts on the South or Mysore bank, the streams above Gairsoppah here forming the boundary of the two Districts. Of these ghauts, the Hinney carried the largest trade, that by Govindaugherry consisting almost in exports, occasioned I was told by its extreme steepness prohibitive of return loads, but partly perhaps by a supply of salt for the country inland of it being easier obtainable from Bhatkul by the Camee and other ghauts further South.

Preference was given to the Hossulmukky ghaut for improvement, partly because it cleared the Gairsoppah River which runs athwart the Hinney line above the ghauts and is a considerable obstruction to its trade. But the chief reason was that a ghaut on the Southern bank would not in the least affect the South of the Canara Balaghaut, while that on the North bank being led to Talgoopah would equally with the former influence the Nugger province East of the Gairsoppah or (as it is called above the ghauts) Shirravutty River. The tract which that stream cuts off has an outlet already provided for its traffic by the Coloor ghaut which only wants continuation within Nuggur limits to introduce the use of carts.

The new Gairsoppah ghaut and road follow the general line only of the Hossoulmukky ghaut as far as Mullaymunny, but are never coincident with it except in crossing. During the tracing operations, portions of the old ghaut between one crossing and the next were superseded as fast as the new bits could be opened to 3 yards in width. Beyond Mullaymunny the old line surmounts a very high ridge which shuts off the upper valley of the Shirravutty from the rest of the Bilghy Talook, and here the new road leaves it, running between that ridge and the precipices which overlook the deep river bed up to the Falls. For 3 miles the line is taken through jungles untrodden by human beings, but marked by Bison paths; then a solitary settlement of Coomry Mahrattas is encountered; and lastly the thinly peopled but most lovely country adjacent to the Falls is reached, and a junction made with the Siddapoor Road. The 8 or 9 miles East of Mullaymunny which time and money only sufficed to open to from one to two yards in width was at once taken up by the traffic, though barely wide enough for a single Bullock.

The portion worked with Mysore money, included an ascent of one mile in length to gain the Mysore Table land from the Vale of the Falls, and the most fortunate coincidence of the lowest gap in the ridge with the directest line took off much anticipated difficulty. A width of not less than 12 feet throughout, was attained for the whole distance to Talgoopah, including several rough Timber Bridges, with some embanking and cutting. As Talgoopah was before accessible from the East to Cart traffic, though imperfectly, the link of communication just added was of no ordinary value.

The following comparative statement of traffic which I have received from the Collector will shew how readily the benefits of the new ghaut were appreciated. The figures represent the number of pack bullocks; the only species of conveyance for which the pass is yet practicable.

	1852.	1853.	Increase.
Imports	95,575	1,42,184	46,609
Exports.....	19,721	1,28,635	1,08,914
Total.....	1,15,296	2,70,819	1,55,523

The Bullock traffic on this line would appear from these returns to be greater than that on Arbyle, Devamunny, and Neelcoond ghauts put together; I cannot help thinking therefore that they include all three ghauts before mentioned, under one head. In that case the great increase of return traffic is all that we can be safe in referring to the effect of the new ghaut, the facilities afforded by which enabled Bullocks to ascend with loads in a proportion far beyond former years.

The monsoon repairs and completion of some rocky portions of the ghaut Trace were carried on by the Native Marahmut Superintendent in a manner very creditable to him, the work being of no ordinary difficulty. It was intended that finished estimates should have been prepared by the Engineer Department, on which sanction should be obtained for further work after the rains of 1853, but the disgraceful neglect of Assistant Surveyor Beahen, entrusted by the Assistant Civil Engineer with the execution of this duty during his absence on sick leave led to the total loss of upwards of a season. For this and other shortcomings the Assistant Surveyor was eventually reported to Government who ordered his degradation to a lower rank in the Department.

The chief works auxiliary to this are the Sircy and Siddapoor Road, and the main line from Shemogah to Talgoopah. Provision has been already made for Timber Bridges on the former, and the works already undertaken on the latter have received a new impulse. But the Northern portion of Nuggur Division wants vastly more opening up, and at a quicker pace, than can be hoped for as long as that province is left destitute of skilled superintendence. There is every desire on the part of its rulers to take advantage of the outlets to the coast made or improved for its trade, but the want of superintendence at their disposal disables them from progressing with more than one or two main lines. Thus the Coloor ghaut and road passable for carts within Canara limits since the year 1847, are yet cut off from the cart traffic of Nuggur by an impassable belt of country only a few miles in width and through which a line might be easily worked, elaborate plans and estimates for bridging the Coloor ghaut and road below and above to the total extent of 30 miles, have been in readiness for years, but necessarily withheld till it can be said that the progress on the Nuggur side demands their production.

The next group (5th) on the list, and placed in that order from their very faint bearing on the north Canara lines above enumerated, are the only roads within Bellary District that have hitherto been taken in hand to any purpose. Not that the subject of the communications of that vast inland District has been totally neglected by the local officers,

for the Engineer Records shew that surveys of lines traversing the country in all directions have been made, and plans and estimates prepared for bridging the Nullahs on them. Major Lawford especially, when Cuddapah and Bellary formed the 3rd Division, appears to have spent much time in planning improvements to all the military communications of the country, but not one single result appears of all his labours. The impulse to do something, after all that was planned and written, came from without.

Heeriall road is simply the completion for 15 miles, to the town of Bellary, of 200 miles of 1st class road originally undertaken in Mysore to connect Bangalore, Toonkoor and Hurryhur, and from which advantage was taken of the peculiar dovetailing of the two provinces to run a Northern branch from Heerivor to the Frontier. So much being done on the one side, so little could not be suffered long to remain undone on the other. But hitherto even the reproach against Bellary has not been entirely removed, the few bridges required on the line being incomplete.

Humpsaugur road may be considered in a military point of view as a continuation of the abovementioned line towards the stations of Dharwar, Belgaum, and Kulladghee within the Bombay Presidency, two of them lately garrisoned by Madras troops. Or commercially under two aspects; either as facilitating the carriage to the nearest large market of the agricultural produce of the Western Talooks of Bellary, and the artificially irrigated banks of the Toombuddra; or as opening the way to the Western ports for the cotton and other valuable products of this central country.

No doubt what has already been done has proved of local benefit, but it can hardly have affected the Western Traffic which demands not one, but several outlets. All the information as to returns is therefore conjectural, the actual traffic on the Humpsaugur line being reckoned by the Collector from observations made at the Toombuddra Ferries to be Rupees 10,00,000 in annual value, on which he anticipated an increase of Rupees 5,00,000. There can be little doubt but that he has at least not overrated the probable increase.

Work on the Humpsaugur road hitherto was confined to the earthworks of the line, and the collection of materials for small drains. South of Hosspett, where its change of direction occurs, the improved line has generally come into use, as the country was far from open, and the old tracks nearly impassable, but in the level plains towards Humpsaugur the old route will as often be taken as the new till the superiority of the latter is established by bridges.

In a country like Bellary, the general surface and soil of which are such that in dry weather it may be traversed in all directions by carts, it is open to question whether the order of proceedings hitherto adopted in constructing its roads may not justly be reversed. In a mountainous region like Canara, in which traffic is absolutely stopped by the periodical rains, a well traced foot track must be the initial step, its opening to bullock traffic, widening to cart traffic, and eventual bridging following properly in that order. But rivers in Bellary are the chief obstacles to traffic, even in the dry season, either from their width of deep sand, or from their steepness of bank and irregularity of bed. It would in many cases be good policy to bridge certain Nullahs before making miles of road on either side, and to lay out the general plan of communications with more regard to the points of crossing the larger rivers than appears hitherto to have been done.

The subject of subsidiary works to the 5 groups above treated of, with special relation to the connection of the last with those preceding it, is too long to be entered on in this paper, and will take its place more naturally in next year's Report.

6. The *Roads* in connection with *Agoomby ghaut*. Of these, the central line to Oodapee and its post of Mulpy was the only one that enters into the list for 1853, and that to a very small extent. Last year's Report mentioned how great a desideratum the bridging of all 3 lines was, and a chief cause of its delay. The same cause viz. the absence of persons competent to prepare the necessary Plans and Estimates, prevented any thing being accomplished in this year and seemed likely to operate for that ensuing. Little remains to be done within the Mysore Frontier for completion of this most valuable line from the west of Bellary, through Hurryhur and Shemogah to the head of Agoomby ghaut; that most useful work itself is now inadequate to the traffic, and as it would be difficult to widen it in some places, it may hereafter be deemed necessary to add another ghaut of moderate width and easier slope on the same hill face to accommodate the cart traffic, giving up the old ghaut to bullocks and empty carts. On the 3 lines below, the nullahs, not many in number, but some of large size, must be bridged. The Oodapee Road in particular is greatly obstructed by 4 rivers respectively 80, 150, 150, and 370 feet in width, which are formidable obstacles to carts. The Collector notes of the line, that "it has been most useful for travellers and pilgrims to Oodapee, but until the bridges are built is not much used for purposes of traffic, except for a very valuable trade in Sandal-wood, and by the Cloth Merchants."

Group No. 7. Consists of Trunk Road No. 3, its extension to the head of the River navigation, and an improved approach to the large town at that point. The works are under the Superintendent of Roads, but at such a distance from Madras as to derive no benefit from his supervision, an Engineer Assistant placed under his orders for a few months did all in his power to complete the timber bridges below Munjerabad ghaut, but was shortly withdrawn upon other duty, and has not been replaced. Consequently the works have been almost at a stand still during the eighth year since their commencement; the length of the line within Canara and the Road Department limits being only 29 miles. What little has been done on the other short portions of road, has been carried out by the Collector's Department.

What is wanted here is the permanent appointment of an Assistant to the Superintendent of Roads, with an Overseer under him to the charge of the line from Foot of the Munjerabad ghaut to Mangalore by both banks of the Naitravutty, the Mercara Road within Coorg limits and down to Pootoor remaining in Overseer Graham's diminished charge. Till this be done the works can never be expected to prosper.

The ghaut itself and communication direct to Bangalore is supposed to have been ere this completed as a 1st class line, much attention having been bestowed upon it within the Mysore Territories.

No. 8. The 2d class road entered under this head was completed in 1853, and with very beneficial effects to lower Canara and Coorg of which the Collector furnishes me with the best evidence in the shape of a comparative statement of salt sales during the Fuslies 1261 and 1262, as follows, viz.

Jaulsoor and Cassergode.	"The traffic on this road is recorded by the salt sales which have been as follows.	
Increase.	In 1851-52 or Fusly 1261—	In 1852-53 or Fusly 1262.
Garces 14 and Maricals 236.	Garces 35 and Maricals 40—	Garces 49 and Maricals 326.

The line yet requires bridges for its larger Nullahs, Estimates for which were prepared by the Collector's Department, and whose construction will complete all that is necessary to be done. The main line of which this is a branch, being Trunk Road No. 2, between Mangalore and Mercara, with its continuations to Seringapatam, Bangalore, Mysore, and the Neilgherries are completed throughout, without a break, and passable at all seasons by any descriptions of vehicles.

Works in connection with Roads, viz.

Travellers' Bungalows and Bridges.

It may be supposed that the 4 works under the former head and 1 under the latter, are entered in the Bellary and Kurnool lists merely to

make a shew where there was little to boast of; but the fact that 3 of the Bungalows and the bridge are on the same line of road, and that the main military communication between Bangalore, by Anantapoor, Ghooty, and Kurnool, to Hyderabad, relieves them from the insignificance of detached works of that nature. It is desirable that they should be followed by other works of the same description of which 3 Bungalows remain desiderata between Anantapoor and Kurnool; while the bridge stands or rather stood (for its re-construction was not complete in 1853) alone in its glory, being the same structure that was mentioned in the report of the Commissioners on Public Works as the only arched bridge within the Ceded Districts. The 4th Bungalow completes the series on the high road from Bangalore to Bellary via Toomkoor and Heerloor.

Of the *Public Buildings* unconnected with the roads the new Hoozoor and Talook Cutcheries at Bellary and Civil Dispensary at Kurnool may be mentioned as well built and adapted to the purposes for which they are intended. Rebuilding portions of the Town wall at Kurnool is a work necessary for the protection of that place from damage by floods of the Toombuddra which seriously injured the old walls, endangering the lives of many during the high freshes of 1851.

Most of the larger *Works of Irrigation* that suffered from the storms of 1851 and whose repairs were still progressing in this year have been entered in the list of Important Works. But though some were on a large enough scale to have been taken advantage of, (had sufficient Engineering means been available), for the introduction of improved methods of collecting, carrying, and putting together the materials used, all were essentially of the nature of local repairs. Extensive works affecting the irrigation of new or abandoned cultivation, and a systematic organized method of performing the general repairs of the numerous tanks and channels of the Bellary and Kurnool Districts, are yet desiderata. So much has been said on the subject of the wants of the 3d Division as regards irrigation in the Annual Report for 1852 that nothing is left for mention in this paper.

While discussing the chief works of the year, notice has already been taken of the satisfactory and improving condition of all those previously executed, and from this and the report for last year together a general idea of the present state of the Division as regards communications and irrigation may be obtained. The subject of ports, and the further wants of the Division in respect of every thing which comes properly under the observation of Civil Engineers, must be discussed in the

report for 1854, the present paper having already been too long delayed and the work of the following year serving better to introduce the topics in question. It only remains to note the strength of the Civil Engineer's Department during 1853 and the manner in which it was chiefly occupied.

Civil Engineer—Major (now Lieutenant Colonel) R. Henderson, c. B. Executive charge of repairs to Darojee tank. Projecting an Annicut and irrigation channels from the Huggry river at Yaparaul. Preparation of estimates for additional work on the Bellary and Humpsaugur road. Planning improvements to 3 of the channels from the Toombuddra river. And general charge of the 3rd Division, to which Kurnool District was added this year.

1st Assistant Civil Engineer—Lieutenant G. W. Walker, Engineers. Trace of New Gairsappa ghaut and general duties in Canara till May; after which absent on sick certificate.

2nd Assistant Civil Engineer—2nd Lieutenant A. S. Moberly, Engineers. General Inspection of tank works 3½ months.

2nd Assistant Civil Engineer—Lieutenant J. M. Thornton, Artillery. Received charge of Lieutenant Walker's office on his departure. Absent on leave from June to September. After which superintended the Hullial and Singawurree Road.

Assistant Surveyor A. P. Kemp—Employed in Inspection of Irrigation works in the Bellary District. Surveys and Estimates of Road near Ramom Droog. Plans and Estimates of New Annicut across the Chinna Huggry River. 3 months employed in Surveying, Levelling, Planning and Estimating for a New Annicut and Irrigation Channels on the Pedda Huggry River.

Assistant Surveyor M. H. Beahen—3 months marching from Bellary to join the Assistant Civil Engineer in Canara, during which time his services were absolutely lost. Survey of Gairsoppah Ghaut 1½ Month. Devamunny improvements ½ Month. Travelling to Mangalore ½ Month. Office work at Mangalore 3½ Months. Travelling to join Lieutenant Thornton 1 Month. Under orders of Lieutenant Thornton on Soopah Roads 2 Months.

During the whole of the time spent in travelling Mr. Beahen appears to have entirely neglected his Office Work.

Assistant Surveyor B. Kemp—11 Months employed in Inspections of Tank work in Kurnool District. 1 Month in Bellary District engaged on the Pedda Huggry Annicut project.

Assistant Overseer Palmer—Shinganamulla and Anantapoor Tank Repairs for 7 Months. Darojee Tank Repairs for 5 Months.

Assistant Overseer W. Milton—Darojee Tank repairs—6 Months. Awimudgoo Tank repairs—6 Months.

GEORGE WARREN WALKER, LIEUTENANT,
Civil Engineer 3d Division.

Civil Engineer's Office, 3d Division }
Canara District, Ankola Talook, }
Sedashghur, 14th February 1855. }

REPORT UPON THE WORKS EXECUTED DURING THE YEAR 1853 IN THE
FOURTH DIVISION, COMPRISING THE COLLECTORATES OF NORTH
ARCOT AND CHINGLEPUT.

Captain Collyer, Civil Engineer.

Lieut. Rideout, 2d Asst. Civil Engineer, joined in May 1853.

Mr. F. Dick, Asst. Revenue Surveyor.

Mr. T. H. Bush, Sub-Asst. Revenue Surveyor.

Mr. J. Shaw Lincoln, Sub-Overseer.

Mr. Downie, Sub-Overseer.

2. The bills for money expended in the Division amount to Rs. 1,23,699-4-6.

	North Arcot.			Chingleput.		
Irrigation.....	43,022	7	0	54,682	2	4
Roads.....	13,498	5	8	1,718	5	5
Building.....	9,097	12	1	898	9	0
Ferry Boats.....	0	0	0	10	1	0
Salt Platforms.....	0	0	0	771	10	0
	<u>66,618</u>	<u>8</u>	<u>9</u>	<u>58,080</u>	<u>11</u>	<u>9</u>

3. The works estimated for or inspected by the Officers are as follows:—

Captain Collyer 169, and in projecting various works, the Southern Canal, the Ponney Channels, the Vencatagherry and Palmanair Road, &c.

Lieut. Rideout 80, and on Wallajahnuggur and Sholinghur road.

Mr. F. Dick, 132 and in various Surveys.

Mr. T. H. Bush 98, and on the Ponney Channels and Cheyaur Repairs.

Mr. R. Downie was employed in superintending the construction of Works at Mamandoor and Vellore.

Mr. J. Shaw Lincoln, Do. Do. and at Cheyaur Repairs.

4. The time of the Officers of the Department has been employed in various duties connected with the District; a Survey and levels for cutting a navigable Canal from the Adyar to the Palaur, has been prepared, this Canal, 40½ miles long, is the first section of the inland navi-

gation to Porto Novo; it is proposed that it be 12 yards broad at bottom, with a depth of 3 feet at low water; the total amount of the estimate Rs. 1,57,455-8-0.

5. The Channels for the Ponney project and Surveys for roads from Vencatagherry Cota to Palmanair, and from Arnee to Vellore, and Arnee to Arcot, have been prepared.

6. An estimate for an Anicut across the Corteliaur at the entrance to the Golden Channel, has also been prepared and sanctioned subsequently; this Channel, the Golden Channel, the principal feeder of the Chembrumbaukum tank, had been allowed to be so choked with sand as to be useless except in extraordinary freshes; but in December 1850, I estimated for opening the Channel to a width of 8 yards, this was done at a cost of Rupees 4,242-6-0 and the money recovered immediately, a fresh having gone down it, taking 5,000,000 cubic yards of the value of 5,000 Rupees a few days after it was opened, this channel will eventually be enlarged; the Anicut is about to be constructed, and will, when the Coratoor Anicut which keeps up the water in the Chembrumbaukum Channel, and which is now also being built is finished, ensure a very steady supply to that fine Tank.

Estimate for the Anicut across the Corteliaur at Casaverum Rupees 9,932-3-1.

Estimate for the Anicut and Head sluice at Coratoor Rupees 16,357-14-1.

7. During the month of July, I was employed, assisted by Overseers Eaton and Howard, in commencing the extension of the Canal from Streehurreecottah to Doogarazapatanum; the estimated sum being Rupees 47,274-15-0, not very good progress was made in this work at the first outset, and then came the monsoon, so that the amount expended up to the end of the year was only Rs. 925-10-8.

Overseer Eaton's Civil pay for 5 months at 43-15-1... Rs. 219-11-5.
Overseer Howard do do ... ,, 219-11-5.

8. In this year considerable repairs were executed under Overseer Lincoln to the Cheyaur Anicut; an extraordinary flood occurred in March 1853; the Cheyaur river rising to a height of 15 feet above the bed of the river owing to some of the wells sinking bodily, one of the piers sank 3 inches on the lower side, cracking the Anicut on which, or rather in connection with which it was built, to a distance of 13 feet; the adjacent pier also sunk, cracking the Anicut but not materially so, the loose stone apron in rear of this, between the wing and

the sluices, was carried away; from the front of the Anicut, the sand was washed to a depth of 2 feet and to a width of 9, though the wings in front of the sluices projected 18 feet; with these exceptions the Anicut remained uninjured. One of the principal causes of this damage was, that the flood was so sudden that the sluice shutters could not be got up, and the handles stopped such quantities of straw and other debris that it very much confined the water way.

9. The repairs consisted of placing a row of wells immediately in front of the damaged part of the Anicut, filled with stones and blue clay, and a wall of brick in chunam joined into the Anicut over it; filling in, in front with stone, and filling up carefully the cracked and injured portion; taking up the aprons and renewing where necessary, the wells and filling the interstices of the apron stones, with stone jelly in chunam; the work has been done and has stood most securely ever since, cost of repairs to,

Anicut and aprons, lengthening wing wall, }
repairing breaches in embankments at head, &c. } Rs. 4,954-7-9.

Other works carried on at the same time to the value of about 2,000 Rupees. Overseer Lincoln's Civil Pay for 9 months and 24 days at 43-15-1 Rupees 429-7-9.

10. The channel from the river Ponney (which falls into the Palaur near Trivalum) has made great progress, in fact has been nearly completed this year; this channel taken from the Ponney a mile above Mailpady, conveys water on the left bank to Sholinghur and Perancanjie, from which tank it is in contemplation to cut a channel to fill a large, almost natural, basin (for it requires only a short embankment) at Carical capable of holding 22,000,000, cubic yards of water; from this a channel will be taken into Moshoor, giving off branches to various parts of the North of the Sholinghur Talook, it is also contemplated to take a branch along the bank of the river running South above the tanks between it and the river as far as Lalapet; and on to Ammoor, supplying all the tanks about Rancepet and Wallajahnuggur; and on the right bank a channel will be constructed for several tanks in Trivullum, an Anicut is proposed, since sanctioned, at a cost of Rupees 31,205-12-11. The Estimate for this channel was Rupees 9,985-8-0 and the sums spent in this year is Rupees 9,807-4-6. This work was carried on by Sub Assistant Revenue Surveyor Bush. Sub Assistant Revenue Surveyor Bush's pay at 103-8-8 for 4 months and 3 days Rupees 424-8-4.

11. The head sluice erected to the Doozy Mamandoor channel, having been washed away, and the foundation and wings too much shat-

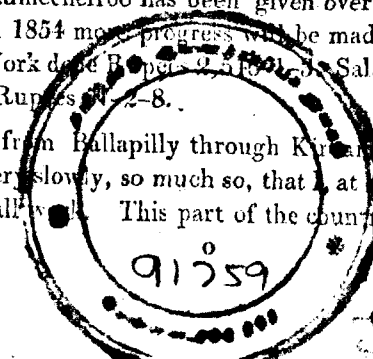
tered to be again used, an entirely new work was commenced, great delay took place in the building; the refusal of some of the labourers to execute at any price, work which it was hitherto their custom to do, necessitating a recourse to less skilful people, the slowness of the supply of stone necessitating, as there was no time to lose, the use of brick, and other causes have tended to raise the price of this work very materially. The sum expended on this work amounts to Rupees 1,831-0-0. The channels &c. to the Doozy tank have also been repaired at a cost of Rupees 1,952-9-6. Sub Assistant Overseer Downie's pay for 6 months and 11 days at 43-15-1 = Rupees 279-12-1.

12. The Perancanjie tank has been entirely restored under the supervision of Mr. Bush. It is a fine tank, and now has an excellent bank, faced with stone; the top width of the bund which is metalled is 16 feet, and forms a portion of the road from Wallajahnuggur to Sholinghur. The cost of this work was Rupees 2,848-12-8. Sub Assistant Revenue Surveyor Bush's pay for 34 days at 103-8-8 = Rupees 117-5-5.

13. A road from Wallajahnuggur to Sholinghur 15½ miles on sanction of Rupees 6,845-3-3 was also commenced under Lieutenant Rideout. Lieutenant Rideout's pay for 2 months at 193-0-0 = Rupees 386-0-0. This estimate was for making passable at all times, a road hitherto impassable during the rains, and this has been done, but a further sanction of Rupees 5,499-10-10 has been granted to complete it throughout with bridges and tunnels, and also for metalling it.

14. Chittoor and Kircumbady road distance 49 miles, was sanctioned in September 1852 for Rupees 15,878-11-0 for making an unmetalled road. This road runs through a fertile valley, the valley of the Soornamooky, and connects Chittoor and Kircumbady through Chundra-gherry and Triputhy. The progress made here has been very slow, caused partly by difficulty of procuring labourers, and partly by there being in re-construction at the same time, the large ruined tanks of Auckmunput and Nagaputlah. Work done Rupees 1,200-0-0. Ten miles of this road from Chittoor to Pootahput forming part of the road to Cuddapah by Daumecherroo has been given over to the Road Department. (I hope in 1854 more progress will be made, but it must necessarily be slow.) Work done Rupees 9,500-0-0. Salaries paid to Maistries on Chittoor road Rupees 2,378-8-8.

15. A road from Ballapilly through Kircumbady and Naggery is also progressing very slowly, so much so, that at the time, considered it advisable to stop all work. This part of the country is thinly populated,



people can only be procured when not employed on their fields. Salary paid to Maistry Rupees 95-3-2.

16. A road from Vellore to Panatoor joining the road from Arcot through Trivullum to Chittoor has been finished at a cost of Rupees 11,592-15-7. This road, a distance of 10 miles, is in many places over paddy fields where it has been raised and metalled 9 inches thick. There are 52 bridges, tunnels, irrigation drains and road dams, giving a total water way of 1,112 feet. The sides of the roads have been planted with banyan and other trees. One of these bridges is of three 16 feet arches; 1 of one 28 feet arch, another of two of 10 feet each, and 2 others each of 10 feet. I mention this simply to shew how much has been done for the money, and had it not been for the unremitting personal supervision of Mr. Sullivan the Head Assistant Collector, who undertook the work on Lieutenant Denison's departure for Burmah, it would have cost considerably more. Overseer Downie's pay for 5 months and 17 days at Rupees 43-15-1 = 244-9-6.

17. A causeway and 2 bridges have been constructed at a cost of Rupees 1,759-11-11 between the town and bazaar of Trivittoor, and is most useful. It forms as well, a portion of the road from Trivittoor to Arcot.

18. Of the minor works executed during the year, there are none requiring particular mention. They are for the most part, for the improvement of existing works, either by repairs, or by construction of calingulahs or sluices, and present nothing, of which a description would be interesting or instructive.

Buildings.

19. Of buildings in North Arcot, there have been constructed a Cutwall's Choultry at Cusbah Vellore on an estimate of Rupees 702-2-5. The work was superintended by Mr. Sullivan the Head Assistant Collector, and cost Rupees 758-7-7.

20. A Police Ameen's Cutcherry, estimate at Rupees 1,334-5-8, was also built by Mr. Sullivan. The building, especially the wood work, is excellent. It was found necessary to build the foundations deeper than estimated. The cost of the building is Rupees 1,358-1-0.

21. The Talook Cutcherry at Nagalapoorum has been repaired on estimate of Rupees 993-11-3.

22. A new Talook Cutcherry has been built at Chundragherry at a cost of Rupees 1,801-6-1, and is a satisfactory building, superintended

by the Talook Maistry; the wards for Pensioners both male and female, have ridge ventilations. Maistry's salary Rupees 111-3-10.

23. Ridge ventilators have been built to the Sleeping wards of the Chittoor Jail at a cost of Rupees 626-7-0.

24. The Huzzoor Cutcherry at Chittoor has been enlarged at a cost of Rupees 2,589-9-9. Maistry's Salary Rupees 24-12-4.

25. The works of Irrigation in Chingleput though sufficiently numerous, are small in amount, and are principally for repairs or for small works, such as sluice, &c. and are not worth reporting on in detail.

The three principal items.

Rupees 674-6-0 for the Damul Channel.

Rupees 3,185-8-0 for the Govindavady Channel.

Rupees 1,752-9-0 for the Vagamungalum Channel were for repairs rendered necessary by the floods of October, November, and December 1852 in the Palaur river. Maistry's salary for these Works Rupees 72-0-0.

26. There is no doubt much requires to be done in Chingleput, that Collectorate has hitherto had a larger share of the attention of the Civil Engineers than North Arcot, the large tanks are in good order, many of them, as reported upon last year, have had large sums expended upon them, and they are in an efficient state.

Buildings.

27. An addition of 2 rooms has been made to the Court House at Chingleput at a cost of Rupees 551-10-0 on an estimate of Rupees 589-7-0. Salary paid to Maistry Rupees 35-14-11.

28. A Cutwall's Choultry at Poonamallee on an estimate of Rupees 269-5-10.

29. Small sums have been expended in road repairs, and Rupees 771-10-0 have been expended on Salt Platforms.

30. In Chingleput it does not appear that the works repaired or executed with a view to increasing their efficiency have, owing to the drought, answered the expectation.

31. In North Arcot, the Cheyaur Channels executed in 1852 have paid Rupees 5,570-4-7 in 1852-53 above the average collection of the 8 preceding years. This is the fairest way of calculating it, but had there been no such Channels, it is difficult to say how much the collections would have fallen below the average. The increase in other works is as follows:—

Statement showing the results of certain Works of Irrigation executed in the District of North Arcot.

Names of the Works.	Year of completion.	Cost.			Average yearly Revenue of the five years preceding the commencement of the Work.			Average yearly Revenue since the work was completed showing the number of years.		Annual average gain in Revenue.
		3			4			6		
		Rs.	A	P	Rs.	A	P	Rs.	A	P
1										7
Repairing the river channel of Chittaroor in Satghur Talook.....	1853	325	3	0	612	7	0	675	8	0
Repairing the Mundegulum tanks in Arcot Talook.	1853	693	12	0	415	10	5	676	10	4
Repairing the Tippiasamoodrum tank in Velloor do.	1853	436	12	3	1,147	9	5	1,340	6	3
Supply from the Chettyr Ancient Repairing Poorisay and Coviloor tanks in Wundawash Talook..... Repairing the tanks, &c. of the Vakady, &c. 20 Villages in Trivatoor Talook..										
					3,805	0	0	5,912	6	0
	1853	4,554	7	9	10,427	4	0	13,890	2	7
					14,232	4	0	19,802	8	7
Repairing the Pondiwakum Hissa tank in Sutvaidd Talook.....	1853	530	13	0	1,139	12	0	1,567	14	3

(Signed) CHARLES WHITTINGHAM,
Collector.

G. C. COLLYER, CAPT., Civil Engineer 4th Division.
Nungumbaucum, 9th March, 1855.

Camp Vaniembaddy,
November 30th 1854.

No 595.

FROM LIEUTENANT C. V. WILKIESON,

Acting Civil Engineer 5th Division,

TO MAJOR J. H. BELL,

Secretary to the Board of Revenue

in the Department Public Works.

SIR,

I have the honor herewith to forward the report on Public Works executed in the 5th Division during the year 1853. I am quite aware that it is defective in many respects, but I hope the short time that I have been in the Division will prove a sufficient excuse with the Board for its incompleteness.

I have the honor to be, &c.

CHARLES WILKIESON, LIEUTENANT,

Acting Civil Engineer 5th Division.

Camp Vaniembaddy, Salem District,
November 30th, 1854.

REPORT ON THE PROGRESS OF PUBLIC WORKS IN THE FIFTH DIVISION FOR THE YEAR 1853.

The more important works under execution during the year.

On examination of the Bills for the year, there does not appear to be many items of importance. The only works that can be brought under that head, consist of,

No. 1. Rs. 1,212-5.—*Loose stone work to the Areyapooroomanoor Hissa Tank in the Cullacoorchy Talook.* The work was superintended by the Talook authorities and was necessary to maintain the ordinary Revenue.

No. 2. Rs. 12,122-7-6.—*Repairing the breach in the Vellaur Anicut.**Salary of Superintendents.*

Captain Ouchterlony.....Rs.	984 3 0
Lieutenant Hessey....."	503 5 10
Assistant Surveyor Vardon.."	599 4 0
Do. Overseer Kennedy. "	297 5 0

Total..Rs. 2,384 1 10

The Anicut was breached in the storm of March 1853, and was repaired on Emergent Estimate. The repairs were carried on under personal superintendence of the Civil Engineer Captain Ouchterlony, assisted at various times by Lieutenant Hessey Assistant Civil Engineer, Surveyor Vardon and Overseer Kennedy. The Sub-Collector Mr. Wood was also present during the whole time.

No. 3. Rs. 3,665-12.—*Constructing a Civil Dispensary at Cuddalore.**Salary of Superintendents.*

Asst. Surveyor Vardon.....Rs.	940 0 0
Do. Overseer Loosemore...."	184 8 11

Total..Rs. 1,124 8 11

The work was commenced in 1852 and nearly finished in that year, but the Bill is included in this year's expenditure. The Building was constructed under the superintendence of Surveyor Vardon and Overseer Loosemore.

To show the utility and suitableness of the building, I here give a few extracts from the reports for 1852-53, of W. Burrell, Esq., Civil Surgeon of Cuddalore. In report for 1852. "The new Dispensary built by Government having been reported as fit for occupation the Patients were removed into it on the 24th November 1852; the building is on an excellent plan, and every way suited to the purpose" "its ventilation is upon an excellent plan and answers well, it is capable of accommodating 20 male and 15 female patients without crowding, while the Verandahs, if necessary, might be made available for 26 more," "its site is as central as could be chosen and is in all respects eligible." In the report for 1853, I may however add that the building continues to prove in all respects suitable for the purpose intended."

Superintended by Talook Maistry.

No. 4. Rs. 1,758-13-5.—*For new Public Bungalow at Salem.*

No. 5. Rs. 3,230-13-10.—*For raising the road from Cuddalore to Puttambakum.* This amount came out of the discretionary allowance. This road is part of the line from Cuddalore to Oolundoorpett. A further sum of Rupees 11,000 has been expended on the work on two Estimates, the repairs having been extended to Punrooty. The road is now quite unfinished, and a sum of Rupees 10,000 has been entered in the Budget 1854-55, but from letters received from the Collector it does not appear that this even will be sufficient. It was superintended by the Collector and his Assistants.

No. 6. Rs. 997-15-6.—*Marking out the line of road from Porto Novo to the Vellar Anicut.* This amount was spent under the direction of the Sub-Collector Mr. Wood. The full estimate for the road is Rupees 19,394-4, it has been placed under the executive charge of Captain Taylor. The amount already expended up to this date is Rupees 14,459-2-6 the remainder of the Estimate will be sufficient for the formation of the road which will still require to be metalled, a very expensive business, as metal could not be supplied under 2 annas a cubic yard. The present Estimate will be expended during the coming season. Captain Taylor reports that the road is now much used by bandies carrying charcoal, &c. for the Iron Company at Porto Novo.

The total amount which appears to have been expended during the year 1853, on public works is Rupees 66,075-14 distributed as follows.

Irrigation.....	46,578
Roads and Bridges.....	13,389
Public Buildings.....	3,908
Revenue Buildings.....	1,012
Judicial Buildings.....	112-6
Government House.....	621
Ferry Boats.....	267
Salt Pans.....	188

The amount under the Head of "Irrigation" appears to have been spent chiefly in repairs to the existing works, in the construction of sluices, the clearing of channels, and strengthening bunds, that for "roads and bridges, &c.," with the exception of Nos. 5 and 6, solely in the improvements to the lines of communications. Amongst the remaining items the only one of note "Public Buildings" includes the sum of Rupees 3,665-12 for the Public Dispensary at Cuddalore.

A general statement of expenditure on Public works classified for 10 preceding years.

This will be found on a separate paper marked A. I would observe that there does not appear in my office any return for the last 10 years of Maramut Establishment under the Collectors. The return on this subject for the year 1853* contains the Talook

Maramut Gomastahs for Salem, but not for South Arcot.

A statement of the more important works previously executed.

On examining the last reports, there does not appear any works to be placed under this head. No returns of traffic are kept on any of the roads in this Division.

The principal employments of the different Members of the Civil Engineer's Department.

See separate papers marked B. and C. It is to be remarked that the subordinates have been chiefly employed in superintending particular works which will account for the few works apparently inspected by them.

Statement of the Collector of Sea Customs.

See paper marked D. Shows an increase in imports and exports at the Port of Cuddalore with a decrease in both at Porto Novo but an increase on the whole of Rupees 1,952-9-5.

A general view of the present state of the Division in regard to Irrigation, communications, Ports.

It would be absurd on my part to endeavour to make a report on this subject, as I have only been in Division as Acting Civil Engineer, since the 20th of last month, and although I was for some years an Assistant in this Division, it is nearly four years since I left it, and I have no doubt since then, great improvements have been made.

Principal wants of the district.

I can, of course, only make remarks in the most cursory way on the requirements of the district, as since I have assumed charge, I have had but little time for acquiring a knowledge on the subject. "Irrigation." From the number of estimates that have already been sanctioned and others gone up with the Budget of 1854-55 it will be seen how much is required in this department. Many more estimates are in course of preparation for large works in both the Collectorates comprising this Division, viz,

The Neringepett Anicut so often brought prominently before Government. An enlargement of the Channel of Mooganoor, and the construction of a branch Channel in the direction of Permuttee, at an estimated cost of Rupees 30,000 and which is expected to bring in an annual increase of Rupees 10,000.

Projects for two Anicuts across the Maneemootanuddee near Virdachellum, with Channels leading therefrom to several tanks in the neighbourhood, by which an increase of Rs. 20,000 per annum is expected. The cost of these works will nearly amount to Rs. 60,000. Several smaller projects are in hand for restoring old Anicuts and Tanks in the Tengrecottah and Kistnagherry Talooks of Salem, and the Ternamallee and Chaitput Talooks of South Arcot, by which water, that now runs waste to the sea, may be made to fertilize many thousand acres of land at present covered with jungle and almost uninhabited. My Assistant

Mr. Hessey has been very usefully employed in examining the old anicuts, &c. in Western Talooks of South Arcot and reports a vast number of works of Irrigation very much out of repair or totally ruined some having remained so for more than 40 years. Numerous old anicuts exist over the Ponnear which is unlike the other rivers of South Arcot and has water in it during the South West monsoon as well as North East, much also may be done by clearing out old channels of supply to tanks and making new ones so as to be in a certain measure to be independent of local rains. In a district like South Arcot where the rivers in general are empty during the greater part of the year, freshes coming down suddenly and perhaps only lasting a couple of days, it is much wiser to have channels leading to reservoirs for storing the water than to hope to cultivate from channels themselves as in the Tanjore District.

Roads.—During the year under report little appears to have been done except in repairing roads, but since that time many lines have been projected by my predecessor Captain Ouchterlony some of which are now in the course of construction, others the work is sanctioned but not commenced and some few the estimates are in course of being prepared. The very important line from Cuddalore to Salem is in progress under Lieutenant Clay and two Overseers, the ghaut line from Yercaud (Sheravary Hills) to Darampoor is in course of construction and on many more roads work is being carried on but these all more properly belong to the report on the Public Works for 1854. Until Captain Ouchterlony joined the Division the South Arcot District was without a made road but now the face of the country is being changed, lines are in progress in every direction particularly in the Western Talooks which were without even a bandy track. An estimate will be sent immediately for repairing a line from Chengamah in Trenamallee Talook to Ootatoor in the Tengrecottah Talook, along which line there is a very large traffic but now all carried either on bullocks or Coolies as there is not a bandy road. In the Salem District the roads it is well known are very good but still many Bridges are urgently called for. Some new lines of road are required such as from Sankerydroog to Raizipoor. A new line is also wanted from Hunamanteertum, on the main line from Salem to Vaniembady via Munjawaddee pass, to Tertamullee and from thence Cotaputty at which last place are large Jungles abounding with forest trees of Atcha, Venghay and Kulamunday. These trees will be useful for Sleepers for the Railway and would not have to be carried above 30 Miles. I am also about to propose two wooden Lattice Bridges on masonry piers over the Kulaur

and Ponneaur on the above main line which might be built very cheaply from the wood from these Jungles. In projecting new lines of road in Salem District and repairing old ones, making them as much as possible feeders to the Railway now in progress will be borne in mind. Thus the trace from Yercaud has been slightly altered as to meet the Railway at Mullapooram at which place there is to be a station so the Coffee planters will not have to send their Coffee much more than ten Miles to the rail.

Civil Engineer Department. One of the chief wants of this District is more Engineers. At present the Officers of all grades belonging to the division are,

One Acting Civil Engineer,
2 Surveyors.

I had an Assistant but he has been lately removed to another Department. There are also 2 Executive Officers and 3 Overseers but they are employed solely on their Executive charges.

Maistries.—The want of proper Maistries is so well known that it is hardly any use entering on this subject; in South Arcot there is a Maistry to every Talook, but in Salem there are only 5 Maistries to 12 Talooks, so that one Maistry has charge of 3 Talooks and nominally takes a tour 2 months at a time in each Talook, but he is at the call of 3 Tahsildars and if he sets about a work in one Talook he gets an order to say he is urgently wanted in the other so that $\frac{2}{3}$ th of his time is spent in travelling, and the consequence is, that not above one half of the Ordinary Estimates of the current year are carried out owing to the want of Superintendence.

CHARLES WILKIESON, LIEUT.,

Acting Civil Engineer 5th Division.

Civil Engineer's Office,
5th Division, Camp Vaniembady, 30th Nov. 1854.

A.
General Statement of money expended on Public Works in 5th Division from 1844 to 1853 inclusive.

Years.	Irrigation works.	Roads, Bridges, &c.	Public Buildings.	Revenue Buildings.	Judicial Buildings.	Flagstaff, &c.	Government house.	Ferry Boats.	Salt Platforms.	Total.	Disbursement to the Civil Engineer's Department.	Marumut Department.	Total.
1844.....	28,382 14	13,798 15	116 12	56 9	0 0	0 0	0 0	178 15	.....	42,434 1	8,061 4	.....	.....
1845.....	27,500 7	5,734 10	510 12	1,764 12	2,452 7	135 6	19 1	656 11	.....	38,774 2	12,654 2	.....	.....
1846.....	40,378 10	2,103 10	4,016 2	817 8	185 7	429 14	0 0	971 5	.....	48,902 8	19,310 11	.....	.....
1847.....	72,795 11	60,988 5	1,944 4	1,753 12	0 0	22 0	202 2	7 4	.....	1,37,713 6	19,076 14	.....	.....
1848.....	1,38,744 14	7,806 13	432 9	3,206 0	1,014 3	0 0	0 0	102 5	.....	1,51,306 12	14,812 1	.....	.....
1849.....	32,456 2	6,324 5	523 4	1,737 8	1,810 3	20 4	0 0	477 9	.....	43,349 3	14,598 10	.....	.....
1850.....	29,617 10	18,174 4	1,123 14	3,109 4	231 4	9 5	25 14	574 12	11 3	52,877 6	12,569 9	.....	.....
1851.....	36,577 2	6,766 12	2,563 3	2,202 12	239 7	52 6	0 0	21 2	0 0	48,422 12	13,317 11	.....	.....
1852.....	40,299 0	4,753 6	524 13	399 6	418 3	114 8	2,212 15	617 12	266 0	49,605 15	16,846 8	.....	.....
1853.....	46,577 15	13,389 0	3,908 7	1,012 1	112 6	0 0	620 9	267 6	189 2	66,075 14	16,470 5	7,833 3	24,303 8
Total for ten years.	4,93,230	51,39,840	0 15,664	0 16,059	8 6,463	783 11	3,080 9	3,875 1	465 5	5,67,946 15	1,47,717 11	7,833 3	24,303 8

CHARLES WILKIESON, LIEUT.,
Acting Civil Engineer 5th Division.
Civil Engineer's Office, 5th Division,
Camp Vaniembady, 30th November 1854.

B.

Principal employments and number of Works inspected by the Civil Engineer's Department during the year 1853.

Names of Officers and Rank.	Number of works inspected during the year.	Nature of employments.
Captain Smythe C.E. Engineer.		From January to June. Sick, and conducting only the duties of the Office.
Captain J. Ouchterlony Civil Engineer.	185	<i>Joined the Division 15th June.</i> <i>June and July.</i> Superintending the reconstruction of the Vellar Anicut, inspecting works and estimating for roads in South Arcot. <i>August.</i> For a few days superintending Vellar works; inspecting, measuring and marking out roads, and inspecting other works in South Arcot. <i>September.</i> Inspecting works and examining lines for roads in South Arcot. <i>October.</i> Examining estimating and marking out roads, inspecting works, and projecting a Railway between Tindevanum and Pondicherry by Mylum, in South Arcot. <i>November.</i> Inspecting works and repairs to Tindevanum and Pondicherry road. <i>December.</i> Inspecting works, examining various projects of Irrigation works in connection with the French authorities, and estimating for Villianoor and Villapoorem road in South Arcot.
Lieutenant W. Helsey, Assistant Civil Engineer.	42	<i>Joined the Division 7th August.</i> <i>August to October.</i> Superintending reconstruction of the Vellar Anicut in South Arcot. <i>November.</i> Inspecting works in South Arcot and marching to the Tapoor Ghaut in Salem District. <i>December.</i> Superintending improvements to the Tapoor Ghaut.
Mr. O'Hara, Asst. Surveyor.		<i>January to March.</i> Surveying Coffee Estates on the Sherwaroy Hills in the Salem District.

Principal employments and number of works, &c.

Names of Officers and Rank.	Number of works inspected during the year.	Names of employments.
Assistant Surveyor Vardon.	38	<i>January.</i> Inspecting works and making a survey of the Ponneaur, Guddelum and Oopenaur rivers. <i>February.</i> Inspecting works and superintending the repairs of the Ponneaur Vaghany. <i>March.</i> Surveying the above 3 rivers and inspecting works. <i>April.</i> Estimating for works to the breached Vellar Anicut and superintending the raising of embankments in the river. <i>May and June.</i> Superintending embanking work in Vellar river. <i>July.</i> A few days superintending embanking work and then on sick leave. <i>August.</i> On leave to 27th <i>September to November.</i> Surveying and estimating for roads. <i>December.</i> For a few days surveying for roads and then levelling and estimating for a channel from the proposed Vicravandy Anicut across the Ginjee river. All in South Arcot.
Asst. Surveyor Martin.	98	<i>Joined the Division 12th March.</i> <i>March to September.</i> Inspecting works. 16th <i>September to 30th November,</i> on sick leave.
Assistant Overseer Loosemore.	20	<i>January to March.</i> Surveying and estimating for repairs of roads and inspecting works. <i>April.</i> Superintending construction of the Kadagathoor bridge on the road from Salem to Bangalore and estimating for repairs to roads. <i>May to November.</i> Superintending the construction of bridges and the improvements to the Tapoor Ghaut. <i>December.</i> On sick leave. All in the Salem District.
Asst. Overseer Kennedy.	2	<i>January to April.</i> Superintending the opening of the Trace from Yercaud to Nagaloor in Salem District. <i>May to November 17th,</i> superintending Vellar Anicut works. 18th <i>November to December.</i> Superintending repairs to the road from Porto Novo to the Vellar Anicut in South Arcot.

Civil Engineer's Office, 5th Division, Camp Vaniembady,
30th November 1854.

CHARLES WILKIESON, LIEUT.,
Acting Civil Engr. 5th Division.

E.

Cost of the Civil Engineer's and of the Collector's Maramut Establishments in 5th Division for 1853.

Number.	Rank.	For what time.		Amount of pay.			Total.	
		Months.	Days.					
1	Civil Engineer.....	12	0	8,846	0	0	16,470	5 2
	His Establishment.....	12	0	1,776	0	0		
1	Assistant Civil Engineer.....	4	25	860	5	9		
	His Establishment.....	12	0	672	0	0		
1	Assistant Revenue Surveyor.....	3	0	412	3	5		
1	Do. Do.	12	0	2,024	8	10		
1	Do. Do.	10	0	1,315	14	2		
2	Assistant Overseers.....	12	0	527	5	0		
Total Civil Engineer's Establishment.....								
<i>South Arcot.</i>								
1	Maramut Superintendent.....	12	...	600	...	...	3,687	0 0
1	Overseer for the Vellar Anicut.....	12	...	420	...	...		
10	Talook Maistries.....	12	...	1,632	...	...		
1	Hoozoor Maramut Writer.....	12	...	390	...	...		
1	Do. Mootsuddy.....	12	...	180	...	...		
2	Do. Goomastahs.....	12	...	144	...	...		
8	Cottens and Well sinker.....	12	...	321	...	...		
Total Collector's Establishment.....								
<i>Salem.</i>								
1	Huzoor Maramut Superintendent.....	11	0	550	0	0	4,146	3 2
1	Writer.....	12	0	420	0	0		
1	Goomastah.....	12	0	420	0	0		
1	Assistant.....	12	0	138	0	0		
2	Talook Maistries.....	12	0	504	0	0		
2	Do. Do.	12	0	480	0	0		
1	Do. Do.	11	6	196	13	10		
11	Goomastahs.....	12	0	1,320	0	0		
1	Do.	11	22	117	5	4		
Total Collector's Establishment.....								
Grand Total Rupees.....							24,303	8 4

Civil Engineer's Office,
5th Division, Camp Vaniembady,
30th November 1854.

CHARLES WILKIESON, Lieut.,
Acting Civil Engineer 5th Division.

Civil Engineer's Office, 6th Division,
Tanjore District, Vellum, 29th Dec. 1854.

No. 805.

FROM MAJOR E. LAWFORD,

Civil Engineer 6th Division,

TO MAJOR J. H. BELL,

*Secretary to the Board of Revenue
in the Department of Public Works.*

SIR,

I have the honor to forward herewith a list of important Works executed in this Division in 1853.

The names of the Subordinates are added in a Memorandum as they were employed in General Superintendence throughout the Division.

I have the honor to be, &c.

E. LAWFORD,

Civil Engineer 6th Division,

REPORT ON THE IMPORTANT WORKS EXECUTED IN THE SIXTH
DIVISION IN 1853.

TANJORE DISTRICT.

Irrigation Works.

As in the preceding year the irrigation works of 1853 in Tanjore were exclusively confined to those of restoration and repair. No projects for the execution of new channels were carried on, and the time of the Department was fully occupied in others of immediate necessity, especially in superintending the repairs of banks, &c. consequent on the violent hurricane of the 27th March, which not only did a great deal of injury, but caused the stoppage of works of improvement throughout the province.

SIXTH DIVISION.

PARELLUM TALOOK.

Improving the Sandana Channel from the Veerasholen river.

Estimate.....	Rupees 5,000	0
Expenditure.....	" 3,091	14
Balance ..	1,908	2

The object of this work was two-fold, viz. to maintain the efficiency of the irrigation from a very important channel, and to open the navigation of the Veerasholen. The head of the channel was extended three miles higher up the course of the river, embankments for separating its course from that of the Veerasholen were constructed, and the entire system of supply was reformed and secured. The construction of a new head sluice was deferred till the following year.

TRITRAPOONDY TALOOK.

Reconstructing the annicut and bridge over it across the Adapaur in the limits of Paumany.

Estimate.....	Rupees 5,449	14	0
Expenditure.....	" 3,843	4	0
Balance Rupees.	1,606	2	0

This work was merely the reconstruction of a dilapidated annicut across which a bridge of 3 arches was built, in order to complete the communication between Negapatam and Tritrapoondy. The work was efficiently executed, but the bridge was not built in the year under review.

TRANQUEBAR TALOOK.

Enlarging the lower and upper Bridges across the Oopenaur on the road from Tranquebar to Negapatam.

Lower bridge Estimate.....	Rupees 1,482	10	0
Expenditure...	" 1,503	15	0
Upper bridge Estimate.....	Rupees 1,422	6	0
Expenditure...	" 1,493	11	0

These bridges were erected by the Danish Government and the arches were so small as to obstruct greatly the free discharge of the flood water on which account their enlargement by the removal of each alternate pier was recommended and sanctioned. The small excess above the estimate was caused by the storm.

SIXTH DIVISION.

NUNNELLUM TALOOK.

Reconstructing a Bridge of 3 arches across the Velapaur river on the road from Myaveram to Trivalore.

Estimate.....	Rupees 1,265	15	0
Expenditure.....	" 1,138	1	0
Balance Rupees...	127	14	0

This bridge was rebuilt to afford additional waterway, and the work was correctly performed.

Reconstructing a Bridge of 3 arches across the Pootaur river on the above road.

Estimate.....	Rupees 1,173	12	0
Expenditure.....	" 1,066	7	0
Balance Rupees.....	107	5	0

A work precisely similar to the preceding, and performed in like manner.

PATTOOCOTTAH TALOOK.

Constructing a Bridge of 3 Segmental arches of 30 feet span across the Maharajah Samoodrum River on the Road from Trichinopoly to Adrampatam.

Estimate.....	Rupees 6,000	0	0
Expenditure.....	" 5,624	0	0
Balance Rupees.....	376	0	0

This bridge was built across a violent jungle stream which occasioned great difficulties to traffic. The work was interrupted by the storm in March, but completed with trifling exception during the season, though for some unexplained reason it was not opened for use till the following year.

Constructing a bridge of 3 Segmental arches of 30 feet span across the Cunnanaur River on the road from Manargoody to Adrampatam altering the course of the River and improving part of the road.

Estimate.....	Rupees 6,202	1	0
Expenditure.....	" 4,799	2	0
Balance Rupees	1,402	15	0

This bridge crosses a stream which when flooded occasioned great obstruction to traffic, and the work is a very great improvement on an

important road. It was interrupted and endangered by the storm, but successfully completed in the following year.

TRITRAPOONDY TALOOK.

Constructing a bridge of 5 Elliptic arches of 35 feet span across the Paumany River on the road from Tritrapoondy to Mootoopettah.

Estimate	Rupees 7,382 10 0
Expenditure in 1852 Rupees	4,307 14 0
Do. in 1853 ..	1,097 11 0
	5,405 9 0
Balance Rupees...	1,977 1 0

This work commenced in 1852, was in progress when the storm of March 1853 carried away the centerings and did such damage that the arches could not be turned till the following season.

Improving the Port of Tranquebar and the Veerasholen River.

Estimate	Rupees 21,091 4 0
Expenditure	5,879 10 0
	Balance Rupees... 15,211 10 0

The object of the works comprised in this Estimate, and their result as far as they have been completed is stated in the following report.

The better navigation of the Veerasholen was the first object proposed in my plans, and the works for that purpose consisted of the removal of an annicut and sluice which endangered the passage of basket boats. This was accomplished last year, and boats can now freely descend the river during moderate freshes, but in high floods, they are still obstructed by a bridge on the Myaveram and Trivaloor road at Perenjairy for the alteration of which I am preparing a plan.

The number of basket boats which arrived at Tranquebar on private account during three years is stated in the accompanying
 • 200. • memorandum, but would probably have been much larger in 1853 had not the failure of the crops interfered greatly with trade.

The opening of the river by the removal of the dams above noticed involved the alteration of the irrigating and draining channels connected with them; the former being made to issue from the river itself, instead of deriving their supply from surplus water, and the drainage being

carried directly to the lowest practicable point without obstruction. These improvements were for the most part executed in 1853, and the results were undoubtedly satisfactory, but owing to the unusual failure of water in the Cauvery, and of rain in the monsoon the altered system had not a full trial. No complaints however have reached me during the present year and I have every assurance that the people are satisfied, and the revenue rendered more secure by the changes.

The improvement of the Port by deepening the Nundalaur River at its embouchure was proposed to be effected by turning the course of the Umbenaur so as to join the former river, and this part of the project is as yet incomplete. A new channel was partly excavated for the Umbenaur last year, but the bed has almost entirely filled up again by the destruction of the banks in the hurricane of March, and the subsequent drifting of sand, and although it has been re-opened this season to form part of the coast line of navigation, yet I have not thought it advisable to divert the river until the dikes are consolidated, and therefore this work has yet produced no effect on the port, nor is it efficient for navigation. The latter deficiency however is of no importance, as the canal cannot be of use until the whole line to Trimulivassal of which I contemplated the construction shall be ready.

Beach defences at Tranquebar.

Estimate	Rupees 20,000
Expenditure in 1852 Rupees	12,659 2 0
Do. in 1853 Rupees	5,790 12 0
	18,449 14 0
Balance Rupees	1,550 2 0

The works embraced in this outlay consisted merely of additions in length and thickness to the groynes for the protection of the Town which were commenced in 1851. During the year under review a violent set of the current took place in the S. W. monsoon on the Northern part of the beach and it was found necessary to throw out an intermediate groyne, as well as to strengthen the sea wall called the King's Bastion by additions of rough stone. The hurricane in March also caused considerable damage to the works which were repaired, and further expenditure was recommended by the Chief Engineer who inspected them during the season.

Extending the Jetty and deepening the harbour of Negapatam.

Estimate	Rupees	7,200	0	0
do.	"	3000	0	0
	Rupees	10,200	0	0
Expenditure	"	3,171	4	0
Balance Rupees		7,028	12	0

The improvement included in these Estimates were intended to deepen the harbour, and succeeded to a certain extent, but owing to the River having forced open a new outlet to the sea, Southward of the Jetty, and to the incompleteness of the works, little result was attained in the year now reported on, nor did the trade at all increase as the hurricane in March, and the subsequent failure of the harvest greatly reduced the exports of grain.

TRICHINOPOLY DISTRICT.

The same system has been carried on in this District during the year as in Tanjore by the improvement of existing works, and the efficient repair of the River Banks, with the object of maintaining unimpaired all present cultivation and revenue dependent on irrigation, and the results though certainly not brilliant, are on the whole very satisfactory.

MOOSERY TALOOK.

Improving the Toteyum Chinna Voikal channel.

Estimate	Rupees	9,458	0	0
Expenditure.....	"	8,934	12	0
Balance Rupees		523	4	0

This channel is the principal one of the Talook having under it and its branches a Revenue of nearly 20,000 Rupees. The head being situated immediately above the confluence of the River Caroopatanaur with the Cauvery and the channel being liable to be filled with sand brought down by the former as well as to have the embankment frequently breached, it was proposed to construct a new head sluice to the channel, and an annicut across the Caroopatanaur. The head of the channel was also to be fixed at a greater distance from the junction.

The works were completed under great difficulties and disadvantages arising from heavy rains at the end of January, followed by the storm in March and occasional bad weather afterwards.

No increase of Revenue was expected but the work was one of preservation which has answered its purpose.

LAULGOODY TALOOK.

Extending Tiroomungalum Annicut.

Estimate	Rupees	9,556	6	0
Expenditure in 1852 Rupees		6,850	7	0
Do. in 1853 ..		2,669	12	0
		9,520	3	0
Balance Rupees...		36	3	0

This was merely the completion of the works entered in the report for 1852, and included the construction of a new head sluice to the Pungoony channel above the annicut across the Coolayaur river, which crosses it. The work was very satisfactorily executed.

Repairing the bank of Pungoony channel.

Estimate	Rupees	1,613	2	0
Expenditure in 1852 Rupees		114	1	0
Do. in 1853 ..		1,136	11	0
		1,250	12	0
Balance Rupees...		362	6	0

This was a work of ordinary repair and improvement.

Roads and Bridges.

CONAUD TALOOK.

Repairing the Road from Trichinopoly to Tanjore via Towagoody.

Estimate	Rupees	2,186	0	0
Expenditure	"	1,026	9	0
Balance ..		1,159	7	0

This estimate was framed to repair damages caused by the hurricane of the 27th March which breached many tanks and covered the country with water.

The repairs could not be completed owing to the extreme dryness of the season.

Constructing part of the road from Trichinopoly to Tanjore via Sircarpolliam.

Estimate	Rupees	2,294	4	0
Expenditure	"	989	1	0
Balance ..		1,305	3	0

The object of this work was to open a communication between Trichinopoly and certain villages situated to the eastward and surrounded by irrigated lands. The work was only half finished owing to delay caused by the hurricane.

Repairing the road from Trichinopoly to Madura.

Estimate Rupees 23,534 0 0
Expenditure „ 8,245 15 0

Balance Rupees... 15,288 1 0

The works included under this head consisted of the construction of a bridge of 5 arches of 30 feet span across the Corayaur, and an extensive alteration of the course of the river, also a complete construction of the road for eleven miles. The foundation and piers of the bridge, and the alteration of the river were completed, and considerable improvement was effected in the road.

This line forms a continuation of the Trunk road No. 8 towards the south and is much frequented. The average number of carts passing daily is stated to be 200.

Repairing the road from Trichinopoly to Coimbatore.

Estimate Rupees 6,896 4 0
Expenditure in 1852 Rupees 382 7 10
Do. in 1853 „ 1,535 11 0

5,413 5 0

Balance Rupees... 1,482 15 0

A work of mere repair on the important line from Trichinopoly to the Westward along the right bank of the Cauvery.

Constructing a Road from Trichinopoly to Vialoor.

Estimate Rupees 3,211 6 0
Expenditure „ 2,274 13 0

Balance Rupees... 936 9 0

This work was designed for opening a communication between Trichinopoly and numerous villages situated in the midst of irrigated lands to the west of the town. It had a purely local object. A bridge of 3 arches across the river Codamoorty formed the chief expenditure.

LAULGOODY TALOOK.

Repairing the Road from Trichinopoly to Combaconum.

Estimate Rupees 5,042 1 0
Expenditure in 1852 „ 2,749 10 0
Do. in 1853 „ 1,433 2 0

4,182 12 0

Balance Rupees..... 859 5 0

This very important road has been under repair for some time, and the work was in progress in the year under review; the traffic is very great but has not been recorded.

LAULGOODY AND MOOSERY TALOOKS.

Constructing the Road from Trichinopoly to Salem, from the Coleroon Bridge to Moosery, and constructing a Bridge across the Iyaur River.

Aggregate amount of Estimate Rupees 18,471 1 0
Do. Expenditure „ 15,322 14 0

Balance Rupees..... 3,148 6 0

These works were in progress when the storm of March occurred and destroyed the unfinished bridge over the Iyaur river which was partly rebuilt the same season. The repairs extended over 20 miles of road forming part of the line from Trichinopoly to Salem and Bangalore.

Constructing the road from Trichinopoly to Salem, from Moosery to the District boundary.

Amount of Estimate Rupees 25,000 0 0
Expenditure „ 20,019 0 7

Balance Rupees... 4,980 15 5

This work was executed out of the Trunk Roads, and was only partially completed in 1853. The principal masonry work was a bridge of 3 arches across the Condarnary river, which was raised to the spring of the arch.

SOUTH ARCOT DISTRICT.

Roads and Bridges.

MANARGOODY TALOOK.

Constructing a Road from the Veeranum Tank joining the high road at Chellumbrum via Pootoor.

Estimate.....Rupees	2,470	0	0
Expenditure....."	1,137	7	0
Balance Rupees...	1,332	9	0

The object of this work is to afford an outlet to the produce of numerous villages situated in the midst of the irrigated lands under the Veeranum Tank. It is an improvement of great local value, but forms no part of any extended line of communication.

Constructing a Bridge across the Vuddavaur at Naturmungalum on the Road from Manargoody to Wodiarpolliam.

Estimate.....Rupees	4,738	0	0
Expenditure....."	2,120	3	0
Balance Rupees...	2,617	13	0

This also is a work of local improvement, serving to connect the Town of Manargoody and its adjacent villages with the Wodiarpolliam Talook. It was only partly built in 1853.

CHELLUMBRUM TALOOK.

Repairing the Road from Chellumbrum to Laulpett.

Estimate.....Rupees	1,450	6	0
Expenditure....."	1,239	8	0
Balance Rupees...	220	14	0

A work of mere repair on the chief line of road intersecting the Manargoody and Chellumbrum Talooks.

Repairing the Road from the Vellaur to Coleroon.

Estimate.....Rupees	1,257	9	0
Expenditure....."	902	9	0
Balance Rupees...	355	0	0

Repairs were executed to this road forming part of the coast line from Madras to Negapatam.

List of ordinary works exceeding 1,000 Rupees in amount.

Talook.	Work.	Amount of estimate.	Amount of expenditure.	Balance.
<i>Tanjore District.</i>				
<i>Ordinary Work.</i>				
Trivady.....	Improving the Anandacauvery River.....	4,591	4,386	205
"	Altering the course of Vennaur in the limits of Sittogel.....	1,916 11	1,908 9	8 2
Keervalore.....	Repairing Vanganays &c. at the Vettaur mouth.....	1,204 7	1,138 11	65 12
<i>Emergent Work.</i>				
Trivady.....	Repairing Vendianputty Tank bund.....		1,071 14	
"	Constructing and repairing Vanganay &c. at the head of Vennaur.....		1,339	
"	Do. do. at upper Anicut.....		1,592 11	
"	Closing breaches and repairing banks &c. of the Vuddavaur.....		1,106 8	
<i>Trichinopoly District.</i>				
Conaud	Excavating Weracondaun.....	5,258 10	2,009 14	3,248 12
"	Codungal surplus and forming bank limits of Paundamungalum.....	1,642 13	1,550	92 13
Vittienty.....	Repairing bank of Jungle stream.....	1,883 3	1,537 5	320 14
"	Do. do. Angunda Cauvery.....	2,023 4	1,793 4	235
Moosery.....	Repairing the bank of Angunda Cauvery.....	1,694 6	1,605	88 6
Laulgoody.....	Do. do. Coleroon	2,700 2	2,533 6	166 12
"	Excavating Nutted Nalla channel.....	1,678 2	1,648 1	30 1
"	Repairing bank of Pungoony channel.....	1,155 5	1,067 7	97 14
Wodiarpolliam	Do. Cotrapalliam tank bank.....	1,022 12	739 2	253 10
"	Widening the supplying channel of Dalaway tank.....	1,069 14	1,037 11	32 3
Arrialoor.....	Repairing the bank of Oogaloor tank.....	1,010 15	1,010 9	6
"	Do. Atteoor tank bank.....	1,331 3	1,273 9	107 10
<i>South Arcot District.</i>				
Manargoody...	Widening and deepening the Praodyoday surplus channel.....	1,106 9	1,029 7	77 2
"	Deepening Veeranum tank bed from the Northern, Calingula to Cullianally Choultry.....	1,879 3	1,678 14	100 5
Chellumbrum..	Widening the Keelay Praodyoday surplus channel.....	1,004 12	1,002 2	2 10
"	Widening Vellaur river and planting Durbah grass in the limits of Causipaukum.....	1,454 11	974 14	479 13

The Total expenditure on Public Works of all kinds in the Division exclusive of Trunk Roads was as follows.

Tanjore.....	1,41,444	14	6
Trichinopoly.....	1,24,749	8	6
Manargoody and Chellumbrum Talook.....	40,118	2	11

Total Rupees... 3,06,312 9 11

List of the Subordinates employed in the Sixth Division 1853.

Rank.	Names.	Monthly salary including Tentage.			District employed in.
Asst. Rev. Surveyor.	C. W. Maitland.	141	4	0	Tanjore.
Do.	W. Loftus	141	4	0	South Arcot.
Assistant Supervisor.	D. Horgan.....	75	0	0	Trichinopoly.
Assistant Overseer ...	J. Mills.....	*43	15	1	Tanjore.
Do.	W. F. Bateman.	*43	15	1	Trichinopoly and Tanjore.

* No Tentage allowed in 1853.

E. LAWFORD, MAJOR,

Civil Engineer 6th Division.

Civil Engineer's Office,
6th Division, Tanjore,
29th December 1854. }

Civil Engineer's Office, 8th Division,
Vennarpetta, 10th January 1855.

No. 5.

FROM CAPTAIN W. H. HORSLEY,

Civil Engineer 8th Division,

TO MAJOR J. H. BELL,

*Secretary to the Board of Revenue Department of
Public Works, Fort Saint George.*

SIR,

I have the honor to forward herewith a Report on the more Important Works executed or in progress during the year 1853, in No. 8 Division.

I have the honor to be, &c.

W. H. HORSLEY, CAPTAIN,

Civil Engineer 8th Division.

Civil Engineer's Office, 8th Division,
Tinnevely District,
Vennarpetta, 10th January 1855. }

REPORT ON THE MORE IMPORTANT WORKS EXECUTED OR IN PROGRESS
DURING THE YEAR 1853, IN NUMBER EIGHT DIVISION.

During the year 1853, no very important works connected with irrigation were undertaken in either of the two Districts forming No. 8 Division, though a considerable amount was expended for repairs and improvements to existing works in both Districts. Of the works mentioned in my Report for 1852, as under progress in Tinnevely on occasional estimates, the rough stone revetment to Seevala Keely Cûlum in the Streevigoonnum Talook, and the improvements to Streevencata-sapoorum Pereacolum in the Nangoonairy Talook were completed, the

former at a total cost of Rupees 1,676-11, and the latter at Rupees 615-7. The Vuddacaul Branch of the Ceelacaul from the Murdoor Anicut, also mentioned in the above Report, had a further outlay of Rupees 508-15 upon it during the year under review, but there still remained a balance of Rupees 944-12 to complete the work agreeably to the Estimate. As the Board have directed that only works of real importance should be individually mentioned in these reports, I refrain from mentioning those in progress or completed in 1853, in Madura and Tinnevely on Occasional Estimates, for though of importance to the village, or community, which they were intended to benefit; they are not such as to call for special notice. Suffice it then to say, that the amount expended in the above year, under the head of Occasional was as follows:—

	Completed		Incomplete		Total.	
	Works.		Works.			
Madura.....	3,981	13	2,559	5	6,541	2
Tinnevely.....	4,534	3	2,580	8	7,114	11
Grand Total...	8,516	0	5,139	13	13,655	13

Under the head of "Ordinary," there were some considerable improvements and repairs to existing works of irrigation carried into effect, particularly in Tinnevely. The more important of these are as follows:—

	Amount of		Expended		
	Estimate.		in 1853.		
Coopacoorchy Tank.....	1,366	10	1,366	10	Completed.
Keelacaul from the Murdoor Anicut.....	6,904	15	3,941	4	Incomplete.
Paroongolum Calingulah & Bridge.	1,072	8	1,072	8	Completed.
Auroomoogamungalum Tank.....	1,458	1	1,181	5	do.
Velloor Pereacolum.....	7,825	0	934	10	Incomplete.
Thencurray do.	9,220	5	983	5	do.
Jetty on the right bank of the Tambrapoorney at Autoor.....	1,089	12	1,003	3	Completed.
Colasagaramungalum Pereacolum.	1,045	11	1,019	11	do.
Paroombathoor do. ...	1,530	0	1,487	11	do.
Perea Suddianairy Tank.....	1,360	9	1,350	15	do.
Eluntheracoondan Pereacolum....	1,429	0	1,392	1	do.

In the Madura District the principal works executed under the head of Ordinary were:

	Amount of		Expended		
	Estimate.		in 1853.		
Meenachipoorum Tank.....	970	13	888	6	Completed.
Nellyoor Channel removing rock.	808	15	503	4	Incomplete.
Ponnamungalum Tank.....	715	10	664	6	Completed.
Cothamungalum Tank.....	1,122	9	690	13	Incomplete.

The total expenditure for works of irrigation in Madura and Tinnevely during the year 1853, was as follows:—

	Ordinary.		Emergent.		Occasional.		Total.
Madura.....	22,670	2	1,938	3	6,541	2	31,149 7
Tinnevely.....	57,783	1	4,219	0	7,114	12	69,116 12
Total in No. 8 Division.....	80,453	3	6,157	3	13,655	13	1,00,266 3

With respect to the more important works previously executed in this Division, I have already given in my Report for 1852, as full an account of these as I have been able to obtain from the records of each District brought down to Fusly 1262. I have not yet received the returns of cultivation for Fusly 1263, but as this was an unfavorable year for wet cultivation in both Districts, it is probable there was considerable falling off in the revenue, though not to that extent that might have been expected from the scanty fall of rain during the North East Monsoon.

Roads and Bridges.

During the year under review the principal outlay under this head took place on Road No. 4, the great Military and Commercial road leading from Trichinopoly, through Madura and Palamcott, to Travancore. In the Madura District, the total sum sanctioned for this road on different dates amounted to Rupees 11,143-13, and the total outlay during 1853 to Rupees 3,295-8, inclusive of a Bridge of 6 arches, each 30' x 7½, across the Goondaur in the Thiroomungalum Talook, the foundations of which, together with the Piers and abutments above, were completed in that year at a cost of Rupees 1,398. The work was superintended by the Maramut Superintendent of the District, Balnyveloo Moodelly, whose salary is Rupees 50 per mensem. In the same Talook a stone cause-way of 70 yards in length was constructed at the estimated cost, viz. Rupees 1,128-0, and 2 small Bridges were re-built at an

aggregate cost of Rupees 562-13. The remainder of the above sum was expended in earth and gravel work and in the construction of small road tunnels on different parts of the line, in the Meyloor Talook. A further sum of Rupees 1,732-12-2 was expended under the head of "Ordinary" on an Estimate of Rupees 3,209-15 for general repairs to the whole road, extending over a distance from North to South of 80½ miles. In the Tinnevelly District, the total amount expended in the construction of parts of this same road, inclusive of the cost of the Bridge across the Virdooputty River, was Rupees 6,833-1, of which Rupees 6,508-5 were for work performed to the North of Palamcottah, and the remainder for that, South of that station. In the above sum is included Rupees 1,632-9 for completing the road as far as Odaycaraputty, in the Sautoor Talook, in continuation of work executed in 1852, the total expenditure being Rupees 7,971-4, on an Estimate of Rupees 9,090-3. A further portion of the above road, about 4 miles in length, between Odaycaraputty and Sautoor was commenced in 1853 on an Estimate of Rupees 9,956-1, but there was not time for more than a small quantity of earth work, valued at Rupees 345-9. The Bridge across the Virdooputty River was commenced in 1853 on an Estimate of Rupees 8,725-1, and by the end of the working season, the foundations, together with the Piers and abutments above, were completed, and some of the stone beams to carry the roadway, laid in their places. The expenditure on this work amounted to Rupees 3,438-13, and it was expected that the work would be completed in 1854 for less than the Estimate. The work was superintended by Sawmynaden Maistry, on a salary of Rupees 14 per mensem. In the above sum is also included an item of Rupees 1,721-0, for making and repairing the road between Gaingoondan and Kytaur on an Estimate of the same amount, sanctioned by Government on the 10th January 1853. This work, as also some ordinary repairs to the same road between Kytaur and Coilputty, for which Rupees 2,232-0 were sanctioned on the 24th June 1853, were under the superintendence of Assistant Overseer Smither, whose Civil salary is Rupees 43-15-1 per mensem.

For the further improvement of this road South of Palamcottah an Estimate of Rupees 7,470-6 was submitted for sanction under date the 5th October 1854. North of Palamcottah there still remain about 12½ miles of road to be constructed between Sautoor and Virdooputty, chiefly over black cotton soil, and about 6½ miles between Shady Khan's Chuttrum and Gaingoondan. Estimates for these portions will be submitted for sanction shortly. In addition to the Bridges under progress in 1853 across the Goondar in Madura, and the Virdooputty River in Tinnevelly, Government has since sanctioned Estimates to the aggregate amount of

Rupees 38,924-2 for bridging the Sautoor and Veypullaputty Rivers, and a small stream North of the latter, termed Catalumputty Oday, and they are all in course of execution at the present time. There remain only 3 streams in Tinnevelly, for bridging which, Estimates have already been submitted, and the Vigay River in Madura requiring to be bridged. An Estimate for the latter will be prepared shortly for insertion in the Budget of 1856-57.

In the Madura District, Road No. 15 between Madura and Dindigul had a further outlay of Rupees 1,778-12 upon it in 1853, in continuation of work performed in previous years on an Estimate of Rupees 7,968-1, and there remained a balance of Rupees 1,031-5 to complete the work. On a branch of the same road between Sholavandan and Pullaputty, Rupees 682-1 were expended in raising and gravelling the road, in rear of Natchycolum tank bund, and constructing 1 Bridge and 2 tunnels on an Estimate of Rupees 694-10. To the Eastward of Madura some improvements were effected to this road, partly at the expense of Government, and partly from the Shevagungah Tripany fund, the cost of the former being Rupees 309-11, and that of the latter Rupees 2,470-6, inclusive of Rupees 573-3 worth of work executed in 1852. For the repair and improvement of Road No. 5, leading from Meyloor on Road No. 4 to Tripatoor and Poodoocotta, Rupees 532-14 were sanctioned on the 11th January 1853 to be expended from the funds of Government, and Rupees 1,790-15 from the Pranoor Devasthanam funds on the 21st October 1852. On the former sanction, work to the extent of Rupees 220-2 was executed in the year 1853, and on the latter the expenditure amounted to Rupees 1,518-7. On Road No. 14 leading from Madura to the Port of Tondi, there was considerable outlay both for Road work and Bridges. That for the former amounted to Rupees 2,929-10, being part of an Estimate of Rupees 6,256-7, sanctioned by Government on the 11th January 1853; and that for the latter to Rupees 8,205-7, paid from the Surplus Tripany fund of Shevagungah. The Bridges here spoken of comprise one of 5 arches (centre 32' x 10½', abutment arches 24' x 8', and intermediate arches 28 x 9½) across the Oopaur, and one of 3 arches of 15 feet span, across a supply channel immediately adjoining the above, near Padamatoor, and lastly a Bridge of 5 arches varying from 18 to 30 feet span across the Saragunny River, between Caliarcoil and the Coast. The two first works were completed, with the exception of the plastering, and the foundations of the latter laid, and the Piers and abutments raised as high as the springing; during the year under review. The works were superintended by the Maramut Super-

intendent of Shevagungah, Vencatramiah, and visited occasionally by Temporary Sub Assistant Surveyor C. W. Kemp. For the improvement of a portion of the cross Road No. 25 in the Thirroomungalum Talook, Rupees 1,322-9 were sanctioned by Government under date 25th November 1851. Of this sum Rupees 578-12-10 were expended previous to 1853, and Rupees 739-13 during that year in completion of the sanctioned Estimate. Another item of expenditure in 1853 was Rupees 1,200 for improving the Ghaut leading from Pereacolum to the Pulney Hills, on the sanction of Government dated 30th November 1850. This work was commenced in March 1853 under the superintendence of Assistant Overseer Bywater, and by the end of June of that year, about $3\frac{1}{2}$ miles of entirely new road were opened, though not fully completed; and it was found necessary to solicit a further grant of Rupees 3,300 to open up the whole line, extending over a distance of about 14 miles, which was sanctioned on the 8th October 1853, and the work is now in progress. The above are the principal works for the improvement of the Roads in the Madura District executed during the year 1853, with the exception of the Branch Cotton Road, which will be mentioned hereafter.

In the Tinnevely District, in addition to Road No. 4 already reported on, the principal outlay took place upon Roads Nos. 10 and 11. The Estimate for the former amounted to Rupees 3,170-3, and during the year under review, work to the value of Rupees 1,486-15 was carried into effect on that portion of the line lying between Purpanairy and Punnagoody on Road No. 4. The improvement to Road No. 11 leading from Tinnevely to Shairmadevy, estimated at Rupees 606-13, consisted of raising the revetments on the sides of the road in the vicinity of the former town, to prevent it being injured by the surplus of Kistnapairy Tank, and laying down a coating of gravel. The expenditure in 1853 on this work was Rupees 563-13. Small sums were expended for improving the cross roads Nos. 20 and 22, the former leading from Palamcotta to Calacaud, and the latter from Coorumboor on Road No. 12 to Yeral a large market town on the left bank of the Tambrapoorney River in the Streevigoontum Talook. For opening a new village road from Arrekesavanulloor, in the Shairmadevy Talook, to the Tambrapoorney River, and widening a Bridge across the Cunnadien Channel from the same, to enable the ryots to bring their grain to market, Rupees 762 were sanctioned by Government, and a similar sum subscribed by the inhabitants. In 1853 the Bridge work was completed and the road raised and tunnels constructed, leaving only the gravel to

be laid down in 1854: The Government share of the expense in 1853 amounted to Rupees 356-2.

Trunk Cotton Road No. 5, between Streevellapoothoor and Shevacausee. This portion of the Trunk Road was commenced in October 1852 under the superintendence of Lieutenant Helbert of the 5th Regiment L. C. and by the end of that year a distance of 1 mile 5 furlongs 147 yards was in part constructed on an outlay of Rupees 1,170-5. Captain G. Paxton, of the 44th Regiment N. I. relieved Lieutenant Helbert on the 30th November 1852, and under his superintendence the work was proceeded with in 1853. By the end of this year, the earth raising, had been carried forward for a further distance of 9 miles 1 furlong 12 yards. About $3\frac{1}{2}$ miles were gravelled and $\frac{1}{2}$ of a mile laid with broken stone. A considerable number of Bridges and tunnels were also constructed. The total expenditure during the year was Rupees 8,938-7 exclusive of Superintendence, leaving a balance of Rupees 6,806-12 to complete this portion of the Trunk Road.

A further portion of this road between Ettiapoorum and Tuticorin was commenced on the 20th May 1853 under Captain Hickley's superintendence, and this Officer continued in charge of it until the 30th November, when he was relieved by the 2nd Assistant Civil Engineer, Lieutenant G. M. Payne of the 12th Regiment N. I. In the course of the $7\frac{1}{2}$ months during which work was under execution, side trenches and raising were completed for a distance of 5 miles 5 furlongs 180 yards, and of this 2 miles 4 furlongs 91 yards were laid with broken stone, and 2 miles 3 furlongs 10 yards with gravel over the broken stone; the whole distance being over black Cotton soil. The expenditure, exclusive of superintendence, amounted to Rupees 6,061-10, on an Estimate of Rupees 68,086-13, sanctioned by Government on the 18th April 1850 to be defrayed from the surplus Tripany fund of Tinnevely.

Cross Cotton Road.—This road connects Road No. 4 at Coilputty with the Trunk Road at Ettiapoorum, the distance being $8\frac{1}{2}$ miles. The amount sanctioned for its construction exclusive of superintendence is Rupees 16,763-3. It was commenced in 1852 under Captain Hickley's superintendence, and completed by the end of August 1853 by the same Officer, the expenditure in the latter year being Rupees 4,767-10, making with that of 1852 a total of Rupees 15,854-2. This road has been open to the Public since January 1854. An accident happened to it on the 18th August 1854 in the immediate vicinity of a

6 Vent Platform Bridge across the supplying channel of Pethapacorom Tank, near Ettiapoorum. In consequence of very heavy and continued rain, the water in the said channel rose to an unusual height, and overtopped the road, carrying away about 9 yards of the western approach. The Bridge itself was not injured in the slightest degree. An Estimate of Rupees 250-7 has been framed for adding 3 more vents to this Bridge, as well as for sundry trifling repairs to the road in other parts, and will be carried into effect in 1855, from the balance remaining from the sanctioned Estimate. In other respects the road has stood remarkably well.

Branch Cotton Road.—This road commences at Aroopocotta in Ramnad, and runs almost due South to Ettiapoorum, a distance of 26½ miles, where it joins the Trunk Road. As mentioned in my report for 1852, the Ramnad portion, measuring 10 miles 1 furlong 140 yards, was completed in that year, with the exception of a Bridge of 3 arches of 24 feet span, which was delayed for want of bricks, and the portion in Talpathy limits, bordering the left bank of the Vypaur. During the year 1853, the above mentioned Bridge was completed, and a small extent of earth raising, executed in Talpathy limits, the expenditure on the former being Rupees 646-14, and on the latter Rupees 182-14, making with the previous expenditure Rupees 21,259-15, exclusive of superintendence, the Estimate being Rupees 26,099-10. In the Tinnevely limits, a further distance of 4 miles 1 furlong 170 yards were completed, and 0 mile 5 furlongs 103 yards partially so in 1853. No. 4 Bridge of 3 arches of 24 feet span across the Thotagoundenputty stream was likewise put in hand, and the foundations, piers, and abutments above, were completed by the close of the working season. The expenditure in the Tinnevely limits amounted to Rupees 8,515-3 exclusive of superintendence, making with the expenditure of the previous year in the same limits, a total of Rupees 11,915-15 on an Estimate of Rupees 41,436. This road, in both limits, was under the charge of Captain Hickley up to the 21st April 1853, when Lieutenant S. Alven of the 44th Regiment N. I. relieved him, and continued in charge until the 15th December 1853, after which the work was superintended by the 2nd Assistant Civil Engineer, Lieutenant G. M. Payne.

The principal items of expenditure in 1853 on account of Public Buildings in Madura and Tinnevely were as follows.

	Amount of Estimate.		Amount expended in 1853.		In previous years.		Total.		
<i>Madura.</i>	Rs.	A.	Rs.	A.	Rs.	A.	Rs.	A.	
Huzoor Cutcherry at Madura	2,660	0	726	2	0	0	726	2	Incomplete.
Talook Cutcherry at Manaparay in the Ramgherry Talook.	3,007	4	1,279	7	0	0	1,279	7	Do.
Travellers' Bungalow at Culpatty on road No. 1	437	13	173	9	0	0	173	9	Do.
Additions to the Head Assistant Collector's Cutcherry at Madura	149	15	144	11	0	0	144	11	Completed.
Repairs to Civil Hospital at Madura	227	9	218	11	0	0	218	11	Do.
<i>Tinnevely.</i>									
Talook Cutcherry at Nangoonairy	2,787	15	715	4	2,072	11	2,787	15	Do.
Do. at Sunkerninarcoil	2,787	15	120	12	2,656	10	2,777	6	Do.
Talook Cutcherry at Ootapedarum	3,099	9	1,549	4	1,528	6	3,077	10	Do.
Police Cutcherry at Tuticorin	2,034	9	2,034	9	0	0	2,034	9	Do.
Do. at Wattrap	1,536	14	156	4	0	0	156	4	Incomplete.
Frontier Chowkey at Ellenjee in the Thencausee Talook.	659	11	349	15	0	0	349	15	Do.
Total Rupees...	19,439	2	7,468	8	6,257	11	13,726	3	

In addition to the above the following Chuttrums in the Tinnevely District, were commenced in 1853 at the expense of the surplus Chuttrum fund of the District, viz.

	Estimate.		Expended in 1853.		
	Rs.	A.	Rs.	A.	
Culpatty Chuttrum on Road No. 1	4,979	0	392	7	Foundations laid.
Chuckaragoody Do. on Road No. 8	4,979	0	301	4	Do.
Sethapurpanulloor do. on Road No. 9	4,979	0	2,134	3	Do. and walls above completed.

In the Town of Madura Rupees 1,340-12 were expended in 1853 in part of an estimate of Rupees 2,620-7 for filling in the Minah Tepacolum, an old ruined tank, and a receptacle for filth of every kind. The expenditure on this work is charged to the surplus Devastanum funds.

During the year under review, this Division may be said to have been without an Assistant Civil Engineer, for though Ensign G. M. Payne of the 12th Regiment N. I., was appointed as 2d Assistant on the 29th July 1853, and joined the Division on the 8th September following, the work being quite new to him, he had every thing to learn, and just as he was beginning to take part in the inspection of work, his services were required as Executive Officer in charge of the Trunk and Branch Cotton Roads, in consequence of the departure of Captain Hickley and Lieutenant Alven on sick certificate.

The two Assistant Surveyors were employed, one in Madura and the other in Tinnevely, in examining works in progress, and in estimating for the repair of such as required it. Assistant Overseer Bywater was engaged for the first six months of the year, in superintending the works on the Ghaut leading from Pereacolum to the Pulney Hills, and for the remainder of the year, in overlooking the repairs and additions to Civil Buildings, and other work in the Town of Madura and its vicinity. Assistant Overseer Smither, as before mentioned, had charge of the work on Road No. 4, between Gaingoondan and Kytaur, in the Tinnevely District. A Statement shewing the number and cost of works inspected, or the amount expended under the superintendence of each member of the Department, is annexed to this Report.

As respects the present state of the Division in an Engineering point of view, I have in former reports, those for 1851 and 1852 especially, shewn that the present state of the 2 Districts forming this Division, as regards wet cultivation, is superior to anything which existed under former Governments, as far at least as we have any records to guide us, and superior also to anything which has existed since they fell into the hands of Government, I would not wish it to be understood, however, that there is no room for improvement in existing works of irrigation. On the contrary, there is much that might be improved under a better system. Works of every description get out of repair now much sooner than they ought to do, for want of proper care on the part of the Meerassadars and ryots. There is also great waste of water both from tanks and channels, but more particularly from the latter, from there being no efficient establishment to look after, and

control the distribution of water. Half an inch depth of water per diem is commonly considered sufficient for wet cultivation, but I feel confident that double this quantity is actually drawn from the channels, if not from tanks, the sluices in the former being so numerous, and their vents purposely widened by the ryots to increase the flow through them. If the system which prevails in the North-West Provinces of selling the water, instead of putting an extra tax on the land could be introduced into this Presidency, it would effectually prevent waste of water, for a ryot would take care not to pay for more than was necessary. It would be very difficult, however, to introduce such a system in Districts where the tanks and channels are so numerous as they are in Madura and Tinnevely, and I do not think it would be liked generally by the people. All that can be done therefore is, to increase the present Executive establishment in each District, and give the Officer in charge authority to impose a moderate fine for wilful neglect, or destruction of the works of irrigation, or waste in the distribution of the water.

With respect to communications, some improvement has of late years taken place in the formation and repair of roads both in Madura and Tinnevely, but much remains to be done, to put even the existing lines, in a satisfactory condition. In Madura the roads principally deserving of attention are; Road—

- No. 1. Connecting Trichinopoly with Dindigul. An Estimate for this road will be forwarded shortly for sanction.
- No. 2. A continuation of the above, the greater part of which is made, but requires annual outlay for repairs.
- No. 4. Connecting Madura with Trichinopoly on the North, and with Palamcotta on the South. The greater part of this road also is made, but requires annual outlay for repairs.
- No. 15. Connecting Paumban with Ramnad, and Madura; and Madura with Dindigul. An Estimate for the latter portion is under preparation.
- No. 16. Connecting Madura with Thiroochuli and the Southern Salt pans. An Estimate for a portion of this road will be forwarded shortly for sanction.
- No. 27. Striking off from No. 16 at Careaputty, and uniting with the Branch Cotton Road at Aroopocotta.
- No. 18. From Madura to Pereacolum and the foot of the Dindigul valley. An Estimate for a portion of this Road was forwarded for

sanction on the 7th November 1854, and one for another portion will be submitted shortly.

In Tinnevely the Roads requiring immediate attention are; Road—

No. 4. Connecting Madura with Palamcotta and Travancore. Part of this road is made and requires annual outlay for repairs.

No. 8. From Palamcotta to Tuticorin, for which an Estimate will be submitted for sanction shortly.

No. 24. Connecting Palamcotta with the Port of Calashagaraputnum. An Estimate for this road will shortly be submitted for sanction.

It will be to little purpose, however, making roads, unless a sufficient annual allowance is granted for keeping them in repair. A statement shewing the total length of made roads in Madura and Tinnevely has lately been forwarded to the Board of Revenue in the Department of Public Works, and it is hoped that the system of mile men will shortly be introduced into these two Districts.

The ports on the coast of Madura and Tinnevely are, with the exception of Tuticorin, simply open road-steads, exposed more or less to the effects of the North-East and South-West monsoons. In Madura the principal port is Keelacuray, 30 miles South of the Paumben Channel. The long spit of land which runs out in the direction of Paumben shelters it a good deal from the North-East monsoon, and during the strength of the South-West monsoon vessels from Colombo can make this port, when they cannot make Tuticorin. The deepening of the Paumben Channel has materially improved the trade at Keelacuray, as well as that of Tuticorin, and when this Channel is completed to the depth recommended by Colonel Cotton, so as to allow of the "Hugh Lindsay" Steamer passing through it, Keelacuray will be a very convenient port for the shipment of Treasure. At present it is shipped at Autengherry on the Northern side of the spit of land before mentioned; the depth of water there, allowing the steamer to come much nearer the shore, than it can opposite Tondi, or Devaputnum, the two Northern ports of Madura. The inner anchorage of the port of Tuticorin in Tinnevely, is only suited to small vessels drawing less than 12 feet of water. For these, it is very safe and convenient, being land locked on all sides, except to the North-East and South. The latter entrance is preferred, the channel being deeper and better defined than the former. Large vessels are obliged to anchor outside Hare-Island, a distance of $4\frac{1}{2}$ or 5 miles from the shore in 6 fathoms water. A Jetty is very much wanted at Tuticorin for the convenience of the public. At pre-

sent bales of Cotton, and other goods are carried on mens' heads for some distance through the water to the boats which are to convey them to the ships, whereby much time is lost, and considerable expense incurred. This the only work that I can suggest at present for the improvement of the port of Tuticorin, and I have no doubt a similar work would be very much prized at Colashagaraputnum, which port is second in importance only to that of Tuticorin, and is well situated in a bag formed by the projecting head land of Manapaud, which shelters it on the South-West. Returns of Trade at the different sea ports in Madura and Tinnevely for the 10 years ending Fusly 1251, or A. D. 1851-52 are herewith forwarded.

W. H. HORSLEY, CAPTAIN,

Civil Engineer's Office, 8th Division,
Tinnevely District, Vennarpetta,
10th January 1855.

Civil Engineer 8th Division.

Statement shewing the amount expended on Public Works in No. 8 Division during the year 1853.

Description of Work.	Madura.	Tinnevely.	Total.
<i>Works of Irrigation.</i>	Rs.	Rs.	Rs.
Ordinary	22,670	57,783	80,453
Extraordinary	1,938	4,219	6,157
Occasional	6,541	7,114	13,655
<i>Works not of Irrigation.</i>			
Roads and Bridges	26,080	37,868	63,948
Civil Buildings.....	3,883	4,926	8,809
Chuttrums .....	.....	2,827	2,827
Military Buildings .....	.....	.....	.....
Total...	61,412	1,14,749	1,75,851

W. H. HORSLEY, CAPTAIN,

Civil Engineer's Office, 8th Division,
Tinnevely District,
Vennarpetta, 10th January 1855.

Civil Engineer 8th Division.

Statement shewing the number of Officers, &c., employed in No. 8 Division during the year 1853, the number of Works examined or superintended, and the amount of salary drawn by each individual.

Name of Officers, &c.	Designation.	No. of days employed in the Division.	Works examined		Works estimated.		Amount of Salary.		Per-centage on the works examined or superintended by each Officer or Surveyor.						
			Number.	Amount.	Number.	Amount.	Rs.	A. P.							
										Rs.	A. P.				
Captain W. H. Horsley.....	Civil Engineer.....	365	166	86,455	4	9	91	29,034	2	9,804	0	0	11	5	5 1/2
Lieutenant G. M. Payne.....	2d Assistant Civil Engineer.....	84	38	8,673	5	0	31	6,454	1	528	10	7	6	1	7 1/2
Mr. F. Mason.....	Assistant Surveyor.....	365	201	31,239	3	0	91	14,041	6	2,080	6	5	6	10	6 1/2
Mr. D. McNair.....	Do.	365	210	44,370	7	9	142	33,874	12	1,695	0	0	3	12	5 1/2
2d Corporal W. H. Bywater.....	Assistant Overseer.....	365	9	2,588	8	0	...	...	...	527	5	0	20	5	10 1/2
Gunner T. Smither.....	Do.	365	1	1,420	2	0	...	...	...	527	5	0	37	1	9 1/2
Captain M. Hickley.....	Supt. Trunk Cotton Road.....	225	1	6,396	3	6	...	...	...	1,022	0	0	14	7	7 1/2
Lieutenant G. M. Payne.....	Do. Cross Cotton Road.....	31	1	1,333	4	0	...	...	...	193	0	0	14	7	7 1/2
Captain M. Hickley.....	Do. Branch Cotton Road.....	243	1	5,560	0	6	...	...	...	1,080	0	0	19	7	0 1/2
Do. Do.	Do. Branch Cotton Road.....	112	1	3,864	0	9	...	...	...	373	5	4	9	10	5 1/2
Lieutenant S. Alven.....	Do. Branch Cotton Road.....	237	1	7,908	0	4	...	...	...	1,429	2	7	18	1	1 1/2
Do. G. M. Payne.....	Do. Branch Cotton Road.....	16	1	204	10	2	...	...	...	53	5	4	25	13	7 1/2
Captain G. Paxton.....	Do. Streetellapoothoor Trunk Cotton Road.....	365	1	8,984	15	8	...	...	...	2,295	0	0	52	8	8 1/2

W. H. HORSLEY, CAPTAIN.

Civil Engineer's Office, 8th Division, Tinnevely District, Vennarpattur, 10th January 1855.

Civil Engineer 8th Division.

W. H. HORSLEY, CAPTAIN,
Civil Engineer 8th Division.
Civil Engineer's Office, 8th Division, Tinnevely District,
Vennarpatta, 10th January 1853.

Statement of the Value of the Exports and Imports at the Sea Ports of Madura and of the duty levied thereon in each of the ten official years 1842-3 to 1851-2.

Names of the Ports.	Years.	Exports.		Imports.		Total.	
		Value of Articles.	Amount of Collection.	Value of Articles.	Amount of Collection.	Value of Articles.	Amount of Collection.
1	2	3	4	5	6	7	8
Keelacuray.	1842-3	Rs. 4,35,980	Rs. 766	Rs. 78,191	Rs. 6,050	Rs. 5,14,171	Rs. 6,825
	1843-4	2,92,274	1,425	83,095	5,377	3,75,369	6,802
	1844-5	3,02,158	7,954	78,575	4,022	3,80,733	11,976
	1845-6	3,74,056	10,660	70,537	3,597	4,44,593	14,257
	1846-7	1,88,756	5,182	63,096	3,307	2,51,852	8,489
	1847-8	3,40,103	9,312	83,117	4,901	4,23,220	14,213
	1848-9	2,11,834	5,834	77,604	3,506	2,89,438	9,340
	1849-0	1,34,299	3,372	93,664	4,703	2,29,963	8,075
	1850-1	1,10,676	2,970	1,02,982	6,551	2,13,658	9,521
	1851-2	1,21,548	3,298	1,34,798	9,877	2,56,346	13,175
		25,11,684	50,778	8,67,659	51,900	33,79,343	1,02,673
Davypatam.	1842-3	3,39,155	1,193	24,893	918	3,64,048	2,111
	1843-4	1,85,418	2,633	90,835	1,131	2,05,253	3,764
	1844-5	1,55,704	4,950	20,291	457	1,75,995	5,407
	1845-6	59,007	1,530	46,843	511	1,05,850	2,091
	1846-7	62,696	2,052	35,536	387	98,232	2,439
	1847-8	50,128	1,437	92,092	561	1,42,130	1,998
	1848-9	73,965	1,860	1,66,959	627	2,40,934	2,488
	1849-0	50,018	1,531	1,11,447	688	1,61,465	2,220
	1850-1	65,745	1,652	44,585	354	1,10,330	2,005
	1851-2	94,908	2,632	44,724	372	1,39,632	3,030
		11,36,744	21,520	6,07,125	6,006	17,43,869	27,526
Paumben.	1842-3	50,976	658	72,809	1,593	1,23,785	2,251
	1843-4	50,730	1,533	48,271	781	99,001	2,314
	1844-5	1,15,101	562	58,937	274	74,038	835
	1845-6	1,09,655	343	91,213	600	20,868	943
	1846-7	1,26,845	572	89,642	709	2,16,487	1,281
	1847-8	1,50,470	734	90,732	301	2,41,202	1,036
	1848-9	1,37,081	114	1,05,884	210	2,42,965	324
	1849-0	1,36,101	186	1,04,907	381	2,41,008	567
	1850-1	1,02,913	165	1,00,976	256	2,03,889	421
	1851-2	1,43,174	198	82,541	200	2,25,715	398
		11,23,046	5,065	8,45,912	5,305	19,68,958	10,370
Tondy.	1842-3	78,236	1,884	2,433	595	87,669	2,479
	1843-4	1,47,126	3,798	5,077	182	1,52,203	3,980
	1844-5	1,72,976	5,085	11,877	590	1,84,853	5,676
	1845-6	68,395	2,059	90,045	524	87,440	2,582
	1846-7	1,09,470	3,050	16,872	398	1,26,342	3,448
	1847-8	68,842	1,970	17,722	691	86,564	2,660
	1848-9	79,893	1,783	14,755	285	94,648	2,068
	1849-0	72,168	1,370	9,344	247	81,512	1,617
	1850-1	55,732	1,853	9,789	153	65,521	2,007
	1851-2	70,462	3,220	15,068	318	85,530	3,538
		9,23,300	26,072	1,28,982	3,983	11,52,282	30,055

Madura,
14th May 1853.

(Signed) R. D. PARKER, Collector.
(True Copy) W. H. HORSLEY, CAPTAIN,
Civil Engineer 8th Division.

Statement of the Exports, Imports, at the Sea Ports of Tinnevely

Sea Ports.	Fusly.	Exports.				Im	
		Dutiable Articles.		Value of articles not dutiable.	Total value of Exports.	Dutiable Articles.	
		Value.	Amount of duty.			Value.	Amount of duty.
1	2	3	4	5	6	7	8
Vypoor.	1252	C. RS. 13,707	C. RS. 571	C. RS. 16,80,730	C. RS. 16,94,437	C. RS. 4,896	C. RS. 347
	1253	3,46,429	14,898	6,74,431	10,20,860	2,383	161
	1254	13,42,934	64,196	.....	13,42,934	2,648	71
	1255	1,65,000	8,205	.....	1,65,000	196	9
	1256	96,816	4,664	79,043	1,75,860	773	73
	1257	2,09,432	10,076	1,18,057	3,27,489	474	26
	1258	796	24	56,139	56,935	205	10
	1259	1,650	49	2,76,185	2,77,834	0	0
	1260	587	18	42,352	42,939	91	5
	1261	210	6	1,68,958	1,69,168	25	1
Total		21,77,561	1,02,707	30,95,895	52,73,456	11,691	703
Tuticorin.	1252	3,30,246	11,873	1,21,842	4,52,088	20,236	1,512
	1253	7,57,019	27,149	1,39,308	8,96,327	10,127	415
	1254	15,12,794	74,726	1,42,618	16,55,412	27,417	1,130
	1255	10,60,034	50,605	77,448	11,37,482	35,827	1,453
	1256	11,40,061	53,941	2,53,113	13,93,174	23,620	1,597
	1257	8,73,061	39,447	2,37,750	11,10,811	36,321	3,188
	1258	1,24,046	4,115	14,32,013	15,56,059	35,899	2,608
	1259	2,49,566	7,997	11,51,714	14,01,280	25,670	1,754
	1260	2,35,402	7,965	16,90,591	19,25,993	53,810	3,274
	1261	2,97,784	9,133	18,16,381	21,14,165	70,093	3,929
Total		65,80,013	2,36,951	70,62,778	136,42,791	3,39,020	20,860
Colicutum.	1252	11,829	431	2,915	14,744	68,664	3,661
	1253	16,252	630	1,458	17,710	62,807	4,583
	1254	31,678	969	.....	31,678	93,968	6,962
	1255	50,264	1,579	81	50,345	55,082	4,155
	1256	25,944	791	.....	25,944	39,066	1,880
	1257	23,942	711	2,873	26,815	34,370	1,829
	1258	19,387	569	14,266	33,652	72,775	4,390
	1259	9,254	295	13,568	22,822	50,320	2,300
	1260	10,974	329	16,264	27,437	38,510	1,950
	1261	13,917	419	18,224	32,141	63,729	3,767
Total		2,13,441	6,724	69,849	2,83,290	5,79,291	35,477
Colasagaraputnam.	1252	3,00,349	9,073	245	3,00,594	62,290	2,140
	1253	2,91,891	10,390	1,183	2,93,074	42,362	1,375
	1254	3,77,421	11,371	.....	3,77,421	74,367	1,841
	1255	3,45,997	10,510	240	3,46,237	10,820	729
	1256	4,13,818	12,770	.....	4,13,818	12,092	543
	1257	3,44,349	10,539	31,065	3,75,415	21,878	956
	1258	17,944	663	3,69,013	3,86,957	12,792	551
	1259	44,740	1,446	2,77,148	3,21,888	16,611	747
	1260	42,088	1,375	3,16,273	3,58,362	16,073	721
	1261	1,03,689	3,186	3,80,689	4,84,378	25,416	1,382
Total		22,82,285	71,323	13,75,857	36,58,144	2,94,701	10,985

Tinnevely, Trichendoor,

4th May 1853.

and of the duty levied thereon in ten Fusly years 1252 to 1261.

ports.	Value of articles not dutiable.	Total value of Imports.	Value of articles re-exported.	Value of Imports after deducting that of goods re-exported.	Total Exports and Imports.
	9.	10.	11.	12.	
	C. RS.	C. RS.	C. RS.	C. RS.	C. RS.
	5,834	10,731	896	9,835	17,04,332
	8,204	10,586	1,728	8,858	10,20,718
	880	3,528	.....	3,528	13,46,462
	1,038	1,234	.....	1,234	1,66,234
	20	794	.....	793	1,76,653
	4,145	4,619	.....	4,619	3,32,108
	460	665	.....	665	57,600
	16,574	16,573	2,536	14,038	2,91,872
	0	91	54	37	42,976
	1,365	1,390	.....	1,390	1,70,558
	38,520	50,211	5,154	45,057	53,18,513
	15,219	35,455	945	34,510	4,86,598
	14,112	24,238	4,176	20,062	9,16,389
	33,048	60,465	12,108	48,357	17,03,769
	52,979	88,806	33,224	55,582	11,93,084
	34,426	58,046	9,647	48,399	14,41,573
	21,034	57,359	23,893	33,462	11,44,273
	78,352	1,14,251	10,231	1,04,020	16,60,079
	31,965	57,635	33,459	24,177	14,25,457
	29,787	83,397	5,058	78,540	20,04,533
	45,704	1,15,797	14,232	" 1,01,565	22,15,730
	3,56,626	6,95,646	1,46,973	5,48,674	141,91,465
	14,131	82,795	2,274	80,521	95,265
	12,983	75,790	4,235	71,555	89,265
	14,563	1,08,531	5,848	1,02,683	1,34,362
	20,940	76,022	17,131	58,891	1,09,236
	23,434	62,500	12,796	49,704	75,648
	46,792	81,161	18,250	62,882	89,697
	43,394	1,16,169	10,315	1,05,853	1,39,505
	1,24,960	1,75,280	16,343	1,58,937	1,81,759
	43,581	82,091	10,743	71,348	98,786
	62,311	1,26,040	5,808	1,20,232	1,52,373
	4,07,089	9,86,379	1,03,773	8,82,606	11,45,896
	72,987	1,35,277	4,671	1,30,606	4,31,200
	70,868	1,13,230	6,901	1,06,330	3,99,404
	76,791	1,49,157	1,507	1,49,650	5,27,071
	1,64,671	1,75,492	2,439	1,73,053	5,19,290
	1,88,157	2,00,248	3,417	1,96,831	6,10,649
	1,96,133	2,18,011	9,804	2,08,147	5,83,562
	2,76,041	2,88,833	12,334	2,76,499	6,63,456
	2,09,692	2,26,303	29,916	1,96,387	5,18,275
	2,54,359	2,70,432	26,649	2,43,783	6,02,145
	1,56,497	1,81,913	23,093	1,58,820	6,43,198
	16,66,196	19,60,896	1,20,791	18,40,106	54,98,250
					82,339

(Signed) C. J. BIRD, Collector.

(True copy) W. H. HORSLEY, CAPTAIN.

Civil Engineer 8th Division.

REPORT ON THE MOST IMPORTANT WORKS EXECUTED DURING
THE YEAR 1853 IN THE SEVENTH DIVISION.

COIMBATORE DISTRICT.

Widening and prolonging the Pullevangul channel.

This channel was remarked upon by Captain Ludlow in his report for 1851, it is included in one of the statements accompanying this report, as it is still incomplete apparently through want of time in the Civil Engineer's Department to take up the matter. It was inspected again by Captain Ludlow in 1853, and it is probable that the difficulties which beset the work from its out of the way position, rocky soil and other local circumstances will render necessary a further Estimate and perhaps some alterations of the line; 46 Cawnies of fresh land have been taken up, but notwithstanding there has been a decrease of Revenue under this channel of Rupees 151 which is owing to the cultivation of land on a reduced rate of Assessment.

Constructing an Anicut across the Varapolliem Jungle stream and excavating channel to increase the supply to the Ookaram Tank.

This work has been completed at a saving in the Estimate of Rupees 126-13-10 the increase to the yearly Revenue is at present Rupees 1,392, considerably more than the whole expenditure incurred; a highly satisfactory result.

Tudapully Channel.

A large Estimate has been sanctioned for the improvement of this channel, building sluices, &c. but the work has only commenced; it is expected to be completed in 1856 and to yield a large return the result will be communicated in a future report, the increase of Revenue arising from additional cultivation is now 1,030 Rupees.

Yathoocooly Anicut and excavating channel.

This work is in the Walliar Jungle and will doubtless have the effect of causing the forest to be cleared around for Punjah cultivation besides the small quantity of land brought under wet cultivation, thus bringing population to this hitherto much dreaded locality, improving its climate and rendering it more healthy. I learn that the Collector in July 1854 transmitted an Estimate for prolonging this channel to the

Southward across the Trunk Road and beyond the Travellers' Bungalow; this work is most desirable and should be carried out to the utmost possible extent. I hope in a future Budget it may meet with favorable consideration.

The result of the ordinary expenditures as exhibited in the statement of important works show a very advantageous increase of Revenue returning actually more than the outlay within the year.

Public Roads.

I append a statement showing the expenditures on the most important Roads in the District of Coimbatore during the year 1853, and the increase in traffic consequent upon the improvements; this appears to have been very great in the Polachee Talook arising from the opening up the communications with the western coast.

Road from Coimbatore to Polachee and thence to the borders of the District towards Dindigul.

Estimate.....Rupees 32,909-4-0

This most important line was only lately commenced and little progress made during the year 1853, from Polachee other roads will continue the traffic to Paulghaut and the western coast, and most probably that line will be found to exceed the branch to Coimbatore in general usefulness, labor from the Anamally forest is generally conveyed direct to the Ponany River west of Paulghaut and floated down to the coast for the use of the Bombay Dockyard but smaller timbers unfit for the purposes there required are conveyed by the Coimbatore branch towards the Neilgherries for the use of the new European Barracks being built there, the cost of this conveyance was $\frac{1}{3}$ the price of the wood and the improvement of the road will no doubt lower this materially. An Executive Officer was appointed to conduct the operations of this road and it is hoped that it will be completed in 1855, though there are a great many bridges to build which on account of the deficiency of artizans in Coimbatore will take up much time.

The Sunganoor Bridge.

This work was still incomplete in 1853; the expenditure upon it being Rs. 1,760-12-7 and the amount required to complete Rs. 2,953, it has since been finished but the river continues to give as much trouble as ever and breaches through the west bank continually occur whereby the high road is damaged or washed away—it has even been proposed for consideration to do away with the Bridge and Embankment and sub-

stitute a work of the road dam fashion but I trust this may not be necessary and that the outlay required to compel this stream to keep its course may be sanctioned.

The great difficulty that we have to contend with is the soft nature of the soil which melts away at the touch of water.

Any one who remembers the three quarters of a mile of heavy sand which formerly taxed the power of draught cattle to the utmost will acknowledge the benefit which Government have conferred upon the public by substituting the work above mentioned: the figured statement of increased traffic conveys no actual notion of the advantage.

I annex to this Report a general statement prepared by the Collector, showing the expenditure of the last 10 Years on public works, and exhibiting on the whole a steady tendency to increase; a new era has been opened upon the Country, and in future improvements and expenditure may be expected to keep pace with our means for carrying them out.

Coimbatore is so utterly deficient in all skilled labor that when every District has works progressing which employ their own workmen to the full, and we can no longer draw upon our neighbours I am afraid we shall show an inferior out-turn of work compared with theirs, but in course of time our own people (though a race terribly deficient in energy as they seem to me after comparison with the Malabar people) will doubtless learn.

In concluding this Report which should have been submitted long ago, I can only regret that Captain Ludlow had not himself prepared it, doubtless much would have come from him in continuation of his very interesting Report on the general state of the district published in the Records of 1852 which I have just now received. I did not receive charge of the division till October 1854 and was previously unfamiliar with the works of the Coimbatore District.

No notice has been taken of the expenditures on the European Barracks building at Jackatalla on the Neilgherries but as these were commenced by me as Executive Officer and the general supervision is continued to me since my appointment as Civil Engineer I shall in the ensuing year's report give an account of the progress there.

I have not thought it of general interest to lengthen the Report by details of ordinary Revenue and other buildings and small Bridges the expenditures will be seen in the statement. I may notice however that much has been done from the surplus Devastanum funds for the

comfort of the people. 5 Chutterims having been built for their use in judicious positions at an average cost of upwards of 1,000 Rupees each, and the interest of the Collector in the welfare of his District is exemplified in the state of cross roads upon which a large amount of Devastanum money has been expended and the care and time bestowed upon the communications generally throughout Coimbatore.

Malabar District.

The statement below gives the particulars of the larger works executed and progressing in this province in 1853, and few of them demand particular notice.

The Allatoor bridge of 5 arches built at the cost of Rupees 4,300-2-2 is a very cheap and most useful structure.

Bungalow, Soldiers' Shed and Choultry at Wotocolly in the Perumbaddy Ghaut.

Built at a cost of Rupees 3,740-1-9 these works were long withheld, but the situation and climate rendered them most essential to travellers.

Bridge over the Perlakadow River on Trunk Road No. 5.

Estimate.....Rupees 13,066 10 0

Expended.....Rupees 9,905 5 9

This work has since been completed with manifest advantage to the traffic and the new road on both sides is in first rate order.

Trunk Road No. 5.

Improving portion between Ponany and Tritalla.

Estimate.....Rupees 3,636 3 6

Expended.....Rupees 3,594 14 7

The Annual allowance for keeping up this road is Rupees 7,100, the whole of which is carefully spent between Walliar and the coast at Ponany, but even yet parts require to be put in better order before the yearly allowance can be considered sufficient.

Trunk Road No. 4.

A large sum was sanctioned, viz., Rupees 14,529-12-10 for metal-ling and bridges on the Perambaddy road but too late to allow of any thing being done in 1853.

A large sum has since been sanctioned for building a bridge over the Irrity River to complete the communications on this very important road, besides works mentioned in the statement, some progress seems to have been made in widening out the Muttanoor and Cotapar-ambah road.

This is a branch road to connect Trunk Road No. 4 with Telli-cherry and is extensively used, it was traced by Captain Francis before he left the charge of the Perambaddy works and was then opened out wide enough for one cart.

Work to the extent of Rupees 2,443 was also done to the canal proposed between Ponany and Chowghaut for which Rupees 16,381-12 have been sanctioned altogether. I have no returns of the traffic on the west coast canal.

Chetwye Dam.

A commencement was made at this great work for which Rupees 46,116-4 have been sanctioned, the first sanction of Rupees 36,215-14 was given early in 1853, but either from want of an executive Officer or from an idea that the estimate was insufficient (as an additional amount was afterwards sanctioned) little was done. Captain Selby the 1st Assistant Civil Engineer was afterwards deputed by Government to carry on the works which will be further noticed in the report for the ensuing year.

P. M. FRANCIS,

Civil Engineer 7th Division.

Civil Engineer's Office, 7th Division, }
Ootacamund, 10th May 1855. }

A P P E N D I X A.

*Extract of a letter from J. D. Bourdillon, Esq. Collector of North Arcot,
to Captain J. H. Bell, Secretary to the Board of Revenue in
the Department of Public Works, dated 5th October 1854.*

* * * * *

" 3. I will first briefly state the results already obtained from the Anicut and the channel to Poorisay. The total original cost of the Anicut and that channel was 31,177 Rupees. The works were begun in January 1852, and were so far advanced in July that on the 24th of that month water was admitted. In that and the succeeding months, some Tanks were filled; but it was not till November that the water reached the more distant, and particularly Poorisay and Yaichoor. This was too late for the early crops, but in good time for the later. In illustration of the good effects of the increased supply of water, I enclose a table showing the cultivation and Revenue in the twenty-five Villages hitherto reached by the channel, in the last ten years; being eight years before the works were undertaken, one in which they were in partial, and one in which they were in full operation.

" 4. It will be seen that the average Revenue of the eight years preceding the construction of the Anicut was 14,431 Rupees; while in Fusly 1262 it rose to 19,539 Rupees being higher than in any previous year in the table, and in Fusly 1263 to 21,416 Rupees. Thus in the first year in which the works came into operation, there was a clear increase of 5,108 Rupees; and in the second year, of 6,985 Rupees above the average Revenue prior to the works. This I may observe exceeds the expectations held out when the works were recommended, and on the faith of which they were sanctioned. In my letter to the Civil Engineer dated 29th June 1850, a copy of which is before

the Board, I stated the probable Revenue immediately after the completion of the works at 19,124 Rupees. That was on the supposition that the water would be taken by the works then contemplated to only twenty-two villages, but it was taken to twenty-five villages. Excluding from the present statement the three villages Cadagumpoondy, Yaichoor, and Palunjoor, the actual Nunjah Revenue of Fusly 1263 in the original twenty-two villages is 19,835 Rupees being Rupees 711 in excess of the expectation formerly stated. But the real gain has in fact exceeded the expectation in a higher degree. The average Revenue from the whole twenty-five villages in the eight years preceding the annicut, was 14,431 Rupees while the Revenue in Fusly 1263 was 21,416 Rupees, being an increase of Rupees 6,985, and this was gained by an outlay of a sum less by 300 Rupees than the sanctioned Estimate for the works.

" 5. The actual gain in Revenue on the average of the first two years of the operation of the Channel, as compared with the previous average Revenue, thus exceeds 19 per cent. on the cost of the works. But the bare statement of this fact gives by no means an adequate idea of the case. The Board are aware that Fusly 1263 was the most disastrous season that has been known for many years. The Trivattoor Talook had its full share of the visitation, and the Nunjah cultivation fell off from 13,785 cawnies in Fusly 1262, to 12,086 cawnies. These figures include the villages under the Cheyaur Channel, those under the Maumundoor tank, and all the others having the great advantage of a river supply of water. I have not the means at hand of stating the falling off in those villages only which are without that advantage; but I think I am justified in placing it at not less than twenty per cent. In the villages affected by the Cheyaur works on the other hand, the nunjah cultivation and Beriz of Fusly 1262 was fully kept up, and in not a few it was materially exceeded.

" 6. The enclosed statement affords some further materials for comparison and induction. The worst year of those there shown is Fusly 1255, which however was very far from being so bad as Fusly 1263. In that year it will be seen that the nunjah cultivation and Revenue in the villages in the table was only 797 cawnies, and 10,364 Rupees; while in Fusly 1263, they were 1,665 cawnies, and 21,417 Rupees; being more than double. Compared with Fusly 1255 there was a clear gain in Revenue of 11,053 Rupees; and considering the more aggravated degree of the failure of rains in Fusly 1263, I feel fully warranted in the belief that compared with what it would have been without the annicut

works, the gain in that year was fully 15,000 Rupees being 48 per cent. on the cost of the works.

“ 7. And great as is the gain of Government by these works, the benefit to the Ryot is still greater ; and I can assure the Board and the Government that it is fully appreciated. When in the Sub-division making the annual settlement, I travelled all along the channel in April last, and it was extremely gratifying to me to witness the high degree of exultation and thankfulness everywhere manifested at the completion of the work, and the experience of its effects. The people spoke of it as redeeming them from penury and starvation and placing them in a condition of wealth and abundance. Nowhere was this feeling displayed more than by the people of Poorisay ; and nowhere with greater reason. This village has a fine tank and plenty of good land, but before the present works the supply of water was extremely precarious. The enclosed statement affords evidence of this. In the worst year, which in this village was Fusly 1259, the cultivation was only 84½ cawnies, with a Revenue of 1,070 Rupees ; the year immediately preceding, viz. Fusly 1258 was the highest, before the entry of the water ; and the cultivation was 221 cawnies, and the Revenue 2,899 Rupees. I beg the Board to consider how bad is the position both of occupiers of land and of labourers, when compelled by means beyond their own control to leave waste two-thirds of the breadth of land which they are able and willing to cultivate. Under such circumstances agriculture in India is truly what it has been called in an official Paper, “ a gambling speculation ; ” but such works as this channel quite deprive it of that character, and render it as safe and certain a pursuit in India as under more equal climates.

“ 8. Before closing my notice of this channel, I must remark briefly on its probable future results. It will be seen that in Fusly 1263 there were still four hundred cawnies of Nunjah land waste in the twenty-five villages bearing an assessment of 5,848 Rupees. A part of this land is so highly assessed that it would be only slowly brought under the plough, and a considerable part would probably be left permanently waste, even with the advantage of the new supply of water. In particular I may point to two villages : Cadagumpoondy where the whole of the Nunjah land has been waste since the return to Ryotwar settlements in 1821, and the village has ceased to be inhabited, solely I believe in consequence of the exorbitancy of the demand on the land ; and Erin-gul, where out of a total Nunjah ayacut of 1,571 Rupees, land to the value of 973 Rupees was waste in Fusly 1262, and to the value of 666 Rupees even in Fusly 1263.

“ 9. Acting on the recent order of Government of the 10th July 1854, I have reduced the excessive assessments in all the villages, and the whole of the land will now certainly be brought into cultivation within a very few years ; the greater part probably in the current year. I cannot state the exact amount of the reductions on the waste land, but as nearly as I can judge the Government Revenue upon it will still amount to 5,000 Rupees at least. Besides this, I have lately fixed Nunjah assessment on 368 cawnies of Poonjah land mostly waste, in these twenty-five villages, which it is now intended to bring under Nunjah cultivation. The amount of the assessment thus fixed on this land is 2,498 Rupees ; and deducting 498 Rupees for the probable Poonjah assessment of land previously cultivated with dry crops, there remains an increase of 2,000 Rupees. This will raise the probable future increase under this channel from land to be hereafter brought into cultivation to 7,000 Rupees.

“ 10. Such has been the success of this work hitherto, and such are its probable future results. Its return in direct Revenue has been, and is morally certain to be hereafter, remunerative in a very high degree, far beyond the usual returns of the most lucrative and successful commercial undertakings, while it has been productive of still greater benefit to the communities whom it affects, greatly augmenting the income of the Ryots, and increasing the employment for labour. Under these circumstances I feel fully justified in advising the Government to sanction the present project for improving the channel.

* * * * *

Statement of Ayacut and cultivation for a series of years under the
Cheyaur Anni-

Talook.	Village.	Nurjah Ay- sant under the tank sup- plied by the channel.		Culti							
				Fusly 1254.		Fusly 1255.		Fusly 1256.		Fusly 1257.	
				Land.	Teerwah.	Land.	Teerwah.	Land.	Teerwah.	Land.	Teerwah.
1	2	3	4	5	6	7	8	9	10	11	12
		Cs.	Rs.	Cs.	Rs.	Cs.	Rs.	Cs.	Rs.	Cs.	Rs.
Trivettor.	102 Covilampoondy .	26	329	10	110	10	113	10	119	9	101
	101 Nagarumbadoo .	75	740	44	452	17	197	36	382	45	474
	100 Cadaguncor .	104	1,164	68	769	36	368	75	859	90	1,012
	29 Keelpalanthay .	43	542	36	463	24	313	31	413	39	497
	27 Thotupadoo .	30	415	22	305	20	305	21	296	24	335
	40 Naval .	116	1,448	73	881	44	543	53	640	69	808
	45 Vakaday .	97	1,228	77	949	41	517	53	663	68	816
	46 Moocoor .	95	1,360	58	753	24	290	27	330	60	803
	47 Colampacum .	70	1,014	49	671	28	415	39	540	49	671
	231 Colatoor .	60	539	30	236	15	124	22	172	29	221
	180 Chengadoo .	109	1,551	79	1,066	60	826	67	882	86	1,168
	225 Eroongul .	106	1,571	43	572	37	481	32	390	43	569
	109 Nellaulum .	69	1,002	51	710	30	412	51	730	58	795
	181 Makariputt .	35	437	34	420	19	237	30	376	34	421
	178 Moorocary .	35	500	30	436	23	342	32	463	33	471
	110 Thoroompoondy .	48	524	24	257	16	166	22	228	26	275
	108 Namaly .	23	228	11	109	7	70	10	92	7	93
	37 Madara .	64	699	39	433	17	192	19	218	40	495
	39 Nelvay .	84	1,061	44	499	21	254	32	348	42	436
	28 Parasoor .	135	1,559	90	1,018	50	544	60	669	78	826
	184 Cadagumpoondy .	20	330	...	...	...	...	...	...	...	...
	Total.....	1,444	18,241	912	11,169	539	6,711	8,807	929	11,218	
Wundawash.	12 Coviloor .	179	2,981	99	1,466	66	973	102	1,527	128	1,965
	64 Palanjoor .	53	771	24	300	12	150	23	289	29	368
	49 Poorisay .	277	3,645	143	1,801	145	1,918	137	1,710	180	2,186
	47 Yaichoor .	109	1,628	68	1,013	35	575	75	1,151	79	1,204
	Total.....	618	9,025	334	4,580	258	3,616	337	4,677	416	5,723
Grand Total...		2,062	27,266	1,246	15,689	797	10,334	1,059	13,484	1,345	16,941

North Arcot Collector's
Cutcherry, Chittoor,
5th October 1854.

Tanks in Trivettor and Wundawash Talooks watered by the
cut Channel.

vation in the last ten years.

Fusly 1258.		Fusly 1259		Fusly 1260		Fusly 1261.		Average of the 8 years.		Fusly 1262.		Fusly 1263.	
Land.	Teerwah.	Land.	Teerwah.	Land.	Teerwah.	Land.	Teerwah.	Land.	Teerwah.	Land.	Teerwah.	Land.	Teerwah.
13	14	15	16	17	18	19	20	21	22	23	24	25	26
Cs.	Rs.	Cs.	Rs.	Cs.	Rs.	Cs.	Rs.	Cs.	Rs.	Cs.	Rs.	Cs.	Rs.
12	141	8	96	15	167	14	170	11	127	16	200	18	212
43	441	27	295	51	507	51	517	39	408	43	453	63	618
81	917	64	742	82	920	88	978	73	821	87	972	90	997
36	463	29	371	32	415	40	512	33	430	40	508	39	504
22	306	18	242	17	235	19	265	20	286	20	269	24	321
77	925	63	767	54	648	74	917	64	766	84	103	93	1,139
76	943	53	645	36	429	63	740	58	713	81	1,031	82	1,046
73	989	39	497	35	450	51	640	46	593	72	975	79	1,067
51	712	36	479	28	360	45	621	41	559	47	639	58	781
40	333	22	132	28	243	37	286	28	225	48	4,021	52	443
90	1,257	65	385	59	719	82	1,037	74	980	92	1,246	94	1,297
54	716	36	465	37	470	36	456	40	515	46	598	65	905
48	673	43	592	41	548	49	656	46	643	58	800	57	795
34	419	24	299	25	307	34	411	29	361	34	421	34	421
31	450	29	408	23	399	32	458	30	428	31	452	34	488
29	305	23	236	22	230	33	342	24	255	29	303	37	396
7	74	8	81	10	96	11	112	8	91	12	116	13	126
37	428	16	196	22	233	22	216	26	293	36	406	46	513
47	503	37	423	28	309	37	395	36	396	44	517	63	737
100	1,136	72	810	63	707	83	889	75	825	96	1,074	114	1,296
...	...	...	...	...	...	...	...	...	...	...	...	...	...
988	12,131	712	8,711	713	8,372	901	10,617	801	9,715	1,016	15,104	1,155	14,122
128	1,975	82	1,185	80	1,169	120	1,817	101	1,510	154	2,469	157	2,562
26	332	20	277	21	276	27	349	23	292	27	336	29	362
221	2,899	85	1,070	112	1,281	212	2,764	154	1,954	243	3,203	243	3,151
67	1,046	35	566	67	1,041	72	1,107	62	963	73	1,110	80	1,218
442	6,252	222	3,098	280	3,767	431	6,028	340	4,710	497	7,113	509	7,293
1,430	18,383	934	11,809	993	12,139	1,332	16,645	1,141	14,434	1,513	22,222	1,664	21,415

J. D. BOURDILLON,
Collector.

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