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MADRAS RECORD OFFICE.

Government of Madras.

Public Works **DEPARTMENT.**

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Read the following papers.

No. 165. From Captain F. H. RUNDALL, Consulting Engineer for Irrigation and Canal Company, to J. D. BOURDILLON, Esq., Secretary to Government, dated Madras, Pater's Garden, 15th October 1860, No. 71:—

SIR,

1. In my letter of the 11th instant, No 67, I stated that the Chief Engineer of the Company, had intimated to me his desire to modify his plans, so far as the head of the main Canal for Irrigation was concerned. I have the honor now to submit his representation on the subject, and my opinion thereon.

2. Just previous to my arrival at Kurnool, the Chief Engineer received from the Engineer of the Bowanassy Division the final surveys and sections of the country adjoining the water-shed of the rivers Tumbaddra and Kundár.

3. These showed no material difference in the relative *levels* of the river at Kurnool and the summit of the proposed cutting from those originally taken, but the contour line when plotted showed the *length* of the Canal itself, as well as of the cutting, to be greater than was originally anticipated, and than the configuration of the country as apparent from the Trigonometrical Atlas would indicate. The general accuracy of the original levels having been previously tested, and no material error detected, the *practicability* of making the head of the main Canal at Kurnool was established, while the economy or otherwise of this arrangement could only be arrived at after further details had been received. Daily expecting to receive this detailed information from the Executive Officer of the District, the Chief Engineer informed me, he purposely abstained from preparing the final Surveys and Estimates for the first section or 14 miles of the Canal, and planned only the anicut and head works, which, though he expected they would not serve the purpose for both Irrigation and Navigation, yet would be necessary under any circumstances for connecting the town of Kurnool as well as the river Kistna and Hyderabad road with the grand Canal, the ultimate exact direction of which must necessarily depend upon the result of the surveys in course of prosecution. It is the result of this information furnished after an unnecessary delay of six months which leads him to propose to take off the head of the Irrigation Canal about 20 miles higher up the Tumbaddra at a place called Sunkasala, where there is now a natural Dam of rock nearly all across the river. The Canal would run from thence parallel to the river at a distance of from ½ to 1½ miles, and cross the Hindri by an aqueduct at an elevation of 40 feet above the level of the bed as taken off at Kurnool, with which it will be connected by Locks at about two miles from the town. The economy of this arrangement is that the gain in elevation brings the bed of the Canal to only 25'5 feet below the summit of the water-shed. Not only is the *depth* of the cutting reduced from 68 to 25½ feet, but its length likewise from 7 to 1¼ miles, and instead of being a laborious it will be only an ordinary undertaking.

4. To lay the matter more clearly before the Government, I have prepared the accompanying Tracing, and on it drawn the contour lines on which the Canals, taken off at different levels, would run.

5. It will be observed that there are two distinct water-sheds to be surmounted. The one is the ridge between the Tumbaddra and the Bowanassy, a small mountain stream that falls into the Kistna below its confluence with the Tumbaddra, and the other is the ridge between the Bowanassy, Tumbaddra, and Kundár.

6. As this latter could not be turned and *must* be cut through, it was always considered as the great obstacle to be overcome, and in the absence of detailed levels the first-named ridge appeared to be sufficiently low to be turned without making any very great circuit. This ridge has, however, been found to maintain a high elevation for a considerable distance, and a Canal led off from Kurnool would have to run to within one mile of the Kistna before it could pass it. The increased length thus lowers the level of the Canal by the time it reaches the water-shed of the Kundár and makes a cutting of 68 feet necessary. Had this depth, however, been only for a short distance, it would not have been formidable, but at this low level the length of cutting amounted to seven miles, varying from 40 to 68 feet in depth.

7. By starting however from the higher level, the length of Canal between Kurnool and the water-shed will be reduced from 53 to 43 miles, while the length of the *cutting* will be diminished from 7 to 1½ miles, and the depth from 68 to 25½ feet.

8. After the Chief Engineer had explained his proposals, I proceeded first to the water-shed of the Bowanassy, and to satisfy myself of the configuration of the country there, took a number of levels, personally, in various directions, and had more lines taken by the Company's Surveyors, in order to ascertain at *what* level the Canal would be most economically carried. The results led me to conclude, that if the water-shed between the *Hindri* and *Bowanassy* could be cut through without great expense, it would be preferable to proceed even higher up the Tumbaddra, until an elevation of 100 feet above the river Hindri was attained. This arrange-

ment would bring the Canal out upon the top of the ridge between the Bowanassy and Tumbaddra, near the village of *Damgutla*, and command one of the most beautiful tracts possible for Irrigation. To ascertain the feasibility of this scheme, I proceeded up the Tumbaddra as as far as the town of Naguldinny, and requested several lines of level to be taken and the results to be forwarded to me to Madras. I have since heard by Telegram, however, that the summit near Damgutla is too high, and the cutting there of too great a length and too expensive to allow the higher line to be adopted, and therefore that the Chief Engineer's line of Canal from Sunkasala is the best improvement. Had this not been the case, the Canal from the higher level near Naguldinny would have run at about two miles distance from the river, crossed the Hindri eight miles above Kurnool and passing through Damgutla have followed the course indicated by the yellow line. The length would have been reduced from 53 to 33 miles between Kurnool and the Kundár, and the Canal would have commanded about 1,50,000 acres of the finest arable land.

9. The Canal from *Sunkasala* will follow the course indicated by the red line, will be about 20 miles long from Sunkasala to Kurnool and 43 miles thence to the Kundár, and command about 75,000* acres on either side of the Bowanassy, over which a branch Irrigation channel from the main Canal will be carried near the village of Kumbulpilly.

* Of these 15,000 are between Sunkasala and Kurnool.

10. The Hindri will be crossed by an aqueduct at the village of Culloor, where I inspected an excellent site in the bed which is there covered with rock. The Canal will run from thence close to the Tumbaddra, be connected by Locks with the navigation branch from Kurnool and then run parallel to the river as far as Shaitancotta, from whence it will gradually diverge to the village of Nagatoor which is on the top of the Bowanassy ridge, and then run on to Pamulpad and cross the water-shed of the Kundár between Kumbulpilly and Banakacherla, after which it will follow the fall of the country along the valley of the Kundár.

11. With the levels of two extreme points in the line arbitrarily determined, it is evident in this case, that in order to avoid heavy cutting, there must be a *certain length* of Canal excavated, and, therefore, the more direct the line can be preserved the greater the advantage secured. Hence extending the head of the Canal to a point above Kurnool, not only does not involve extra expense, but affords also the benefits of navigation to a greater distance, in addition to Irrigation to an increased area of land.

12. The lengths to the Kundár water-shed would be as follows:—

1. With the Canal taken off at Kurnool. Above Kurnool 0 below Kurnool 53
2. From Sunkasala. do. do. 20 do. do. 43
3. From near Naguldinny. do. do. 33 do. do. 33

the respective totals being 53, 63 and 66. The increased length of 10 miles in the two last instances being more than compensated for by the more favorable nature of the soil, advantage of which will be taken by following nearly a contour line, and confining the excavation to the surface, so as not to reach the depth at which the rock is found at this higher level.

13. The approximate estimates for the relative lines are:—

		Rupees.
	For the 1st Line	
46	miles of Canal 15,000†	6,90,000
7	miles of cutting excluding the value of stone quarried...	11,00,000
		17,90,000
	For the 2nd Line.	
61¾	miles at 10,000	6,17,500
1¼	mile of cutting	1,25,000
	Aqueduct over Hindri	1,00,000
		8,42,500
	For the 3rd Line.	
60	miles at 10,000...	6,00,000
6	miles of cutting	12,00,000
	Aqueduct and approaches	2,00,000
		20,00,000

† The soil on the lower level is more rocky than on the higher, the excavation will consequently be dearer.

N. B.—The masonry works along the lines are not included, but these will not be heavy as no great area of drainage is crossed.

14. The areas commanded between the Canal head and water-shed of the Kundár are respectively as follows:—

By 1st, 20,000 Acres.
By 2nd, 75,000 „
By 3rd, 1,50,000 „

15. From the above it will be seen that on the whole the 2nd line is the one that can be constructed most economically as well as most quickly, although the 3rd line commands the greatest area for a given length of excavation. This, however, is not a point of importance, as the Canal does not terminate at the water-shed, but is intended to irrigate the valley of the Kundár.

16. The only way in which the works hitherto sanctioned by Government are affected, is that the head Sluices will have to be transferred from Kurnool to Sunkasala, while the height of the Anicut at Kurnool may be reduced from 12 to 10 feet, and the posts and shutters be dispensed with. One under-Sluice will still be required to keep the river from silting up in front of the Lock. The Canal also being used only as a connecting line of navigation to the town, will not require to be more than 15 yards wide.

17. The *additional* works necessary are an Anicut at Sunkasala, which will not be expensive, and an aqueduct across the Hindri with two additional Locks at the junction with the branch to Kurnool. These last are, strictly speaking, not additional, as they form part of the Lower Bellary scheme, and are merely removed in position, for they must have been built in any case in the Canal from Bellary somewhere above the town of Kurnool.

18. Though an additional expense is apparently incurred for the Anicut at Sunkasala and Hindri aqueduct, yet in reality it is the more economical arrangements, and does not much exceed Colonel Cotton's original rough estimate for these works* from Kurnool to the water-shed, which I observe is 10 lacs. Adding the proportionate expense of the 20 miles of Canal above Kurnool, included in the Lower Bellary project, and estimated at 6,000 Rupees per mile or 1,20,000, will make his total 11,20,000.

* Viz., Anicut and Head Works.

	Rs.
For the 2nd line as shown in paragraph	8,42,500
Masonry works	1,20,000
Add for anicuts at Kurnool and Sunkasala and head works	3,55,000
	13,17,500

19. The estimate for all the works noted above will as far as I can judge at present, not much exceed thirteen lacs.

20. I must here add, that before adopting the proposal for removing the Canal head, the feasibility of reducing the cutting at the water-shed by raising the Anicut at Kurnool was well considered. By taking it obliquely across the river and increasing its length from 1,000 to 1,800 yards, the Anicut might have been raised still four feet higher without danger to the town. This, together with a reduction of the fall in the bed of the Canal, would have diminished the depth of the cutting by 10 feet as well as its length in proportion, and therefore its cost; but as the total saving was not nearly equal to that effected by the removal of the Canal head, the latter alteration of carrying the supply over the Hindri by an aqueduct, which is merely the revival of an idea originally discussed and mentioned as probable in paragraph 21 of my report of the 1st February 1860, No. 36, is preferable, especially as the late orders from the Secretary of State, enjoining that the whole scheme is on no account to exceed the guaranteed million, necessitates the adoption of arrangements, which by the greatest economy both in design and execution shall extend the benefits of Irrigation over the greatest area, and those of navigation to the furthest possible limit. As, therefore, a certain sum *must* be expended in excavation, it is manifest that the most economical arrangement is one which will provide at the same outlay a Canal to extend to 20 miles beyond Kurnool, instead of one which would only afford a circuitous route, terminating at the town itself.

The revision of the *whole* scheme necessary to bring the outlay within the limit enjoined by the Secretary of State, will form the subject of a separate communication.

21. Having then well considered the several plans investigated the surveys and levels hitherto submitted, and examined the various portions of country already mentioned. I am of opinion that Colonel Cotton's proposal is judicious, and that the line of Canal from Sunkasala is the one that will be executed most speedily and at the least cost, while at the same time, a fair of extent of land compared with the length of Canal excavated will receive early irrigation, I therefore beg to recommend its adoption.

22. With regard to the rumours which have lately appeared in the Public prints, I beg to state, that the only irregularity which has come to my notice is, that instead of confining the work to the 1st mile of Canal, the estimate for which alone had been submitted, the 2nd mile was commenced in order to find (as the Executive Engineer informed me) more space for the large crowds of laborers attracted to the work. It is right to add, however, that the Surveys and Estimates for this additional mile, awaited my arrival at Kurnool, but as the proposed modification would require a diminished width of Canal, I returned them to the Chief Engineer for revision.

23. During my tour, I have taken the opportunity of obtaining from the Engineers a statement of their expenditure and also of the amount of work executed in each Division. These particulars I propose submitting to Government in a separate letter.

24. I cannot conclude without observing, that there exists at Kurnool a most decided hostility to the Company's operations. As, however, it is apparently confined to the European community, while with the agricultural and laboring classes the works are popular enough, it is not a matter of much consequence, though it is to be regretted that where co-operation is looked for, a spirit of dislike and opposition is manifested towards an undertaking in which the welfare of both the country and the Government are so much concerned.

No. 166. MINUTE BY THE HONORABLE THE PRESIDENT.

1. The letters submitted by Captain Rundall exhibit, in my opinion, an unsatisfactory state of matters at Kurnool. That a serious mistake has been committed by the commencement at that spot of the works to be executed by the Irrigation and Canal Company is apparent. It is also evident that the error might, with ordinary care, have been avoided.

2. The project undertaken by the Company is a gigantic one. The measures adopted for carrying it out have been hastily devised, and are incomplete in themselves. I however trust that hereafter no portion of the work will be begun until in every respect the plans and estimates connected with it have been carefully prepared and scrutinized. Should therefore the results, which I thus anticipate be obtained, the check which the Company has now met with in their hap-hazard mode of acting will be a cause of rejoicing rather than of regret.

3. I do not, in reference to what has happened, attach so much blame to the servants of the Company as I do to Captain Rundall. In the instance of the Company's servants, it was natural, but not wise, that they should desire to press on the works; whereas it was the duty of Captain Rundall, as our Consulting Engineer, to have guarded the Government, from giving their assent to the execution of works, for which, he ought to have known, the plans and estimates had not received that consideration which alone could justify him in submitting them to Government for sanction.

4. The proposed removal of the Anicut, as now suggested to us for approval, to Sunkasala is, as far as I can judge, a judicious measure. It however calls for careful examination, and ought not to be adopted until the Government feel fully satisfied that it is practicable. The work is to cost less than the one it is proposed to give up. Should this prove to be the case, it is so far satisfactory. But it seems to me that if the Anicut is to be at Sunkasala, the Anicut at Kurnool need not be built. No water from the Kistna it is evident can be conveyed by that means into the Sunkasala channel, and no benefit sufficient to justify the outlay can be obtained by having a navigation canal from the Kistna to the Tumbaddra. The abandonment of the works at Kurnool is, therefore, in my opinion, consequent on the adoption of the Sunkasala channel, as the means of conveying the water of the Tumbaddra into the Kundár Valley, &c. The project of obtaining a supply of water from the Kistna must also be at an end.

5. There is one circumstance connected with the general approval which this Government has accorded to the "Tumbaddra project of the Madras Irrigation and Canal Company" which calls for further consideration and that is that the Secretary of State for India has refused to guarantee interest on the £350,000 required, in excess of their original capital, for the completion of the project in question. The Secretary of State has also instructed us to confine our sanction to such a scheme as the Company can completely execute, within their guaranteed capital, of one million sterling.

6. It thus becomes necessary, before we can sanction any further execution of works by this Company, that there should be submitted by them to Government for approval, a project such as we have been empowered to sanction.

7. I do not ask for this, as a mere matter of form, but I do so because I can discover no other safe mode of dealing with the subject. The present project that has been sanctioned will, I find, after the works connected with the Mari tank have been omitted, still cost 12 lacks more than the Company's guaranteed capital—(*vide* page 7 of the Government Proceedings, dated 4th April last).

8. It is moreover possible that the project which the Company may hereafter submit for approval may be one that the Government cannot agree to. For instance, if any portion of the Bellary section of the present scheme were seriously affected by the new project, I do not think that I could accede to such alteration, as Bellary is certainly the part of the country included in the present scheme that needs most urgently a supply of water.

9. Until therefore the Government has been informed of the manner in which this 12 lacks is to be reduced, it would not be right in us to permit the commencement of further or new works by the Company.

10. This demand of mine need cause no delay, as Captain Rundall in his letter states that the revision of the whole scheme is now under preparation; it is only, therefore, necessary to call upon him to expedite its preparation by the Chief Engineer of the Company.

11. In my Minute of the 16th instant, I have called attention to several points connected with the plans and estimates prepared by the Irrigation Company that appear to me should hereafter be dealt with by the Government before they sanction the commencement of any works by the Company.

12. The points that I have thus noticed, are in my opinion most important, and I feel assured that if they are not attended to the operation, of the Company's works will be greatly impeded.

13. I observe that Captain Rundall in the last paragraph of his letter refers to the conduct of the European community at Kurnool as being objectionable: he should be asked to explain the nature of the opposition, and want of co-operation met with and of which he complains.

(Signed) W. MOREHEAD.

18*th October* 1860.

No. 167. From Captain F. H. RUNDALL, Consulting Engineer for Irrigation and Canal Company, to J. D. BOURDILLON, Esq., Secretary to Government, dated Madras, 24th October 1860, No. 76.

SIR,

1. I have the honor to submit copy of a letter addressed by the Chief Engineer to the Secretary of the Company, and forwarded to me by the Agent this day. In it he explains the modifications required in the source of supply and main line of irrigation and navigation through the water-shed into the Kundár valley.

2. He states, 1st, that the Dam at Kurnool will form the base of a low Anicut, the completion of which will be at a reduced expense, and the channel already partially excavated will require very little more to complete it for the navigation.

Second. That the Lock at Kurnool is in hand under contract.

Third. That at Sunkasala eighteen miles above Kurnool will be the source of supply, by which a lift of 40 feet will be gained, and the course of the channel improved. That the supply will pass the Hindri by an aqueduct, and at the point where the channel approaches the original cut a junction for carrying the navigation to Kurnool and across the Tumbaddra will be formed, leaving this part of the project with respect to navigation as it is was, the only change being the source of supply.

Fourth. That this variation will bring some land very quickly under irrigation, and increase the area commanded between Kurnool and the Kundár, and that it will reduce the cost of the cut at the water-shed to a trifle.

Fifth. That he necessarily kept in view the possibility of the change, while the section across the water-shed was undefined and so partially carried on the works at Kurnool, that there could be no work done in vain, and according to this modification, the expense above Kurnool is balanced by the reduction below.

3. Having already in my letter of the 15th October 1860 No. 71, explained in detail the reasons for the proposed modifications and my opinion thereon, it is not necessary to recapitulate them here.

4. The remainder of the Chief Engineer's letter has reference to his disappointment in the delay of Mr. Brumell's Surveys, which he states, any other of the Engineers would have submitted three months earlier.

From H. C. COTTON, Esq., Chief Engineer, Madras Irrigation and Canal Company, to J. WESTWOOD, Esq., Secretary, Madras Irrigation and Canal Company, London, dated Kurnool, 12th October 1860.

SIR,

The result of Mr. Brumell's Surveys in the Bowanassy Division clearly displays the modification required in the source of supply and main line of irrigation and navigation channel through the water-shed into the Kundár valley, since I removed from under his direction the Surveys attached to his Division and placed them in one body with those of the Hindri Division. I have had all necessary levels taken above and below Kurnool and am now prepared to plan the works and carry out the following arrangements.

The Dam at Kurnool will form the base of a low Anicut, the completion of which will be at a reduced expense, and the channel already partially excavated will, require very little excavation to complete it for the navigation.

The Lock at Kurnool is in hand under contract.

At Sunkasala eighteen miles above Kurnool, will be the source of supply, by which a lift of 40 feet will be gained and the course of the channel will be improved. The supply will pass the Hindri by an aqueduct, and at the point where the channel approaches the original cut, a junction for carrying the navigation to Kurnool and across the Tumbaddra will be formed, leaving this part of the project with respect to navigation as it was, the only change being the source of supply.

This variation in the works will bring some land very quickly under irrigation above Kurnool, and increase the area of irrigation between Kurnool and the Kundár. It will reduce the cut at Bowanassy to a trifle. I need scarcely allude to Mr. Brumell's Estimate for that cut which amounted to 31 lacs of Rupees, as I trust the Board will not have been in the slightest degree misled by the false view he would give of the undertaking, by means of that absurd Estimate. Had I selected any other of the Engineers sent out from England for that Division, this variation of the scheme which at length his Surveys enable me to make, would have been carried out three months earlier.

I necessarily kept in view the possibility of a change while the section at Bowanassy was undefined, and so partially carried on the works at Kurnool, that there could be no work done in vain, and according to this modification the expense above Kurnool is balanced by the reduction below, and there will be more land commanded, and it will be more quickly brought under irrigation.

Unless I hear from the Board that any answer is required to what Mr. Brumell may have written in exculpation of himself or complaint against me, I shall forbear remarking further on his conduct.

His high testimonials and higher professions led me to delay the step of withdrawing from him the Establishment he was evidently unable to make use of, lest at any moment such withdrawal would leave the full trial he has had incomplete, and a question remaining whether he would not in the end exhibit first rate work as the fruit of his first rate professional character and salary. I beg to assure the Board that so much work has been got through since I relieved Mr. Brumell from all duty, that the whole of the operations in this part of the scheme have obtained new life and animation and all engaged are working with spirit and energy.

No. 168. MINUTE BY THE HONORABLE E. MALTBY.

* Dated 15th October 1860.

1. In considering this letter* of Captain Rundall's and its enclosures, it is necessary to revert to the circumstances under which the works at Kurnool were commenced.

2. In their Order of the 4th April 1860, No. 690, Government declined to sanction the commencement of any work because no detailed plans and estimates had been sent in, as required by the Directors of the Company.

3. But immediately afterwards—(see Government Order of 13th April 1860, No. 745), on an application from the Company, who were satisfied with the general information before them, Government permitted the commencement of some operations near Kurnool, viz., the Anicut and the head works for the Kundár Valley Canal. The Company, with the approval, it was stated, of the Secretary of State for India in Council, had resolved not to wait for detailed plans and estimates because, under the circumstances of the season in Bellary, labour would be abundant, and they were paying Rupees 10,000 per mensem for the servants whom they had sent out from England.

When Government gave this permission Captain Rundall had informed them that the plans and estimates for the Anicut and its head works were in his office and nearly ready for transmission. Government therefore directed that these plans and estimates should be submitted without delay, and added that the Canal from the Anicut was only to be commenced "*provided Captain Rundall has fully satisfied himself as to the proposed line.*"

4. In its Order of 17th April 1860, No. 792, Government afterwards formally sanctioned Rupees 3,03,080 for the Anicut and its head works in accordance with the estimates sent up by Captain Rundall, and a separate sum of two lacs of Rupees was placed at the Chief Engineer's command for Stores, &c.

5. In sending up these estimates Captain Rundall made no direct allusion to the *conditional* sanction given for commencing the Kundár Valley Canal, but his letter showed that already a very important change of plan had taken place. When writing on 1st February last he reported that his examination of the ground, in company with the Chief Engineer and with Colonel A. Cotton, had led to "the site of the Anicut and head works for the Kundár Valley Canal" being fixed at Abunpur, about six miles *below* Kurnool. The reasons were that six miles of river navigation up to Kurnool would be gained "and a corresponding excavation in the Canal *through some rocky spurs be saved.*"

It was therefore surprising to find, after permission had been given to commence work, that the Chief Engineer had "thought it expedient to remove the Anicut close up to Kurnool." But as this change was made with Captain Rundall's approval, and Government had given him a discretionary authority to fix the line of the Canal in consultation with the Chief Engineer, no observation was made. In reporting this alteration of plan Captain Rundall briefly remarked: "The reasons he (the Chief Engineer) gives for the change are sound and such as fully bear out its expediency;" and an assurance then followed that "the designs for the respective works and their arrangements *are suited for the locality and purposes required.*"—Letter of 12th April 1860, No. 65.

6. Here matters rested until continued statements in the public newspapers that the works at Kurnool had proved failures and must be abandoned attracted the notice of Government, and as no information had been supplied on the subject by their Consulting Engineer, calls were made upon him for it. These calls led to Captain Rundall's brief communications of the 11th instant, Nos. 67 and 68, and to his longer report of the 15th instant, No. 71, now under consideration.

7. I have given my best attention to these explanations of Captain Rundall, but am obliged to state that the proceedings at Kurnool seem to me very unsatisfactory. Large and expensive works have been commenced there without sufficient enquiry, and loss both of time and money must, I believe, follow. Whatever Captain Rundall argues to the contrary, I must regard the works at Kurnool as a heavy loss to the Company. Captain Rundall states that they will still be necessary to secure that line of navigation to the Kistna in the direction of Hyderabad which constituted a part of the great original scheme. But on the Anicut being moved up to Sunkasala, the northern Canal to connect the Tumbaddra and Kistna should be, I conceive, from there and not from Kurnool. *That will consequently become the line of navigation*; and, had no works been commenced at Kurnool, I cannot suppose that the Company would have ever sanctioned for navigation purposes a canal from Culloor near the Hindri *viâ* Kurnool to Paugtoor on the Kistna, which although only about fifteen miles in length must entail very heavy expense. For example: the partial excavation of 2,496 yards on the south of Kurnool, *without the Locks*, has already cost Rupees 40,874—(Captain Rundall's letter of 18th October, No. 74); then an extra Anicut must be built to take the canal across the Tumbaddra, and afterwards a canal be dug to the Kistna. The mistakes at Kurnool throw in my opinion this heavy burden on the Company unless it proves a lighter loss to abandon the works commenced there.

8. That the Canal should have been commenced at Kurnool seems a subject of much blame to Captain Rundall. The difficulties of the cutting in that locality appear to have been known, as it was intended at first to avoid them by building the Anicut lower down the river. Nevertheless Captain Rundall at once allowed the Anicut to be brought up to Kurnool and the Canal to be commenced, although he had no authority for the latter step until he had fully satisfied himself that the proposed line was practicable. In his letter of 12th April last, he assured the Government that the Chief Engineer's altered "arrangements are suited for the locality and purposes required;" yet now he has to propose a new scheme, which involves another Anicut higher up the river, eighteen additional miles of Canal, and an aqueduct over the Hindri. What little investigation of the ground could have been originally made appears from paragraph 3 of Captain Rundall's present letter, where it is mentioned that a cutting for the Canal of 60 feet in depth for 7 miles will be reduced to 25½ feet for 1¼ miles by placing the Anicut in the site now proposed. The cost of the new line is represented to be only 8,42,500 against Rs. 17,90,000 for that line on which Captain Rundall had allowed operations to be commenced.

9. The scheme now recommended for an Anicut at Sunkasala appears to have many advantages; but after the little aid we have had from our Consulting Engineer, in gaining accurate information to check the hasty and over-sanguine plans of the Company's servants, I think that the interests of the Shareholders and the Government require that a new opinion should be taken before it is ordered to be adopted. The District Engineer might be consulted, or an Engineer Officer of experience sent from Madras. It is most important that this great experiment of introducing English capital and skilled labor into India should not be marred or further injured by haste and want of care.

10. The concluding paragraph of Captain Rundall's letter is surprising, and he should be called on to state to whom he refers, and in what way hostility was shown. It has never been complained that difficulties were raised to giving the necessary land, and the boasted rapidity

with which the works were carried on shows that neither materials nor workmen were wanting. In fact in para. 22 Captain Rundall excuses the unauthorized excavation of a part of the Canal by saying that it was necessary to employ the crowds of labourers attracted to the spot. What practical discouragement the local European community could have thrown on the operations is not therefore easy to be seen, though it is very possible that unfavourable opinions may have been expressed by persons on the spot who saw expensive works hastily entered upon with little or no prospect of success.

11. The above was written under the impression that Captain Rundall's report embodied the substance of the Chief Engineer's formally recorded views, as Captain Rundall stated that he *submitted* Colonel H. C. Cotton's representation respecting the proposed alteration of plan. As however no letter of Colonel Cotton's was among the papers, and I wished to see his own explanation regarding the Kurnool works, I asked the Revenue Secretary for it, and learn to my surprise that there is no such document, Captain Rundall explaining that he wrote his report merely on conversation with Colonel Cotton. Government has thus been asked to sanction an alteration of plans and important new schemes, vitally affecting the interests of the Irrigation Company, without having laid before it any explanatory statements and plans either from its Chief Engineer or its agent.

I am obliged to observe that Captain Rundall has thus in my opinion shown that he misunderstands his position. It was not his part to initiate schemes or take the lead in laying plans before the Government. It is the part of the Company's servants to suggest the works to be undertaken, and to prepare fully detailed plans and estimates, upon which the Consulting Engineer is expected to offer his advice when laying them before Government for orders. Until this is done I do not see that Government can take any action on Captain Rundall's report; and I consider that Government ought to have Colonel H. C. Cotton's own explanation why it is necessary to depart from the plans of the works commenced at Kurnool after he himself had altered the site of the Anicut from the spot originally decided upon.

12. As I am aware that the President had a similar impression that a report from the Chief Engineer, Colonel H. C. Cotton, accompanied Captain Rundall's letter but was mislaid, I send the papers back for his further consideration.

24th October 1860. (Signed) E. MALTBY.

No. 168A. MINUTE BY THE HONORABLE E. MALTBY.

* Dated 4th October.

1. The second letter* of Captain Rundall's with its enclosure has just been sent to me by the Revenue Secretary, in consequence of the other papers connected with the alteration in the Kurnool Works having been reforwarded to me at my request.

2. The enclosure consists of a letter from Colonel H. C. Cotton to the Secretary of the Irrigation Company, in which he briefly mentions, without apparently submitting plans and estimates, that he has resolved to build an extra Anicut at Sunkasala to feed the Irrigation Canal which is to water the Kundár Valley, in consequence, as I understand, of the Anicut commenced at Kurnool being useless for this purpose.

3. But I find in these papers no explanation why, with confessedly imperfect information before him, the Chief Engineer commenced operations at Kurnool, altering the site originally fixed on for the Anicut. Government should have, it appears to me, the explanation of Colonel Cotton and Captain Rundall on this point.

4. Colonel Cotton further announces his intention of completing the Anicut at Kurnool with its head sluices and locks. But the Anicut, if I understand the scheme correctly, is to be lower in height than at first intended, and therefore less expensive, because its only use will now be to promote navigation between the Kundár Valley canal and the Kistna, by a Junction Canal from Culloor on the south of Kurnool to Paugtoor.

5. Regarding this scheme, I must remark that the original idea of water carriage from the Tumbaddra to the Kistna near Kurnool was, it appears to me, entirely subsidiary or supplemental to the great Irrigation project. An Anicut was to be built across the Tumbaddra to water the Kundár Valley, and because a navigation Canal could be taken from its northern end to the Kistna, *therefore* this additional work was to be constructed. But now that the intended Anicut near Kurnool is given up as respects Irrigation purposes, it becomes a very serious question whether it is worth while to construct it and the expensive though short line of Canal south of Kurnool with its locks, merely to obtain water carriage to the Kistna *at this particular spot.* It appears to me that the proper line for this communication will now be by a Canal from the northern end of the Anicut which is to be built at Sunkasala, and full enquiry ought to be made

on this point before the costly works at Kurnool are allowed to be proceeded with. It may entail less loss on the Company to abandon the works begun at Kurnool than to complete them when another line of communication with the Kistna is available.

6. I adhere to the opinion expressed in my Minute of yesterday that an Engineer Officer of experience should be sent to the spot to furnish Government with the means of coming to a satisfactory judgment regarding the whole of these Tumbaddra works.

(Signed) E. MALTBY.

25th October 1860.

No. 169. MINUTE BY THE HONORABLE THE PRESIDENT.

I have just had sent to me Mr. Maltby's Minutes of the 24th and 25th instant. I agree with Mr. Maltby that the course pursued by our Consulting Engineer on this occasion is wrong. We must have from the Chief Engineer of the Company a full and accurate statement of what has been done, and of the reasons that have led him to wish to adopt the present alteration. This information the letter from the Chief Engineer to the Secretary of the Irrigation Company does not afford. I likewise agree with Mr. Maltby, in the remarks made by him in respect to the works at Kurnool. As I have observed in my previous Minute, this Government ought not for the future to sanction works proposed by the Company for execution in connection with this grand project until a plan has been submitted, with tolerably accurate and reliable calculations, for a complete project to be carried out within the guaranteed capital of the Company.

The Government erred seriously, I am now satisfied, in permitting works to be begun before sufficient surveys and investigations had been made. To perpetuate this error, would be alike injurious to the interests of the Government and of the Company. I therefore think, after what has occurred, that the safe course for the Government to adopt is to act on the advice given by Mr. Maltby in the last paragraph of his Minute dated the 25th instant.

(Signed) W. MOREHEAD.

26th October 1860.

No. 170. ORDER THEREON, 9th November 1860, No. 2,324.

1. In the former of his two letters above recorded, the Consulting Engineer for the Irrigation and Canal Company reports to Government a material change which it has been found necessary to make in the plan of the works at Kurnool. With the second letter he lays before Government copy of a Report on the same subject addressed to the Board of Directors of the Company, by their Chief Engineer.

2. The design of the works as stated in Colonel H. Cotton's letter of the 21st December 1859, submitted with Captain Rundall's letter of the 9th March 1860, and approved by Government, was an Anicut six miles below Kurnool, and a channel of large capacity taken off at its southern extremity to cross the water-shed of the Tumbaddra and Kundár by a deep cutting near Mettakunda; the probable length of the channel to this point was stated to be about thirty miles;* Captain Rundall now reports that the detailed surveys having been completed, it is found that the water-shed of the Hindri and the Bowanassy, which was to be turned by the canal, maintains a high level much further to the north than the Trigonometrical survey Map indicated; and that consequently the length of the canal between the two points above mentioned, as well as that of the deep cutting, would be greatly increased, and its execution much more expensive than was expected.

* See Estimate in Colonel Cotton's letter of September 20th 1859, in Mr. Agnew's of October 19th.

3. This has led to a modification of the design. It is now proposed to have another Anicut 18 miles above Kurnool, at a place called Sunkasala. The canal thence led off to cross the Hindri by an aqueduct forty feet high, and to reach the water-shed of the Kundár at so high a level, that very little cutting will be necessary. It is proposed still to have an Anicut at Kurnool, though of reduced height, in order to maintain the navigation between the Tumbaddra and the Kistna; and that navigation is to be connected with the main irrigation channel, by means of a canal of small dimensions with locks. An incidental advantage of this new plan is stated to be that it will supply irrigation for about 75,000 acres of land between the channel and the Tumbaddra before reaching the Kundár water-shed, while the original plan would only have watered 20,000 acres in that region.

4. The cost of the new plan as compared with Colonel Cotton's Estimate for the original design is given by Captain Rundall as follows:—

The original plan:—	Rs.
Estimated cost of the Anicut at Kurnool, and Canal and works to the Kundár water-shed...	10,00,000
Twenty miles of the Canal of the lower Bellary project, superseded by the Canal from Sunkasala at 6,000 Rs. a mile ...	1,20,000
Total...	11,20,000

The present plan :—

	RS.
Canal from Sunkasala to the Kundár water-shed, with the Hindri aqueduct...	8,42,500
Masonry works on the Canal...	1,20,000
Two Anicuts and Head works...	3,55,000
Total...	13,17,500

Thus the excess of the estimate for the present plan over that of the original plan, is about two lacks of Rupees.

5. The Government must remark that the mode in which the present papers have been sent up is not the proper one. Captain Rundall first sent up merely a Report from himself, without any document at all from the Company's Officers; and afterwards when this omission was demi-officially pointed out, he submitted a copy of a letter from the Company's Chief Engineer to the Board of Directors, giving a brief and summary account of the change of plan. This, however, is not nearly sufficient. The proper course, and that invariably followed in the Railway Department, is for the Chief Engineer to make a full written Report of all measures which he proposes, and his reason for them, with detailed Plans, Surveys and Estimates, in the case of works proposed for execution. The same plan should be followed in the case of the Irrigation Company. The Chief Engineer's Report should come through the Agent to the Consulting Engineer, and should be laid before Government by him with his remarks. Captain Rundall will now adopt this course with reference to the present proposals.

6. On the present papers the Government cannot but record their opinion also that they have much ground for dissatisfaction with their Consulting Engineer, as respects the works already sanctioned and partially executed. One principal object for which he was appointed was to furnish the Government with authentic means of judging of projects brought forward by the Company's Chief Engineer. It was, accordingly, on information supplied by him, and on his assurance not only of the physical but the economical practicability of the Kurnool works, and of the sufficiency of the estimate, that the Government in April last sanctioned the project and allowed the operations to begin. Now, when a large sum has been spent, the Government are informed that the scheme must be almost wholly changed.

7. Of Colonel Cotton's Proceedings it is not necessary that the Government should remark at any length. He has certainly fallen into a mistake and has misled the Government; having been too hasty in assuming facts to be as he wished, and too anxious to commence works without sufficient preliminary enquiry. But it was natural, though not wise, for the Officers of the Company, to be desirous to commence work at the earliest possible time; the Government Consulting Engineer was the Officer whose duty it was to prevent incautious and ill-considered operations.

8. The Government are disposed to regard the present modification of the design as judicious. But before they can deal with the question they must have submitted to them, in the manner pointed out in paragraph 5, a report from the Company's Chief Engineer, of all that has occurred, and of the alterations in the Kurnool portion of the project, which he would now suggest. It is also desirable that explanation should be afforded of the reasons that led the Chief Engineer to change the site of the Anicut from the one originally decided upon several miles below Kurnool, to that one where operations were actually commenced.

9. There is one part of the revised plan which appears to the Government to be of doubtful propriety, viz., the proposal still to have an Anicut at Kurnool, and to connect the Kistna navigation with the main southern canal at that point. The principal Anicut, and the head of the canal, having been moved to Sunkasala, it would seem the more obvious course to take off the junction canal to the Kistna from the north end of that Anicut. It is possible indeed that there may be high or difficult ground between the two rivers at that point, but on this matter Captain Rundall's Report is silent. The Government are moreover of opinion that it is probable that it may be found better for the present to abandon the plan of connecting for navigation only, the Kistna and the Tumbaddra rivers. But if the Chief Engineer should still consider it advisable to continue the construction of an Anicut at Kurnool, and the junction of the Kistna with the Tumbaddra by a canal at Paugtoor for navigation only, he will be called on to explain for the information of Government, what will be the cost of this canal, and the, advantage to be gained by the Company from it, compared with a junction canal, from Sunkasala.

10. Only one matter remains for notice. In the concluding paragraph of his letter of the 15th October, Captain Rundall alludes to "a decided hostility to the Company's operations" as existing among the Europeau community of Kurnool. This statement requires explanation Captain Rundall will be requested to inform the Government to whom he refers, how the feeling which he speaks of is manifested, and how, if at all, it has affected the proceedings of the Company's servants. It appears from former Reports that no difficulty has been experienced in obtaining either materials or work people.

(Signed) J. D. BOURDILLON,
Secretary to Government.

Consulting Engineer's Office
Irrigation & Canal Company
Easton Jardon Madras 15th October 1860

No. 71

From,

Captain F. W. Rundall
Consulting Engineer for
Irrigation & Canal Co.

To

The Secretary to Government
In the Department of Pub. Works.
Fort St. George.

Sir,

In my letter of the 11th Instant I stated that the Chief Engineer of the Company had intimated to me his desire to modify his Plans so far as the Head of the Main Canal for Irrigation was concerned. I drew the Government to such his representation on the subject and my opinion thereon—

2 Just previous to my arrival at Kurnool the Chief Engineer received from the Engineer of the Company [illegible] sion the final Surveys and Sections of the country adjoining the Waterside

of the river Tumbudra and Hundeir-
3 y Sheve showed no material
difference in the relative levels of the
river at Kurnool and the summit of
the proposed cutting from those originally
taken but the contour lines when plotted
shewed the length of the Canal itself,
as well as of the cutting, to be greater
than was originally anticipated and
than the configuration of the country
as apparent from the Trigonometrical
Atlas would indicate: The general
accuracy of the original levels having
been previously tested, and no material
error detected, the practicability of
making the Head of the Main Canal
at Kurnool was established, while
the economy or otherwise of this
arrangement could only be arrived
at after further details had been
received. Daily expecting to receive
this detailed information from the
executive Officers of the District, the
Chief Engineer informed me he
purposely abstained from preparing

The

13

the final Surveys and estimates for
the first section or 11 Miles of the
Canal, and planned only the Anicut
and Head works, which, though he expect-
ed they would not serve the purposes for both
Irigation and Navigation, yet would be ne-
cessary under any circumstances for
connecting the town of Kurnool as well
as the River Kistna and Hyderabad
road with the grand canal, the ultimate
exact direction of which must necessarily
depend upon the results of the Surveys
in course of prosecution. It is the re-
result of this information furnished
after an unnecessary delay of 18 months
which leads him to propose to take off
the Head of the Irrigation Canal about
20 Miles higher up the Tumbudra at
a place called Lon[illegible]kavala, where there
is now a natural Dam of rock nearly
all across the river. The canal would
run from thence parallel to the river
at a distance of from ½ to 1½ Miles, and
cross the Hindrily an Aqueduct at an
elevation of 40 feet above the level of

the

the bed as taken off at Kurnool, with which it will be connected by Locks at about 2 miles from the Town. The economy of this arrangement is that the gain in elevation brings the bed of the canal to only 25-5 feet below the summit of the watershed. Not only is the depth of the cutting reduced from 68 to 25½ feet but its length likewise from 7 to 1¼ Miles, and instead of being a laborious it will be only an ordinary undertaking.

4 To lay the matter more clearly before the Government I have prepared the accompanying Tracing and on it drawn the contour lines on which the Canals, taken off at different levels, would run.

5 It will be observed that there are two distinct watersheds to be surmounted. The one is the Ridge between the Tumburra and the Bawanapy a small mountain stream that falls into the Kistna below its confluence with the Tumburra, and the other is the ridge between the Bawanapy Tumburra & Kundar.

6 As this latter could not be turned and must be cut through, it was always considered the great obstacle to be overcome, and in the absence of detailed levels the first named Ridge appeared

3 appeared to be sufficiently low to be 15
turned without making any very great circuit. This Ridge has however been found to maintain a high elevation for a considerable distance and a canal led off from Kurnool would have to run to within 1 mile of the Kistna before it could pass it. The increased length thus lowers the level of the canal by the time it reaches the watershed of the Kundar and makes a cutting of 68 feet necessary. Had this depth however been only for a short distance, it would not have been formidable but at this low level the length of cutting amounted to 7 miles varying from 40 to 68 feet in depth.

7 By starting however from the higher level the length of canal between Kurnool & the watershed will be reduced from 53 to 43 miles while the length of the cutting will be diminished from 7 to 1¼ miles & the depth from 68 to 25½ feet.

8 After the Chief Engineer had explained his proposals. I proceeded first to

to the Watershed of the Bowanaffey, and to satisfy myself of the configuration of the country there, took a number of levels personally in various directions, and had more lines taken by the Company's Surveyors in order to ascertain at what level the Canal could be most economically carried. The results led me to conclude that if the watershed between the Hindri and Bowanaffey could be cut through without great expense, it would be preferable to proceed even higher up the Lumbuddra until an elevation of 100 feet above the river Hindri was attained. This arrangement would bring the Canal out upon the top of the ridge between the Bowanaffey and Lumbuddra near the village of Dunguttla and command one of the most beautiful tracts possible for Irrigation. To ascertain the feasibility of this Scheme I proceeded up the Lumbuddra as

far as the town of Nagulduny and requested Several lines of level to be taken and the results to be forwarded to me to Madras. I have since heard by Telegram however that the Summit near Dunguttla is too high, and the cutting there of too great a length and too expensive to allow the higher line to be adopted, and therefore that the Chief Engineer's line of Canal from Soontasala is the best improvement. Had this not been the case the Canal from the higher level near Nagulduny would have run at about 2 miles distance from the river, crossed the Hindri 8 miles above Kurnool and passing through Dunguttla have followed the course indicated by the yellow line. The length would have been reduced from 53 to 33 miles between Kurnool and the Thundar & the canal would have commanded about 150,000 acres of the finest arable land.

9. The Canal from Soontasala will follow the course indicated by the Red line will be

be about 20 miles long from Soonkasala to Kurnool
& 43 miles thence to the Kundar I command about
75,000 acres on either side of the Bowanasy
over which a branch Irrigation Channel
from the Main Canal will be carried near the
village of Kumbulpilly —

× of these 15000 are between Soonkasala and Kurnool

10— The Kundri will be crossed by an aqueduct at the village of Culloor where I inspected an excellent site in the bed which is there covered with rock. The Canal will run from thence close to the Tumbudra be connected by Locks with the navigation & Branch from Kurnool & then run parallel to the river as far as Shaikancotta from whence it will gradually diverge to the village of Sagatoor which is on the top of the Bowanasey ridge, & then run on to Pamulpad and cross the watershed of the Kundar between Kumbulpilly and Bainakacherla after which it will follow the fall of the country along the valley of the Kundar

11— With the levels of two extreme points in the line arbitrarily determined, it is evident in this case that in order to avoid heavy cutting there must be a certain length of Canal excavated and therefore the more direct the line can be preserved.

the greater the advantage secured Hence extending the Head of the Canal to a point above Kurnool not only does not involve extra expense but affords also the benefits of navigation to a greater distance in addition to Irrigation to an increased area of land —

12 The lengths to the Kundar watershed would be as follows.

1 With the Canal taken off at Kurnool	}	Above Kurnool	0	below Kurnool	53
2 From Soonkala	do	do	20	do	do	43
3 From near Nagulduna	do	do	33	do	do	33

the respective totals being 53. 63 and 66 —

The increased length of 10 miles in the two last instances being more than compensated for by the more favorable nature of the soil, advantage of which will be taken by following nearly a contour line, and confining the excavation to the surface so as not to reach the depth at which the rock is found at this higher level

13. The approximate estimates for the

the relative lines are

For the 1st Line

46 Miles of Canal 15,000 ... 6,90,000

7 Miles of Cutting excluding the value of Stone quarried ... 11,00,000

17,90,000

For the 2d Line

61¾ Miles at 10,000 ... 617,500

¼ Mile of Cutting ... 12,500

Aqueduct over Hundri ... 100,000

8,12,500

For the 3d Line

60 Miles at 10,000 ... 600,000

6 Miles of Cutting ... 120,000

Aqueduct and approaches ... 20,000

20,00,000

The soil on the lower level is more rocky than on the higher the excavation will consequently be dearer

N.B.

The masonry works above the lines are not included but these will not be heavy as no great area of drainage is crossed

14. The areas commanded between the Canal Head and watershed of the E. Hundar are respectively as follows:

By 1st — 20,000 Acres.

By 2d — 75,000

By 3d — 150,000

15 From the above it will be seen that on the whole the 2d line is the one that can be constructed most economically as well as most quickly although the 3d line commands the greatest area for a given length of excavation. This however is not a point of importance as the Canal does not terminate at the watershed but is intended to irrigate the valley of the Hundar

16 — The only way in which the works hitherto Sanctioned by Government are affected is that the Head Sluices will have to be transferred from Kurnool to Soonkasala while the height of the Annicut at Kurnool may be reduced from 12 to 10 feet; and the Posts and shutters be dispensed with. One Under Sluice will still be required to keep the river from silting up in front of the Lock. The canal also being used only as a connecting line of Navigation to the Town will not require to be more than 15 ft. wide

17 The additional works necessary are an Annicut at Soonkasala which will not be expensive and an aqueduct across the Hundri with two additional

additional locks at the junction with the branch to Kurnool. These last are strictly speaking not additional as they form part of the Lower Bellary Scheme and are merely removed in position, for they must have been built in any case in the Canal from Bellary somewhere above the town of Kurnool.

18 Though an additional expense is apparently incurred for the Anicut at Svonkasala and Hindri aqueduct, yet in reality it is the more economical arrangement and does not much exceed Col. Cotton's original rough estimate for these works from Kurnool to the watershed which I observe is 10 lacs. Adding the proportionate expense of the 20 miles of Canal above Kurnool included in the Lower Bellary Project & estimated at 6000 Rs per mile or 1,20,000 will make his total 11,20,000.

19. The estimate for all the works noted above will as far as I can judge at present not exceed ~~13~~ lacs.

For the 2 Lines as shown in Para	Rs 2,500
Add for Anicut at Kurnool & Svonkasala & Head works	12,000
	3,55,000
	13,17,500

20 I must here add that before adopting the proposal for removing the Canal Head, the feasibility of reducing the cutting at the watershed by raising the Anicut at Kurnool was well considered. By taking it obliquely across the river & increasing its length from 1000 to 1800 yards, the Anicut might have been raised still 4 feet higher without danger to the town. This together with a reduction of the fall in the bed of the Canal would have diminished the depth of the cutting by 10 feet as well as its length in proportion, and therefore its cost, but as the total saving was not nearly equal to that effected by the removal of the Canal Head, the latter alteration of carrying the Supply over the Hindri by an aqueduct which is merely the revival of an idea originally discussed and mentioned as probable in Para 21 of my report of the 1st Feb/60 is preferable, especially as the late orders from the Secretary of State, enjoining that the whole Scheme is on no account to exceed the guaranteed 8 Million necessitates

X No 56.

necessitates the adoption of arrangements, which by the greatest economy both in design and execution shall extend the benefits of Irrigation over the greatest area, & those of navigation to the furthest possible limit. As therefore a certain Sum must be expended in excavation it is manifest that the most economical arrangement is one which will provide at the same outlay a Canal to extend to 20 miles beyond Kurnool, instead of one which would only afford a circuitous route terminating at the town itself.

The revision of the whole Scheme necessary to bring the outlay within the limit enjoined by the Secretary of State will form the subject of a separate communication.

21 Having then well considered the several plans investigated the Surveys & levels hitherto submitted, and examined the various portions of country already mentioned, I am of opinion that Col. Cotton's proposal is judicious, and that the line of Canal from Soonkasala

Soonkasala is the one that will be executed most speedily and at the least cost, while at the same time a fair extent of land compared with the length of Canal excavated will receive early irrigation. I therefore beg to recommend its adoption.

22 With regard to the rumours which have lately appeared in the Public Prints I beg to state that the only irregularity which has come to my notice is, that instead of confining the work to the 1st mile of Canal, the estimate for which alone had been submitted the 2d Line was commenced in order to find (as the Executive Engr. informed me) more space for the large crowds of laborers attracted to the work. It is right to add however that the Surveys and estimates for this additional mile awaited my arrival at Kurnool, but as the proposed modification would require a diminished width of Canal I returned them to the Chief Engineer for revision.

23 During my tour I have taken the opportunity of obtaining from the Engineers a

a Statement of their expenditure and also of the amount of work executed in each Division. These particulars I propose submitting to Government in a separate letter.

24 I cannot conclude without observing that there exists at Purnool a most decided hostility to the Company's operations. As however it is apparently confined to the European Community while with the agricultural & laboring classes the works are popular enough it is not a matter of much consequence. Though it is to be regretted that where co-operation is looked for a spirit of dislike and opposition is manifested towards an undertaking in which the welfare of both the country and the Government are so much concerned.

I have the honorable
Sir
Your most obed.t Serv.t
F. W. Russell, Capt.n
Consulting Engr. for
P. W. Co.

Compared & Examined
Rea

work - I presume the Port will remain this season & doubt that estimate may be submitted as to time & probable cost. The whole subject will be fairly considered.

The minutes were in progress in the Govt. Secy's office when I left Madras - but that is a matter of little importance; it is better in the report circulation; it is better than being overtaken [illegible] - Colonel Fay for many years a resident - & one of the Directors of the Carnatic Co. & Mr Stevenson [illegible] with officials, that I have taken both along with me, have been [illegible] - I beg to enclose [illegible] that it will not be thought necessary to make any observations [illegible] remarks - Col. Cotton has been absent [illegible] & misrepresented in the newspapers [illegible] I feel this. We will feel [illegible]

Recd. 10th April/60 No. 31-32-82
" 20th " " 41-42-83-133-134
" 13th Octr. " 206@209.

Col.

Copy in a Letter to Engr.
Capt. 19th Decr./60 No. 74

No. 165

P. W. 1860 Octr. 25
Proofs for Government
No. 2419.

From
Captain H. Rundall
Consg. Engr. for Irrigation
V.C.E.

To
The Secretary to Government
In the Dept. of P. Works
Fort St. George

Dated 15 } Octr./60
Recd. 16th }

enclosures

Submits the Chief Engineer's representation with the Consulting Engr's opinion thereon, on the subject of modifying the general Plan so far as the Head of the Main Canal for Irrigation was concerned.

29 Novr./60 No. 2324

was really any cause or reprimand from Govt. He is an officer of undoubted zeal & ability. For an officer to find an accurate account that his first conceptions of a country were inaccurate, is nothing new.

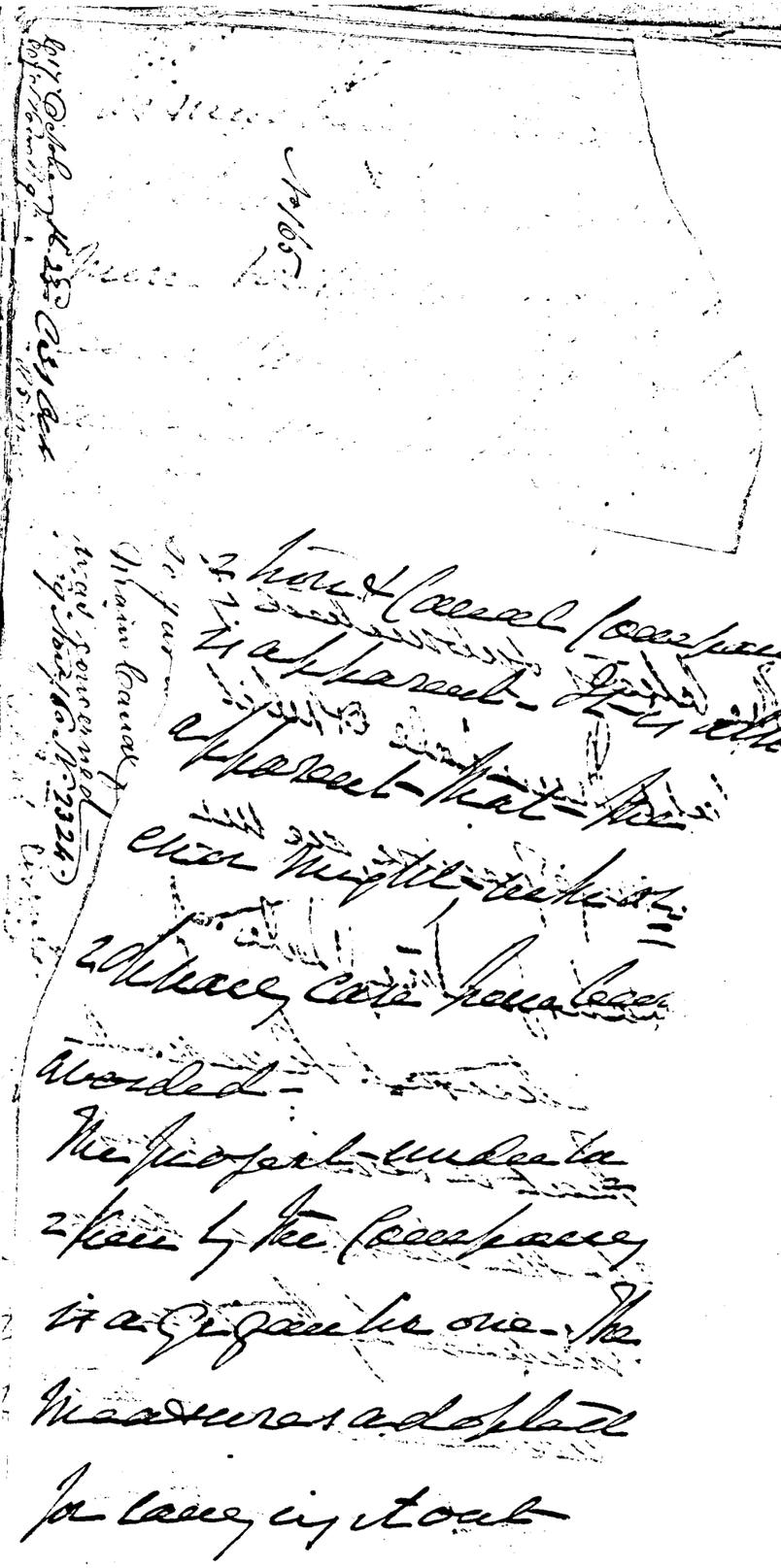
H. C.
Oct. 16

51

...ble the President

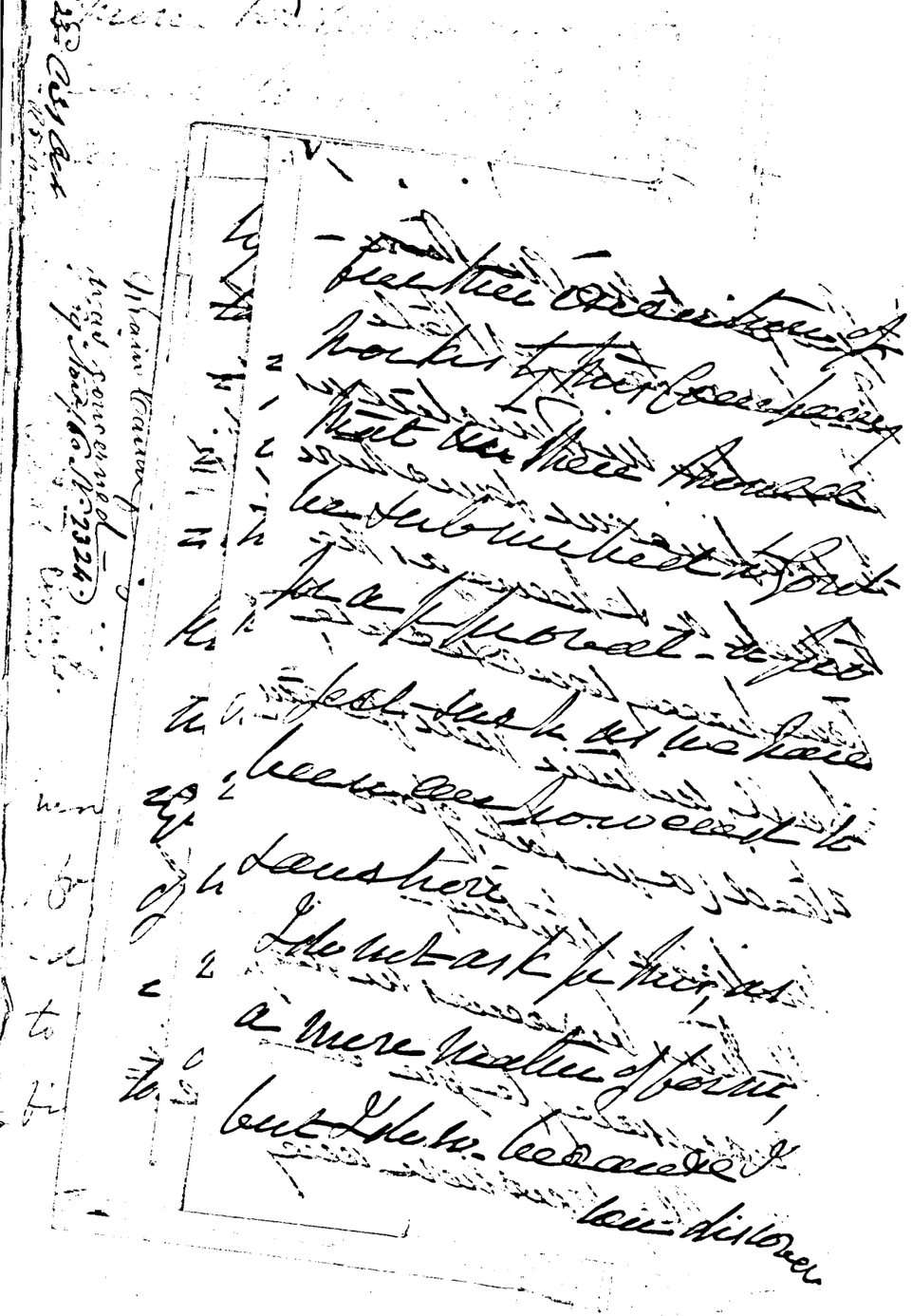
~~The selection submitted by Capt. Rundale & which in my opinion are ... satisfactory state of materials ... that ... ... Part of the work executed by the Engine~~

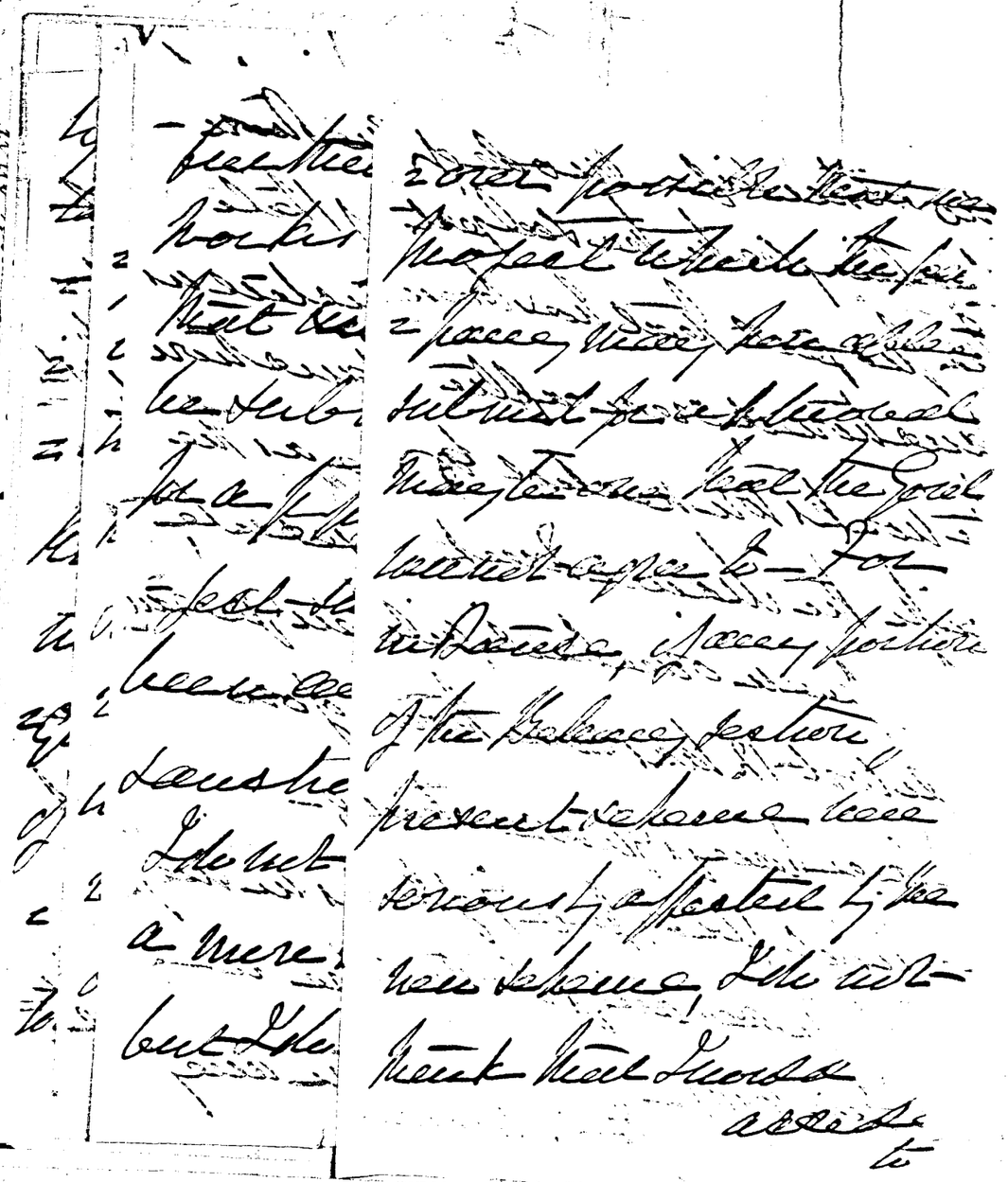
...ers. I however ... a portion of the work ... til in every respect the



Should Texas become [illegible]
Santa Fe Expedition
in Mentioned, Texas
Sketch Made from Cave
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Texas Map Showing
Texas Boundary
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Contains Description
Letter Means of Regret
Letter Mentioning Expedition
Texas

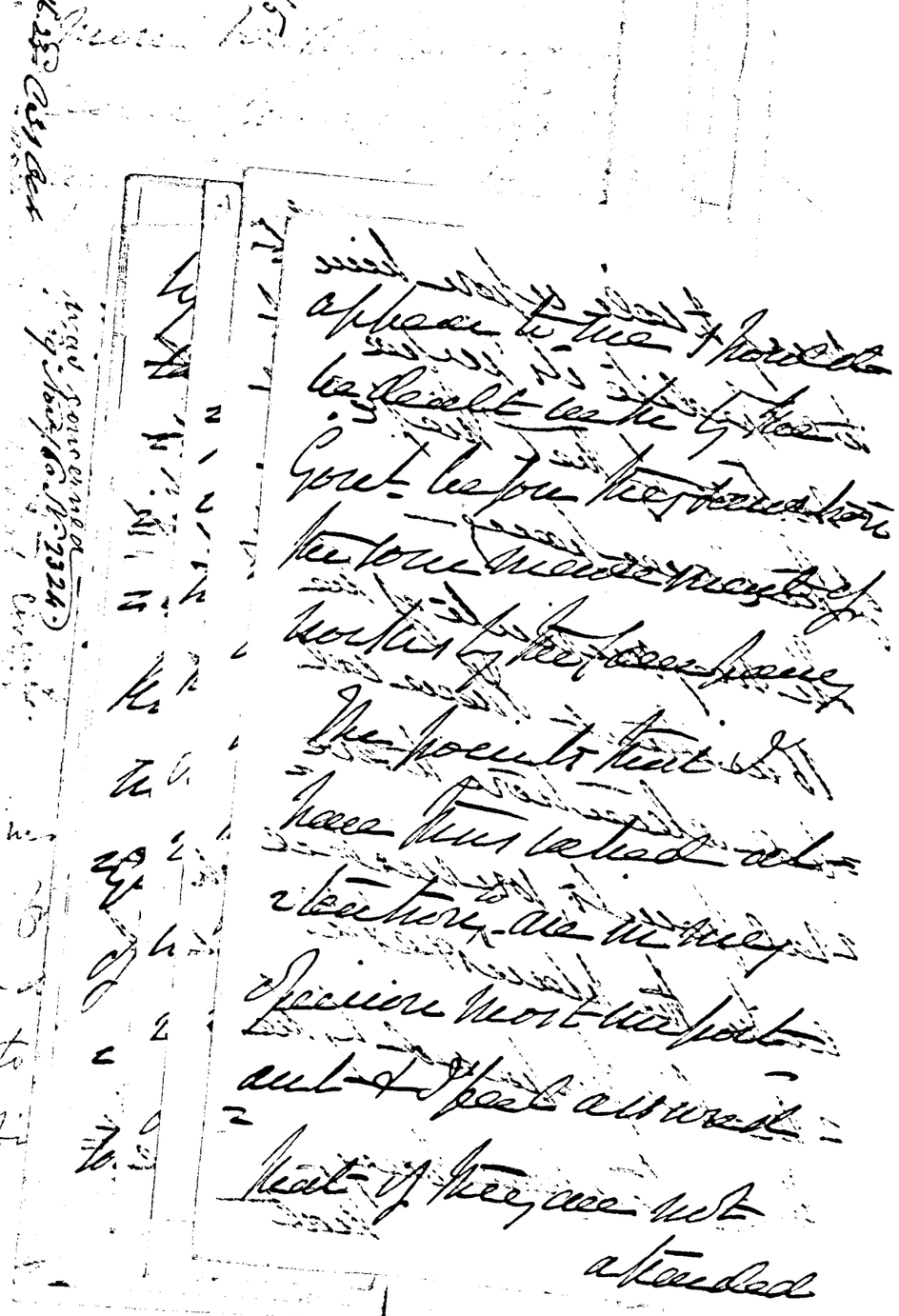
2/
Capt Pierce Mentioned
Texas Boundary
Extracts of Texas Congress
Capt Pike to Capt Reynolds
Texas Boundary
Texas Boundary
Texas Boundary, Texas
Capt Reynolds, Engineer

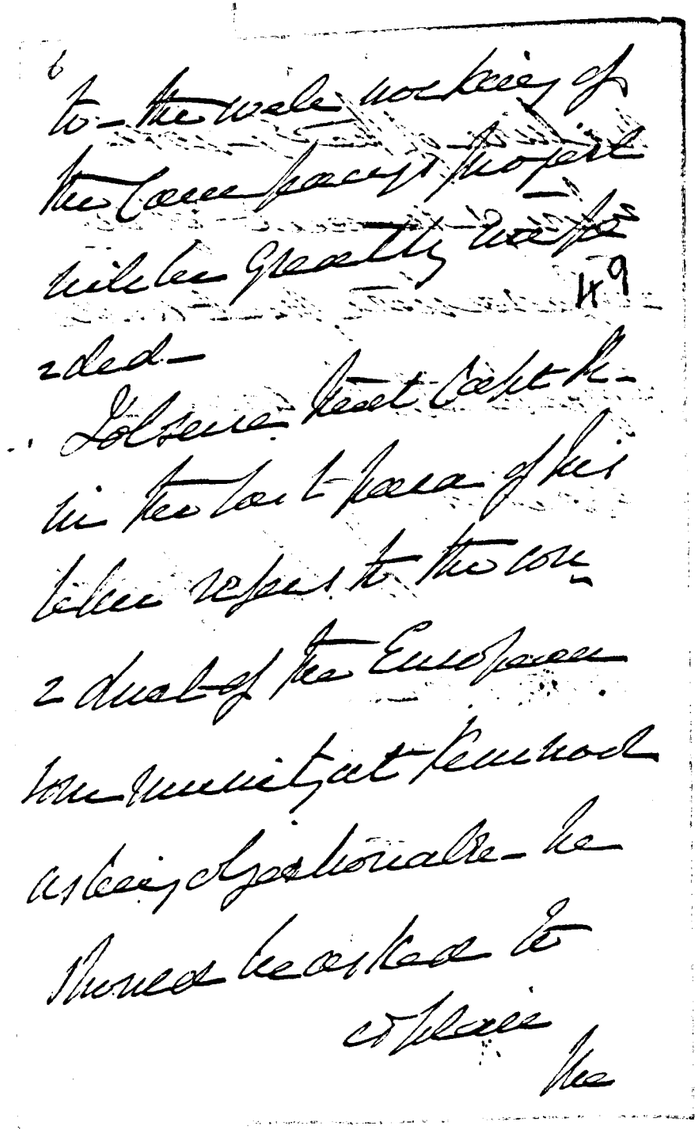




5







Minute by the Hon'ble the President.

The letters submitted by Captain Rundall exhibit in my opinion, an unsatisfactory state of matters at Khurnool. That a serious mistake has been committed by the commencement at that spot of the works to be executed by the Irrigation and Canal Company is apparent. It is also apparent that the error might, with ordinary care have been avoided.

2 The project undertaken by the Company is a gigantic one. The measures adopted for carrying it out have been hastily devised, and are incomplete in themselves. I honour trust that hereafter no portion of the work will be begun until in every respect the

the Plans and Estimates connected with it have been carefully prepared and scrutinized. Should the results, which I anticipate, therefore, be ~~reasoned~~ detrimental the check which the Company ~~rocks~~ has met with, in their thoughtless mode of acting will be a cause of rejoicing rather than of regret.—

3— I do not in reference to what has happened, attach so much blame to the servants of the Company (as I do to Captain Rundall—) to the instance of the Company's servants, it was natural, but not wise, that they should desire to press on the works— Whereas it was the duty of Captain Rundall, as our Consulting Engineer, to have grounded

guarded the Government from giving their assent to the execution of works, for which he ought to have known, the plans and Estimates had not received that consideration, which alone would justify him in submitting them to Government, for sanction.

4 The proposed removal of the Cement, as now suggested to us for approval, to Sea Reveled, is as far as I can judge a judicious measure ~~to~~ especially for careful examination, and ought not to be adopted until the Government feel fully satisfied that it is practicable— The work is to cost less than the one it is proposed to give up— Should this prove to be the case it is so far satisfactory— But it seems to me that if the Cement

Aqueduct is to be at Soonkasala, the Aqueduct at Khurnool need not be built. No water from the Kistnah it is evident can be conveyed by that means into the Soonkasala channel, and no benefit sufficient to justify the outlay can be obtained by having a navigation canal from the Kistnah to the Toombudra. The abandonment of the works at Khurnool is therefore in my opinion consequent on the adoption of the Soonkasala channel, as the means of conveying the water of the Toombudra into the Khurdah valley &c. — The project also of obtaining a supply of water from the Kistnah must also be at an end. —

There is one circumstance connected with the General appraisal which this Government has formerly recorded to the "Toombudra project of the Madras Irrigation and Canal Company" which calls for further consideration and that is that the Secretary of State for India has refused to guarantee interest on the 350000 £ required, in excess of their original Capital, for the completion of the project in question. The Secretary of State has also instructed us to confine our sanction to such a scheme as the Company can completely execute, within their guaranteed Capital of one million sterling. — It

6— It thus becomes in my opinion necessary, before the further execution of works by the Company that these should be submitted to Government for approval a project such as may hence forward be enforced to that effect.—

7— I do not ask for this, as a mere matter of form, but solely because I can discover no other safe mode of dealing with the subject. The project that has been mentioned, besides the works connected with the Manir tank (hereafter omitted) will still cost 12 lacks more than the Company's guaranteed Capital (vide page 4 of the Govt. Pro. dated 4th April last)—

It

8— It is moreover possible that the project which the Company may hereafter submit for approval may be one that the Govt. cannot agree to. For instance, if any portion of the Bellary section of the present scheme were seriously affected by the new scheme, I do not think that I would accede to such alteration as Bellary is certainly the part of the country included in the present scheme that needs most urgently a supply of water.—

9— Until therefore the Govt. has been informed of the manner in which this 12 lacks is to be reduced it would not be right in us to permit the commencement of further or new works by

by the Company.—

10 This demand of mine need cause no delay as Captain Rundall in his letter states that the revision of the whole scheme is now under preparation, it is only therefore necessary to call upon him to expedite its preparation by the Chief Engr of the Company.—

11 In my minute of the 16th instant - I have called attention to several points connected with the plans and Estimates prepared by the Irrigation Company that appear to me should be dealt with by the Government before they sanction the commencement of any

works by the Company.—

12 The points that I have thus called attention to, are in my opinion most important and I feel assured that if they are not attended to - the whole working of the Company's project will be greatly impeded.—

13 I observe that Captain Rundall in the last paragraph of his letter refers to the conduct of the European Community at Khurnool as being objectionable - he should be asked to explain the nature of the opposition, and want of co-operation, met with and of which he complains.—

(Signed) W. Morehead

18th October 1860.

Copy in a Letter to England
Oct 19th Sandh. for Sec. of St.

Publication fee 18£ Dep. Sec. of State for India

Minute by the Hon'ble the President.-

Respecting the present state of the Irrig. Co's works at Kurnool

Dated 18th Octr. 1860.

Observes that a serious mistake has been committed by the Commencement at Kurnool of the Works to be executed by the Irrig. Company and that the proposed removal of the channel to Soontasala is a judicious measure but ought not to be adopted until it shall be fully satisfied that it is practicable - suggests that the Consulting Engr. be called upon to expedite the revision of the whole Scheme which he states is now under preparation -

No 166.

No 2324 - 9 Nov. 60.

1860

Consulting Engineer's Office
Irrigation & Canal Company
Bellary Madras 24th October 1860

1876

From,

Captain F. H. Rundall 63
Consulting Engineer for I. & C. Co.

To

The Secretary to Government
with the Department of Public Works
Fort St. George

Sir,

I have the honor to submit copies of a Letter addressed by the Chief Engineer to the Secretary of the Company, and forwarded home by the Agent this day, in which he explains the precautions required in the course of construction and maintenance of Irrigation and Navigation through Mr Bidie's Land in the Kurnool District.

2 He states that the Channel at Kurnool will form the base of a Channel, the completion of which will be at a reduced expense, and the Channel already partially executed will require very little more to be done to it for the Navigation

Secondly That the Lock at Kunnoal is in hand under contract.

Thirdly That at Soonkoola 15 Miles above Kunnoal will be the source of supply by which a lift of 10 feet will be gained, and the course of the Channel improved.

That the supply will pass the Hundy by an Aqueduct and at the Soonkoola the Channel will approach the original Cut to Kunnoal and across the Lambadola will be formed during this part of the project will be subject to Variation and change being the source of supply.

Fourthly That this variation will bring some land very quickly under Irrigation, and increase the area commanded between Kunnoal and the Hundar and that it will produce the cost of the Cut at the Waterhead 80 Rupees.

Fifthly That the necessity for retaining the possibility of the change in the Section across the Waterhead as an undefined and so partially carried on the work at Kunnoal that Others could

65

be made no work done in vain and according to this Modification the expense about Kunnoal is balanced by the production below.

I Having already in many of the Letters of the 15th October 1871 explained in detail the ... reasons for the proposed Modifications and any opinion thereon do not necessary to be repeated here.

The remainder of the Chief Engineers letter refers to this division of opinion in the delivery of Mr Drummonds Surveys which he states any other of the Engineers named have submitted, upon the earlier

I have the honorable

Sir

Your most obedient Servant

F. W. Randall Captain

Commanding Engineer for Mysore

Confidential

Copy of Letter No 255 Cut Office

Copies in Letter to Engrs
Dft 19th Nov. 60 No. 74

No. Works 1860 Defrate
From Chief Secy to Govt for Scotland
No. 2545.

Captain F. H. Rundall
Consulting Engineer for
Irrigation & Canal Co.
&c.

The Secretary to Government
In the Dept. of Pub. Works
Fort St. George.

Dated 24th
Rec'd 25th October 1860

Enclosure Cor.

Forwarded copy of a
letter addressed by the
Chief Engineer to the
Secretary of the Company
explaining the modification
in the Source of supply and
Main line of Irrigation
& Navigation thro' the
Watershed in the
Kundar Valley.

No. 2324 dated Nov 60

Returned Encl. 15th Nov 60

No 67.

Encl. 31 Oct 1860 Thos.

Ltr 17 October No. 23 Encl 31 Oct
Encl in Ltr 19th " " 25th "

Sketch shewing the Contour lines which a Canal taken off at different levels from the Tumbuddra will follow along the watersheds of the Rivers Tumbuddra and Bowanassy the Bowanassy and Hundar and the Bowanassy and Hindri to accompany the Consulting Engineers letter of the 15th October 1860 No 41

No 2329. Sp. Office No

Moonapenn
Perchaut
Vic[illegible]pad
Sassmoor
Eurapoor
Dobashpilli
Karpatoolla
Margumpa
Pallay
Tree St.
Poongaud
Vaupurlah
Buesavapoor
Paugtoor
Perrapoor
Pagoda
Tukseel
Koangunpad
Kecaloor
Gunchipad
Boordepad
Bhyrapoor
Puchingal
Casipoor
Burgalow
Goondipurlah
Dodipad
Gullcor
Pardagpad
Ekdurpad
Baupad
Baldary
Peeseelloor
Rayapooram
Kiasuvaram
Tuguldinny
Goorjala
Soampooram
Pedda Dhanyada
Yevanapulli
Toomella
Nalasompoor
Timandody
Goondapoor
Goondavad
Pullakody
Kajaweloo
Purumuch Gariapad
Toomullupulli
Veldaroor
Thorp Gariapalee
Koontalpad
Soondsala
Muldoor
Korwipad
Vinnepad
Nidduvoy
Mosh
NOUL
Kolekul
Kerra Bellagul
Length of 1st line from Kurnool to
of Tumaar including windings 53 Miles
D[o] ____ D[o] 2nd D[o] D[o] 43
D[o] ____ D[o] 3rd D[o] D[o] 33

For Corresp. respecting Capt. Rundall. 1860 & 62

Minute 69

1 In considering the letter of Capt. Rundall dated 15 Oct 1860 & its enclosures, it is necessary to revert to the circumstances under which the Works at Kurnool were commenced.

2 In their order of the 4th April 1860 No 690, Govt declined to sanction the commencement of any work because no detailed plans & Estimates had been sent in as required by the Directors of the Company

3 But immediately afterwards (see Govt Order of 13 April 1860 No 745) on an application from the Company, Govt permitted the commencement of some Works at Kurnool viz. the Canal & Works in Bellary, as the Company resolved not to wait for detailed Plans & Estimates because under the circumstances of the season Labour would be abundant, & they were paying Rs 10,000 per measure for the Cements whose they had sent out from England.

When Govt gave this permission Capt Rundall had informed that the Plans & Estimates for the Canal & its Headworks were in his Office & nearly ready for transmission. - Govt therefore directed that these Plans & Estimates should be submitted without delay - & stated that the Works only to be commenced at Kurnool were the Canal from the Tunnel & Capt Rundall was fully satisfied himself as to the proposed line"

4th - In its order of 17 April 60 No 792 Govt afterwards

formally sanctioned 303000 for the Bullock
Head Mills in advance with the Estimate
up by Capt Rundall, and a deposit sum
two Lacks of Rupees was placed at the Chief
Engineers Command for Storeks

5. On sending up these Estimates Capt Rundall
made no direct allusion to the condition
section four for commencing the Kundoo
Canal, but his letter showed that already
important change of plan had taken place
Whilst waiting on 1st July last he
that his examination of the ground in company
with the Chief Engineer & Colonel R Cotton had
had led to the site of the Aqueduct & Head Works
for the Kundoo Valley Canal" being fixed at
Rowmpeer about 6 miles below Kurnool -
reasons were that 6 miles of canal excavation
up to Kurnool would be saved & a considera-
ing excavation in the Canal through some rocky
Years be saved."

- It was therefore surprising to find after per-
-mission had been given to commence work that
the Chief Engineer had "thought it expedient to re-
"move the Aqueduct closer up to Kurnool" but
no Plan or Estimate of the changes made with Capt Rundall
approved & Countersigned from him & discretionary
authority to fix the line of Canal in consultation
with the Chief Engineer, no observation was made
In reporting this alteration of plan Capt Rundall
briefly remarked "The reasons (the Chief
Engineer) gives for the change are sound &
such as fully bear out its expediency" and

followed by "The
Designs for the respective works & their ar-
rangements are suited for the locality & pur-
poses required" - Letter of 12 April 60 No 65

6 - These matters rested until continued state-
ments in the public Newspapers that the works
at Kurnool had proved failures & must
be abandoned, attracted the notice of Govt
and as no information had been satisfied on
the subject by their Consulting Engineer calls
were made upon him for it. These calls
led to Capt Rundalls brief communication
of the 11 Inst No 67 & 68 and to his longer report
of the 15 Inst No 71 now under consideration
of the

7 - I have given my best attention to these
explanations of Capt Rundall but am obliged
to state that the proceedings at Kurnool seem
to me very unsatisfactory - Large expenses
works have been commenced there without lar-
ficient enquiry & at both of time & money
must I believe follow. - Whatever Capt
Rundale argues to the contrary I must regard
the works at Kurnool as a heavy Loss to
the Company - Capt R states that they
will still be necessary to secure that line of
navigation to the Kistna in the direction
of Hyderabad which constituted a part of
the great original scheme -

~~under that the Langelle injection should be suspended from the 1st of Sept to~~

But on ~~examining~~ the ground being mostly ~~the~~ the ~~Ancient~~ rise to Toonsala, the work Canal to connect the Tambaddra & Kistna should be ~~so~~ commenced from there & not from Kurnool- ~~and~~ consequently become the line of navigation ~~has no works been commenced at present~~ the Company ~~and~~ Canal ~~suppose~~ that the would have been sanctioned for Navigation purposes a ~~definite~~ plan Canal from Cullor the Hundree via Kurnool to Pangloor on the Kistna, which although only about 15 miles in length ~~must~~ entail ~~an~~ very heavy expenditure ~~for~~ the partial execution of 2496 yards on the south of Kurnool, without the locks, has already cost Rs 40874. (Capt Ri's letter of 18 Oct 1874) ~~the~~ ~~entire~~ Ancient must be built to take the canal ~~by~~ ~~the~~ ~~Kistna~~ along the Tambaddra & afterwards a canal to the Kistna — The mistakes at Kurnool ~~of~~ throwing ~~my~~ opinion this heavy burden ~~also~~ on the Company

8 - That the Canal should have been constructed at Kurnool ~~from~~ ~~such~~ blame ~~to~~ Capt Randall ~~seems a subject of~~ the cutting in - The difficulties of that locality appear to have been known as it was intended at first to avoid them by building the Ancient lower down the river. - Nevertheless Capt Randall at once allowed the Canal to be brought up to Kurnool & the Canal to be continued, although he had no authority for the latter step until he had fully satisfied himself that the proposed line was practicable - In his letter of 12 April last he assured the Govt that the Chief Engineer's absence "arrangements are

~~Under~~ Lighters & Lighterage to Kurnool. Commercial Rate.

settled for the locality & purpose required" & that he has to propose a good scheme which involves another Ancient higher up the river, 18 additional miles of Canal & an aqueduct over the Hundree - What little under the pond of the Canal could have been repeatedly stated from Capt Randall's present letter, where para 93 of Capt Randall's present letter, where it is mentioned that a cutting for the Canal 160 feet in depth for 7 miles will be reduced to 25 feet for 1¼ Mile by placing the Ancient on the site now proposed - The cost of the new line is represented to be only 42500 against Rs 17.90.000 for that line on which Capt Randall had allowed operations to be commenced -

9 - The scheme now recommended for an Ancient at Toonsala appears to have many advantages, but often the little aid to be had from our Consulting Engineer in forming accurate information to check the Contractors Estimates & Plans of the Company's servants - I think the interests of the Shareholders & the Govt require that a new System should be taken before it is ordered to be adopted. - The District Engineer might be consulted, or an Engineer officer of experience sent from Madras - It is most important that the great experiment of introducing

English Capital & skilled labour, such should not be incurred by haste & want of care.

10 - The concluding Para of Capt. Rundall's letter is surprising & he should be called on to state to whom he refers & on what body hostility was shown - It has never been complained that difficulties were raised to joining the necessary land, & the books of expenditure with which the works were carried on show that neither material nor workmen were wanting - In fact on 22 Capt. Rundall assumed the execution of a part of the work by saying that it was necessary to employ the utmost of labourers attached to the Port. Practical - What discouragement the local European community could have thrown in the way is not therefore easy to be seen, though it is very possible that unfounded opinions may have been expressed by persons on the spot who have long been hostile to the Port & little or no prospect of success.

11 The above was written under the impression that Capt. Rundall's report embodied the substance of the Chief Engineer's friendly remarks, as Capt. Rundall stated but he submitted Colonel Cotton's representation respecting the proposed alteration of plans & as however no letter of Colonel Cotton was among the papers & I wished to see his own explanation regarding the Kurnool Works I asked the Revenue Secretary & any enquiries that there is no such document - Capt. Rundall's report merely explaining that he wrote his conversation with Colonel Cotton - Govt has been asked to sanction alterations of plans & new schemes of the Irrigation, involving important & totally affecting the interest of the Company without having laid before it any explanatory Statements & Plans either from the Chief Engineer or its Agent -

I am obliged to observe that Capt. Rundall has been in my opinion shown that he misunderstood his position - It was not his part to initiate schemes & take the lead in laying plans before the Govt. - It is the part of the Company's servants to suggest the works to be undertaken & to prepare fully detailed

Copy of Letter to Govt
24th September 1862

Plans & Estimates, upon which the Canadian Engineer is expected to offer his remarks before laying them before Govt for orders.

When is done I do not see that Govt can take any action on Capt Brandlis report. I consider that Govt ought to have Colonel H. C. Cotton's explanation why it is necessary to depart from the plan of the Work at Kamloops which commenced under the latter officer, & which he himself had originally selected upon the site of the work from the spot he decided upon.

12 - As I am aware that the President has the impression that a report from the Chief Engineer Colonel H. C. Cotton on Capt Brandlis letter had been published, I send the papers back for further consideration

24 Oct 1862

Letter to Lushington

Copy in a Letter to Govt
19th Nov. 60 No. 74.

Public Works 1860 Despatch
Govt of Govt for Mysore
No. 2861

Minute by the
Honorable Mr. Maltby.

Dated 24th October 1860.

Reverts to the [illegible]
Circumstances under which the
works at Hunnoor were commenced
by the Irrigation and Canal Compy
attaches much blame to the
Consulting Engineer Capt. Rendall.
and observes that the scheme
now recommended for an
ament at Soonkasala appears
to have many advantages but
that a new opinion should
be taken before it is ordered
to be adopted.

No 168

No 2324. 9 Nov. 60

This second letter of Captn Rendall's with
its enclosure has just been sent to me by the
Revenue Secretary, in consequence of the letter
papers connected with the alteration in the
Hunnoor Works having been forwarded
to me at my request

The enclosure consists of a letter from Colonel
H. C. Cotton to the Secretary of the Irrigation
Company in which he briefly mentions
that he has resolved to avoid an extra heavy
outlay apparently subsidiary, Plans & Estimates.
at Soonkasala to feed the Irrigation canal
which is to water the Koondar Valley, in
consequence as I understand, of the heavy
commenced at Hunnoor being unlikely for
the purpose

But I find no [illegible] papers they are
hopelessly imperfect information before him
the Chief Engineer commenced operations at Hunnoor
altering the site originally fixed on for the
work. - What should have, it appears to
me, the explanation of Colonel Cotton & Capt
Rendall in this point.

4 - Colonel Cotton further announces his intention

Meeting of the 24 & 25 inst Dant - Copies
with the Resolutions passed at the Courts Quarterly
Court Meeting Enquiries, Orders or reasons
in writing - Memorandum to know from the C & E
of the Company the Sales & estimated Sales
& Rent of Lands - Surveyors Stores, & of the Workmen
that have been discharged to wait the Boards
Investigation - Price for taking down
the C - E - the Treasurer's Salary of the Superintendents
Company - Horses lost or found - Likewise
a Copy of the Resolutions passed by
the Committee of Works at Lunenburgh -
as I have already observed in my
former Memorandum - That Court compleat
ed - for the Future to consider Orders
proposed by the Company for consideration
in the next Quarter Court Just
2 post - until a Plan for each Settlement
2 feet, with Tables annexed of
the Lots

calculations, for a compleat Plan
2 feet to the commencement of the
Navigation and Capital of the
Company -
The Court adjourned Yesterday, Saturday
now to this Instant - the Surveying works
to be begun before the first of Nov-
2 days, each Minutes taken
been made - to the Inhabitants Surv-
2 ors, would be alike injurious
to the Interest of the Court - of the
Company - Storm for Stock, which
what has occasioned that the
Lots cannot for the Court to confirm
is to last on the Quadrinial Term of the Quarterly
in the last Year of this Minute
dated the 25 inst Dant -
26 - Office - Richmond

Copy in a Letter to England
of 19th Novr/60 No. 74

Public Works 1860 Deptt
Reg. of Govt for Novr.

No. 2882

Minute by the
Honorable Mr Maltby

Dated 25th October 1860.

Makes observations on the proposed Change in the plan of Works to be executed by the Irrigation and Canal at Kurnool, and adheres to the opinion expressed in his Minute of 24th Instant.

No. 2883.

Minute by the Honorable the President.

Dated 26th October 1860.

Agrees with Mr Maltby in the remarks made by him in respect to the Irrigation Company's Works at Kurnool, and thinks that the safe course for the Govt. to adopt is to act on the advise given in the last para of Mr Maltby's Minute of the 25th Instant.

No 2324. 9 Novr.

No 168 A + 169.

No 2324. P. W. D.

87

Proceedings of the Madras Government
Under date the 9th Novr./60.

Reports a material change which it has been found necessary to make in the plan of the Irrigation Company's works at Kurnool.

Submits the Chief Engineer's representation with the Consulting Engineer's opinion thereon on the subject of modifying the general plan so far as the head of the main Canal for Irrigation was concerned

Minute by the Honble the President

from the Con. Engr. for Irr. & C. Co.
Forwards copy of a letter addressed by the Chief Engineer to the Secretary of the Company explaining the modification in the source of supply and main line of Irrigation and Navigation thro' the Watershed in the Kundar Valley

Minute by the Honble Mr Maltby
" by the Honble the President.

Read the following ~~letters~~ papers from
the Consulting Engineer for Irrigation and Canal Company

(Here enter 15th October 1860 No. 71
(" " 18th " ").

(Here enter 24th October 1860 No. 76.

(" " 24 & 25th " ")
(" " 26th " ")

In the former of the two papers above recorded, the Consulting Engineer for the Irrigation and Canal Company reports to Government a material change which it has been found necessary to make in the plan of the works at Kurnool. With the second letter he lays before Government copy of a Report on the same subject addressed to the Board of Directors of the Company,

by

by their Chief Engineer.

2 The design of the works as stated in † Captain Rundall's letter of the 9th March 1860, and approved by Government, was an Anicut ~~immediately~~ six miles below Kurnool, and a channel of large capacity taken off at its southern extremity to cross the watershed of the Tumbudra and Hundar by a deep cutting near Mallakunda; the probable length of the channel to this point was stated to be about thirty miles; † Captain Rundale now reports that the detailed surveys having been completed, it is found that the Watershed of the Hundri and the Boundary, which was to be turned by the canal, maintains a high level much further to the north than the Trigonometrical Survey map indicated; and that consequently the length of the Canal between the two points above ~~indicated~~ mentioned, as well as that of the deep cutting would be

† See Estimate in Col Cotton's letter of Sept 20/59 in letter Agreem.t of Oct.r 19

† Col H. Cadell's letter of the 21 Dec.r 1859, submitted with

† ~~recommended to be put by their~~ ~~consulting Engineer, Capt~~ ~~as~~ [illegible]

greatly increased, and its execution much more expensive than was expected.

3 This has led to a modification of the design. It is now proposed to have another anicut 18 Miles above Kurnool, at a place called Sunkasala. The canal thence leads off to cross the Hundri by an aqueduct forty feet high, and to reach the Watershed of the Hundar at so high a level, that very little cutting will be necessary. It is proposed still to have an anicut at Kurnool, though of reduced height, in order to maintain the navigation between the Tumbudra and the Kistna, and that navigation is to be connected with the main irrigation channel, by means of a canal of small dimensions with locks. An incidental advantage of this new plan is stated

to

to be that it will supply irrigation for about 75,000 acres of land between the channel and the Tumba-dra before reaching the Kundar watershed, while the original plan would only have watered 20,000 acres in that region.

4 The cost of the new plan as compared with Colonel Cotton's original Estimate for the ~~whole~~ design ~~plan~~ is given by Captain Rundall as follows

The Original plan

Estimated cost of the anicut at Kurnool, and Canal and works to the Kundar watershed — 10,00,000
Twenty miles of the Canal of the lower Bellary project, superseded by the Canal from Sunkasala at 6,000 Rupees a mile ——— 1,20,000
Total 11,20,000

The Present plan.

Canal from Sunkasala to the Kundar watershed, with the Hindri aqueduct ——— 8,42,500
Masonry works on the Canal ——— 1,20,000
Two Anicuts and Head works ——— 3,55,000
Total 13,17,500

Thus the excess of the estimate for the present plan over that of the original plan is about two lacks of Rupees.

5 The Government must remark that the mode in which the present papers have been sent up is not the proper one. Captain Rundall

First.

Note. The substance of the President's remarks on the merits of Para 1 is contained in Letter No 2 from Secretary to Government.

first
sent up merely a Report from himself, without any document at all from the Company's Officers; and afterwards when this omission was demi-officially pointed out, he submitted a copy of a letter from the Company's Chief Engineer to the Board of Directors, giving a brief and summary account of the change of plan. This, however, is not nearly sufficient. The proper course and that invariably followed in the Railway Department, is for the Chief Engineer to make a full written report of all the measures which he proposes, and his reason for them, with detailed Plans, Surveys and Estimates, in the case of works proposed for execution. The same plan should be followed in the case of the Irrigation Company. The Chief Engineer's report should come through the Agent to the Consulting Engineer, and should be laid before Government by him with his remarks: Captain Rundall will now adopt this course with reference to the present proposals.

Our

6. On the present [illegible] the Government

93

cannot but record their opinion also that they have much ground for dissatisfaction with their Consulting Engineer, as respects the works already sanctioned and partially executed. One principal object for which he was appointed was to furnish the Government with authentic means of judging of projects brought forward by the Company's Chief Engineer. It was, accordingly, on information supplied by him, and on his assurance not only of the physical but the ~~commercial~~ economical practicability of the Runnoolwork, and of the sufficiency of the Estimate, that the Government in April last sanctioned the project and allowed the operations to begin. Now, when a large sum has been spent, the Government are informed that the scheme must be almost wholly changed.

7. Of Colonel Cotton's

Collins proceedings it is
not necessary that the
Government should remark
at any length - He has
certainly fallen into a mis-
take and has misled the
Government, having been
too hasty in assuming facts
to be as he wished, and too
anxious to commence
works without sufficient
preliminary Enquiry. But
it was natural, tho' not
wise, for the Officers of
the Company, to be desirous
to commence work at
the earliest possible
time; the Government
Consulting Engineer
was

was the officer whose
duty it was to prevent
95
incautious and ill
considered operations -

8 The Govern-
-ment are disposed to
regard the present modi-
-fication of the design
as judicious. But before
they can deal with the
question they must
have submitted to them
in the manner pointed out in par 5,
~~them~~, a report from
the Co's Chief Engineer
of all that has
occurred

occurred, and of the alterations in the Kurnool portion of the project, which he would now suggest. It is also desirable that ~~[illegible]~~ explanation should be afforded of the reasons that led the Chief Engineer to change the site of the anicut from the one originally decided upon ~~to the present~~ several miles below Kurnool, to that one where ~~[illegible]~~ operations were actually commenced.

The

Note— The change of plan here noticed was proposed without remarks & so tacitly approved at the time perhaps therefore it may be better not to raise objection to it now —

[illegible] we should now [illegible] Kurnool, as it [illegible] proposed

[illegible]

9 There is one part of the revised plan which appears to the Government to be of doubtful propriety, viz, the proposals still to have an anicut at Kurnool, and to connect the Kistna navigation with the main Southern Canal at that point. The principal anicut, and the head of the canal, having been moved to Sunkasala, it would seem the more obvious course to take off the junction canal to the Kistna from the north end of that anicut. It is possible indeed that there may be high or difficult ground between the two rivers at that point, but on this matter Captain Rundall's Report is silent. The Government are moreover of opinion that it is probable that it may be found better for the present to abandon the plan of connecting for navigation only the Kistna and the Toombudra rivers. But if the Chief Engineer should still consider it

advisable

advisable to continue the construction of an Anicut at Kurnool, and the junction of the Kistna with the Toombudra by a canal at Pangloor for navigation only; ~~the Chief Engineer is requested by~~ Government, ~~to know~~ what will be the cost of this canal, and the advantage to be gained by the Company from it, compared with a junction Canal from Sunkasala.

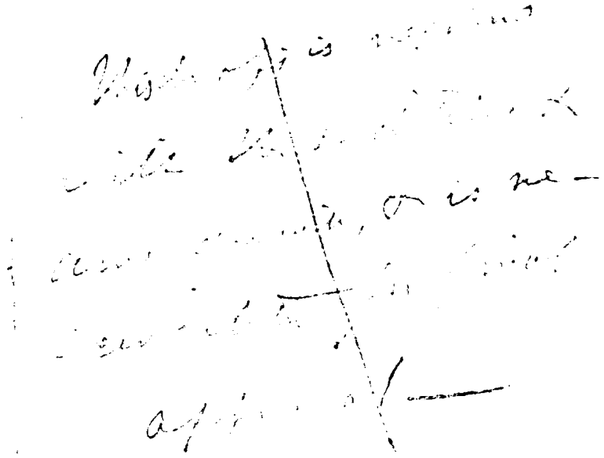
10. It is necessary to advert to another point. In a late Despatch the Secretary of State refused to allow any increase of the guaranteed Capital of the Company, so as to suffice for the whole scheme of works which they have undertaken, and he desired, and he has since emphatically repeated the injunction, — that they should not be allowed to commence a scheme which could not be completed within the million Sterling, to which the guarantee is limited. His orders place the Govt under the necessity of requiring from the representatives of the Company a definite scheme, with complete Estimates, of the works which they propose to undertake, and until they have such information before them, and are satisfied that the cost of the whole scheme will not exceed a million Sterling, they are precluded from sanctioning any works. Captain Rundall will therefore communicate with the Agent, and will lay before Government as early as possible the information here called for.

10 ..... Only one matter remains for notice. In the concluding paragraph of his letter of

of the 15th October, Captain Rundall alludes to "a decided hostility to the Company's Operations" as existing among the European community of Surat. This statement requires explanation. Capt.n Rundall will be requested to inform the Govt. to whom he refers, how the feeling which he speaks of is manifested, and how if at all, it has affected the proceedings of the Company's servants. It appears from former Reports that no difficulty has been experienced in obtaining either materials or work people.

Copy to the Consulting E.I.R. & Dispo 10
4 — Agents — for do
10 — Chief Engr
12 — Bd of Revs

Change in the plan of the Irrigation Company's works at Kurnool



2629.

7th November 1864

The Original plan.

Estimated cost of the Ancient at Kurnool and Canal and works to the Tundarwadinka — 10,00,000

Twenty miles of the Canal of the lower Bellary project, extended by the Canal from Sanktasala at 6,000 Rupees a mile ——— 1,20,000

Total — 11,20,000

The Present plan.

Canal from Sanktasala to the Tundar watershed, with the Hindri Aqueduct ——— 8,42,500

Masonry works on the Canal — 120,000

Two Anicuts and Head works — 355,000

Total 1317500

Thus the excess of the estimate of the present plans over that for the original plan is about two Lacks of Rupees.

5 — Having given careful consideration to the papers, the Government cannot but record their opinion that there have been ample ground for dissatisfaction with

with their Consulting Engineer,
One principal object for
which he was appointed
was to furnish the Govern
ment with authentic means
of judging of projects brought
forward by the Company's
Chief Engineer. It was,
accordingly, on information
supplied by him, and
on his appearance not only
of the physical but the
commercial practicability
of the Harwood works, and
of the sufficiency of the
Estimate, that the Govern
ment in April last sanc-
tioned the project
and allowed the operations
to begin. Now, when a
large sum has been
spent, the Government
are informed that the
scheme must be al-
most wholly changed.

4). — Of Colonel
Colleton's proceedings
at

5 The Government
must point out that the
mode in which Captain
Prospero
Captain Rundell
not the prosperous
Rundell first
first, secondly
a Report from himself
without any document
or aid from the Com-
pany's Officers and
forwards submitted a
copy of a letter from the
Company's Chief Engineer
to the Board of Directors
giving a brief and sum-
mary account of the
change of plan. The
proper course, and
that invariably fol-
lowed in the Railway
Department, is for
the

when this mission was
determined
not, he

This term, is not
wholly suppressed.

the Chief Engineer to
make a full written
report of the measures
which he proposes, and
his reasons for them.
This Report should
come thro the Agent
to the Consulting Engineer
and should be laid
before Govt by him,
with his remarks. Cap-
tain Rundall will
now adopt this course
with reference to the
present proposals.

with detailed Plans
Surveys &c &c in
the course of the ensuing
Year & same to be
transmitted by
the Agent of the Peninsular Comp
to the Govt of Lisbon

In ch. Cs

it is not necessary that the
Government should remark
at any length. He has cer-
tainly fallen into a mis-
take and has misled the
Government, showing
been too hasty in assuming
facts to suit as he wished,
and too anxious to com-
mence works without e-
nough sufficient preliminary
enquiries. But this was
natural, this notwithstan-
ding the officers of
the Company, to
be desirous to
commence work
at the earliest
possible time,
the Government
consulting

Consulting Engineer
was the officer whose
duty it was to pre-
vent incautions and ill
considered operations

for in the interest of
navigation more especially as they
are disposed to
modification of the
designs as judicious.
But before they can
give it their sanction
it must be carefully
investigated; and
the Government
consider it necessary
to obtain the opinion
of an Officer
unconnected with

3.

the previous proceedings.
For this purpose they resolve
to depute Colonel Baitum, the
Deputy Chief Engineer of the
Northern Circle, in which the
works are situated, to go to
Kurnool, investigate the pre-
sent project, and report
to Govt as to its feasibility
and cost.

8 & 9 There is one part of
the revised plans which
appears to the Govt to be of doubtful
propriety, and to this Colonel
Baitum's attention will be
specially directed; viz: the pro-
posal to have an Anicut at
Kurnool and to connect the
Kistna Navigation with the
main Southern Canal, at that
point. The principal Anicut
and head of the Canal, having
been moved to Sunkesula, it
would seem the more obvious
course to take off the junction
Canal to the Kistna from the

North

Cont. northward of that union. His possible indeed that there may be high or difficult ground between the two rivers that Mr Rundall's Report is silent on this point. But if necessary to adhere to another point. In a late Dispatch the Secretary of State refused to allow any increase of the guaranteed Capital of the Company, as was to suffice for the whole scheme of works which they have undertaking, and he desired, and he has since emphatically repeated the injunction, that they should not be allowed to commence a scheme, which could not be completed within the millions Sterling, to which the guarantee is limited. This order places the Govt. under the necessity of requiring from the representatives of the Company a definite scheme, with complete estimates, of the works

From Secy of State 29th June 1846

From Secy of State 28th Sept 1846

works which they propose to undertake; and until they have such information before them, and are satisfied that the cost of the whole scheme will not exceed a million Sterling, they are precluded from sanctioning any works. Captain Rundall will therefore communicate with the Agent, and will lay before Government as early as possible the information here called for.

Only one matter remains for notice. In the concluding paragraph of his letter of the 15th October, Captain Rundall alludes to "Antecedent hostility to the Company's operations" as existing among the European Community of Tahiti. This statement requires explanation. Captain Rundall will be requested to confirm the fact to which he refers, from the overflowing which he speaks of

manifested, and how far all, it has affected the proceedings of the Company's servants. It appears from former Reports that no difficulty has been experienced in obtaining either materials or work people.

Change in the plan of the Irrigation Company's works at Kurnool