

WHAT THE NATIVE PRINCES DID.¹

"The native princes, who constructed the tanks and channels of irrigation, knew quite well that from their very nature they must stand in need of constant repair. They therefore made a special provision for this necessity by subjecting every acre of land irrigated to a special cess for this particular purpose, which was in some instances contributed by the ryots, and in others, in equal parts from the ryots' share and the Government share of the produce, the revenue being in those times received in kind. We have not the means of determining whether this constitution of things was universal in all the provinces now forming this Presidency; but it certainly prevailed generally throughout those in which irrigation is most common, and it was probably universal all over the Carnatic at least.

"After the assumption of the government by the English it was determined to consolidate all the items, making up the land revenue into a single demand, and for the most part, this was a fixed sum in money for each acre or each cawny, the revenue in kind being commuted. In that operation the tank cess was included in the settlement, and was merged in the revenue; and the correlative duty of maintaining the works of irrigation in efficiency was fully recognised on the part of the Government. The only exception to this arrangement, we believe, was Tinnevely, where, though the tank cess was commuted into money, and the proceeds included in the general revenue, a separate account of its amount has always been kept"—(sec. 454).

THE RESPONSIBILITY OF THE GOVERNMENT.

"These facts place the Government in a new position as to the works of irrigation. It now appears that these works are not by any means generally maintained out of the State revenue. As

¹ "It is no matter of surprise that the kings who devoted their treasures and their personal energies to the formation of tanks and canals have entitled their memory to traditional veneration as benefactors of their race and country. In striking contrast is the pithy remark of the author of the *Rajavalu* mourning over the extinction of the 'Great Dynasty,' and the decline of the country, that, 'because the fertility of the land was decreased, the kings who followed were no longer of such consequence as those who went before.'"—SIR EMERSON TENNENT, in his great work on *Ceylon*.



regards a large portion of them, the Government are in the position of trustees of a special fund, contributed wholly or in part by the holders of irrigated land, over and above, and independently of, the Government rent of the land, which latter was at first actually, and still is theoretically, a certain proportion of the year's produce for the maintenance of those works, originally constructed at the cost of the Government, by which the additional value was given to their property. Or, even granting that Government may be regarded as having contracted to maintain the works in consideration of these fees, and so are not responsible for the unexpended amount, even then the condition of their title to the money is that they shall keep the works in good repair. It thus appears that it is not simply a question of policy whether the Government shall keep the works in repair, nor even that there is a merely implied engagement to do so, but that it is a positive and express obligation to be fulfilled in return for an equivalent received. It must be admitted that this duty has not been performed, and private property has suffered great damage in consequence; and it now remains, therefore, to retrieve the past neglect, and bring up the works into a state of full efficiency as rapidly as possible—(sec. 465).

“But the last, and not the least consideration is behind, THE CERTAINTY OF PREVENTING THE AWFUL RECURRENT OF FAMINE.”¹

AN IRRIGATED *versus* AN UNIRRIGATED DISTRICT.
A COMPARISON BY SIR ARTHUR COTTON.

TANJORE: *Irrigated.*

In one district, Tanjore, a system of moderate, but actual, progress had been steadily pursued for fifty years, with the most extraordinary and unvarying success, by which the revenue has been increased from

GUNTOOR: *Unirrigated.*

In the district of Gunttoor all such works are utterly neglected, and in one year a famine occurs which sweeps away two hundred and fifty thousand people out of five hundred thousand, and causes a loss of revenue in

¹ J. Bruce Norton, “Letter to the Secretary of Board of Control, 1854, p. 41.”



£320,000 to £500,000 a year, while the saleable value of the land had equally advanced, till it is now (allowing for the difference in the value of money) equal to the value of land in England; and that this had been accomplished without any sudden extensive outlay of capital, producing a temporary difficulty, but by an average annual expenditure of about £4,000 a year, besides the current expenses for the repair of existing works. The total sum so expended is about £200,000, and the increase of revenue per annum is the same. The increase of private property in the value of the land is also about £3,000,000 or £3,500,000, indicating an addition of private income of £180,000 or £200,000 a year. The money expended was employed in embanking the rivers, cutting channels for the distribution of water, and for drainage, constructing weirs, sluices, aqueducts, and other masonry works connected with the irrigation and drainage; in building many hundreds of bridges, and in

the next ten or twelve years of £800,000, while not an acre of land is saleable. The sole cause which, has made this difference between these two districts, is the different degree of attention given to public works.

Let us suppose a district under a zemindary and village settlement from which almost every farthing that is collected (besides what is expended on the collection) is sent out of the district; the old and partial means of securing it a supply of food left to go to ruin, and not a mile of road made in it; not a reservoir of water constructed, not an embankment thrown up to prevent the water drowning any extent of crop; not a stream bridged, so that almost all its produce, except what can be consumed in the village where it grew, is utterly valueless. Besides this ordinary state of things, let us suppose a failure of local rain to occur, which, in consequence of its being unmitigated by a single tank of water, which borders the district for eighty miles, or a single channel leading water from an unfailing



making one thousand miles of common road for facilitating transit.

All the districts around it have remained almost or quite stationary, excepting in so far as they have, though in a minor degree, had similar advantages granted to them. And still the expenditure in Tanjore has been so inadequate that the whole of its immense traffic is carried by common roads. Had a system of canals been added to the other works, it would probably have benefited to the extent of another £200,000 a year.

The district of Tanjore is taken care of, irrigated, and provided with common roads (though not with better communications), and the revenue steadily rises till from £200,000 it becomes £500,000 a year. The population increases from seven hundred thousand to eight hundred thousand, and the land reaches a saleable value of at least £4,000,000, equal to £24,000,000 in England.

river, it produces the utmost horrors of famine, sweeping off fully half of the population, and reducing the revenue at once by £140,000 a year, which is not fully recovered for twelve years.

Now this is a correct statement of the "progress" of Guntoor.

But, said one of the leading citizens of Madras,¹ writing

¹ Mr. John Bruce Norton, in a letter to the Secretary of the Board of Control, Robert Lowe. Mr. Norton's memory is still held in high



in 1854, let this matter be carried farther. Great as are the advantages which Tanjore possesses over the other districts of Southern India, let us suppose that, instead of a comparatively scanty expenditure upon her public works, a really liberal outlay had been made upon a well-considered, systematic plan, with a view still further to reduce the cost of transit. What would *then* have been her position? It is highly important to ascertain this, because in the pictures above drawn, much of her prosperity must undoubtedly be attributed to the improvement of works of irrigation. What follows from Col. Cotton's pen applies mainly to means of communication:—

“Now let us suppose,” he says, “in the case of Tanjore that, instead of the petty trifling way in which it has been improved, a really intelligent and vigorous system had been pursued. Suppose, for instance, that instead of £4,000 a year even £10,000 only had been spent in the irrigation improvement, so that the district had been brought into tolerable order in that respect in twenty years instead of fifty, and that, by continuing the expenditure, water had been stored so as to supply it through the dry season, instead of having it, as now, without water for four months, so that it might have grown sugar and other valuable products, instead of rice only. And thus, long before this, the district might have been exporting one hundred thousand tons of sugar a year, worth £2,000,000, besides various other things. Let us suppose further, that, instead of merely during the last thirty years of the fifty, constructing very imperfect unmetalled roads, worked at fourpence-halfpenny per ton per mile, they had from the first commenced a system of steam canals, by which the transit could have been carried on at one-sixteenth of a penny per mile! At present there are just one thousand miles of road in the district; if the

esteem because of his public-spiritedness while in Madras. He may be remembered in England as one of the proprietors of *The Hour* newspaper, a daily journal which excited much interest during its too brief existence thirty years ago.



average traffic is equal to fifty tons of goods a day, the daily cost must be £300, or £320,000 a year. The steam canals, providing for the great bulk of this, would have relieved the district from an expenditure of £250,000 a year on the goods and passengers now moved, besides, probably, an equal sum gained in the additional value given to goods which are not moved at all at the present high rates. With these additional helps, an additional income in more valuable products of at least £1,000,000, and advantages in the transit worth £500,000 a year, the revenue might now be £1,000,000, instead of £500,000, and the net income of the people also one million more than it is at present. And all this might have been done without a rupee being paid out of the general treasury. The district would itself have paid for all these improvements from year to year out of the additional revenue it would have been yielding, just as of late in the Rajahmundry [now Godavari] district where, while £200,000 have been spent in eight years, £300,000 of additional revenue have been received. No reason whatever can be assigned why this should not have been done, and thus this one district, instead of paying £200,000 a year in mere revenue towards the late annual deficit of one million, might have paid £700,000 or seven-tenths of the whole deficit; and two districts so improved would have made a difference of our having, for the last thirty years, a surplus revenue upon all India, of half a million, instead of a deficit of one million. And, I think we may venture to say this would have been the case under that revenue system, which is the worst in India, according to Mr. [afterwards Sir George] Campbell, that is, even if every landowner had been allowed to manage his own land in his own way, and without the interference of his neighbours."

Sir Arthur was not without a sense of humour, as those who knew him best often found. He could be satirical, too, on occasion. It is true his satire was like summer evening lightning, illuminating rather than danger-



ous, but there it was. I give two instances, to be found in his writings of this period, of his humorous treatment of the great red-tapeism which then (and now almost as largely) prevailed in Indian administration.

THE GREAT PUTTY CASE.

A range of barracks is built by an Engineer at a cost of £30,000 or £40,000; there is a large saving on the estimate sanctioned, for which he officially receives the thanks of the Court of Directors. Some time afterwards a storm occurs, which breaks a few panes of glass valued at £7. The whole Presidency is at once in a state of excitement. The heads of that division of the army are directed to assemble a committee of officers to investigate this matter. Their report is referred to the Military Board, who, after patiently examining all the papers, and referring to all their records, forward all the documents to the Governor-in-Council, with a deliberate and elaborate report, in which they assure the Government that they have not hastily come to a decision, but have given their best energies to the investigation. They conclude that the cause of the windows being broken was the inferior quality of the putty used, and that, therefore, the Engineer ought to pay for them. All the papers connected with this intricate and vital matter are now examined by the Secretary to Government, who sends them in circulation to the Governor and the three members of Council. After a sufficient time has been given them to consider this weighty subject, and to record their individual sentiments in writing, the important day at length arrives when the whole is to be reviewed and discussed in Council. The flag is hoisted, his Excellency's carriage, with two troopers with drawn swords, in front, and three behind, enters the fort, and is drawn up at the gate of the Government Offices. It is followed by the Commander-in-Chief, and the two Councillors with their silver sticks. The Secretaries are summoned, and this solemn investigation is proceeded with, upon which the fate of £7 depends. It is, however, discovered that the decision of such an important question, by an assembly drawing among them salaries amounting to £40,000 or £50,000 a year, and the cost of whose weekly meetings in council may be calculated at about £1,000, would be too presumptuous. After much discussion, therefore, and



probably, a second or third set of minutes, it is decided that the Secretary shall draw up a report embodying the opinions of the Council, to be submitted, with all the important documents connected therewith, to the honourable Court of Directors, and the Board of Control.

The thoughtless mail agent little thinks what he has got under his charge, when he receives the box containing this despatch, in the cabin on board the steamer. After many months, during which these papers have been the frequent subject of communication and discussion among the secretaries, directors, etc., etc., in London, another steamer proceeds with the freight of these papers, greatly increased in bulk and value by the opinions and decision of the august Board at home. They reach Madras, the Council is again assembled, the despatch is considered, a copy, with resolutions, etc., is sent to the Military Board, and, after having been circulated, considered, discussed, etc., by them, instructions are issued announcing that the honourable Court, of course with the concurrence of the Board of Control, have decided, for reasons duly stated, that the windows shall be mended at the expense of the Engineer. If a wing of the barracks had fallen down, of course, as a subaltern could not pay ten thousand pounds, there would be no alternative but to rebuild it at the public expense; but, as he can pay seven pounds, justice to the public service requires that he should be made an example of. In the meantime, as the officer is not in India, the matter lies over for a year or two. On his return, being surprised at the receipt of these orders, after having been officially thanked by the Court for having acquitted himself so well in the construction of this large building, he addresses the Chief Engineer, giving him, in a few words, reasons why he ought not to be held responsible for the loss of the £7, and, as he has not previously had an opportunity of speaking in his own behalf, the Chief Engineer draws up a minute on the subject, which is laid before the Military Board, who again considers the question, and once more report to Government. Nothing can exceed the condescending and unwearied patience of all the authorities. The Governor once more records a minute, the second member of Council minutes, the third member minutes, the Governor winds up by a fourth minute; by which time the subject is ripe for discussion. Again the Council assemble, consider, decide, and issue instructions to the



Military Board; and finally, the officer is told that he may keep his £7. And so ends the affair, till the report of the Governor-in-Council reaches the Court, when they will possibly order the matter to be taken up *de novo*, and thoroughly investigated. It should be mentioned that it was discovered at last that some brads had been omitted in fixing the glass, which was not likely to be discovered either by the President of the Board of Control, the twenty-four Directors and their Secretary, the Governor and Council of Madras and their Secretaries, the Military Board, the Chief Engineer, the General of the division, the Committee of Officers, or the Engineer himself, as none of them had ever served an apprenticeship to a glazier.

This is the literal history of an Indian question, which has recently been agitated.

ROAD-MAKING PECULIARITIES.

The history of communications in the Madras Presidency is one of the most curious of all the odd things that have occurred in the management of India. A sketch of this may be of great use as a warning to us in our future proceedings. The first roads made probably were those in Tanjore. When it was proposed to open one or two lines in that impassable sheet of irrigation it was immediately objected:—

“Well, this is a fine proposition, to make fine roads where there is not a horse or a cart to be found.” There was not a mile in the whole delta over which a horse or a cart could have moved. After some struggling, however, a first attempt was made, and it was discovered that when there were cart roads, carts were used. But what was done in Tanjore was done without the least reference to any other part of the country. The questions were never asked: “But if roads are to be made, where are they most wanted? where will capital so expended produce the greatest results? which ought to be made first, etc., etc.?” Tanjore possessing the most active Government officers got roads, and the rest of the country generally remained without, as it is to this day. The next roads were probably those made by the Pioneers. The arrangements for these works were as follows: some lady at Madras having a favourite brother or cousin in one of the native regiments, took an opportunity at a pleasure ball given by the Quarter-Master-General, to ask him if he could not do something for her relation. Upon this he is put into the Pioneers, and in a



few years he gets the command of a battalion. In the course of time some great public functionary being detained for weeks on an impassable line of country in his palanquin, becomes very sensible of the sufferings of the people in that neighbourhood from want of roads, and persuades the Government to send a battalion of Pioneers to make one. The whole management of the work, of course, falls to the officer so carefully selected to command them. He has never seen a road made; he left England before he was old enough to entertain a thought about the roads he travelled over there. He has not an idea on the whole subject, nor a book to refer to. Of the principles on which the lines should be selected, as well as those on which the roads should be constructed, he is as utterly ignorant as the lady who recommended him for his appointment. He soon finds that a thousand men are lost upon a hundred miles of road, and obtains permission to employ a few thousand coolies, and thus, besides the cost of the Pioneers, a few lakhs of rupees are spent by a man who has not the slightest knowledge of, or even natural turn for, the work he is employed upon, and who possesses perhaps a low degree of general ability or zeal.

There is not the slightest exaggeration in this; it is a literal statement of the *usual* course of proceedings, in times past. No check of the remotest kind was exercised over these works, not a single professional officer had anything whatever to do with them. The Quarter-Master-General under whom they were carried on, was as perfectly ignorant of the matter and probably at least as indifferent about it, as the Executive Officers. Of the state of things a very distinct idea may be formed by the following anecdote. One of the officers commanding the Pioneers employed as above described, drew up a memo on the best construction for a road on cotton soil (black alluvial mud without sand or gravel mixed with it), and highly pleased with the knowledge he had attained, he sent it to the Quarter-Master-General. Struck by the remarkable talent displayed in the paper, the Quarter-Master-General sent a copy of it to all officers employed in that department; and that the utmost possible use might be made of it, he also sent a copy to the Chief Engineer, that he might circulate it through the corps. The plan was this, first a complete layer of large stones about a foot or a foot and a half thick were to be laid over the whole surface to be occupied by the road, and over these were then to be laid three feet of black cotton soil to raise the road to a sufficient height and pre-



vent its being flooded. By this admirable arrangement almost any amount of money might be spent, as in such a situation the stones would have to be brought several miles, and, at the same time, the surface of the road being formed of the natural soil, but thoroughly loosened by being dug and thrown up, would be ten times worse than the original surface of the country. Such was the state of knowledge of road-making among those who conducted and who were entrusted, without check or supervision, with the expenditure of many tens of thousands of pounds.

The road from Masulipatam on the coast, three hundred miles north of Madras, to Hyderabad, a distance of two hundred and twenty miles, was one of those executed in this manner. When about £30,000 had been spent upon it, besides the pay of the Pioneers, the Court of Directors put a stop to it; and, as no metal of any kind was put on most of it, the road had never yet been practicable in the wet season, and even in the dry season, the communication was very little better, if at all. Then only about one hundred and twenty miles of the whole distance was meddled with; the money spent was, therefore, nearly £700 a mile before the work was began, or twice as much as would make an excellent road, and quite as much as would have made a good horse railroad (for there was not a single difficulty on the line), which would have reduced the cost of transit to one-twelfth of what it was and still is. The road from Madras to Poonamallee, eleven miles, was a similar case, and, as in this instance, the Pioneer officer was able to communicate constantly with the authorities in person, he was not so restricted about expenditure as in the other case; accordingly £44,000 was spent here, or £4,000 a mile. The Court of Directors now saw it was necessary to apply a remedy: and it was, to order that no more roads should be made. This was simple and effectual.



CHAPTER X

The Struggle in a House of Commons Committee Room,—with an Anticipatory Debate and Interludes

"God has said, From water all things are made. I consequently ordain that this jungle [Hissar district in the Punjab], in which subsistence is obtained with thirst, be converted into a place of comfort."
—AKBAR, 1568.

THE nearly forty years of arduous toil in India were matched by an almost equal period of so-called retirement to England, and the enjoyment of well-earned leisure. Sir Arthur Cotton's notions of retirement and leisure accord with some men's ideas of a busy career. He was always occupied in furthering some beneficial project or other. And, though it may appear that oftentimes he was but "beating the air," that he could not exhibit equal success in enterprises carried to completion such as marked his "active" forty years, it may yet be proved that, in the result, even more good will accrue from these later years than is apparent for the former period. For, if these pages convince a sympathising and responsible public that grave injustice has been done to India in the denial of widespread irrigation, Sir Arthur's projects will yet find completion. He has left behind him a rich record of material which, rightly understood and enthusiastically employed, will surely bring under safe cultivation not merely the miserably inadequate four millions of acres which Lord Curzon of Kedleston declared, in the Viceregal Council in April, 1900, was all that remained of



productive works to be taken in hand, but many many millions of acres and many thousands of miles of water navigation to aid in saving the people alive and in the development of the country.

A friend, who saw a great deal of Sir Arthur in his retirement, declares that he was incessantly engaged with the great subject of irrigation and navigation in India, holding conference with men high in office, delivering lectures and writing pamphlets and letters to the newspapers. His great ideas were :—

First. To establish canals for irrigation wherever they were practicable, and to supersede rain and well-water by river-water, which carried with it fertilizing matter greatly augmenting its value as compared with all other water.

Next. To render irrigation canals navigable, and to establish thousands of miles fit for steamboats to carry the immense amount of produce which could not be moved for internal use or exportation save by the cheapest mode of transit ; this could be provided by water alone.

The difficulties he had to encounter, from official sources particularly, seem, to an outsider, almost incomprehensible. At least he had no selfish aim to satisfy. In common parlance he had no axe-edge of his own to sharpen. He was able, proudly, to state to the House of Commons Select Committee on East India Public Works, in 1878 : "I have never made this a personal matter, and I trust I am not going to begin in my old age. I never asked for an appointment, or for anything else, except to be allowed to irrigate India. I never possessed property, nor ever took a share in any speculation, that I might have nothing to occupy my thoughts or warp my judgment, but might give myself up to my duty of helping to raise India in this particular point. It has pleased God so to prosper the works I have been engaged in, that the dispute among my adversaries is whether returns are seventeen, twenty-eight, or forty per cent., and, in another, whether the return is not less than eighty-seven per cent." A magnificent, yet modest, boast ! Had the percentage been all the other



way, had there been loss instead of gain, had no material advantages followed, severe criticism might not have been unexpected. As it was, one noble lord, while Secretary for India, remarked to Manchester men at a public meeting, that water could not be made to run up hill, while a then recently resigned Member of Council invented a range of mountains in order to make it impossible for a canal to be carried across the lower part of Central India. Men learned in the law, like Sir James Fitzjames Stephen, considered themselves capable of teaching the laurel-crowned, successful, old Engineer that they knew more of hydrostatics and water-engineering than did the creator of the Coleroon anicut and the designer of the Dowlaisweram dam.

BEFORE A PARLIAMENTARY COMMITTEE IN 1872.

Twice Sir Arthur appeared before Select Committees of the House of Commons on Indian affairs, in 1872 and in 1878. As the first Committee dealt generally with finance, particularly in connection with military expenses, while the latter had to do solely with public works, it is but natural that his second appearance should be more important than the first. This is why so much space and consideration are given in this chapter to the enquiry of 1878. While more than nine hundred questions were asked of him, in that year, less than three hundred were asked in 1872. And, after enquiries about irrigation on points, all of which were exhaustively dealt with in 1878, and will be found a few pages later, most attention was given to navigation; yet was not irrigation forgotten.¹ Consequently, in the brief reference, which is all that this incident calls for, atten-

¹ "Now," asked the Chairman, the Rt. Hon. A. S. Ayrton, "this system of irrigation has been productive of very great benefit in certain districts; but do you think it is equally applicable to other portions of India as it is to the deltas of great rivers?"

The witness replied: "TO EVERY DISTRICT IN INDIA; *but not with equal benefit, because some districts would be more expensive to irrigate than others*; BUT IT IS EQUALLY APPLICABLE."—Q. 8371, Report, 1872.



tion will be concentrated wholly on the navigation aspect of Sir Arthur Cotton's evidence. In elaborating one of the early questions put to him concerning the population on the banks of the Godavari, the witness mentioned "a very noteworthy fact" concerning that part of the country: "The most palpable and striking result of our government," he said, "has been a steady emigration of a section of the population, constituting forty per cent. of the whole, and the gradual depopulation of the district under our rule."¹

One feature strongly insisted upon by the witness was the need for plentiful storage if navigation was to be provided the year through: such storage is also pressingly required for irrigation, as Mr. Walch points out in his book, as most of the Indian Members of the Viceregal Legislative Council urged in April, 1900, and as some Indian newspapers have indicated. "It would not require a very large sum, say £200,000, to store water for the completion of the navigation of the Godavari for the whole year," was Sir Arthur Cotton's matured judgment.

It was elicited that repeated requests for funds were sent to successive Secretaries of State without success. "They must have given you some reason why they thought it was undesirable to advance this additional sum of money," persisted the Chairman. "They never gave me any reason at all," responded the witness. "I had continual correspondence with former Secretaries of State, and Lord Halifax, and it was always said the money could not be found." But why it could not be found for works which repaid capital over and over again, Sir Arthur could never make out.

The Chairman: "In your opinion would canal navigation meet the whole transit wants of India, of its commerce, and its people?"

"Perfectly and entirely," was the reply; "without any one defect whatever." Thinking this assertion might be thought too sweeping he qualified it with the remark: "I

¹ Q. 8344, Report, 1872.



do not mean to say that every line in India can be traversed by a canal, but every line on which it is of great importance there should be transit. There may be minor tracts, like some part of the line between Bombay and Madras, which might be better for railways."

To the question as to whether he considered that there was water enough in India to feed all the canals of which he spoke, Sir Arthur, with strong conviction, said :—

"There is water enough in India for every conceivable purpose ten times over ; THERE IS NO WANT OF WATER."

One more question, quoted because of its bearing on the manner in which the Ellore and East Coast Canal has had its boat licences penalised in the interests of the East Coast Railway,¹ and with it the close of my references to this most disappointing enquiry—singular amongst the many Parlia-

¹ See official documents, pp. 282–284 of this work. A curious feature of this enquiry of 1872 was the most serious mistakes which a leading Indian official made in his evidence. Two questions (8498 and 8499) with their answers are worth quarrying from the ponderous volumes in which they appear :

"8498. [*The Chairman.*] Now the river is opened up to the second barrier, and the traffic, I think you stated, was 20,000 tons the first year. General Strachey states that he believes almost the whole of that traffic was food for the people employed on the works ; have you any account of what that traffic consisted of ; is it possible that there can have been twenty thousand people employed on that work, and that they could consume, each of them, a ton of food in that period ?"

"Here is the report of the navigation for the year 1869–70, which is the last that I have got. The total traffic was 20,500 tons, and of that the Government stores were 1,500, leaving 19,000 tons for general merchandise. I cannot understand how General Strachey, who is so very accurate in general, could have made a mistake of that sort."

"8499. One of General Strachey's objections to the opening of the Godavari is, that it would take off the railway a portion of the existing traffic, and also the further traffic that it was likely to receive : what have you to say to that ?"

"I have two things to say to that. One is this : because we have made a railway, are we therefore to compel the people to carry by an expensive mode when they could carry by a cheap one ? The other is, that we have nothing to do with the railway in considering the question. There is the question of whether we shall make a line of communication through an important tract of five hundred miles, or have none at all in that five hundred miles."



mentary Committees which have enquired long and ended in nothing.

If, asked the Chairman, it be argued that if you open the Godavari it will compete with the Great Indian Peninsula Railway, will not the projected Indus Valley Railway compete with the river Indus in the same way?

"Yes," was the regretful answer; "but it seems that there is no objection to make a railway to compete with the river, though there is great objection to open a river to compete with a railway."

A HOUSE OF COMMONS DEBATE.

A SEVERE ATTACK UPON AN ABSENT MAN.

So dreadful a famine as that which swept over Southern India in 1876-77, could not pass unnoticed in Parliament. Much discussion on many platforms throughout the country and in almost every newspaper in the United Kingdom made Parliamentary action of some kind inevitable. The Queen's Speech on the opening of the session, contained the following passage:—

"I am thankful that the terrible famine which has ravaged Southern India is nearly at an end. Strenuous and successful exertions have been made by my Local Governments to relieve the sufferings of the population, and in that duty they have been powerfully seconded by the liberal aid of my people at home and in my Colonies. I have directed that an inquiry should be made into the measures most proper to diminish the danger of such calamities for the future."

In the debate which followed in both Houses of Parliament, references to irrigation and to Sir Arthur Cotton's part in it were made. One—that which first follows—shows the harm done to his reputation by the refusal of *The Times* to publish his reply to Sir James Stephen: because no reply appeared to the lawyer's dicta on irrigation it was assumed there was no reply! The Earl of Wharnccliffe said:—

" . . . Her Majesty also refers in her gracious speech to the



terrible famine which has ravaged Southern India. I rejoice that that great calamity is nearly at an end; and I sincerely trust that the Commission that is to be appointed will be able to discover, in the investigation of the causes of the present famine, the means of preventing these deplorable calamities in the future. The subject is a very difficult one, and it is to be regretted that one of the greatest orators in this country¹ should have recently propounded a scheme, so haphazard and incomplete, that it only needed a stroke of the pen from that distinguished Indian official, Sir James Stephen, to accomplish its entire refutation, and to show how unsound were the premisses of those who supported the plan."

The Earl of Loudoun, on the other hand, supported extension of irrigation. He said:—

"With regard to the Indian Famine, it is gratifying to think that such a calamity has been alleviated by open hearts and hands in England, and by able administration in India itself. The question of irrigation in India is most important, and it is to be hoped that it will receive due consideration. There was an important meeting in Birmingham last night, reported in *The Standard* to-day, at which Sir Arthur Cotton, who has been connected with engineering in India for more than half a century, spoke of the great works of irrigation which had been carried out by the Government, who had spent £20,000,000 on it. But he added that much, of course, remained to be done, and that it was often a very good investment."

In the Commons debate, Mr. Wilbraham Egerton's remarks are almost a replica of Lord Wharncliffe's in the Upper House. He remarked:—

"The good feeling which had long existed between this country and India must have been strengthened by the generous response which had been made, not only by the English people, but by the English race in our Colonies, to the cry for assistance of those who were suffering from the consequences of a dire famine, which would, in his opinion, have resulted in a much greater loss of life but for the facilities which had been afforded by the railways in carrying food at a low rate. The question how

¹ John Bright, who, so far as his time permitted, ardently advocated the adoption of Sir Arthur Cotton's proposals.



to prevent famines in India was now engaging public opinion. The right hon. gentleman the member for Birmingham (Mr. Bright) gave at Manchester some advice on this subject, but his statements were disputed, and his arguments refuted by a very able writer in a leading newspaper. He was glad to see that a Commission was to be appointed to go into the whole subject, and he understood that the additional taxation to be imposed on India was to be devoted either to pay off the loans raised for the famine or to carry on new works, if found necessary."

So soon as discussion upon the answer to Her Majesty's gracious message was concluded, the Under Secretary of State introduced a motion for the appointment of a Select Committee to enquire into and to report as to the expediency of constructing Public Works in India with money raised on loan, both as regards financial results and the prevention of famines. This was the form which, after amendment suggested by Mr. Fawcett and a speech by Mr. John Bright, the motion took.¹ It is essential to a right understanding of the deplorable situation, as regards insufficient extension of irrigation, which resulted from the debate on the appointment of the Committee and the report of the Committee itself, that everything which was said in debate should find record here. I, therefore, abstract from pages 324 to 384 of vol. 237 of *Hansard's Parliamentary Debates*, the speeches which follow:—

LORD GEORGE HAMILTON: Lord Dalhousie suggested a plan by which money might be raised through the agency of

¹ The mutations which the original motion underwent are interesting:—

Motion for a Select Committee.

"That a Select Committee be appointed to inquire into and report as to the expediency of constructing Public Works in India with money raised on loan." (Lord George Hamilton.)

Amendment. Mr. Fawcett.

"That the following words be added to the motion of the Under-Secretary of State for India:—

"And further to inquire into the best means to be adopted to prevent the recurrence or to mitigate the intensity of famines in India; and whether by greater economy, especially with regard to



certain companies, and, in fact, the making of the desired railways was handed over to those companies, who were induced to find the capital by being guaranteed high rates of interest. That was the origin of guaranteeing railways in India. Lord Dalhousie also proposed to hand over irrigation works to similar companies, and on the abolition of the old Military Boards some few years later, various offices for the construction of public works in connection with the Civil Department were consolidated into a new department, to which the name of the Public Works Department was given. It was proposed that this department should annually expend about £2,000,000 on productive irrigation works. . . . Previous to the establishment of the Public Works Department, a considerable sum had annually been expended in the construction of irrigation works in India; but that was entirely from the ordinary revenue of the year. After the Mutiny, great pressure was put upon the Secretary of State. Certain companies, such as the 'Madras' and the 'Orissa,' were formed for the promotion of irrigation, but they were failures. Lord Lawrence drew attention to the great charges those high guarantees were placing year by year on the revenues of India, and he suggested that in future railways and irrigation works should be constructed by loans. Some years after a proposal was made by the Indian Government, and confirmed by the Home Government, that the Government should in future be entirely responsible for the construction of irrigation works. So long as money was found for these works by private companies, the real state of the case was

military and other charges, which are under the control of the Home authorities, a fund for the relief of famines may not be provided without subjecting the people of India to such burdensome taxation as will be imposed upon them by the contemplated increase of the salt duty."

Mr. Grant Duff.

All that he would suggest was the addition of a few words at the end of the motion of the noble lord, namely :—

"Especially such works as may be adapted to prevent the recurrence or mitigate the intensity of famines."

Amendment and motion (by leave) withdrawn.

East India Public Works.

"Select Committee *appointed* to inquire into and report as to the expediency of constructing Public Works in India with money raised on loan, both as regards financial results and the prevention of famine." (Lord George Hamilton.)



obscured; but the moment the State undertook their construction, the whole of the capital embarked was charged against the ordinary revenue of the year. . . . Last session, the Government had proposed a form of account to be sent out to India by which the whole of the transactions connected with railways and irrigation works were brought under one head, and all the interest on the money expended on them, as well as the working expenses, were charged against the receipts, so that at a glance they could see what the actual result of the construction of these works actually was. . . . It was proposed to devote £4,500,000 annually to the construction of Public Works Extraordinary, of which £3,000,000 were to be devoted to railroads and £1,500,000 to irrigation. . . . He had pointed out that the allotment annually given to irrigation had been diminished, and in ordinary times he would not have considered it necessary to call attention to this fact; but, owing to the recent agitation out-of-doors with a view to exercise pressure on the Indian Government, to induce them to spend enormous sums on irrigation works, he felt compelled to refer to this subject. An association, he believed, had been formed, and application had been made to members of Parliament asking their assistance, in order to induce, if possible, the Indian Government to embark upon a gigantic speculation in that direction. That, however, was the continuance of an old agitation. Some twenty years ago a similar agitation had prevailed, there being a strong impression out-of-doors that they had merely to construct an irrigation work in India, and it must immediately pay. A chief supporter of that view, and a very distinguished engineer, was Sir Arthur Cotton, who, in the early part of his career, had been singularly successful in the construction of certain irrigation works in the Madras delta. Those works had proved satisfactory and had paid well, although what their exact actual returns were, it was difficult to say; but making all allowance, there was no doubt that those works were a great credit to their designers and promoters. But the delta of Madras was exceptionally favourable for such works, and could not be held to be a precedent for other parts of India. Had Sir Arthur Cotton and his friends been content with advocating the construction of works under as favourable circumstances as those he constructed in Madras, he would unquestionably have done unmitigated good to India. But, unfortunately, they went



a great deal further, and in all their speeches and statements with reference to the advantages of irrigation, by some curious oversight, those gentlemen had wholly ignored the results of recent experience. Shortly after the Mutiny, great pressure was put upon the Secretary of State to construct irrigation works in Madras by means of a private company. Lord Derby was then Secretary of State for India, and all Lancashire urging him, contrary to the opinion of his Council, he assented to the project and the Madras Irrigation Company was formed. In the prospectus it was represented that the undertaking would be very remunerative, and Sir Arthur Cotton said he would select for execution the work which would, in his judgment, give the best commercial return. In writing to the Indian Government on the scheme, his language was peculiar, considering what the actual results of that company had been. It was stated that when they had secured their plunder, it would be an agreeable task to sit down at their leisure and divide the spoil. It was the actual possession which put everybody in good humour, and the eighty per cent. dividend in the case of the Ganges Company was mentioned. It was further stated that the 'work was composed of distinct parts, each of which formed a complete scheme in itself, and would yield, when executed, its own return independently of the remaining parts.' On the recommendations of so distinguished an authority the Company was constituted with a capital of £1,000,000 sterling, which had been spent without any returns. In consequence of an agitation that was set on foot, the Indian Government was authorised to lend £600,000 to the Company at five per cent. This money also was laid out and no return had been made. Not only so, but the Government had not received any interest; and although they had been paid a small portion of the money so advanced, that Company had never once paid its working expenses. That work ran right through one of the famine districts, and, of course, it did some good; but its most enthusiastic supporter would not say that the crops it had saved were worth a moiety of the expenditure on its construction. It was necessary, therefore, to be cautious in regard to agitation set on foot to put pressure on the Indian Government and to induce it to incur an enormous outlay on undertakings of that character. One of the main points urged on the public was the advantage of cheap water-carriage. No doubt India had a number of magnificent rivers; and of all the



rivers in the south, the first, perhaps, was the Godavari. The Indian Government, yielding to an appeal made to it as to the benefits that would accrue from the improvement of the navigation of that river, sanctioned an expenditure for that object. The expenditure was put at £80,000 and the works went on. Lord Mayo took the Public Works Department under his own particular charge, and having heard of the expenditure on the Godavari, sent down gentlemen to enquire what the amount was. The result was startling: no less than £700,000 had been spent without any return. This improvement was intended for the benefit of the Central Provinces. Mr. Norris had written strongly to deprecate the further continuance of these works and had stated that the question in his mind was whether the Government could utilize the expenditure of the past, the main result of which had been, in many places, nothing more valuable than a rich deposit of thick, black mud. The Indian Government sent home the papers relating to the affair, and the conclusion of their despatch was to the effect that the project had swallowed up £700,000, that the work could not be utilized till an expenditure of at least £900,000 had been incurred, and that the river could not be made navigable for less than £1,200,000. It was evident from the circumstances that complete designs were necessary for every project. Woeful as their failures had been, there was still a worse one. The Indian Government had commissioned Sir Arthur Cotton to inspect the Bay of Mahanuddy and to suggest some scheme for securing the neighbourhood from famine. He advocated the expenditure of £13,500,000, but the Government could not accede to that proposal, and, after some delay, it was resolved that the works should be constructed by a private company. Consequently the Orissa Company was formed, with a capital of £1,000,000; but that proved a failure and the Government took over their works at a very high valuation. They then sent down engineers to revise the estimates and it was found that a sum of £2,700,000 would give a return of sixteen per cent. The Duke of Argyll was informed of this, and the Indian Government had reason to believe the estimate safe and sufficient; but only last August it was necessary to write with reference to the affair that, while in 1871 the outlay had been calculated at £2,700,000 and the profit at sixteen per cent., in 1873 the revised estimate amounted to £4,400,000, and at the present time to £6,208,000,



the estimated receipts being diminished in an even greater proportion. He had mentioned this fact with the idea that it was desirable to know the results of recent experience, and seeing that, except in the delta, these irrigation works had all failed, he thought it was wrong for any one to support a gigantic agitation to force the Government into incurring an enormous expenditure and yet keep back these notorious facts. Especially was he sorry to find that Sir Arthur Cotton had received countenance from such a high quarter as the right hon. gentleman, the member for Birmingham (Mr. John Bright). His eloquence was so great that it seldom failed to influence the public mind. But that made it all the more necessary for public men of such high position to be careful how they too freely endorsed the ideas of speculative engineers. In purely commercial life he felt certain that the right hon. gentleman would not ask the public to embark in any scheme, respecting the success of which he was not absolutely certain. He ought to be equally cautious in lending his help to an agitation for promoting an immense expenditure of money for purposes which it had been proved would be valueless. Caution and prudence were all the more necessary in this case, because the Indian taxpayer was not directly represented in that House; and of all the departments of the State none was so weakly represented, in a financial sense, as the Indian department. Indian questions were, fortunately, outside the area of party politics. The representative of the India Office could not depend upon that support which party organisation afforded to other departments; and whenever any scheme involving increased expenditure was brought forward, all the advocates of increased expenditure of any sort took good care to prime their friends in the House, so that the representative of the Government found many against him and very few in his favour. He was therefore extremely sorry, and it was doubly unfortunate, that at the Manchester meeting the right hon. gentleman should have taken up one of the wildest and rashest of Sir Arthur Cotton's schemes—that, namely, by which it was proposed to construct a number of navigable canals all over India at a cost of £30,000,000. For his own part, he would like to know what might be expected to be the actual and final cost of such a scheme. He (Lord George Hamilton) did not deny that the reputation of Sir Arthur Cotton was deservedly great, but there was another gentleman, Colonel Chesney, well-



versed in such matters, in whose book, to which the right hon. gentleman had alluded, was a passage explaining that the cost of making a canal depended upon the supply of water, the slope of the ground and the drainage of the course. In certain favourable conditions, great canals might be made for a comparatively small sum, and might be navigated cheaply for exactly those reasons which made ocean traffic cheap. But when those favourable conditions were absent, the case wholly changed, and the expenditure on canals was practically indefensible. The best possible way to dispose of Sir Arthur Cotton's ideas would be the appointment of a Select Committee, before whom the advocates of rival opinions could be heard, and their value estimated; but before any committee considered any scheme involving an outlay of £30,000,000, they should first require satisfactory explanations of those past failures to which he had alluded. The recent famine in Madras had, no doubt, directed attention to that part of India, and there were some who thought that much might be done by increasing irrigation in that district to protect it against the recurrence of famine. It had been found by experience that it was no use to construct canals or tanks to prevent drought, which were solely dependent on rainfall for their supply of water. In Madras there were only three rivers, whose sources of supply were independent of the rainfall of Madras and Mysore; and, in the opinions of many competent engineers, it would not be possible to utilise the waters of those rivers to any further considerable extent. Moreover Sir Richard Temple had directed attention to the fact that in the wet lands the famine had been the worst, and he had dwelt on that circumstance in a despatch to Lord Salisbury, concluding by depicting the sheets of water and all the apparatus of irrigation lying useless. From that it was clear, that the construction of tanks or canals, which were not connected with permanent sources would not be sufficient to save the people from famine. In Bengal, the conditions were very different from what they were in Madras, because not only was there a great number of rivers, but the country was flat and the canals were easily constructed. But even in Bengal the results were very remarkable. If he took the total expenditure in Bengal, the result was not altogether unsatisfactory. It appeared, from the last account, that there had been expended about £12,500,000 in Bengal, and the results, including direct and indirect receipts, are a return of $3\frac{1}{2}$ per



cent. on the capital. But the moment this sum was analysed, it was found that this revenue was almost exclusively derived from two canals—the Jumna and the Ganges. The capital expended on these two works was £3,500,000 and the result was $10\frac{1}{2}$ per cent. On the whole remaining expenditure in Bengal, which amounted to £9,500,000 there was only a return of half per cent., and this proved very clearly, what recent experience strongly confirmed, that it mainly depended on physical conditions as well as the rainfall, whether a canal paid or not.

GENERAL SIR GEORGE BALFOUR asked whether the results referred to in connection with the Jumna canal were independent of the old works?

LORD GEORGE HAMILTON replied that the Jumna canal was an extension of the old work, and he doubted very much if the old work was included in the calculation. He believed that was not worth very much. Another circumstance to be borne in mind was that it took twelve or fifteen years for the revenue of a canal to be fully developed. The consequence was that if they were, during that period, to adopt a strictly commercial system of increasing the capital account by compound interest, they would make such a capital account as would prevent almost any irrigation work from making the least return. Altogether, the works which the Government had constructed might be divided into three classes—firstly, those which paid well during ordinary years; secondly, those which would not pay during ordinary years, but which averted famines; and, thirdly, those which would not pay in ordinary years and which would not avert famine. It had been shown that it would be a delusion to rely altogether on irrigation, but, on the other hand, it would be a mistake to ignore the service which it had rendered in the past. One of the main questions which the proposed committee would have to enquire into was, what had been the result of irrigation works, and to obtain from the various officers of the Public Works Department the cause of their failures; also to see whether the principle on which their receipts were estimated was sound or not. It was not worth while to enter into a comparison between railroads and canals, because there was not at present data sufficient to enable any one to draw a comparison between them as to their financial results. In the estimated returns from canals, the whole of the indirect receipts, the enhanced value of the land, etc., as well as the direct



receipts, were included; but in the case of railways that was not done, although there could be no doubt that railways also enhanced the value of the land, and enabled the Indian Government to largely reduce the number of European troops kept in India.

REPLY TO ADVERSE CRITICISM.

The above speech was delivered on January 22, 1878. Sir Arthur saw it in *The Times* the next day. He immediately prepared a reply to the surprising, even astounding, statements made by Lord George Hamilton. This reply was not sent to the newspapers. He knew he could not expect to receive sufficient space in any journal in which to answer the noble lord's strange travesty of facts or indicate the dis-service done to India by the contracted view taken of irrigation projects. Therefore, he addressed his reply to Viscount Cranbrook, Secretary of State for India, and appealed for justice at his hands. The appeal was in vain. Only by the circulation of his own pamphlet, and at his own expense, did he obtain vindication for himself, and for irrigation as the prime need for India. His reply was in these terms :—

With reference to the late debate on India, in which Lord G. Hamilton was pleased to mention my name, as I was not present to reply to him, and the references to me have been published in all the papers, I have the honour to request that the Secretary of State will, in any way that may seem best to him, place before the public the reply which would have been allowed to me if I had been a member of the House, as I conclude, of course, that the Secretary of State would not wish any one to be thus brought before the public without an opportunity of offering his defence as publicly. It is such an acknowledged right in England that every man should be allowed when accused to state his defence, and *that*¹ before the tribunal before which he has been called, that I need not hesitate to

¹ The italics throughout this reply are Sir Arthur Cotton's.



ask for this, which is essential to a just judgment being formed by the tribunal before which I have been called.

Had these charges been made against me merely in an official paper, I should have had no claim beyond a similar official reply, but having been held up before all the world, by a high authority, it will, of course, be allowed that I ought to be permitted a similar mode of reply.

SIR ARTHUR A DISCRIMINATING ADVOCATE OF
IRRIGATION EXTENSION.

His lordship says, "Some twenty years ago there was a strong impression out of doors, that it was only necessary to construct an irrigation works in India and it must necessarily pay. The chief supporter of that view was Sir Arthur Cotton." So directly contrary is this to fact, that one of the main points I continually insisted upon was, that the Ganges Canal was a grand warning against ill-projected works, and I insisted upon the lesson that that work gave us, that great mistakes might be made in such projections, insomuch, that where there were the greatest natural advantages, false projection might cause a comparative failure. His lordship then proceeds to speak in the slightest possible way of the success of the Madras works, in a way that would entirely mislead people as to the actual results, viz., that they had raised Tanjore and Godavari from a very low state to a state of the greatest prosperity (Godavari especially from a state so far below the general low state of the districts at that time, that Sir H. Montgomery was sent as a Special Commissioner to try and raise it from its extreme degradation, to by far the most prosperous state of any district of India), raising the revenue from £400,000 and £230,000 respectively, to £750,000 and £570,000, while the average revenue of all India is £250,000 per district. How completely the public have been misled in this is plainly shown by *The Times* saying, "The Godavari, the Orissa, and the Bengal works have all been more or less failures." Surely such an utterly false statement, gathered from his lordship's speech,



requires an official contradiction. I have no doubt these works are the most profitable engineering works in the world. An expenditure of £700,000 has irrigated seven hundred thousand acres, paying eight shillings an acre for water rate alone, amounting to £280,000 a year or forty per cent., while the total revenue of the district has risen from £230,000 to £570,000 a year, the exports have increased from £60,000 to £800,000, and the imports from £20,000 to £200,000. And this is represented to the world as "more or less a failure." Of these works his lordship says, "*What their actual returns were, it was difficult to say.*"¹

WERE "RECENT RESULTS" EVER IGNORED BY
IRRIGATION ADVOCATES?

Further on, he says, "In all their speeches and statements with respect to irrigation, Sir A. Cotton and his friends, by some curious oversight, had wholly ignored the results of recent experience."

In reply to this, I beg to state that in every paper of mine, without a single exception, I have stated the results of the whole of the new works, and every one of my conclusions is drawn from those whole results. I have continually quoted Mr. Thornton, the head of the railway department of the India Office, as to those returns, in respect of the works actually in operation, as he gave them at the Society of Arts. And to those I have added full statements of those works which, through the refusal of the water by the ryots, are only yet in very partial operation. Not a single work has ever been omitted. Especially have I been particular in entering fully into the cases of the two works in which the water has been refused, because it is most essential that it should be known whether those works have, as yet, made no returns from the failure of the *works*, or the failure of *their management*. Nothing can be more mischievous than to confound these two things. If the

¹ See Appendix B.



works themselves are failures, the money is irrecoverably lost, and the only use we can make of them is not to make similar mistakes in future projects. But, if the failure is in the management, we have only to put them into more effective hands, and they will immediately become, like all the thousands of others, highly profitable.

WHY THE TUNGABUDRA WORKS WERE ONLY
PARTIALLY SUCCESSFUL.

His Lordship then proceeds to speak of the Tungabudra works, and to make me responsible for their results. The answer to this is very simple. Is the man who recommends a work answerable for all that is done in its execution, and its management when executed? If I were answerable for all the management of irrigation works by the revenue authorities, I should indeed have much to answer for. I don't think Watt is answerable for every steam engine that has failed. However, the Tungabudra works were not only a thoroughly good project, as it is clearly proved to any person who will look into the case, but they have been most successfully executed, and are, as works, an unqualified success, that is, they have been executed at a cost that will give most abundant returns, when they are used, and they have been proved thoroughly sound and good in their standing most severe storms without any injury, while the adjoining railway was destroyed for miles, that is, most seriously injured. They have cost £1,500,000, and they distribute four hundred thousand cubic yards per hour for two hundred days per annum, or a total quantity of two thousand million cubic yards. Taking seven per cent for interest and management, they thus cost £105,000 a year, which gives a cost of £1 for twenty thousand cubic yards. The question is, Is this a high price or a low one? The natives are in the habit of raising water from wells in millions of cases all over India, at a cost of about three thousand cubic yards per £1, or seven times this cost, and this they willingly pay for well water, entirely without the rich manure contained in river water. Again, the



Government charge in this district for tank water, very inferior to river water, is about ten rupees an acre, that is for about six thousand cubic yards, or at the rate of £1 for six thousand cubic yards, three times the cost of this rich river water. This is perfectly conclusive as to the success of the works, as works. Their failure, therefore, consists solely in the management. Those who have had the charge of the sale of the water have not been clever enough to sell at six rupees per acre what was worth certainly seven times as much, for it is most certain that the natives all over India would not go on raising filtered water from wells at three thousand cubic yards per £1, if it were not worth it. The fact is that the revenue officers, into whose hands the authorities have committed the sale of the water, have entirely failed. We have no proof that the Company, if they had been allowed to manage their own affairs, as every Company in England is, would not have had tact enough to persuade the ryots to take water at one-seventh of its value. Why should not this be tried? These are the things that so effectually keep British capital out of India, and are the reason why British capitalists will readily invest hundreds of millions in America, Turkey, Spain, rather than in our own dominions. This is why India is perishing for want of British capital, while Turkey is carrying on war at our expense. I have spoken only of the value of the water in ordinary years, but who can estimate its value in such a year as the past? In the Company's reports, their effects are thus spoken of: "The value of the crop created by the canal cannot be estimated more nearly than at a million sterling." The whole cost of the works was one and a half millions; thus two-thirds of the whole cost was repaid by a single partial crop, for only one hundred thousand acres were irrigated? Again, in January of this year, 1877, the overseer reports: "The white cholum is magnificent. I have never seen finer crops of this grain. The ears were so full and the plants so thick that they were touching each other." Again, "The average yield per acre is two putties, sold recently at £2 16s. per putty, and the



MISMANAGEMENT OF REVENUE OFFICERS 229

straw is almost half as valuable as the grain." Thus the value of the crop was £14, or twenty-four times the year's water-rate. All this in the midst of the terrible desert produced by the drought. One would suppose that to decry such inconceivably important works would be impossible to anybody, and that the only anxiety would be to discover what could be the mistake through which they were rendered even for a time partially useless. Is it possible that the whole Civil Service cannot produce one member with the very moderate tact and talent that would enable him to get over difficulties which have certainly never yet been got over, but this is simply because they have never occurred or been dreamt of in the whole Presidency before in the tens of thousands of irrigation works that are now in operation and have been in operation for thousands of years?

And if such talent cannot at present be found in the Civil Service, surely it would be better to let the Directors of the Irrigation Company search the world for such a man, rather than let the Government and the ryots continue without such inestimable benefits. How strange it seems that it should never have occurred to any of the officials that there must surely be some prodigious mistake, that a thing should occur which has never been heard of in the whole Presidency before. If the whole of this water were used, it would irrigate three hundred thousand acres of rice, producing one hundred and fifty thousand tons, worth £900,000, or sixty per cent. on the cost besides the straw and the cheap transit on some three hundred miles of canal. And the returns to the Company would be, at twelve shillings per acre, £200,000, or fourteen per cent. besides canal tolls. And this supposes the whole of the water is used for rice, whereas it would go much farther if used for wheat and other dry grains. Thus, the temporary failure of this one work out of the thousands of Madras works, solely through mis-management of the revenue officers, is charged upon the Engineers, who up to the point beyond which they were not allowed to interfere,



have been eminently and perfectly successful, the revenue officers themselves being the judges.

I must dwell upon this point. If this refusal of the water in one single instance out of the thousands of the Madras irrigation works, new and old, a thing never heard of or thought of before, (I have been all my life employed on these works, and, without exception, always found the natives ten times more eager to get the water than we were to give it to them), if this is represented as the general case, and again, if the failure of these works to afford returns is represented as a failure of the works themselves, in any way, instead of solely the failure in the management, so that at any moment under intelligent management they must inevitably become as profitable as all the other irrigation works in this presidency, without exception; if these things are asserted the whole case is essentially falsified and all our conclusions and proceedings must be utterly wrong.

THE DELTA WORKS IN NORTHERN AND SOUTHERN MADRAS.

To return to the delta works so slightly noticed by the Under Secretary of State, and stated to be more or less failures by *The Times*, what is said of them by others? Mr. Monier Williams, in his letter to *The Times*, giving an account of his tour through the famine districts, says: "All the belts of land reached by the grand system of irrigation which stretches between the Godavari, Kistna, and Cauveri rivers (fertilizing the soil wherever it reaches, and forcing even the haters of English rule to admit that no other raj ever conferred on India such benefits), present a marvellous contrast to the arid tracts which meet the traveller by the Peninsula, Madras, and South India railways." Not a word to this purport has been said either in the Under Secretary's speech, or in any other, on the subject of the famine. From all the accounts of the famine given officially, the public are left in total ignorance of the immeasurable benefits conferred on the presidency by these



most beneficent works, but for which the Government would have been overwhelmed. For if, instead of these districts supplying hundreds of thousands of tons of food to their neighbouring tracts, they had added five millions of starving people to the dependents on relief, it is most certain that the Government could not possibly have met the difficulty. The omission of this great fact, therefore, from the reports of the famine quite falsifies the accounts. And the following is the description of these works by the ryots, who are living in immediate contact with, and partaking in the benefits of the works. The ryots of Trichinopoly, on the 13th of November last, thus addressed the Governor: "It was here, in Trichinopoly, that the earliest triumph of hydraulic science was achieved by Captain Cotton. Taking the idea probably from the grand anicut, a most remarkable work of remote times, and a monument of untutored native engineering skill, Captain Cotton conceived and carried out the bold design of controlling the Coleroon by a gigantic dam of masonry, so as to arrest the drying up of the Cauveri, which became imminent year by year. The successful result of the upper and lower anicuts of the Coleroon emboldened that engineer to bridle the Godavari, a river five miles wide at the chosen point, in a similar way and with still more magnificent results. Thenceforward this system of deltaic irrigation has been applied to the Kistna and Pennair, and to the rivers of other presidencies—the Mahanudi in Bengal, the Ganges canal in the Doab, and the Sone in Bengal; all which works have converted *the tracts affected into scenes of matchless fertility and wealth, and have for ever protected them and neighbouring provinces from the disaster of recurring drought.*" This is the way in which the parties most intimately concerned speak of them. These ryots then proceed to press upon the Governor the execution of six extensive projects, which they define, in that one district of Trichinopoly. For one of these they state that they had themselves, years before, subscribed money. In the face of these things the public are led to suppose that the



general opposition of the ryots to water is an insuperable difficulty, though the Government are anxious to supply it to them. The ryots conclude by saying: "All these projects will in their humble estimation *bring fertility and wealth to tracts now too frequently exposed to droughts, and which suffered but too severely during the present famine.*" I am persuaded that the English public generally have not the least idea of the true state of the case, either as respects the results of these works or the feelings of the natives about them, or rather that their notions of these are directly contrary to the truth, so completely are they misinformed on the subject.

His lordship then reproves Mr. Bright "for endorsing the speculative ideas of enthusiastic engineers"; these speculations consist exclusively of statements taken from the Blue Books of the actual results of all the works of irrigation, not omitting one, constructed by our Government, illustrated by fifty years of the most thorough practical experience in almost all parts of India. In no single instance is anything in the way of a conclusion stated without the support of facts and figures from the India Office.

THE PROPOSED NAVIGATION CANALS THROUGHOUT INDIA.

His lordship then speaks of "the wildest and rashest of all Sir A. Cotton's schemes," viz. :—to construct navigation canals throughout India, at a cost of thirty millions. But not one word is said to show in what respect this proposition is wild and rash.

In proposing this scheme, I give the most complete data by which anybody can judge of the case, but I may begin my reply to this charge by showing in what good company I am in recommending canals for navigation. Lord Mayo had actually begun a canal by the side of the East India railway for one hundred miles to Ranigunj, and when he stopped it, he said, "Should the discovery of coal at Midnapur result in a coalfield equal to Ranigunj, one of



RAILWAY CARRYING POWERS INSUFFICIENT 233

the principal objects of the Damuda canal will no longer exist, because the coal would be carried by the Midnapur canal to Calcutta." *But when it was reported to Lord Mayo that on the removal of the contractor who had charge of the boring, no more coal appeared, the Damuda canal was not resumed.* Thus Lord Mayo first discovered that a canal was essential where £25,000 a mile had been spent upon a railway, after twenty years' trial. And, of course, if a canal was wanted for coal, it was wanted also for ninety-nine hundredths of the traffic, all of which, like coal, require cheapness and not speed. Next, we have the late Bengal Government, which says in its last administration report—that for '75-6—speaking of the communication between the Hooghly and the Ganges, "Although some portion of the traffic is taken off by the railways, still the greater portion follows the water highways, notwithstanding they are so tortuous as to be lengthened out to an excessive distance. It is calculated that a boat plying between Eastern Bengal and Calcutta, travels some two hundred or three hundred miles more than it would if there were anything like a straight route by water. *The obvious remedy will be to construct a canal for navigation across the country from Eastern Bengal to Calcutta.*" And, thirdly, I must quote the present head railway engineer of India, Mr. Leslie, who as soon as he had finished the extension of the East India railway to Goalundo, the confluence of the Ganges and Burhamputra, wrote a letter to the Calcutta merchants, in which he said, "The fact that the railway company has been in the field twelve years, and has literally acquired only a tithe of the traffic, is an unanswerable argument in favour of the canal. The present eastern traffic is one million nine hundred thousand tons per annum, and it is rapidly increasing. A toll of half a crown on this traffic alone would yield a return of £240,000, sufficient to pay all expenses of working and maintenance, and yield a return of eleven per cent. on the capital outlay of £2,000,000. The western traffic would *probably double the receipts*; at the rate of cost of three shillings and sixpence



a ton for tolls and carriage, there would be a saving on the eastern traffic alone of £840,000 a year, as respects the present cost by rail, steamer, and boat." Thus, another *rash* and *wild* engineer calculates that on a line on which £4,000,000 have been spent on a railway (which has been tried for twelve years), if £2,000,000 are spent on a canal, there would be a return on the eastern and western traffic together of twenty-two per cent., and a saving to Calcutta of £1,750,000 a year, on a line of only one hundred and thirty miles direct distance. And this on the present traffic alone, which is rapidly increasing, without the enormous stimulus that such a great reduction of time and freight would cause. Boats, which carry by far the greater part of the traffic, take six weeks to accomplish the four hundred and twenty miles by the rivers. Now we cannot certainly imagine either Lord Mayo, the late Bengal Government, or the head railway engineer, very violently biassed in favour of canals against their own children—the railways—and if they were, the simple figures given by Mr. Leslie are quite decisive to anybody. Since I was ordered to project a work on this line in 1858, when I recommended a canal, at least £20,000,000 have been lost, besides £4,000,000 spent on the railway in cost and debt. This will give some idea *why India is still a poor country*. If by the grievous mistakes that have been made, £24,000,000 have been thrown away on a line of one hundred and thirty miles, what must be the loss on all India for want of cheap transit, and this leaves out of the calculation nine-tenths of the results in the immense traffic that would be created by such effective transit. Of course, what is thus declared to be necessary and practicable on these two lines running out of Calcutta, is equally applicable to all the main lines through similar country. It will be thus seen that there is more than one *rash* and *wild* man connected with India.

CANALS RUNNING PARALLEL WITH RAILWAYS.

There is not the smallest room for question as to the canals being as advisable by the side of the railways after



the first hundred miles, as they are for those hundred miles where the face of the country is suitable for canals. Now let us consider what these conclusions imply, to which Lord Mayo, Sir Richard Temple, and the other members of the Indian Government, and the head railway engineer have come. If £1,750,000 a year are lost on the present traffic for want of a steamboat canal between the Hooghly and the Ganges, there cannot be less than three millions a year lost on the three lines out of Calcutta, the Northern, the Western, and the South-Western, on the present traffic alone; consequently, during the thirty years that the railways have been on hand, the loss within one hundred and thirty miles of Calcutta could not have been less than £70,000,000 on the actual traffic, besides the loss from want of the traffic that would have been created. So we are quite safe in saying that £100,000,000 have been lost for want of canals within one hundred and thirty miles of Calcutta, while the railways have been in operation almost all that time. What, then, has been the loss during that same time on all the ten thousand miles of main road that India requires? Certainly *several hundred millions*. Most certainly, if this is well considered, one way of increasing the wealth of India is most palpable and certain. Nobody can answer this argument for cheap transit, based upon the statements and conclusions of the committed railway men themselves.

THE GODAVARI NAVIGATION.

His lordship next proceeds to speak of the Godavari navigation. He says that the estimate was put at £80,000. A first rough estimate was £300,000. But this was not in the ordinary sense of the word an estimate. It was a mere rough guess, preparatory to the formation of an estimate in detail. The remarkable thing is that it has turned out perfectly correct, for it is now certain from what has been expended and effected, that if that sum had been granted at the time it was named, twenty-five years ago, it would have been amply sufficient. But the history of the work is



perhaps the most perfect specimen of how not to do a thing, that could be found. Instead of providing £100,000 a year for three years, as any private company would have done, uncertain sums were given from year to year, for twenty years, sometimes more, sometimes less, sometimes none, so that the Engineer never knew what he had to expect. Two or three times the works were suddenly stopped without notice, and the workpeople, who had been collected from great distances, most unjustly dispersed without remuneration, till all confidence was lost, and it was only by very high pay that the people could be collected again. On one occasion the Engineer was compelled to send away the workmen to save them from starving on the spot. Thus the work was spun out for more than twenty years, till the value of money had fallen to half what it was when the work was proposed, and the invaluable time of the most talented and devoted Engineer that India ever had, Colonel Haig, was in a great measure thrown away, and the work cost more than double what it need have done. When an Engineer recommends a work, is he to suppose that such imbecility is to be exhibited in the carrying it out? He necessarily supposes that it will be conducted with ordinary judgment and diligence. But, further, as to the actual cost notwithstanding this astonishing management: his Lordship states that it was £700,000, but *not a word was said as to what was accomplished for this sum*. How can we judge whether money is well spent or not, unless we are told what we get for it? Now the fact is that this sum very nearly completed the works at the Second Barrier, which would have given four hundred miles of navigation, or at the rate of £2,000 a mile. *Now was it no part of the question whether £2,000 a mile for river navigation would be dear or cheap?* A railway has cost from £25,000 a mile to £9,000, and the average charge is one penny per ton, while the cost on the river is one half-penny per ton, in its present condition, but it might, at a very small expense, be further greatly improved by storing water. It must be stated, however, that, without this stored



water, it would only be navigable for seven or eight months in the year, but it would still be a communication of immense value. The Erie Canal in the States is only open seven months in the year, and it conveys four million tons. Had his lordship stated that this navigation would have cost one-tenth of what the great railways have cost, and have carried at half their charge, it might have considerably affected the judgment of the public as to whether it was a wise expenditure or not. The fact is, that it was one of the most profitable undertakings in India, if the works had been completed. It would have laid open the whole district of Nagpur, etc., to the world, whereas it is now paralyzed, solely by being cut off, and isolated by the expense of land carriage.¹ Nothing in the world in the way of internal arrangements will avail to raise this vast tract of Central India from its present state, till it is put within reach of the coast districts and of the world's markets. When Australia was in a state of utter insolvency, and sheep were selling for two shillings each, some clever man discovered that, by converting them into tallow, he could get over the difficulties of carriage, and give them value in the London market; instantly they became of the value of eight shillings each, and Australia entered upon a career of prosperity which has never since been checked, *all having hung upon the cost of transport to foreign markets*. And the same will be the case when Central India can send her excellent cotton, oilseeds, wheat, etc., to the coast at practicable rates, and can receive in return the salt and rice of the coast, and the manufactures of England. At this moment a very small sum is wanted to complete these most essential works, and all Central India *is waiting and must wait till it is done*.

THE ORISSA AND TUNGABUDRA WORKS.

His lordship then goes on to speak of the Orissa works, which is a similar case to that of the Tungabudra, except that it is greatly aggravated there by the dreadful zemind-

¹ See Appendix D.



ari system. The success of the works there also is complete, as works. The failure is solely in the refusal of the water, through the inconceivable evils of the revenue management. The works have cost about £3 an acre, including the navigation, the traffic on which is so great already, that it alone, without irrigation, promises to go far towards paying the interest of the cost. But here, too, we are met with the same sort of false economy which has ruined so many schemes. The navigation between Calcutta and Cuttack has a gap of eighty miles unexecuted, which, of course, keeps the traffic at about a fifth of what it ought to be. What can stand against such a system as this? What would have become of the railways if gaps of eighty miles had been left in them? There is no doubt that the zemindari system is a most terrible difficulty in the way of these works, but I am quite certain that energetic and intelligent men will find their way out of all difficulties there also. But, to represent the present failure of these works to yield returns, as if it were the fault of the works, instead of their management, falsifies the case. When the natives there are asked why they do not use the water, they have often said: "What is the use of it, when, if there is any profit, half of it will go to the money lenders, and the other half to the zemindars?" Of course nothing in the world can stand against such a state of things, but we are surely perfectly justified in hoping that some day some Governor of tact and faithfulness will be found, who will set these things to rights. Some notion of the inconceivable state of things there, may be formed from the following extract from the report of the native deputy superintendent of canals in Midnapur for 1877. "But the most patent cause about the gradual decline of the area leased is the indebtedness of the ryots. They are involved over head and ears, and it is a matter of infinite regret, that their debts are increasing as their connection with government irrigation is growing older. Excepting during the year under review, the canal irrigation has always increased the yield by from 240 to 400 lbs.," (worth about eight shillings,) "but the



irrigators are not in a condition to benefit by it; all they obtain from the fields goes *punctually to fill the coffers of the Mahajuns*. They have finally to borrow the money to pay the water rate. The increase of *the crop is sure to prove more than enough for the purpose*, if reserved for the liquidation of the government debt; but no notice is taken of it, and when the irrigator is forced to pay for the irrigation of his land, he blames the canal for the increase of his debt."¹ Such is the state of things, and then the engineers are charged with the failure of the returns. If such a state of things had existed in Madras, the works there, which have yielded fifteen, twenty-one, and eighty-seven per cent, would have as completely failed. On the other hand, the chief engineer says, in his last report, "The returns show a considerable increase of irrigation in Orissa, attributable partly to the deficient rainfall, and partly to a growing appreciation on the part of the cultivators of the value of the canal water in all seasons." We may thus fairly conclude that here also these difficulties will be got over. But nothing can justify the representing of the difficulties which have occurred in these two instances of Orissa and the Tumbudra as if they were generally the case, because it is entirely contrary to the truth.

HAVE ALL THE SOURCES OF IRRIGATION BEEN TAPPED.

Again, his lordship says: "It had been found from experience in Madras that tanks and canals could not be constructed so as to be solely dependent on rainfall, and, in the opinion of many competent Engineers, the waters of the three rivers of Madras could not be much further utilized." It really seems inconceivable that such things could be uttered. We take out of the Godavari 8,000,000,000 of cubic yards, and it discharges about 200,000,000,000 or twenty-five times as much, sufficient to irrigate 30,000,000 acres of rice, and four times as much of dry grains. Out of the Kistna we do not take a fiftieth part. What can be

¹ See Appendix C.



the use of making such statements? In Madras five million acres are irrigated. There is water enough in the rivers to irrigate 100,000,000 acres. But, with respect to the tanks. In the first place only a very few of them are in thorough repair. Then, by far the greatest part of them could be enlarged, and thousands of them supplied from the never-failing rivers. A recent *Friend of India* says: "A native Revenue officer of the Madras Presidency of twenty-six years' standing, Mr. Pillaymootoo Pillay, who has been eleven years in charge of three taluks of North Arcot, tells us, though he witnessed the famines of 1846 and 1866, he has seen no famine before like that he has just passed through." In reply to the question,—“What, in your opinion, is the best way of meeting the difficulty of bad seasons?” Mr. Pillay said: “We ought to increase the supply of water to the cultivator to enable him to grow more crops; for this the tanks must be strengthened. *They must be kept always in good condition.* We must also dig wells widely over the country. In ordinary years we shall be able to grow two crops, and the grain stored would be greater. In this district there are two large tanks. The water has been flowing from these for long past periods, and giving water to the neighbouring lands. This year owing to the water famine, they were dry. They were never so at any previous time. They were built under former rulers, and under our rule were improved. Dams are now constructed so that these tanks are now fed from the Pallaur river. However, as there were no floods in the Pallaur in 1875 and 1876, this led to these tanks becoming dry. By strengthening these tanks and making them capable of growing two crops in ordinary seasons, the stocks of one and a half years could be increased to two and a half. Not only the large tanks but the small ones can be made to hold water enough so as to raise two crops.” The fact is that the neglect of these noble native works has been one of the most grievous and most astonishing defects in our government. One of the very first things to be done is thoroughly to examine into the state of all these



works, and first, to enlarge them, second, to provide them with ample waste weirs in which they are generally defective, and, lastly, to plan works for filling them from the great rivers that never fail, for, at present, very few of them are so supplied, while thousands can be. Nothing has been more astonishing than the neglect of these essential works by the Civil Service generally. In the last report of the Presidency, of eight hundred pages, no account whatever is given of these works, as if they were matters of no sort of importance, while almost everything else in the Presidency, however insignificant, is given in great detail.

SINGULAR STATEMENTS REQUIRING EXPLANATION.

His lordship goes on to say: "Moreover, Sir Richard Temple had directed attention to the fact that in the wet lands the famine had been the worst." What in the world can this mean? As if famine could be aggravated by water!

He adds: "It was clear that the construction of tanks and canals which were not connected with permanent sources, was not sufficient to preserve the people from famine." Then why were they not so connected wherever it was possible? What has been done about this? Nothing. This is one of the grievous defects in our Government, and then it is made an excuse for doing nothing. What can be a greater contrast than the way in which these tanks are spoken of by the Under Secretary of State and those in which the same works are mentioned by the Trichinopoly ryots and the Arcot tahsildar?

His lordship then makes a number of statements as to the returns of the Irrigation works and the Railways. As to the Irrigation works, Mr. Thornton has given a statement *in figures* of the whole results of the new works in operation. We cannot suppose that an India Office man would be biassed to overstate these results. He states that the lowest return, even adding to the cost what he supposes had been spent on some of the works before we took them in hand, was four and three-quarters, and the highest forty



per cent., and the average, seven and a half per cent. This is direct returns. He gives no report of the change in the districts where the works are, and only speaks of the effects in ordinary years ; to which he says must be added the enormous increase in prosperity of the people and the incalculable effects in a year of failure of the season. He says also nothing of the prodigious effects of the cheap transit. But if we put together the accounts of two India Office men respecting the direct returns from irrigation and the statements of official men, which I have given before respecting the effects of transit by canals, we shall certainly arrive at conclusions diametrically opposed to those in his lordship's speech ; that is, that notwithstanding the temporary failure of two works owing to the refusal of the water, arising solely from the shocking state of the revenue management of the districts, there is a vast surplus in the treasury from the irrigation works and a far greater saving to the people. The Godavari works alone have, since 1846, when they were begun, raised the revenue by £350,000 a year, or an average about £175,000 for thirty years, amounting to £5,250,000 against £700,000 which they cost and three per cent. for repairs, etc., or ninety per cent. on half the cost, equal together to £300,000, leaving a clear gain of £4,000,000 besides the accumulation of interest. And this is without reckoning the prodigious saving of life, revenue, and property in all the famines that have occurred.¹ And the results of the Railways in point of direct returns are £4,500,000 upon an actual outlay on works and lands of £116,000,000, with an accumulated debt of £45,000,000, being four per cent. on the cost and three per cent. on the cost and debt, leaving a loss on the cost and debt together of £3,000,000 a year, for the total charge upon the Treasury is five per cent. on £94,000,000, the share capital, and four per cent. on the remaining £67,000,000, or £7,500,000.

¹ See Appendix B.