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*Proceedings of the Madras Government, Public Works Department,
27th January 1869.*

No 493. Read the following letter from the Chief Engineer for Irrigation, to the Secretary to Government, Public Works Department, dated 11th December 1868, No 122 —

1 I have the honor to forward reports from the Superintending Engineers of Divisions on the results of surveys and investigations lately carried out in connection with Irrigation Projects in this Presidency, as called for by the Government in G O, No 1,824, dated 10th June 1868, and by the Government of India Besides summarising these reports, I propose to furnish the Government with an account of the bearings of the projects which have been under inquiry, in connection with the present condition and the extension of irrigation in this Presidency.

2. To commence at the Northern boundary — In Ganjam, Captain Beckley, Royal Engineers, has recently been employed in examining the capabilities of the district for extended irrigation, and has had his attention engaged in devising means for utilising the supply of the principal river in the district, the Rooshkohia (drainage area 2,400 square miles), and a preliminary report has been submitted. The present condition of the irrigation in Ganjam is described as extremely defective. There are a great number of tanks, but, with two exceptions, they are of insignificant size, and though the rain-fall even in the worst years is believed to be sufficient for the wants of the district, if reservoirs were available to store even one month's supply, the loss of a portion of the crops is a common occurrence even in average years, and in bad years the whole crop is lost, and a famine is the result. While the smaller tanks are powerless to save the cultivation under them, the large tanks are perfectly efficient. Of the two specified by Captain Beckley, one yields a revenue of 15,000 Rupees, and no remissions have ever been made, and the other, which yields upwards of 10,000 Rupees, furnished a plentiful supply of water to the lands under it when the failure of crops elsewhere was so complete as to occasion a famine. "The general condition of the district must, I think be pronounced unhappy, and such as to demand amelioration. The prevailing custom of growing rice upon lands depending solely on the rains for irrigation must always be a source of anxiety to the people and to Government, and must produce famines periodically, perhaps the oftener now that high prices and other causes have given great impetus to the export grain trade, the soil is rich and fertile there is little barren or stony land — the hills rising abruptly from the plains: the rain-fall is very large, though not excessive, and though variable, never appears to fail all parts have short easy access to the sea; but, notwithstanding all these advantages, Kurnool and much of the Bellary District evince signs of far greater prosperity than Ganjam. Doubtless much of the squalor and wretchedness observable around is due to the apathetic character of the Oriahs, and one great argument in favor of large Public Works is that through them the people would be trained to labor, and their indolence gradually overcome."

3. Captain Beckley suggests the construction of a series of large reservoirs, but in preference to dealing with them singly, he proposes to form them in connection with channels from the principal streams in the district. He proposes to construct a dam across the Rooshkohia to the west of Aska, and above the junction of its principal tributary, the Mahanuddy; to lead the supply of the latter by a

cross cut from a point above, the configuration of the country preventing his fixing his head works below the junction; and then to carry the combined supply from the two rivers by a cutting to the southward, between two ranges of hills, into the valley of the Shargaddah and Godahallow, (two other feeders of the Rooshkohia) The plain country is then reached, and no obstacle would be experienced in carrying the channel onwards to the coast at Chettpoor near Ganjam. It is further proposed to make the channel navigable, and to open out the section from Injelly to Ganjam in the first instance. Captain Beckley appears to have formed a favorable opinion of the scheme, as regards its remunerative results and its effect in improving the condition of the country, but the investigation cannot as yet be considered to have advanced to such a stage as will allow of Government forming any conclusions regarding it, especially as no definite information has been furnished concerning the water-supply of the Rooshkohia, but it may be surmised that the works projected will be of an exceptionally expensive character, partly in consequence of storage for water having to be provided in addition to an entirely new system of channels, and partly from the necessity of carrying the main channel through a heavy cutting in rock. I think it very desirable that the investigation should be continued, and that Captain Beckley should be furnished with such special establishment of Surveyors as he may require to work out the project thoroughly. Up to the date of Captain Beckley's last report, 160 miles of ground had been surveyed and levelled, and observations were being made of the rain-fall and the daily discharge of the Rooshkohia and Mahanuddy rivers.

Vizagapatam

4 In Vizagapatam there are no important irrigation works, nor are any in contemplation. Both in this district and in Ganjam there are extensive Zemindary estates, and the management of the irrigation works is in the hands of the proprietors. On this account the field for improvement is of a limited character, especially in Vizagapatam, where the area of land under cultivation by the Government Ryots is only between 60,000 and 70,000 acres.

Godavery

5. GODAVERY DELTA.—The channels in this Delta, which were commenced in 1847, combine navigation with irrigation, and have been in operation for a number of years. The alignment may be considered tolerably complete, as it already embraces nearly the whole area of the Delta. The improvements that are required are mainly the simple enlargement of various channels, to admit of their carrying a further supply of water and of bringing fresh land under irrigation; but various other works of a miscellaneous kind are also necessary, especially as regards provision of outlets for the discharge of the cross drainage of the country which the channels intercept, and of the surplus water from the irrigated lands and from the channels themselves. Various locks on the larger channels, which were originally constructed on the most rigidly economical principles, and in not a very substantial manner, and which are now in bad order, will have to be replaced by larger, more commodious, and more efficient works. The fall of the bed on some of the channels, especially along such portions where the current is inconveniently high for navigation, has also to be rectified, and the subsidiary channels have to be extended and improved. Up to the end of 1866-67, the expenditure on the Godavery Delta works, exclusive of the charges for general establishment, has

amounted to the following sum —

	RS.
New Works	42,45,648
Repairs	34,17,029
Machinery	4,16,116
	80,78,793

6 A project for the formation of a considerable reservoir beyond the Delta limits has recently engaged the attention of the Superintending Engineer, Captain Ryves. The site is at the village of Unnoomoolunka. Fifteen square miles of country have been surveyed, and forty

Latitude 17° 2'
Longitude 81° 27'

miles of contour levels carried out, from which it would appear that about 465 million cubic yards of water would be obtained on the supposition that the fall of rain is only 22½ inches. The bund would be eighty feet high and one and a half miles long, and the cost would be about twenty lacs. This project has not been worked out in detail, and it would be premature to express an opinion upon it, but it is desirable that the investigation should be continued, since, as Captain Ryves remarks, besides its value as a source of supply for irrigation, the reservoir would be of great service in reducing the volume of the Yerrakalva floods, which have now to be passed across the Delta, between embankments, and which in seasons of excessive rain-fall, may be productive of very serious injury to extensive tracts of irrigated lands.

7. The construction of an anicut across the Godavery at Polavetam, about twenty miles above Rajahmundry, was advocated many years ago by Sir A. Cotton, (I write from memory, and may be mistaken, as I have been unable to trace a reference to this project in any of Sir A. Cotton's reports in my possession,) but the subsidiary channels would necessarily be of a more expensive character than those in the Delta, and although the project is likely at some future period to merit attention, it cannot be seriously thought of until the Delta system is fully completed.

Kistna

8. KISTNA DELTA.—The works are similar in character to those in the Godavery, but having been commenced five years later, they are not so far advanced. The general scheme for completing the whole of the works has already been submitted to Government, and sanction has been accorded to various projects, forming portions of the whole, which will occupy the establishment for a considerable period. The detailed plans and estimates for the remainder of the works are in a backward state, and at this moment are in abeyance, in consequence of the Superintending Engineer having expressed his inability to form a reliable estimate of the whole area of land which is likely to be brought within the influence of the channels eventually.

9. The expenditure on the Kistna Delta works up to end of 1866-67 has been as follows, charges for general establishments not being included —

	RS.
New Works	27,35,196
Repairs	11,05,832
Machinery	1,47,489
	39,88,517

10 In the Kistna District, but beyond the Delta limits, a project has been under investigation for raising the flood-water of the Moonyair, a considerable

river (drainage area 3,050 square miles), which passes through the Nizam's territories to within thirty miles of its junction with the Kistna. The project will have to comprise the formation of tanks for the storage of flood-water, and in that respect it will be more expensive than the majority of irrigation works which have been carried out by our Government.

11. A project for the restoration of an old native tank at Dondapad, in the south west corner of the district, has also been partially investigated, and Government allotted funds in 1867 for the prosecution of this work and of another of a similar kind, but the preparation of the plans and estimates was not sufficiently advanced to warrant the Superintending Engineer commencing the work during that year, and since then the Officer who was employed on the investigation, (Captain C. J. Smith, Royal Engineers,) has been obliged to go Home on medical certificate. The drainage area is of limited extent, thirty square miles, and no very important results are to be anticipated from the work.

12. Both in the Godavery and Kistna Districts, the irrigation works out of the Delta limits though numerous, are individually unimportant. The country is undulating, and in some places hilly, and the works cannot be embraced under one or even under many separate systems they must be treated in a great measure singly. A great deal of cotton is grown in the south-west portion of the Kistna, the soil is also well adapted for dry cereal crops, especially for cholum or jowar. The tanks besides enabling the cultivators to raise a small quantity of rice, are also very valuable as reservoirs of drinking water for the people and their cattle. The Kistna itself has no influence beyond the Delta, as the country rises rapidly away from it. It carries an enormous body of water to the sea even in the worst years, and it would be quite possible, if an anicut were constructed about thirty miles above Bezvada, to lead the water to a much higher level than can be commanded by the existing channels. But such a project would be greatly more expensive than the Delta works, owing to the undulating and rocky character of the country, and it would be quite premature to take it up seriously, while the irrigation in the Delta is only half developed. This project was recently recommended for investigation

by the Acting Collector of the Kistna District, Mr. Wilson, who is under the impression that the site he selected at

G. O., No. 3,316, dated 20th October 1868

Chintapully had not attracted the attention of the Engineers in the district, but it will be seen on reference to the original report* on the Kistna anicut, that the

river was fully explored, and that the site in question was rejected on account of the

* Professional papers, Madras Engineers,
Vol. IV p. 8,9

difficulty of dealing with the floods, which there attain a height of fifty or sixty feet above summer level.

Nellore

13. The Nellore District is traversed by one large river, the Pennair, drain-

age basin 20,000 square miles. As far as Sungum on the north bank, and to near Nellore on the south, the country falls towards the river, but from these points towards the sea a considerable alluvial tract extends from the north and south banks of the river respectively. From Nellore, on the south bank, the Pennair water has been distributed by means of an anicut and a complete system of channels to the whole of the land which can be commanded in that direction, which may be considered as

14. On the north bank the tract within the command of the river is already very richly provided with tanks, to some of which flood water has hitherto been led by means of imperfect channels of native execution. It is now proposed to form head works at Sungum, thirty miles from the sea to lead all the ordinary flood water available in the Pennair, after the lower Delta works are provided for, by a capacious channel, into the Kanigeri tank, already one of the largest in the country to enlarge its capacity, and that of another tank adjacent to it, so as to allow of their holding together about 340 millions of cubic yards, and to distribute the water from them not only to all the purely deltaic lands which are under command of them, but to a tract of country beyond. The area to be irrigated is computed at 80,000 acres. This project, which is estimated to cost between twenty and thirty lacs of Rupees, is now matured, and the preparation of the plans and estimates far advanced. I have every reason to believe that the project, which has been drawn up by Mr. R. Smith, Executive Engineer, will commend itself to the favorable consideration of both the Local Government and the Government of India.

15. The other rivers in Nellore, with the exception of the Soornamookhy, near the southern limit of the district, and the Gundulcumma, on the north, all rise in the Eastern Ghauts, which run nearly parallel to the sea, and at the distance from it of fifty or sixty miles. The floods brought down by them are of a spasmodic character; and as their supply is derived almost entirely from the north-east monsoon, which is not only of short duration, but of very uncertain character, there is no field for any extensive irrigation systems, besides those above noted, in this district, though doubtless a good deal may be done towards improving the flood channels leading to tanks, and the tanks themselves, some of which are already very fine works. The examination of the Soornamookhy (drainage area 1,174 square miles) will shortly be taken in hand. Improvements to the supply of various tanks under it have been contemplated for several years past, but, in consequence of the greater part of the land along the south bank being Zemindary, and of the Zemindar claiming certain rights with regard to the water-supply of the river, the local Officers have been deterred from taking up the subject, being hopeless either of coming to an amicable arrangement with the Zemindar, or of being able to establish a right to any specific proportion of the water in favor of the Government ryots. The longer any matter of this kind is left unsettled, the more difficult it is to arrive at any result, and I would, therefore, propose to have the river examined as soon as a Surveyor can be set free from the Sungum project. The Gundulcumma (drainage area 3,100 square miles) is a considerable river, but the supply from the most important part of its basin is already absorbed by the great Cummum tank, and from thence onwards to the sea the channel is an unfavorable subject for artificial appliances, on account of its very considerable depth and the heavy expense which would in consequence have to be incurred to lead the water in low freshes to the surface of the ground.

16. The Kundalauroo, which passes close to Gudur, twenty miles south of Nellore, has a drainage basin of 1,240 square miles. There is already a well built native anicut across it, and a channel feeding Gudur tank. Another channel from a branch of the same river to the Chennur tank is in progress, but the resources of the

river cannot yet be said to be fully utilised, and it is desirable that they should form the subject of further investigation.

Bellary
Cuddapah
Kurnool

17. Turning to Bellary, Cuddapah, and Kurnool, it will be seen, on reference to the Map, that the Toongabudra runs along the northern boundary of Bellary, and that, at a short distance below Kurnool, it is joined by the Kistna; also that all the other rivers in these districts derive their supply from what may be termed local drainage. The Huggry, a branch of the Toongabudra, is an exception, but, though it comes from a distant part of the Mysore country partially within the influence of the south-west monsoon, its supply, owing to local circumstances, is scanty and uncertain, and it is consequently a very poor river as regards its power of irrigation. On the Toongabudra there are several anicuts and channels, and as that river derives its unfailing supply from the Western Ghats, in which there is an abundant fall of rain, the cultivation under them is secure, and of course very valuable to the small section of the district to which their influence extends, when other sources of supply fail. But they are small works, and do not offer any great field for improvement, to say nothing of the claim which the Madras Irrigation and Canal Company have on any of the Toongabudra water which is not yet utilised. It is on the Huggry that the Mauri Convai works are contemplated by the Mysore Government, and, if they are carried out, of course even less water than before will reach the Bellary District. But it is hoped that, with the aid of various branches which will be unaffected by this scheme, there will be enough water left to supplement the supply of several considerable tanks. A project with that end in view has been under investigation, and may shortly be expected. The other rivers in the three districts above named are nearly all in the Pennair basin. It will be observed that the Cluttravutty, the largest of its branches, and also most of the smaller branches, have been dammed across to form tanks, and some of these works are not only extensive, but exhibit a boldness of design which is worthy of high admiration. With extraordinary natural disadvantages to contend against, the old native rulers have indeed done so much, that the difficulty now is not, from a number of promising projects, to select the best, but to find any projects which are worthy of consideration at all. The Irrigation Company have already secured a right to the Toongabudra, but were it otherwise, the feasibility in an economical point of view of further utilising its water for irrigation from any point higher up than Kumply is made more than doubtful by the extremely uneven and rocky character of the country skirting its course. The other rivers have an uncertain supply, and though they are no doubt useful, in ordinary seasons, for the better supply of the tanks connected with them, it would be puerile to look to them as a safeguard against famines, for if the local rains fail, they fail also. The only projects which have yet come forward, and which are likely to turn out well, are two anicuts and sets of channels on the Pennair, at the distances of from thirty to fifty miles from its source. In the locality in question, there are already a series of tanks, some of which derive a partial supply from the Pennair by means of temporary dams across it, and small channels from it. The proposed works will, no doubt, place the supply on a better footing; and, though it may be difficult to prove that they will secure a return exceeding five per cent. on the outlay, it is possible that that standard may be reached. Another project on a larger scale, and which is nearly matured, has been designed

with a view to supplementing the supply of the Anantapoor and Bookacherla tanks by means of a channel from the Pennair, which would be led off shortly below the terminus of the other new channels above described, but these tanks are not in the valley of the Pennair, and the cutting through the water-shed would be of a very expensive character. This might not be an insuperable objection if an abundant supply of water could be counted on, but the reverse is the case. The project is one of those which have been frequently pressed on the attention of Government by the Revenue Officers of the district and by the Revenue Board. Plans and estimates for carrying it out were fully considered by Government in 1864, but were not approved, as they did not appear to be based upon sound calculations of the cost of overcoming the natural difficulties of the country. They were consequently returned for revision, and this having lately been accomplished, the result is, I fear, that the project will have to be condemned. A project is also under investigation in Cuddapah District for improving the supply of two large tanks, but it is not yet matured.

18. As in Nellore and other districts, numerous improvements may be made to the existing tanks. Many of them have silted up to such an extent as materially to impair their efficiency, and the attention of the Officers of the department may be usefully occupied in restoring the capacity where possible by raising the embankments, when this can be advantageously done without submerging valuable land, or without incurring too great an outlay. No one project of this nature can merit the special attention of the Government of India; but a number of well devised improvements, which may individually appear insignificant, are what such districts as Bellary, Cuddapah, and Kurnool, and indeed most of the other districts in the Presidency as well, want; for it is by means of them that the existing sources of supply can be utilised to the full extent, while the introduction of a supply from extraneous sources is beyond the power of any works, however great.

North-Arcot
Madras

19. Turning now to North Arcot and Madras, I have to explain that various improvements are in contemplation.

The Government of India have already sanctioned the enlargement of the Red Hill and Cholaveram tanks, which derive their supply from the Cortilliar river, after it is joined by an important branch from the north-west; and also of the Chembrambaukum tank, which lies between the Cortilliar and the Palar river. These works, which are both in the vicinity of Madras, are now in progress, but the supply of the latter tank is dependent to some extent on that of other tanks, which cannot yet be considered to be on a satisfactory footing.

20. The Palar Anicut, and the channels leading from it, were designed with a view to improve the supply of nearly all the tanks—which are very numerous—situated between that river and the Cortilliar, as well as others to the north of the latter, but a very mistaken estimate was formed of the capabilities of the Palar, which, it was supposed, was in fresh for thirty-five days in the year on the average, whereas in reality, in some years, it does not come in fresh at all.

21. Very exaggerated views of the capabilities for sustaining extensive systems of irrigation of the rivers on the Eastern Coast of this Presidency have been entertained by the public, and have been persistently urged on the notice of

Government. Even the Commissioners appointed to enquire into the Public Works system in the Madras Presidency would have led the readers of their report* to the conclusion that the superiority of Tanjore over the districts adjacent to Madras was to be ascribed mainly only to one cause, viz, that capital to a vast amount had been invested in it, in bringing water to the fields, while they lost sight of the fact that Tanjore has extraordinary natural advantages, in possessing a deltaic tract of country traversed by a number of arms of the Cauvery, and that, moreover, no amount of capital expended in attempting to bring water to the fields in North Arcot or Madras could place these districts on the same footing with Tanjore, unless the source from which that water was to be drawn could in the first instance have been made as abundant and as unfailing as the Cauvery. It now appears that the Palar works do not answer the expectations that were formed of them, nor is it likely, when the project was drawn up, which was at a time when Officers had the greatest difficulty in obtaining money for any large works, that either they or the Government would have ventured to propose anything, had they foreseen that to secure a supply from the uncertain freshes of the Palar, a much higher scale of expenditure than had been customary on any other class of Irrigation works in the Presidency would prove to be necessary, and that the supply of that river was both so defective and so uncertain as it has proved to be. But on the other hand, it has now to be argued, that imperfect though the supply of the Palar is, it is the only one, besides local rains, which can be made available for filling a number of tanks, many of which are of considerable size and importance. That the remunerative effect of Irrigation works is not the only aspect under which they are to be regarded, and that if Government derive an exceptionally high rate of profit from one system of works like those in the Deltas, they ought to be prepared to make a corresponding sacrifice to bring up works less favorably situated to the highest standard of efficiency.

22 It must stand to reason, that it must be more difficult and expensive to draw a supply for a given area from a river which may be in fresh for ten days in the year, than it would be if the freshes lasted for sixty days or more, as is the case even with the Pennair at Nellore, and that, as there are tanks in the Pennair Delta, as well as in the country affected by the Palar, it must be a much more costly and less remunerative undertaking to distribute water from the latter than the former; and the disproportion of cost must be still greater if the Palar is compared with the Cauvery, or the Godavery, or Kistna Deltas, where the aid of tanks is unnecessary. Besides which, the country through which a channel from the Palar has to be carried, instead of being alluvial and possessing a fall suitable for the conveyance of water, is undulating and irregular, and the soil in many places is hard and even rocky. These disadvantages have stood in the way of the Palar works having been taken up in a comprehensive manner.

23. The channels, so far as they are carried out, are, I believe, in the right direction, but they cannot be considered as in any way complete. They have to be greatly enlarged before the tanks at a distance from the head can be supplied by them, and numerous masonry works are required to regulate the fall. The expense must necessarily be great, as above explained, but unless the tanks are to

be left to the natural supply from local drainage, it will have to be incurred. One thing should never be lost sight of, viz, that our native predecessors have constructed the tanks for us, and that the cost of improving the means of irrigation to the part of the Presidency under consideration must be immeasurably below what an entirely new system of works would have proved.

24. The above remarks on the Palar are applicable also to the Cheyaur, and in a somewhat less degree also to the Poiney. These, with the Palai, being the three streams from which such improvement of irrigation, as is compatible with the condition of a limited command of water, is expected to be derived. The Poiney, though only a branch of the Palar, is better situated, from the direction in which it takes its rise, to receive a good supply, and the anicut which was constructed on it some years ago, with the channels under it, have, in consequence, proved more useful than the similar works on the other two rivers, although they have not come up to what was expected of them. There is already an anicut and a system of channels from it on the Cheyaur, and two other projects connected with the same river have formed the subject of investigation during the past season. The existing project is not yet complete, and the surveys of the others have only been advanced to a stage which will enable a skilful Officer to use them as a basis for a general design of the works. I say skilful, for the alignment of channels through an undulating country, coupled with the necessity of providing for the supply of an enormous number of tanks of various sizes, must necessarily be an intricate and difficult operation. The object and scope of the projects connected with the Palar and Cheyaur rivers, which have been under investigation, are fully explained in the report by Colonel Boileau, Superintending Engineer, 4th Division. Two minor projects are also particularised by the Superintending Engineer, but I have not yet had the means of forming an opinion of their value. It is also designed to examine the north banks of the Cortilliar, and the Arnee or Nurnaveiam river (drainage area 500 square miles) which runs a few miles further north, and which traverses a tract which is well provided with tanks. Indeed, the surface of nearly the whole of the North Arcot and Madras Districts is covered with a perfect net work of tanks. Some of these admit of enlargement, others may be connected with rivers, and have their supply more or less improved, and though the irrigation in both districts must always be attended with uncertainty, the Government should, I think, take it upon themselves to undertake that the supply of water available in average years at all events should be utilised, even if the works required to effect this object do not promise to be sufficiently remunerative to entitle them to a grant from the "Loan" Fund.

South-Arcot

25 South Arcot is already well provided with the means of irrigation. A

number of small but useful works have been carried out by the present Superintending Engineer, Colonel Foord, who has been connected with the district for the last twenty years, and two other projects, estimated to cost 54,800 and 11,000 Rupees respectively, have lately been submitted by him, and have received the sanction of Government. The smaller class of rivers which traverse this district are better supplied than the Palar, while the southern portion of the district is bounded by the Cauvery, and derives a supply from it by a channel leading from the lower anicut.

26 The Superintending Engineer is of opinion that there is no field left for works of the larger class, but that various improvements, of which he mentions several, may be superadded to the existing supply channels of tanks. The improvements which have either been carried out, or which are in contemplation, may all be said to be of the same character. Small channels have in times past been led off from the river to various tanks, and in freshes the water is turned into them, in some cases by means of permanent dams, in others by banks of sand and brush-wood. The old channels are imperfect works, and the tanks furthest from the head get an insufficient supply. The revenue of course suffers in proportion. The new works almost invariably comprise the construction of a masonry weir or anicut across the supplying stream, and of head sluices for the regulation of the supply. The old channels are either abandoned altogether, or modified both as regards their sectional area and their levels, and distribution sluices are built for giving a proper share to the different tanks. It cannot be affirmed that the distribution is in all cases perfect, or that there is not room for further improvement in some of the works which have been executed under this Government, but, judging by results, the small projects which have been carried out in South Arcot may be looked upon as pattern works of their class. It need not be supposed that the very high returns which are quoted from some of them are exaggerations. The storage room for the water had already been provided by the natives; the defects of the channels as regards its supply and alignment and the distribution of water, had to be remedied before the people could get a proper supply for their fields; but these defects once removed by the judicious outlay of a moderate sum of money, the cultivation and revenue rise to the *maximum* of former years, or it may be beyond it, and, compared with the average revenue, this rise may be enormous, and indeed appear incredible to any one who has not the opportunity of scrutinizing and verifying the returns. For example, it is hard to believe that an expenditure of between 11,000 and 12,000 Rupees on the Trivady Anicut, in South Arcot, yields an annual return of 30,000 Rupees. Of course, the more promising projects of this class are taken up in the first instance, a less paying series has then to be fallen back on, and, finally, we arrive at a stage when the improvements required may be of so expensive a character, that the results accomplished though they may be very beneficial to the country, may not be highly remunerative to Government.

Salem

27. In Salem, with the exception of tank improvements and the extension of irrigation from the Cauvery, no projects are likely to be brought forward. The Superintending Engineer mentions one which is now under investigation and which is estimated to cost 59,600 Rupees. The formation of a large tank across the Pennair, near Kistnagherry, was suggested by the late Sub-Collector Mr Thomas, and an Officer has lately been deputed to survey the site. Several other projects have been proposed for examination by the Revenue Officers.

Coimbatore

28 The Cauvery forms the southern boundary of the Salem District and the northern boundary of Coimbatore. A project has been drawn up for the construction of an anicut across the river, at the distance of about twenty-eight miles from Erode, and for channels leading from the north and south flanks. The length of

each in a direct line would be about twenty-five miles, though their actual course will be considerably more. An ancient rough stone anicut, a remarkable work of its kind, crosses the Cauvery at Nainjepett*.

* Poolumpett in the Trigonometrical map

and its restoration had long been advocated by the Revenue and Engineer Officers of the Salem District, but, prior to the year 1855, no detailed professional examination of the work, with a view to the preparation of a definite project in connection with it, had been made. In that year an estimate for restoring it and for a channel for the north bank was drawn up by Lieutenant (now Colonel) C V Wilkieson, but it was not sanctioned. The subject has been investigated afresh during the past season, and, with a view to gain a better command of the country, a site for a new anicut has been selected about four miles higher up the river than the old one. The ground to be traversed by the channels is very irregular, and is intersected by numerous drainages, which will necessitate the construction of a corresponding number of aqueducts and escapes. The project will thus be of an expensive character, but as a certain supply can be counted on from the Cauvery for the estimated acreage (about 20,000 acres, one crop only) without, it is believed, producing any injurious influence on the extensive irrigation in Tanjore, it is anticipated that the estimates will meet with favorable consideration. They are now nearly ready for submission.

29 The Calingaroyen channel, which is fed by the Bowany river, and which runs with an extremely tortuous course fifty-five miles in length, but in a general direction nearly parallel to the Cauvery, and at a mean distance of about half a mile from the south bank, has also been engaging attention. The anicut across the river, and the channel itself, are of purely native formation, the head sluice and several masonry works constituting nearly all the improvements it has received under European management. The levels of the channel and the distribution of water are extremely defective, the water being led to the fields by means of cuts in the banks, to the number of about 2,000.

30 Large estimates were submitted for sluices in 1855 and other works, but funds were not available. This channel and others of a similar character under the Bowany, the aggregate revenue of which is about 2,00,000 Rupees, are being placed in the separate charge of an Officer, who, after surveying them, will prepare the necessary plans and estimates for the various improvements which are required to place the irrigation on a satisfactory footing.

31. There are numerous other channels in the Coimbatore District, chiefly under the Amravutty and Noyel rivers, with an assessment of about two lacs of Rupees. I cannot at present speak with any confidence as to what extent they are capable of improvement, but it can hardly be doubted that the present arrangements for the distribution of the water are defective, and that some of the channels which are now supplied by means of temporary dams, or Corumboos, would be benefited by the construction of masonry weirs across the supplying streams. On the Amravutty, there are twenty-two separate channels, of which six are supplied by the aid of temporary dams, and on the Noyel river there are twenty-four channels, all supplied by means of anicuts. Colonel Ludlow wrote as follows, in 1854, on the subject of these works — "The Amravutty drains

* 3,500 square miles

an area of upwards of 3,000 square miles,*

including the northern slopes of the Dalle or Palaney range of hills and is

partially affected by the south-west monsoon For a considerable portion of the year, therefore, it has a fair supply, and at times a very large one, but at the latter end of the season this frequently fails, and the crops suffer much in consequence, and the necessity arises for large remissions in the worst cases "

" The area of drainage of the Noyel river (1,340 square miles) is much more circumscribed than that of the Amravutty, and owing to the confined extent and eastern aspect of Bolumpetty valley, on which it has its source, the supply is anything but abundant " From Fuslies 1244 to 1260 (inclusive) the average annual assessment was Rupees 1,38,694, the settlement only 66,197, the per-centage of loss on the ayacut being fifty two, or rather more than half.

32 Mr W Fraser, C. E., was occupied several years ago in drawing up projects for the formation of extensive reservoirs, on the branches of the Cauvery which drain the Neilgherry Hills, but the plans and estimates have not yet been submitted I learn, however, that the designs for the most important of the proposed reservoirs will be sent in without further delay. A minor reservoir project was drawn up by Major Farewell, under the direction of the Superintending Engineer, 7th Division, Colonel Walker, and the prosecution of the work has been entrusted to Mr McIvor, Superintendent of Government Chinchona Plantations, who has engaged to raise a bund to the height of 140 feet and to furnish the necessary appliances for disposing of the flood water for the sum of 25,000 Rupees

G. O., No. 2,271, dated 16th July 1868

Tanjore and Trichinopoly

33 In Tanjore and Trichinopoly the field for improvement is of a limited character. It has indeed been proposed to restore the old Ponnany tank, which was formerly fed by the channels from the Coleroon and Vellaur, and it is very desirable that an investigation into the economical practicability of the undertaking should be carried out, when an Officer can be spared for the purpose, but the attention of the Officers of the Department, in these districts, will mainly have to be occupied in perfecting the existing system of irrigation under the Cauvery and Coleroon. In the Trichinopoly District there are several old channels, which may be considered as in a great measure independent of the great system under the Upper Anicut They are of a similar character to the Calingaroyen channel, above described, and it is probable that the arrangements for the distribution of the water are capable of considerable improvement, and that it will be found advantageous to place an Officer in exclusive charge of them

34 In Tanjore, the regulation of the Cauvery and its numerous important branches, or rather arms, is now engaging attention. The necessity of distributing the supply among the various channels, in proportion to the cultivation under them, has long been recognized by the Engineers of the district, though, from the inability of the Government to provide the requisite funds, it is only recently that a project for carrying this important operation into effect has assumed a definite shape. As the Government are aware, Captain Mead has been engaged for a considerable time in carrying out the necessary preliminary surveys and investigations, which, owing to the enormous size of the rivers to be dealt with (the Cauvery for

some distance from its head at the upper anicut being fully a mile wide), the total absence of reliable records of the cultivation under each river, and of levels showing the state of the channels at different periods, have necessarily been of a very laborious and intricate character. Captain Mead's first report has already been before Government, and the construction of regulating dams across the Cauvery at the heads of three large arms, the Codamoorthy, the Arasalar, and the Veerasholen, and across the heads of the arms themselves, has been decided on. Plans and estimates may shortly be expected for the works which are still required for the control of the Cauvery itself They are designed with the two-fold object of shutting off dangerously high floods from the Delta, and of effecting a fair apportionment of the ordinary supply between the Cauvery and the Vennaur, the cultivation under each of which is about 350,000 acres It is not considered safe to discharge into the Coleroon beyond a limited supply of the surplus flood water, and as, moreover, a large quantity of water is required at times in the Delta, to make up for the deficiency below the ordinary standard at other times,—a contingency very liable to occur in consequence of the fluctuating character of the freshes,—the regulating works have to be designed on a scale far more extensive than any work of the kind that has been undertaken in this country.

35 The Superintending Engineer, Captain Oakes, does not anticipate that any great increase of cultivation, and, therefore, of revenue, will result from the improvement of the deltaic rivers, but he explains that the supply of the lands will be better regulated, and, therefore, more constant

G. O., No 1,783, dated 6th June 1866

in seasons when the monsoon is not very favourable; and that the waters during

floods being more fairly distributed, according to the capacity of discharge of the various rivers, will do less injury than they now do, and that a large saving in temporary repairs and in closing breaches will in consequence be effected

36 The regulation of the Cauvery and the larger streams in Tanjore once effected, the next step will be to improve the system of distributing the water to the smaller channels, or rather to institute a system, for at present there is none. It will be a task that will not be willingly taken up by many Officers in the Department, as, independently of various engineering difficulties in their way arising from the variable character of the supply of water, they will meet with great opposition from the influential cultivators, who would not only present hundreds of petitions against the introduction of the new works, but would take more active measures to check them by bringing actions against the Superintending Engineer in the Law Courts. This is no imaginary evil as the Government are well aware. That some day or other it will be necessary to put a stop to it by legislation if any real improvement on the old native systems of irrigation is considered essential, I feel perfectly satisfied, and, indeed, without legislation to support the Public Works Officers in Tanjore, it will be useless, as has been already brought to notice on several occasions, for them to attempt to introduce any real improvement in the present defective style of distributing the waters of the Cauvery.

Madura

37. In the Madura District, the existing supply of water is already fully

utilised There are numerous small channels from the Vigay and the minor streams in the district, but they are far from sufficient for the wants of the people. The