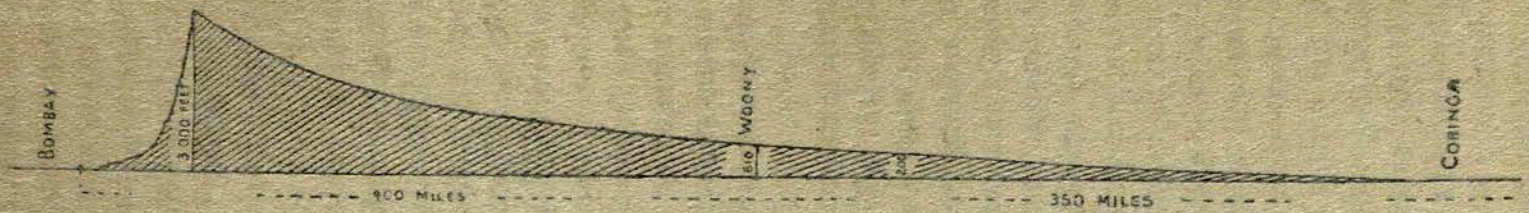
But the railways expect to be able to carry goods at twopence-halfpenny per ton, which for four hundred miles would be £4, or two-thirds of what it is now, in which case £8,000,000 more must be placed against the railway, making the expenditure on that line £23,000,000, against £1,700,000 by the river; or thirteen times as much as the latter. Even allowing the railway to be worked for nothing, there would be a difference of £12,000,000.

"Does this admit of an answer?" asks Mr. J. Bruce Norton, in his letter to the Secretary of the Board of Control. He proceeds: "Yet we find that with a natural slope from Berar to the eastern coast, and a river, which has now been proved to be easily navigable, leading down to the smooth-water harbour at Coringa, every argument has been used to drive traffic westward. Indeed, it has been throughout *assumed* that Bombay was the only feasible route by which to convey the cotton of Berar to England; and this, notwithstanding the whole country slopes *up* westward, so that the railway would have to be ascending an inclined plain until it reached a wall of ghâts, up which it must be forced two thousand four hundred feet in order to be dropped three thousand feet on the other side, into the waters of Bombay! Can anything be more conclusive than this?" Yes, says Colonel Cotton, *This*—and sketches on the margin of proof-sheet the following diagram, which I take the liberty of transferring, as it graphically, succinctly, and conclusively, tells the whole story, and embraces the whole question.

Finally, remarked Sir Arthur, if we could have a shipload of directors, Manchester merchants, Indian reformers, and others interested in this matter landed at Bombay, carried twenty miles by railway, and then on horses and in palanquins three hundred miles to the Wurda, a journey of from eight to twenty days at an expense of £10 each; and, on arriving there, placed on a steamer and floated down to Coringa in thirty or forty hours, for two shillings each, then they would probably return to England with a more correct notion of the real state of the case: parti-



Horizontal Scale, 100 miles = 715 inch. Vertical Scale, 3,000 feet = 68 inch.

RAILWAY.

Ascent	2,390 feet.
Descent	3,000 „

Cost: 400 miles × Rs. 70,000 per mile = £2,800,000.
Time for construction: About twenty years.
Charge, per ton, for transit, according to Mr. Chapman's estimate: 400 m. × 2¼*d.* per m. = 75*s.*
Probable actual charge, at ¾*d.* per ton: 25*s.*

CANAL.

Ascent	350 feet.
Descent	610 „

River navigable at present for six months in the year.
Cost of improving river for steam navigation throughout the year: 350 m. × Rs. 1,000 = £350,000.
Time required: Two years.
Cost, per ton: 350 m. × ¼*d.* = 7*s.* 3½*d.*

cularly as, on the way up, they would have met thousands of worn-out bullocks and drivers carrying cotton at the rate of ten miles a day and at a cost of £6 a ton, whilst on the boats in which they descended the river there would probably be one hundred tons of cotton on freight at 10*s.* a ton. Reaching the end of the railway after a journey of twenty miles, when it had already been two years in progress, and then seeing the frowning ghâts immediately above them, would also be a highly instructive circumstance, which would tend greatly to clear their sight; and there would also be plenty of time for true impressions to be received on their long weary journey of ten or twenty days to the Wurda through a country without roads and across rivers without bridges. What a lively idea they would have of the advantage of inland steam communication long before they reached the Wurda, and with what entire satisfaction would they resign themselves to the sofas in the steamers, and consider themselves as good as at their journey's end.

Surely it cannot be that this record of a life's work and teachings will fail, once the tremendous significance of that work and those teachings is realised, to become instrumental in arousing public attention and lead to the adoption of drastic measures of reform. When we remember the many, many, years during which Sir Arthur laboured, apparently with little result, for a widespread adoption of irrigation, and with no result at all, so far as stopping the extension of railways was concerned, we, not unnaturally, feel intensely anxious as to whether that which will be adequate will be done at once, and before it is too late. At the same time when we call to mind the obstacles with which Sir Arthur had to contend nearly eighty years ago we again begin to be hopeful. For, be it remembered, there is now enough of successful irrigation in India to constitute an object lesson, the teachings of which cannot be mistaken. May we not urge that there is no duty, on its intrinsic merits, which so loudly calls for earnest

effort in the United Kingdom as the redemption of Indian daily needs by the adoption of such proposals as Sir Arthur advocated to the last moment of his singularly prolonged life?

Who, in the good Providence of God, will be raised up to carry on this needed work? That which has to be done, it is rightly said, is worthy of the amplest and most elaborate study in every aspect and in all detail. First of all, trustworthy knowledge is required. It would greatly help forward irrigation extension if a succinct history of each scheme, describing and explaining all its failures and all its successes, and depicting its present condition in a clear forcible way, were prepared. "These," says one who himself gave much study to the subject, "should be grouped into systems, their likenesses and differences noted, and the principles which they illustrate set forth, so that even laymen might read and understand, while professional men would acquire fresh evidence and suggestions for new developments of their work. An opportunity remains for the writing, by a competent literary man and engineer, of a book which would be a manual of construction, for many years to come, of the greatest value to the colonies. If complete, it would at the same time offer, to the outer world, the best justification for British supremacy in India, and the best evidence from facts and actions, of the large-minded generosity and courage of its rule." [1]

[1] The author quote from was writing for the Australian colonies, and, consequently, applied his argument to the needs of Australasia. As to the justification the record would afford for British supremacy in India, a hundred times yes—so far as irrigation has been undertaken. But, in view of what needs yet to be done, it is more important we should consider the opportunities we have omitted to turn to account than that we should indulge in self-gratulation. In the presence of ever-increasing starving multitudes in India, it ill-beseemeth us to make boast of our "large-minded generosity and courage"—at the financial risk of India always, be it borne in mind.

Appendices

I.

THE GOVERNOR-GENERAL OF INDIA ON IRRIGATION EXTENSION.

During the Budget Debate, in the Viceregal Council, towards the end of March, 1900, His Excellency Lord Curzon thus expressed himself on this important subject :—

"The second suggestion that is frequently made to me, I admit as a rule from the outside of India, where I am afraid that a good deal of ignorance of the actual position prevails, is that the obvious method to stop famines is to introduce irrigation. Some of these writers seem to plume themselves upon the originality of the idea, and to be unaware that such a thing as irrigation has ever been heard of in India, or has been so much as attempted here. They do not seem to realise that irrigation has been going on in India for quite a considerable number of years, that about nineteen millions[1] of acres in India are already under irrigation, and that upon the works so undertaken has been spent a capital outlay of no less than £25,500,000. Worthy people write me letters, based upon the hypothesis that any Indian river which ultimately discharges its waters into the sea is really so much

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[1] It is difficult to understand what His Excellency means in giving this figure. The total area irrigated in India, one harvest, is 30,418,454 acres—for both harvests 33,124,322. At first, I thought Lord Curzon referred to Government Canal Irrigation, but that does not seem to have been the case. The details of the thirty and a half millions are interesting :—

	Acres.
By Canal :	
Government	11,736,755
Private	1,398,432
By Tanks	4,671,195
By Wells	11,328,323
Otherwise	1,283,479
Total	30,418,454
Under second harvest	2,705,868
Acres	33,124,322

(From *Statistical Abstract of British India*, 1898–99, p. 149).

agricultural wealth gone astray, which somehow or other the Government of India ought to have got hold of at an earlier stage, and turned into crops and gardens. Now I have had a very careful estimate made out for me of the extent of fresh ground in the whole of India which we are likely to be able to bring under cultivation, either by new irrigation projects, or by extensions of existing systems. Under the head of Productive works, *i.e.* works which may be expected to yield a net revenue that will more than cover the interest on the capital outlay, the estimated increment is about 3½ million acres, and the estimated outlay between eight and nine millions sterling. Under the head of Protective works, *i.e.* works which will not pay, and which, inasmuch as they constitute a permanent financial burden on the State, can only be undertaken in exceptional cases, and then, as a rule, do very little towards the prevention of famine, we contemplate spending about ten lakhs a year, and shall probably in this way about double the area of 300,000 acres which is covered by that character of work at the present time. It seems, therefore, that the total practicable increase to the irrigable area of India under both heads will not amount to much more than 4,000,000 acres. This increase will, of course, be of value in its addition to the total food-supply of the country, in the employment of labour thereby given, and in its effect upon prices in time of famine. But I am afraid that it cannot be expected to secure immunity from drought to districts now liable to famine, or to help directly their suffering inhabitants. Indeed, when a desert tract is brought under cultivation, a stimulus is given to the growth of population, and more mouths have in time to be fed. The fact remains that the majority of the irrigation works that were most feasible, or most urgently required as protective measures against famine, have now been carried out, and that there is not in irrigation that prospect of quite indefinite expansion with which the popular idea sometimes credits it. At the same time, I am so much in agreement with the general proposition, which has received a good deal of support from many quarters in the course of the present debate, that irrigation should be encouraged, both because of the extension thereby given to the growth of food-supplies in this country, and because, in the case of what are known as Productive works, of the extraordinarily remunerative character of the capital outlay, that I have inau-

gurated, since I came to India, a definite and, as I hope, a permanent extension (so long as we can find the works to undertake) of our irrigation programme. In my predecessor's time, the annual irrigation grant amounted to 75 lakhs. Last year I persuaded Sir James Westland to increase this; and, in the financial year just expired, we have spent 90 lakhs, some of it being directly applied to the provision of labour in famine districts; while, during the forthcoming year, in spite of the general curtailment of our programme owing to famine, I have prevailed upon Mr. Dawkins to fix the irrigation grant at 100 lakhs, or one crore of rupees. I am hopeful that generosity in this respect will not be a misplaced virtue, either in the direct returns that it will bring in or in its general effect upon the prosperity of the country. For the reasons that I have named, I doubt whether irrigation can continue to do as much in the future as it has done in the past, owing to the gradual exhaustion of the majority of the big schemes. Still, even if our sphere of action is less grandiose and spacious than in bygone days, I believe that for a long time to come, and certainly during my day, we shall find more than enough to occupy our funds with smaller and less ambitious designs."

II.

SIR RICHARD TEMPLE ON IRRIGATION DONE AND TO BE DONE.[1]

Canals have been proposed or projected in general terms or designed more or less in detail, but not yet undertaken, to be derived from the following rivers,—

The Chenab in the Punjab,

The Sarda in Oudh,

The Gandak in Behar,

The lower part of the Pennar on the east coast north of Madras,

The Periyar stream which issues from the Travancore mountains near Madura in the southern peninsula,

The lower part of the Tapti, on the west coast, north of Bombay,

[1] Extracts from *India in* 1880, by Sir Richard Temple, pp. 252, 253, and 254.

The lower part of the Nerbudda in the same quarter,
The Wardha, the Wynganga, and lesser streams in the province of Nagpur,
The upper course of the Mahanudi in the eastern extremity of the Central Provinces,
The Chambal in Central India,
The Betwa and the Kene in Bundelkhand, and
The Jumna to carry off surplus water of the rainy season towards the arid tracts east of the Sutlej.

Artificial lakes and several canals, greater or smaller, have been projected in the Deccan districts of the Bombay Presidency, which works have, however, not yet been undertaken. There are, probably, other projects or proposals in different parts of India, for thoughtful officers are constantly busying themselves with plans, whereby the drought so much dreaded in most parts of the empire may be averted.

From this review it will be apparent that the following great rivers have by the British Government been placed under contribution more or less, for the fertilization of provinces or districts in India,—

The Ganges,
The Jumna,
The Sone in Behar,
The Sutlej,
The Ravi in the Punjab,
The Indus,
The lower part of the Mahanudi and some lesser streams in Orissa,
The lower part of the Godavari on the east coast,
The lower part of the Kistna or Krishna,
The Cauveri and Coleroon in the southern peninsula,
The Tunga-badra or Tumbadra in the Deccan,
The upper courses of the Kistna and the Tapti,

and many other lesser rivers and streams, for the formation of artificial lakes, which it would be tedious to enumerate.

The following rivers are known to be capable of affording water for irrigation, but remain yet to be dealt with for this purpose,—

The Gandak in Behar,
The Sarda in Oudh,

The Chenab in the Punjab,
The lesser rivers in Orissa,
The lower part of the Pennar near Madras,
The Periyar river near Madura,
The lower part of the Tapti on the west coast near Bombay,
The lower part of the Nerbudda on the same coast,
The several rivers in the Nagpur province,
The Chambal in Central India,
The Betwa and the Kene in Bundelkhand,

and many other lesser rivers and streams for the formation of reservoirs for irrigation in the Deccan districts of the Bombay Presidency. The only remaining rivers of note are the Jhelum in the Punjab, from which a canal might perhaps be taken; some smaller rivers which flow through Native States, and of which the capabilities are now known; the rivers in the humid regions of lower Bengal, where it is drainage that is wanted rather than irrigation; and the Brahmaputra river and its affluents, the Megna and others, which are not likely ever to supply canals for irrigation.

III.

HOW THE WATER WAS WASTED DURING THE '77 FAMINE.

Even the rain which fell was a source of disquiet, so much of it was wasted. After such a crisis as had been passed through, and with much suffering still to come, arising from the want of water, the least that might have been expected would be that, when the rain did come, it would not be permitted to run to waste. Yet on the day the rains ceased, and for many days after, lamentations were upon almost every lip, as millions of gallons of water were seen to flow away entirely unused, much of which might, and ought, to have been stored against a dry and sunny day —the oriental equivalent for the proverbial "rainy day" of England, which needs to be provided against. As an instance of the frightful waste of water which occurred, the case of the Adyar river may be taken. Nothing was done to conserve the water in its channel. For three days the river flowed full from bank to bank—two hundred and fifty yards wide at the Marmalong bridge. In the middle of the stream, for the width of one hundred yards at the

least, the current was moving at the rate of two miles an hour: the depth of water was four feet on an average. It may be that there was not tank accommodation available for the storage of more water. But, even from the tanks, the waste was enormous. The Marmalong Tank at Saidapett (a suburb of Madras) may be taken as an indication of the waste permitted. This tank, when it was seen by the writer, a few days after the rain, was discharging over its waste weir a volume of water six yards wide and one yard deep, flowing at the rate of five miles per hour. The reason given for this outflow was that, if the water were retained, some of the banks of the tank might give way. Yet the level of the water in the tank was below what it frequently had been, and no disaster followed. The truth was this: the budget for petty repairs of tanks was cut down at the beginning of the revenue year, and funds were not available for carrying out such precautionary works as were absolutely needful. The system by which works are done is so unsatisfactory that engineers, though they see the necessity of saving water, are unwilling to take the responsibility of keeping the water in the tanks, in the absence of that protection to the banks which they feel is necessary. They, therefore, choose the lesser of two evils, and, rather than risk a breach of the banks, with consequent flooding of the country around and much damage, they consider it wise to let the water run to waste, and keep the level of the tank very low. Nine months previously, when Lord Lytton issued his Minute on the necessity of economy everywhere, and called upon the local governments to report what savings could be effected upon their budget estimates, the Madras Board of Revenue reported that "a considerable saving could be made on 'estimates' for the annual petty repairs to tanks, channels, etc." The consequences ought to have been obvious. What they were in one instance has been shown, and that was but one instance out of many. Tanks are the prime pre-requisites for cultivation in many parts of India, and, when economy is required, they are the very last things which should be tampered with. When they are neglected, the result is a flow towards the sea of a precious fluid, which represents, in passing away unused, a sacrifice of human lives.[1]

[1] Pp. 148–9, 50, vol. i. of *The Famine Campaign in Southern India*, 1876–1878. London, Longmans, Green & Co.

IV.

OBITER DICTA BY SIR GEORGE CAMPBELL, K.C.S.I.

Expressed as a witness before the Public Works Committee of 1878.

"It does seem to me, looking over Sir Arthur Cotton's account of the various irrigation works, that wherever they succeed, the engineers and civilians are both admirable; but, wherever they fail, then the engineers are still admirable, so long as they are not Bengal engineers; but the civilians are detestable, and it is entirely their fault. Where the engineers are Bengal engineers, there both the civilians and the engineers are equally in fault."

[This is a strangely inaccurate remark, and has no relation to Sir Arthur's singularly courteous character. Probably, there never was a man who had less bias or personal feeling: his one thought was the welfare of India.]

A FAMINE ONCE IN ONE HUNDRED YEARS ONLY.

"The general result is to impress me with the idea that, excepting certain special parts of India, which seem to be peculiarly liable to famine, we have no reason to expect a famine to occur oftener than about once in a hundred years in any one tract of country."

[The Central Provinces, at one time ruled by Sir George Campbell, have been visited by famine four times within the past thirty-two years.]

SIR ARTHUR COTTON'S GRAND CANALS FOR BENGAL.

"The only other schemes in Bengal, of which I have any knowledge, were two schemes of Sir Arthur Cotton's. One was to bring a grand canal from the Ganges to Calcutta, and the other was what has been mentioned as the Damuda scheme. I think that the Ganges canal was designed more for navigation than irrigation, but at the same time it was also urged upon the Government, that it would be extremely useful for irrigating Nuddea and other districts. That scheme was a good deal urged upon me during my incumbency in Bengal, but it seemed to me that the project was in so very crude and inchoate a form, and the difficulties were so great, that I declined seriously to entertain it. It involved the making of a great dam to stop the flow of the Ganges, just at the point where it is at its very largest, where it has received all its

feeders, and before it has begun to distribute its waters among the channels of the delta. . . .

"I was perhaps a little afraid of once letting in Sir Arthur Cotton and his schemes, for I did not know when we should get them out again."

RAILWAYS IN FAMINE TIMES.

"I will only notice one or two points with regard to the special use of railways in times of famine. I am very much convinced of this, that railways, by increasing the facilities of communication, do very much obviate the future risk of famine; in fact, I think the experience which we have recently had in India almost justifies one in saying that when a complete system of railways is in work throughout India, provided sufficient foresight and care is shown, and sufficient money is forthcoming, no real famine, leading to a very great loss of life, need occur."

THE REMARKABLE FREQUENCY OF FAMINES NOWADAYS.

"That remarkable frequency of famine in recent years, although it may possibly be accidental, is, in my opinion, so serious as to demand very searching inquiry into the questions as to whether modern conditions are not such as to render the country more liable to famine than under the old conditions. It is quite possible that that may be so. To begin with, no doubt, under British peace the population has considerably increased, and, with the population, cultivation has increased. In ordinary times the increase of cultivation counterbalances the increase of population. But, on the other hand, it is my experience that in sparsely populated countries a sparse population has greater resources than a very large population in very fully peopled districts, in time of famine, because where the population is sparse and the uncultivated country is large, there are considerable facilities for resorting to jungle berries and jungle fruits, and one thing and another, so that I think I may state it, as a matter within my own experience, that those jungle districts do not suffer so severely from famine as the more highly populated districts.[1] Then it is certainly the case, although I am inclined to think there has been a good deal of exaggeration in statements which have been made

[1] An exactly opposite experience has been noted during the existing famine (1900) in the Central Provinces and in Eastern Bombay.

regarding the effects of cutting down forests, that considerable effect is produced in the country in the long run by the spread of cultivation, by the cutting down of forests, and by the drainage of the country, which causes the natural water supply to run off more rapidly, and to be less completely stored in the natural reservoirs, which Nature has provided in countries in which the hand of man has not been very active.

"So that on those grounds I think it is quite possible that the country may become more liable to famines. Then there is another very important view, which I think it is necessary to bear in mind. We are very much alive to the fact that improved communications have the effect of enabling us to meet famines in a way in which they never were met before; but we must also remember that there is another view of the question, that those improved communications lead to the export of grain, and a cessation of the old native habit of hoarding grain, which was formerly a very great security against famine. I can speak from my own personal experience. I know parts of the country where, every now and again, when they have had a very good year, the country was perfectly glutted with grain. That was so as regards parts of the Punjab; on the upper part of the Sutlej grain was almost a drug in the market; you could scarcely get anybody to buy it when you had a good season and an enormous produce of grain, and it was the same in the Nerbudda valley, grain was occasionally excessively cheap there. It was the native habit—a habit which no doubt has come down from the time of Joseph—to consider that it was the height of prudence and virtue to store enormous quantities of grain in those cheap years, as a provision against bad years. It was the habit of the native grain dealers, and native zemindars, and cultivators, and others, to make enormous underground pits, in which, in that dry country, they could store grain and keep it for a very large number of years. The consequence was that, under that native system, the difficulty of a market in the plentiful years being so great, there was an immense hoarding of grain, and provision against famine, the great store of which came out in times of famine. Nowadays there has been nothing so conspicuous in recent famines, as the extent to which the country has been denuded of supplies of grain by the facilities of exportation which such means of communication have afforded."

GRAIN STORES IN OLDEN DAYS; NO GRAIN STORES NOW.

"In Orissa it is actually the case that, up to the month of March of the famine year, a very active export of grain was going on, that is, within six weeks of the time when the country was in the throes of the most frightful famine. The traders had miscalculated. In Bengal, during the greater part of the famine, whilst the Government were importing with one hand, the traders were exporting with the other, so that a very great drain took place. I have not the least doubt that on general economical grounds the result of improved communications is a very good result. It is very much better that the cheap grain of cheap years should be brought to market in the quantities in which it is wanted, and that it should be imported in years of dearness and scarcity, but from a financial point of view, it leaves the evil just as great as ever it was, because, although it is perfectly true that the means of communication enable you to bring into a famine district in a bad year the grain which is there wanted, still that does not give the people the means of buying the grain. What has happened of recent years is that, there being no grain stores in the country where those famines have occurred, the grain being brought in through improved communication, it has been necessary either to supply the grain to the people, or to furnish the means of buying the grain; and, therefore, although you may have succeeded more or less, sometimes more, and sometimes less, in obviating the mortality by famine, you have done so at an enormous expense, and that expense is increasing from famine to famine; therefore it is that there is very great room for question, whether, from a financial point of view at any rate, you are not a good deal more liable to very serious and very expensive famines than you were in former days; I think that is a subject which it will be very necessary to work out fully.

Questions by LORD GEORGE HAMILTON, Chairman:

"You stated that in olden times it was the habit of the natives to store grain, but if a famine occurred the people in the district were still unable to buy that grain, and, unless they had the money, they would not be able to obtain it?—That is so to a very great extent, but the people themselves, the zemindars and the cultivators, sometimes stored a good deal of grain. The grain, too, was very much in the hands of their local bankers and money-

lenders, who are in the habit of dealing with people who generally get an advance of grain in time of famine and scarcity to be repaid in time of plenty.

"But unless the people generally are more impoverished now than they were in those times, they would still have the money to buy the grain?—No; I do not think they either had the money in former days or have it now, but what I believe to be the case is this, that the grain was then in the hands of their own bankers, and traders, and money-lenders, with whom they habitually dealt, and whose very trade and profession it was to advance them what they required in time of need, to be repaid with interest in time of plenty."

THE "GREAT BENGAL FAMINE" OF 1770 EXAGGERATED.

"What I wish to say is that, if we look into the matter historically, I believe no famine ever has occurred, which we could not meet by our present means, that there never has been such a scarcity of grain throughout India that you could not meet the necessities of one part of India from another part of India. Take the great Bengal famine of 1770. In this, as in other matters, I think that distance often leads to a good deal of exaggeration; that famine has been handed down to us as if it were a famine in magnitude quite beyond anything that we have known in modern times. If the Committee will refer to the actual facts as they were extracted by me from the records of the India Office, and which are contained in the paper which I have just put in, it will be found that, in reality, that famine was perhaps scarcely greater than some of our modern famines. It was a very severe famine indeed, and it led to a great loss of population in very considerable parts of Bengal, but by no means in the whole of Bengal. The general result, showing that it was not a famine which threw the country back for hundreds of years, in the way which it has been supposed, will be apparent from some figures which are quoted on page seven of the report which I have put in, for there it will be seen that, the very year following the famine, the revenue rose higher than it had ever been before, and for the next two or three years it continued higher."

WHY HE OPPOSED IRRIGATION EXTENSION.

"And you think, therefore, that the certain danger resulting from an enormous expenditure would more than counterbalance

the risk hereafter of some great famine occurring which we could not meet?—That is my view; but at the same time, I think it is very necessary to remember that India contains a very great variety of climatic conditions. I think there are some parts of India in respect of which there is great justification for the irrigation works which have been made, and that there is justification for some additional works. I have wished to go over a rain map with a view of making that clear, but I think I had better postpone that until another day."

HOARDS OF GRAIN IN ANCIENT SCARCITIES.

Questioner: MR. ONSLOW, M.P.

"Was it the fact that the hoards of grain which you mentioned in those different states were compelled to be produced by the different rajahs?—In the native times it is very frequent that a pressure is brought to bear upon the people who have hoarded grain, and who are unwilling to sell it; that is a process which has been well known in Europe, and is well known in Asia, and I believe it was very common in India in native times.

"Under British rule there is no pressure of that kind, I presume?—There has been a good deal of popular pressure; there have been occasions on which riots have taken place; in the famine of 1837–38, there was a good deal of popular disturbance, and a great many grain hoards were plundered."

COLONEL FISCHER, R.E., ON THE GRAND CENTRAL RESERVOIR.

Questioner: SIR GEORGE CAMPBELL.

"We have heard of a grand reservoir scheme, 1,600 feet above the level of the sea, from which all India[1] was to be irrigated; do you know anything about that?—That is the reservoir scheme which I proposed for Bellary; although I did not actually survey the whole of it, I took the levels and proposed it.

"It is the same scheme which Sir Arthur Cotton referred to as

[1] "All India!" This was Sir George Campbell's unfair way of begging the question. Not "all India," nor even all Southern India, was to be served by one great reservoir. It will be seen, on reference to Sir Arthur Cotton's map, that a number of storage reservoirs were indicated.

a great reservoir, 1,600 feet high, from which canals are to be carried out to irrigate all India?—Yes, 1,600 feet above the level of the sea; but not to irrigate all India.

"Have you seen Mr. Gordon's surveys?—Yes, he told me himself that he had brought the canal through the hills in exactly the same way as I had proposed, and he went back to finish it; but, in the distribution of the water, the project was so excessively expensive that it was abandoned altogether. I was away from that part of the country, engaged elsewhere, and did not see it at that time; but when I saw the distribution, I saw the mistake which had been made.

"Apart from the distribution, had you the papers regarding the survey which Mr. Gordon had made, which satisfied you that a reservoir on a very large scale was practicable, and upon what scale?—I have no papers here with me, but I think I could point out upon the map of the district something about the extent of the land which would be submerged by the area of the reservoir.

"Were you satisfied of the practicability of that scheme?—I was then, and I am more so now.

"Do you remember up to what height you proposed to carry the dam?—One hundred feet.

"What was the area of the land to be submerged?—At a level of about one hundred feet you will hold the water back for between eighty and ninety miles up the bed of the river.

"What would be the breadth of the area submerged?—The breadth would vary very much; at the greatest, I suppose, it would be about six or seven miles wide; but then, after you have got up some twenty or thirty miles, the valley narrows very rapidly, and also the bed-face of the river is smaller. . . .

"Is there any existing tank which has an embankment as high as one hundred feet?—I believe the Cumbum tank in the Kurnool district is fully that; it has sixty feet of water over the sluice. I beg to say that I did not intend to make the dam of the reservoir entirely of earth, across such a river as the Tungabudra. If I had to construct it, I should build it with concrete blocks, with a water-tight wall through the centre.

"What would be the length of it?—The length is between eight thousand and nine thousand feet.

"Do you think that it would be safe in time of floods, and that it might not wash away and drown the whole country below?—

At that site I believe it would be perfectly safe; it could not get away there, because the river immediately below goes through a very narrow gorge for forty miles, with hills on either side.

"Could you tell us what was the fate of this scheme?—They abandoned it; after Mr. Gordon made his distribution, they said it would be so expensive that it could not be carried out. I happened to go into the matter again before I left India, and I saw how the distribution had been made, and saw that they were carrying the water in a most unnecessarily expensive manner. I have shown the project to several people, and the way in which the distribution ought to have been made, by which there would not have been that expense. I estimated that you could irrigate one million acres of land in that district for about fifteen rupees an acre.

"You are aware, I think, that Sir Arthur Cotton has alluded to this tank as a grand tank, from which enormous canals might be carried to irrigate, if not all India, at least a very large part of India; do you concur in the practicability of carrying out a gigantic system of irrigation from this tank to that extent?—In Bellary, I think, it would irrigate somewhere about a million acres, if not much more. Sir Arthur Cotton proposes to utilise a large quantity of the water in the Carnatic plains, but that is a mere suggestion of his, and I think it is well worth looking into and investigating, if you take a large quantity of water and utilise it from the Kistna and Tungabudra rivers."

BELLARY FREQUENTLY FAMINE-STRICKEN.

Questioner: MR. VANS AGNEW.

"You would not consider, then, that those tanks in Bellary, under the Government, were sufficient protection from famine?—Oh, dear no; Bellary has, since 1850, suffered three times from famine."

THE GODAVARI WORKS.

Questioner: SIR G. CAMPBELL.

"Do you consider that those works on the Godavari have been extremely successful?—Certainly.

"Are they without any drawback in respect of unhealthiness or exhaustion of the soil, or anything of that sort?—There is no exhaustion of the soil; the soil is fertilised from the river every year. That is not the thing complained of by the people at all.

"Have you observed any unhealthiness attending the irrigation system?—We had a very unhealthy season indeed in 1869 from fever, but the doctors are of the opinion that it was not due to irrigation. The population has increased very largely, and the people have increased enormously in wealth and comfort.

"On the whole, you are of the opinion that the health of the district has not deteriorated?—I should think that the health of the district has considerably improved.

"Was the district an unhealthy district before?—It was a very feverish one and a very poor one.

"And you think that now there is less fever than there was formerly?—I believe so. The fever was of a very ordinary type. A great deal has been said about it, but during the whole time I was there, and I have treated many cases myself, I never saw a case that could not be easily recovered.

"I believe that the Godavari district is the only part of India in which navigation is largely combined with irrigation; in your opinion has this system of navigation been very successful there?—Most successful.

"Do you see any reason why such a system of navigation should not be applied to other irrigation projects?—It will be carried out in the Kistna delta.

THE CENTRAL RESERVOIR AGAIN.

"Will you tell us some particulars respecting that grand project in Bellary, at a height of 1,600 feet above the sea, to which allusion has already been made?—The proposal is to have a dam across the river in the Bellary district.

"Had you yourself fully surveyed and examined and completed that?—No, I had not completed it; it was never under me for completion.

"Will you have the kindness to tell us how much you had done?—I took the cross sections for the dam.

"Were you the originator of the project?—Yes, for that dam.

"I mean for the whole scheme of the reservoir?—No, Sir Arthur Cotton had proposed a scheme to take a channel out of the river by an ordinary anicut, and to irrigate a large area of Bellary, and to throw a quantity of water into the Pennar for the use of the Nellore district. In going over that project of Sir Arthur Cotton's, and taking the levels up and down the bed of the river, I came upon this site for a reservoir, where the natives had

originally intended to build one; an earthwork is there to this day, and when I found this I took it up and proposed it; but as the money had been obtained for carrying on the Kurnool works, and water could be so readily supplied from it for the use of the Koondal valley and the Nellore district, Sir Arthur Cotton abandoned that project at Bellary and went to Kurnool."

Questioner: MR. JOHN CROSS.

"Then you would bank up 250 square miles of water, and with that 250 square miles of water you would propose, I think you said, to irrigate 1,000,000 acres?—One million in Bellary. My estimate for that was fifteen rupees, but more land could be irrigated in Bellary, but it would be very difficult to get at, so that I am afraid that that would raise the average cost of irrigation in Bellary to twenty or twenty-five rupees an acre.

"You say that you would irrigate 1,000,000 acres of land from this great tank; the tank would be 250 square miles; 1,000,000 acres represent, I think, about 1,700 square miles; you would, therefore, have eight miles of irrigated land for one mile of tank?—Yes.

"Is it possible that such a thing would pay at all?—The land pays you nothing now, absolutely nothing. These taluks in the Bellary districts, which would be submerged by this reservoir, have been now for nearly three years almost entirely supported by the Government; they are the most wretched parts of the country and the worst taluks in Bellary. The rains are constantly failing there, and, except a small strip of irrigation along the banks of the Tungabudra river, and one or two other jungle streams about there, they have nothing at all.

"In what period of time do you suppose this 1,000,000 acres would be irrigated from the time that you began the works?—I should think it would take five years to carry out the project to bring the water.

"Have you made any estimate of the cost?—I have made an estimate. This large dam with the head-works I estimate at thirty lakhs of rupees or £300,000; twenty-five miles of canal through the hill, fifty lakhs of rupees or £500,000; forty miles of canal to the Huggary river, including a large aqueduct, £200,000; one hundred and twenty miles of canal towards Kurnool, £150,000; eighty locks for navigation, etc., £200,000; com-

pensation for land, etc., £50,000; minor distributaries, sundries, and supervision, £100,000. That makes a million and a half.

"And that would be in the hope of irrigating 1,000,000 acres?—Yes. I had eight years' constant experience of the Bellary district, being in charge of all the works there, and I never failed to get the water taken for any land which I proposed to irrigate, and which I showed our people could be irrigated. I never failed in one single instance to get the land taken up."

WIDESPREAD BENEFIT OF IRRIGATION.

Questioner: MR. SAMPSON LLOYD.

"So the benefit of these works, in your opinion, is not confined to the amount of direct revenue that it brings to the Government?—Certainly not.

"But it extends to the general comfort, health, and well-being of the people?—Yes, and the preservation of the people of the district.

"And the prevention of future famines?—Yes, and the prevention of famines. That has been a work which has been long under consideration.

"From your own personal knowledge, would you confirm the evidence of that witness,[1] that there is great difficulty in moving barges or boats against the current?—I am entirely against that view. I know that the Italian canals are navigated, although the current is of very much greater velocity than we are using now in the Godavari district. We have never given in our canals a greater slope than five feet a mile, and that is only for half a mile over a large aqueduct. That part is navigable, with difficulty, and I propose, in revising the estimates, to remedy that defect; but the slope that we, generally speaking, give, gives a velocity of under a mile an hour, which is perfectly easy for navigation.

"In fact, I gather from the whole of what you have said, that you consider the uses of irrigation, when properly constructed for navigation, to be most important to the well-being of the people?—I am perfectly certain of it. I can give one or two instances in point if you will allow me. A brother officer and myself had to cut two canals for Sir Arthur Cotton, in 1852, the Nursapur

[1] "A witness of great experience," not named, referred to in a previous question.

Canal and the Attaly Canal. The Nursapur Canal was made navigable throughout, and out of 40,000 acres of expected irrigation the people took up over 36,000. The Attaly Canal was simply cut as an irrigation channel, and therefore without any navigation works in it. The area expected to be irrigated by it was about 30,000 acres; but the people never took up more than 12,000 or 13,000 acres. In 1871, when I was carrying out the revised estimates for those works, I put locks into the Attaly Canal to make it navigable, and before we had got the foundations of the first lock in, the people applied for an increase of 10,000 acres of land for irrigation.

"So that as soon as they could get their produce to market by means of a navigable channel they took up more land?—Yes, they took 10,000 acres at once. The whole of the works for the completion of that canal cost £5,600, and £4,000 was returned for water-rate in the first year."

The whole of the preceding passages are taken from the Blue Book: "Report, East India (Public Works), ordered by the House of Commons to be printed, 1 August, 1878." No one, who desires to thoroughly understand the irrigation question, can afford to leave this volume unstudied; notwithstanding the strong bias of leading members of the Committee against irrigation, irrigation comes triumphantly out of the ordeal.

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CHAPTER XII

The Cost of a Famine—In Lives and Money

IF, as some allege, and as this work endeavours to prove, famines in India are largely, if not wholly, preventible, it may be pertinent to enquire what is the cost in lives and money of an Indian famine, so as to ascertain whether it would not—to put the matter on the most material basis—be cheaper to provide remedies than to be content with administering relief. An absolutely accurate estimate is not possible, even of money loss. But, so full are the records of some recent famines in India, that a fair approximation of the cost may be made. This is not an idle enquiry. On it depends the material welfare of the people of India. If it be found that, even on a merely money basis, it would have been better to undertake public works which were sufficiently large to mitigate, if not to wholly prevent, famine, we may hope that, even now some steps will be taken towards seeing that this is done in the future.

Unhappily, a feeling prevails, particularly in official circles, that famine in India is to be accepted as an inevitable evil. "Famines," it seems to be argued, "will come, are coming nowadays with a frequency before unknown.[1] It is all very dreadful. But they are the act of God. All we can do, when they come, is to mitigate their consequences as far as may be." Passing by the obvious remark

[1] Sir George Campbell in 1878, and the Famine Commissioners in 1880, used language practically identical with this. The official remarks savour almost of fatalism.

that if famines are the act of God, His creatures, even though they be the rulers of India, ought not to be found fighting against His decrees, it must, in bare justice to the Government of India, be stated that during the past twenty years, they have done wonderfully well in their *treatment* of famine. They have acted in direct contradiction to their argument. They have devised a famine code which, as an attempt to grapple with all phases of relief, has probably never been surpassed in any department of government anywhere. Likewise—but, as I hold, and consider I prove in these pages—not at all wisely, so far as railways are concerned, money has been expended with a lavish hand in the construction of public works, which have always been put forward as means for the prevention of famine. Again, unhappily, the pity and the mischief of it all is, with the best intention in the world, the wrong thing has been done. Successive Governments in India may have desired to *prevent* famine: they must now recognise their efforts have wholly failed, for what they have done is simply to *relieve* the famine-stricken. So long as they can show, with more or less of accuracy, that enough food-grain is reaped year by year in the Empire to give an average of one and a quarter pounds of grain per head of population, per day, with a surplus for emergencies, and, on famine occurring, relieve the people—with their own money, obtained from general taxation—they appear to consider the utmost has been done which can be done. God sends famines; we will relieve all the sufferers we can, and keep everybody alive if that be possible. "We wish we could do more, but we must be content with saving life and preventing extreme suffering."[1]

The most astonishing feature in this distressful state of

[1] So said Lord Lytton and his colleagues, January, 1877. And yet, though it was at the same time laid down ". . . human life *shall* e saved at any cost and at any effort; no man, woman or child *shall* die of starvation," at least five millions in that very famine *did* die of starvation and diseases brought on by innutrition and want generally. The Indian authorities mean well; they go the wrong way to work.

affairs is the fact that the unavoidableness of famine is put forward without disguise. The late Sir James Caird and the Hon. H. E. Sullivan (of the Madras Civil Service) wrote a Minute of Protest against some of the conclusions of their colleagues on the Famine Commission of 1879–80. In paragraph 9, of their protest, they institute a comparison between the free black labourer in the Southern States of America and the Indian labourer. "The common price of grain," where the negro is employed, "is the same as that of the Indian labourer, namely, fifty lbs. to sixty lbs. per rupee." [1] But, the negro's "wages are eight times that of the Indian, two shillings to two and threepence against threepence per day, while the climate is much the same in its demands for clothing and shelter." The protesting Commissioners regard this as a fact of extreme gravity as illustrative of the poverty of the Indian cooly or field labourer. They urge this fact is "not to be met by resting satisfied that 'chronic famine is one of the diseases of the infancy of nations.'" For (they rightly proceed to remark), "India as a nation has long passed its 'infancy,' and the task of the British Government is, by fostering diversity of occupation, to guard it against decline." [2]

Here, a brief interruption of the argument must be accepted by the reader, so that note may be taken whether, now, in 1900, the price of food leaves the Indian labourer in as good a position as he was twenty years ago, when Sir James Caird and Mr. Sullivan made the above comparision. Not the least useful feature in the *Statistical Abstract for British India*, published annually, is the section devoted to Prices Current. Turn to the latest number, that for 1897–98, issued in the autumn of last year. Food prices are given for all parts of the Empire, ranging over the period from 1873 to 1897. The figures given represent number of pounds purchasable for one rupee. I take the first and last years for comparison, exactly as I find them,

[1] Pp. 66–67, *Famine Commission Report, 1880*, Part I.
[2] *Ibid.*, p. 67.

and work them out in English lbs., with a result as follows :—[1]

VARIOUS FOOD GRAINS.	1873.	1897.	
	lbs. per rupee.	lbs. per rupee.	FEWER LBS. per rupee in 1897.
COMMON RICE.			
Bengal (13 districts), average	43·25	19·49	23·76
North-West Provinces and Oudh (11)	28·57	17·40	11·17
Burma (3)	42·17	23·18	18·99
Punjab (6)	23·49	15·53	7·96
Central Provinces (3)	46·80	19·11	27·69
Madras (7)	36·28	20·27	16·01
Bombay and Sind (8)	23·81	15·97	7·84
Assam (4)	47·17	17·78	29·39
WHEAT.			
Bengal (14 districts), average	27·31	17·16	10·15
North-West Provinces and Oudh (11)	34·37	20·09	14·28
Punjab (6)	43·75	20·85	22·90
Central Provinces (3)	46·59	18·83[3]	27·76
Bombay (7)	27·91	15·16	12·75
BARLEY.[2]			
Bengal (5 districts), average	53·83	22·67	31·16
North-West Provinces and Oudh (10)	59·79	26·30	33·49
Punjab (6)	67·08	28·33	38·74
JOWAR (Great Millet).			
Bengal (2 districts), average	41·27	28·88	12·39
North-West Provinces and Oudh (11)	46·10	25·07	21·03
Punjab (6)	57·13	23·63	33·50
Central Provinces (3)	56·79	24·41	32·38
Madras (3)	46·97	28·92	18·05
Bombay and Sind (8)	47·19	22·00	27·19
BAJRA (Bulrush Millet).			
North-West Provinces and Oudh (11) average	40·52	24·83	15·69
Punjab (6)	54·38	20·38	34·00
Madras (4)	57·92	35·78	22·14
Bombay (7)	37·53	19·56	17·97
RAGI.			
Bengal (1 district), average	47·24	25·83	21·41
Madras (4)	67·84	32·13	35·71
Bombay (2)	33·09	27·63	5·46

[1] Calculated from particulars on pp. 316–328, *Stat. Abs.*, 1897–98.
[2] The earliest year given for barley is 1886, not 1873 as with others.
[3] There were times and places in the Central Provinces when

Apply Sir James Caird's test to the above figures, and it will be found that in no case is the Indian labourer now on an equal footing, or anything like an equal footing, as regards price of food with the negro labourer. He was twenty years ago. He is not now. On the contrary, in 1897, he got only twenty-one and a half lbs. of common rice for a rupee, instead of from fifty to sixty lbs.—a little more than one-third. Meanwhile there is nothing to show that his wages have increased in Bengal, while, in other Provinces and Presidencies, the increase shown in the accompanying table has in no way been in proportion to the rise in the price of food either for the labourer or for the artisan. And, it must not be overlooked, that, save in large towns, with the advent of high prices and scarcity, work for labourer or artisan almost entirely ceases. The negro artisan, further, certainly earns more than the negro labourer, with whom alone the comparison is made. The increased price, too, affects all classes of the community—not the labourer and artisan simply, whose wages alone are given.

Matters are even worse in regard to wheat. Of this foodstuff—not often consumed by the ordinary labourer—the average in 1897 was 19·69 lbs. per rupee, a big shrinkage by the side of the negro labourer's fifty to sixty lbs. and eight times higher wage.[1]

The commoner grains show a little better, but are woefully short of the fifty-five lbs. per rupee desiderated by Sir James Caird:—

nearly sixteen times as much food as is here represented could be obtained. "The price of wheat, rice, and grain (in 1828–29) rose at Bilaspur to 12 seers (25 lbs.) per rupee, and the effect of this rise on the condition of the poorer classes may be judged of from the fact that at that time prices in favourable years were, in Rajpur 400 seers (823 lbs.) to the rupee, while in Bilaspur 120 seers (247 lbs.) of rice and 180 seers (370 lbs.) of kodon had been procurable for a rupee."—Para. 221, p. 156, *Report on the Famine in Central Provinces*, by R. H. Cradock, I.C.S., vol. i. Nagpore, 1898.

[1] The figures for 1898 (available on Sept. 1st, 1900) are better, but only in a few cheap grains, such as barley and jowar, do the figures reach 50 lbs. per rupee. The year after, 1899, famine over a great part of India ran up prices again.

Grain.	Lbs. per rupee in 1897.	LBS. FEWER per rupee.
Barley	25·77	34·45
Jowar	25·49	24·99
Bajra	25·14	22·45
Ragi	28·53	20·86

It will be putting matters in a very moderate form if it be stated that, at the end of twenty-four years, judged by the figures given above, the condition of the negro labourer is not eight times better off than that of his compeer in India but twelve times, with this most important difference: the negro has always work if he cares to do it; the Indian has, in such times of high prices, none at all. Since 1897 there is not likely to have been much, if any, permanent improvement. When a cycle of years of comparative plenty comes again—as it certainly will—it may not be expected prices will drop to the old level. They will not. It is contrary to the nature of things prevailing in India that they should.

The following wages table may be usefully quoted here. (See page 406).

Even in 1879, when the position was much better than it is now, Messrs Caird and Sullivan said, of the Indian labourers: "Already their wages bear a less proportion to the price of food than in any country of which we have knowledge!" The proportion to-day is considerably less than it was then.

The argument interrupted on page 402 may now be resumed. It was broken off at the point where two of the Famine Commissioners protested against India being regarded as a nation in its "infancy," and that famine was a disease incidental to such callowness. With some Indian officials this would seem to be a favourite doctrine. Notwithstanding the manner in which the notion had been shown, by the Famine Commissioners named, to have no relevance, Lieut.-Col. Pitcher,[1] in a letter addressed to his official superiors, dated June 8th, 1888, refers "to the

[1] Officiating Director, Department of Land Records and Agriculture, North-West Provinces and Oudh.

MONTHLY WAGES RATE IN CERTAIN SELECTED STATIONS IN RUPEES, AND NEAREST DECIMALS.[1]

Station.	Able-bodied Agricultural Labourer.			Common Mason, Carpenter, or Blacksmith.		
	1873.	1897.	Increase (+) or Decrease (−) % approx.	1873.	1897.	Increase (+) or Decrease (−) % approx.
Calcutta	—	—	—	7·5 to 10	18 to 20	+140 to 100%
Patna	3 to 4	4 to 5	+33 to 20%	5·6 to 7·5	7 to 8	+25 to 7%
Rangpur	5·5	7·5	+36%	7·5 to 10	15 to 30	+100 to 200%
Backerganj	7·5	10 to 15	+33 to 100%	8 to 15	8 to 15	0
Cawnpore	—	4 to 5	—	7·5	7·5 to 9·4	0 to +25%
Fyzabad	4	1·9 to 4	−52% to 0	8	5·6 to 7·5	−30 to −6%
Meerut	4·5	4·5	0	9	10·5	+17%
Delhi	5·6	7·5	+34%	10	13·1	+31%
Amritsar	6	8	+33%	12·7	15	+18%
Rawalpindi	5·5	6·6	+20%	12	23·1	+92.5%
Karachi	10 to 15	12 to 15	+20% to 0	20 to 25	30 to 45	+50 to 80%
Belgaum	7·5	6	−20%	18·7 to 22·5	14	−33 to −61%
Ahmednagar	4·7	6	+27%	13·1 to 20·6	15 to 30	+14·5 to 46%
Bombay	9	11	+22%	25 to 50	27·5 to 42	+10% to −16%
Ahmadabad	6·1	7	+15%	19·7	22·5	+14%
Jubbulpore	4	3·5	−12·5%	15	10	−33%
Nagpur	5	5	0	12	15	+25%
Raipur	3	4	+33%	11	15	+36%
Bellary	4	6 25	+56%	15	18·75 to 20·6	+25 to 37%
Madras	6	6	0	14·1	13 to 16	−8% to +13%
Salem	2·5	3·8	+52%	13·5	12 to 12·7	−11% to −6%
Rangoon	12	15	+25%	40 to 45	45	+12·5 to 0
Toungoo	15	14	−7%	20	30	+50%

[1] Calculated from particulars on pp. 308–310, *Stat. Abs.*, 1897–98.

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state of England in the fifteenth century" as "strangely resembling the state *from which India is gradually emerging*." He then quotes a "recent writer" without naming him, as having said :—

"There is necessarily a sameness in the records of these pestilences, and this makes it wearisome to dwell upon the sufferings of the people throughout well-nigh the two centuries which lie between the death of Edward I. and the coming of Henry of Richmond. The history of the people of England cannot, however, be understood without dwelling upon the sad monotony of suffering."

"In the pages of the chroniclers we come upon the records of famine and the details of the pestilences which followed closely on the famine. There is hardly any period of five years during that time without these ghastly records." [1]

Colonel Pitcher has only to turn his observation quite round and strengthen it: then, in the light of existing facts, he will be correct. He should have written, "The state into which India is rapidly sinking." It is of common knowledge in India, that, be the reason what it may, the condition of the vast masses of the Indian people, save in the irrigated districts and those districts on the Western coasts and the major part of Bengal, where the rain is always in sufficient quantity, is going from bad to worse. The statistics given above bear mournful witness to this. Although this is not the place in which to argue in detail what, added to the need of further irrigation, is the real cause of the continually increasing distressed condition of India, as the question has been raised by Famine Commissioners and high officials, two brief quotations from Draper's *Intellectual Development of Europe*, relating to our own country at the time referred to by Colonel Pitcher, may be cited. They are as follows :—

[1] Chap. iv., *An Inquiry into the Economic Condition of the Agricultural and Labouring Classes in the North-Western Provinces and Oudh* (Government Printer, Allahabad, 1888), one of the most melancholy records which ever came from the printing press in any country.

"Through the operation of the Crusades all Europe was tributary to the Pope (Innocent III.). . . . There was a steady drain of money from every realm. Fifty years after the time of which we are speaking, Robert Grostête, the Bishop of Lincoln, and friend of Roger Bacon, caused to be ascertained the amount received by foreign ecclesiastics in England. He found it to be thrice the income of the king himself. This was on the occasion of Innocent IV. demanding provision to be made for three hundred additional Italian clergy by the Church of England; and that one of his nephews—a mere boy—should have a stall in Lincoln Cathedral." "In England—for ages a mine of wealth to Rome—the tendency of things was shown by such facts as the Remonstrances of the Commons with the Crown on the appointment of ecclesiastics to all the great offices, and the allegations made by the 'Good Parliament' as to the amount of money drawn by Rome from the kingdom. They asserted that it was five times as much as the taxes levied by the king, and that the Pope's revenue from England was greater than the revenue of any prince in Christendom." "The Parliamentary Bill of 1376 sets forth that the tax paid in England to the Pope for ecclesiastical dignities, is fourfold as much as that coming to the king from the whole realm, that alien clergy, who had never seen, nor cared to see, their flocks, convey away the treasure of the country." [1]

Our enquiry as to the cost of a famine may now be resumed. There appears to be material available for doing this, with any approach to accuracy, only in relation to the calamity which befell Southern India in 1876 to 1878. The famine of that time was regarded as the most widespread and terrible visitation which India had known. It has since been twice eclipsed,—in 1897 to 1898 and in 1899 to 1900.

[1] Draper's *Intellectual Development of Europe*, fifth edition, pp. 365, 397, and 434.

1. GOVERNMENT EXPENDITURE:—

	£
"The direct outlay on relief reached the sum of nearly"[1]	8,000,000

2. LOSS OF LAND REVENUE:—[2]

1876	£90,000	
1877	1,300,000	
1878	1,130,000	
		2,520,000

3. LOSS OF CROPS:—

Assume the revenue taken by Government represents, as the Famine Commissioners, on p. 112, of Part II. of their Report say it does, one-sixteenth of the gross produce, the loss to the cultivators is £2,520,000 × 15[3]	37,800,000

4. LOSS OF EXCISE REVENUE:—[4]

1877	£76,000	
1878	163,000	
1879	46,000	
		285,000

5. LOSS OF CUSTOMS REVENUES:—[5]

1876	£13,000	
1877	74,000	
1878	118,000	
1879	114,000	
1880	88,000	
1881	72,000	
		479,000

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[1] *Famine Commission Report*, Part I., 1880, p. 32, para. 96.

[2] P. 27, No. 14, *Statistical Abstract, British India.*

[3] I very much doubt whether this is not greatly overstated, but I take the figures as the Commissioners give them. And yet I find nearly the same proportion of tax to total produce is claimed in the Central Provinces. The land revenue demand "absorbs probably not more than about 6¼ per cent. (or one anna in the rupee) of the value of a normal out-turn." "The poorest parts of the Province . . . where distress has been most severe, pay either no revenue at all (save an insignificant quit rent) to Government . . . or a trifling rate (less than four annas per cultivated acre)." Para. 163, p. 115, *Report on the Famine in Central Provinces*, by R. H. Cradock, I.C.S., vol. i. Nagpore, Secretariat Press, 1898.

[4] No. 14, *Statistical Abstract, British India*, p. 29. [5] *Ibid.*, No. 16, p. 26.

6. Loss of Salt Revenue:—[1]

	£
1877	£62,000
1878	211,000
	273,000

7. Country Silver and Silver Ornaments:—[2]

Bombay Mint returns, for years of the famine, show:—

Year.	Country Silver. Rs.	Silver Ornaments. Rs.	Total. Rs.
1877–78	—	1,24,00,000	1,24,00,000
1878–79	67,00,000	1,16,00,000	1,83,00,000
1879–80	45,00,000	92,00,000	1,37,00,000
	Rs. 1,12,00,000	Rs. 3,32,00,000	Rs. 4,44,00,000

Mr. Barclay said: "The quantity which reached the Mints must have been only a fraction of what was sold by the natives to the dealers." . . . "In the recent famine [1897–98], when the Mints were closed, the silver ornaments would only realise about fifty per cent. in rupees." Sir David Barbour testified: "The return from the Bombay Mint excludes gold; but we know that in the years of the great famine in Madras and Bombay, a large amount of gold was sent from India to England, and, I think, Sir H. Hay said he received a quantity of gold from India which was evidently composed of ornaments melted down."[3]

Take Mr. Barclay's "fraction" as representing only as much more as was actually minted, and Sir David Barbour's exported gold at one million sterling, the reserves drawn upon in Madras and elsewhere (needlessly drawn if only proper means had been adopted to prevent distress) was Rs. 4,44,00,000 × 2 = Rs. 8,88,00,000 @ 2*s.* per rupee = £8,880,000; gold, £1,000,000 . . . 9,880,000

[1] No. 16, *Statistical Abstract, British India*, p. 27.

[2] "East India Currency Enquiries: Official and other Figures submitted by Mr. Donald Graham, C.I.E., Appendix" [c. 7060–1], 1893, p. 304; also "Evidence of Sir David Barbour, K.C.S.I.," p. 305; and "Evidence of Robert Barclay," Ans. 11,612, Part II., 1899.

[3] "Some lakhs of savings were brought out in the famine of 1876–77; the goldsmith's melting-pots were going day and night for some months

The foregoing is not only of much interest but also of great importance in the light it throws on the "pinch" experienced by the well-to-do classes. The five millions and more who perished in the Madras Presidency, and the millions who were on relief works, or in receipt of charitable relief, would not, I estimate, contribute, Rs. 200,000 towards the Rs. 4,44,00,000 worth of ornaments which disappeared in the melting pot at the Mint. No; all this came from the better-off people, drawn from them by the high price of food. As prices now are always at what used to be considered famine prices, it may be realised how impossible it is for wealth to be accumulated by any class in India.

8. INCREASED PRICE OF FOOD:—

The Famine Commission of 1880 estimated the value of food at £5 per ton. In Madras, during the famine, the Duke of Buckingham and Chandos, the Governor, stated[1] that "two-thirds of the Presidency were suffering from the high price of food." Two-thirds of the Presidency would be twenty millions of people. Say, they endured these high prices for six months only (an under-estimate), and that the price of food was doubled, £10 per ton, though, as a matter of fact, the price was much more than doubled.[2] The Commissioners considered eight millions of tons per annum were consumed in Madras: take half of that for six months at £5 additional cost,

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and the Mint Returns alone will show what the accumulation of precious metals in the famine districts must have amounted to."—Hon. J. B. RICHEY, C.S.I., Aug. 15, 1888.

[1] Speech at Famine Relief Meeting held in Madras on August 4th, 1877.

[2] Under normal circumstances at that time one anna would buy i Southern India nearly two lbs. of grain; in August, 1877, it would not purchase more than one-half pound, nor even that quantity. Rice, in ordinary seasons sold at the rate of ten measures per rupee; in the last week of July it was quoted at three or four measures, which was as if the quartern loaf in England, instead of being sixpence, was nearly four times that amount. In merely doubling the price of grain, therefore, the estimate is a moderate one. See *Famine Campaign in Southern India*, 1877–79, vol. i., *passim*.

and the increased price of food represented, £
4,000,000 tons × £5 = £20,000,000 : take off one-third, to come into accord with the Duke's (under) statement, and the amount to be brought out is, say 13,000,000

9. LOSS OF CATTLE, HOUSES, AGRICULTURAL IMPLEMENTS, ETC. :—

Roughly, in normal years, there are, in the Madras Presidency :—

14,000,000 cattle
8,000,000 sheep
5,000,000 goats
40,000 horses and ponies
100,000 mules and donkeys

Total . . 27,140,000[1]

Sir Richard Temple, Famine Delegate, in one of his reports, stated "the country was almost entirely bare of all crop or stubble, and there was no sign of fodder or grass." Before the end of December, 1876, in the Bellary district, "one-fourth of the cattle were said to have died, and it was thought more than half would perish before June unless heavy showers fell in January,"[2] but the showers did not fall; "cattle dying for want of fodder" was a frequent item in District Reports. In Bombay careful statements were prepared, such as these :—

Sholapur :—

Cattle before famine	224,599
Cattle in August, 1877	97,167
Loss . .	127,432

"Of these only 44,000 were considered fit for agricultural purposes" :

Madhee and Mohul Taluk :—

Cattle before famine	16,591
Cattle in August, 1877	5,470
Loss . .	11,121

Indee Taluk :—

Cattle before famine	35,747
Cattle in August, 1877	5,644
Loss . .	30,103[3]

[1] *Agricultural Statistics for British India for* 1888-89, p. 229.
[2] P. 56, *Famine Campaign*, vol. i. [3] *Ibid.*, pp. 364-366.

	£
In view of all this it will not be going too far to assume that one-fourth of the live-stock in the Madras Presidency perished. One-fourth of 27,140,000=6,785,000; taken all round at Rs. 7 each: 6,785,000 × 7 = Rs. 47,495,000, or, at Rs. 10 to the £[1]	4,749,500
10. LOSS OF WAGES:—	
Say, 5,000,000 labourers, without work for nine months at Rs. 5·5 per month[2] (the famine extended from the Autumn of 1876 to September, 1877, and much longer in some parts)—5,000,000 × Rs. 5·5 = Rs. 27,500,000: at Rs. 10 to the £ .	2,750,000
11. LOSS OF CAPITAL BY AGRICULTURISTS AND INTEREST BY MONEY-LENDERS AND OTHERS:—	
". . . about one-third of the land-holding classes are deeply and inextricably in debt, and at least an equal proportion in debt though not beyond the power of recovering themselves."[3] The census of 1881[4] gives 6¾ millions of agriculturalists in Madras: say two millions[5] of these indebted at least Rs. 50 each = Rs. 100,000,000; of these assume twenty per cent. lost through the famine Rs. 20,000,000, at Rs. 10 to the £ .	2,000,000
12. LOSS OF PROFIT BY MERCHANTS, TRADERS, ETC., BY DIMINUTION OF BUSINESS:—	
This can be no more than a guess, and, unsupported by any authority, my guess must be taken for what it is worth. Considering, however, the great contraction of business throughout the whole Presidency, Rs. 10,000,000 to Rs. 15,000,000 might	

[1] It will be seen I have not taken into consideration anything for ruined Houses, loss or sale of Agricultural Implements, etc.; if included, they would make an appreciable difference. Their omission may be covered by any slight excess in what I have estimated.

[2] P. 310, *Statistical Abstract*, 1897–98.

[3] P. 131, *Famine Commission Report*, 1880, Part II.

[4] P. 351, *Census Report*, vol. i.

[5] In all India there were 29,207,150 "Tenant Cultivators"; as a ryotwarry (or peasant-cultivating) province, Madras would have a large proportion of these.

	£
be fairly reckoned, say the smaller sum at Rs. 10 to the £.	1,000,000

Total ascertained and estimated cost of the Madras Famine £82,736,500

Say, *in money* £82,000,000

and THE LIVES OF FIVE MILLIONS OF HUMAN BEINGS.

Who can estimate, in pounds, shillings, and pence, what this terrible loss in lives means!

To the period embraced by the Madras famine the whole expenditure for all India on account of irrigation works was £20,298,000; of this sum £12,769,800 was capital expenditure, and £7,619,000 from current revenue. The accounts for this period, as presented, are somewhat confusing, but it would seem that the capital expenditure in Madras for the twelve years ending 31st March, 1879, was £753,730 only.[1] In 1877 it was £28,589; in 1878, £32,616; in 1879, £19,047. During that same period in the remaining provinces the expenditure was :—

Bengal	£4,741,208
North-West Provinces	2,849,429
Punjab	1,965,752
Bombay	923,446
Rajputana	18,696
Total . . .	£10,498,531

And these were the years in which Sir Arthur Cotton was making his most strenuous endeavours in England to procure adequate irrigation in Madras! It is absolutely safe to say that if, from 1860, when he had to retire from the Service, Sir Arthur Cotton had been retained and had had the £30,000 a year which he desired for expenditure on irrigation works in each of the twenty districts in the Madras Presidency for the succeeding seventeen years,—£10,200,000 in all,—there would have been no famine in Madras in the years 1876 to 1879. More than that: instead

[1] P. 117, *Statistical Abstract*, No. 14.

of a loss to Government and people of seventy millions sterling, so great would have been the gain to both that, probably, a net advantage of two hundred millions would have accrued. There would not have been a broken sluice, a damaged bund, or an empty tank among the sixty thousand in the Presidency; navigation canals would have been constructed in many directions, and storage tanks to keep all channels at a high level would have been provided. The Godavari river would have maintained a large fleet of passenger and cargo steamers, and the Central Provinces, too, would have been saved from three famines. But Sir Arthur Cotton, as John Bright reminds us, was an "enthusiast"[1] in a cause which only enthusiasm *could* lift over all the difficulties in its path.

> Now there was in that country a poor wise man who would have delivered the country from its evils, yet few gave heed unto him, and wisdom was not justified of her son.

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[1] "They say that Sir Arthur Cotton is an enthusiast. Well, we all have been enthusiasts in our time; it would be a dull world if there were no real and honest enthusiasm in it. But, Sir Arthur Cotton is not surpassed by any man in the Indian service for long experience and for great success in the works with which he has been connected, and which he has undertaken. He has broader and grander views than some of his competitors, or some of his fellow-officers, or those connected with the Government. But he knows that this is a great question, that India is a great country, that two hundred and fifty millions of people are a great people, and therefore he thinks that a broader and a grander policy is necessary on this occasion."—JOHN BRIGHT, *Speech at Manchester*, December 11, 1877.

Appendix

WHAT THE 1900 FAMINE IS COSTING PEOPLE AND COUNTRY.

LET me turn aside for a moment from the contemplation of the famine in Marwar as it exists to-day, and endeavour to show how deep, how abiding, how slowly effaced are the effects of such an awful drought as that from which Rajputana is now suffering. It was an evil day for India when some secretariat official, whose purview was limited to revenue returns and balance sheets, invented those misleading phrases: "the marvellous recuperative power of the Indian people," "the gratifying elasticity of Indian revenues." The cry has been taken up by every machine politician from Land's End to John O'Groat's, until the impression is general in Great Britain that it needs only a single good year to bring prosperity and contentment to famine-stricken India, and wipe out the influence of widespread crop-failure. A passing acquaintance with any famine area will show how entirely the contrary is the case. Take, for instance, the State of Marwar. It is a comparatively poor country, with a small population scattered over a wide area. The State revenue is derived chiefly from the land tax, and a small toll upon sheep, goats, and buffaloes. This year the whole of the land revenue was remitted, and the mortality amongst the live stock so great, that little was gathered under the second head. A debt of £240,000 was incurred with the Government of India, money was borrowed from other sources where possible, and even the State jewels have been pledged to meet the current expenses of the Maharajah's household. The State will emerge from the crisis saddled with an enormous load of debt, and with the certainty of diminished revenues for at least a decade. Ten years ago the buffaloes, cows, and bullocks in the State were numbered at 1,223,670; of these not five per cent. remain. The camels, sheep, and goats, have stood the strain better. "Unth chodio akro, bakri chodio kakro," ("The camel will eat anything but the ak bush, the goat anything but stones,") runs the Marwari proverb, but even the camels and the

goats have been decimated. The principal fount of material wealth has dried up. For years, instead of being a great cattle-exporting territory, Marwar will have to import to repair this terrible wastage. A million sterling might be beneficially expended in relieving the distressed pastoralists in this State alone, and still the havoc would not be made good. The plough bullocks, too, have been swept away. Truly the native says, "My bullock is my life"; with no oxen to yoke to plough and ramp and harrow, much good land will lie fallow at the next sowing, and tens of thousands of acres uncropped at the next harvest. As far as possible camels will be substituted for draught cattle, and light agricultural implements will be introduced suitable for manual labour; but, under the most favourable conditions, not more than one-half the culturable area will be sown this year. I might multiply indefinitely the directions in which famine on a grand scale presses sorely upon this brave people; at least a generation will elapse before its baneful influence is eradicated.—Special Correspondent in India, *Daily Chronicle*, July 2, 1900.

CHAPTER XIII

Is Famine in India due to an Insufficiency of Rain?

NINETY-FIVE years ago the great Duke of Wellington, then serving in India, urged that there were but two ways of meeting famines. These were:—

(1) By making the more fortunate parts of the community supply the wants of the rest, and the superfluity of one year making good the deficiency of another.

(2) By making as much of the country as is liable to famine by drought safe by an extension of irrigation.

In theory, we have got no farther than the Wellesley of 1805; in practice, the way—a needlessly burdensome, costly, way, for the expense of doing what is necessary will be much greater to-day—is now open to an Administration which will take the trouble to inquire what can be done.

There can be no greater fallacy than that which finds expression in such remarks as that: "God has shut the heavens"—therefore famine prevails: "There has been a rain failure, more or less partial, therefore famine is in our midst." As a fact, not one of the three elements which nature provides in India for the growth of human food ever fails:—

The sun, day by day, never withholds its vivifying power.

The soil remains.

The rain, every year, comes in sufficient quantity to supply the requisite moisture for the necessary crops.

We cannot control the sun or the soil, therefore we do not blame God in connection with either or both, if one should be clouded for a while and the other prove sterile. With the rain it is otherwise. We are too heedless to conserve it when it does fall. Then, when, in accordance with physical laws which, at present, we imperfectly apprehend or do not at all apprehend, the rain falls not exactly to suit agricultural needs, we put the blame upon God, when, instead, we should have built a reservoir. It is the essence of natural law that there should be fluctuations arising out of what science teaches to be the foundation of physical life-motion: with motion and the action and interaction of forces come fluctuations (as we call them), but really movements as regular and as certain as ocean tides, did we but know enough to search them out. Some day we shall. These are owing to the prevalence or absence of sun-spots, variations in temperature, maybe perturbations arising out of the movements of our earth in its orbit. But there is never less moisture or warmth than is needed to ensure seed time and harvest, if only we could learn how to employ all the elements placed at our service to ensure sowing and reaping.

There is nothing the matter with God's world, nothing wrong with that part of it which is called India. There is grievous fault, but it lies at the door of those who, claiming Heaven's light their guide,[1] are content to grope in the darkness and are heedless of the light.[2]

[1] Motto of the Most Illustrious Order of the Star of India.

[2] The late Colonel Chesney, R.E., sometime Conservative M.P. for Oxford, one of the most distinguished of Indian officials, in an article in the *Fortnightly Review*, in 1877, declared that irrigation works which were undertaken by the Indian authorities were extorted from them by famine suffering. He proceeded to say that the Indian Government was very like a father who spends a great deal on the doctor or the nurse if his child is ill and ready to die, but in ordinary times does not take the smallest care of him whatever, or teach him anything with regard to the preservation of his own health. Colonel Chesney, it may be remarked, because of certain detail criticisms, was officially quoted as an authority in opposition to irrigation!

Is it, a reader may, with wonder, ask, really true that always enough rain falls to sufficiently moisten the soil of India, and produce food for man and beast?

"To the law and to the testimony" for the reply to this question.

Twenty-two years ago, the Meteorological Reporter to the Government of India prepared a statement,[1] based on the observations made over a series of years at two hundred and eighty-nine stations scattered throughout the empire. This statement proved that, *on the average*, there is no single month in the year in which some rain does not fall, even though the quantity be as low as 0·02 in Pegu, Upper Burma, in January. The total average annual fall ranges from 251·80 in. at Tsawia, in the Konkan and Ghâts (Bombay), to 4·28 in. in Sind and Cutch—Jacobabad the station. The highest and lowest are, singularly enough, in the same presidency. A summary of the chief table presented by Mr. Blandford, the reporter, cannot fail to interest. It is as shown in the table on the opposite page.

Those are the averages, what are the actuals? Records exist, which may be depended upon, from the following periods:—

Place.	From.
Madras	1813
Bombay	1817
Calcutta	1829
Bangalore	1837
Mysore	1837
Nagpore	1826–32 1855
Jubbulpore	1845

Here are seven fairly representative stations of the whole of India, save the far north, which did not come under our control until nearly half the century had passed, and the North-West Provinces, unaccountably omitted.[2] The table before me takes the figures to 1876, sixty-four years so far as Madras is concerned, sixty in relation to Bombay: in any case a sufficiently long period on which to base trust-

[1] pp. 8–11, *Famine Report*, 1881, Appendix 1. [2] *Ibid.*, p. 10.

TABLE OF AVERAGE RAINFALL IN DIFFERENT PARTS OF INDIA.

DISTRICT OR LOCALITY.	No. of Stations.	Annual Rainfall.
1. Western Himalaya (Punjab and N.-W. Provinces)	8	65·07
2. Punjab Plains (Punjab)	29	21·98
3. Upper Gangetic Plains (N.-W. Provinces and Bengal)	50	38·00
4. Eastern Himalaya (Bengal)	4	144·49
5. Lower Gangetic Plains (Bengal)	22	67·20
6. Assam and Eastern Bengal (Assam and Bengal)	16	96·47
7. Western Bengal (Bengal)	10	55·92
8. Central India and Nerbudda (India[1] and Central Provinces)	12	44·30
9. Rajputana and Guzerat (India[1] and Bombay)	16	32·24
10. Sind and Cutch (Bombay)	10	8·79
11. Khandeish and Berar (Bombay and India[1])	7	29·21
12. Central Provinces (South) (Central Provinces)	15	49·09
13. North Deccan Plateaux (Bombay)	13	28·09
14. Hyderabad and South Deccan (India[1] and Madras)	5	25·50
15. Konkan and Ghâts (Bombay)	12	145·20
16. Malabar and Ghâts (Madras)	7	111·77
17. Carnatic (Madras)	28	33·88
18. Northern Circars (Madras)	10	36·16
19. Aralam (British Burma)	3	192·85
20. Pegu	6	76·36
21. Tenasserim	4	173·37
22. Bay Islands	2	108·41

worthy conclusions. From the figures the following facts are garnered :—

MADRAS :—

In sixty-four years the annual fall fluctuated between 88·41 inches in 1827 and 18·45 inches in 1832. The year *preceding* the lowest fall had 44·35 inches ; the year *after* 37·11 inches.

[1] In official publications, when allusion is made to Administrations, the word "India" means that the place indicated is under the direct control of the Viceroy and his Executive Council, through the Foreign Office, of which the Viceroy generally takes personal charge.

BOMBAY :—

Sixty years : Highest, 121·98 inches in 1828.
Lowest, 33·87[1] inches in 1824.
Year preceding, 61·70 inches.
Year following, 72·24 inches.

CALCUTTA :—

Forty-eight years : Highest, 91·49 inches in 1868.
Lowest, 43·61 inches in 1837.
Year preceding, 45·66 inches.
Year following, 52·99 inches.

BANGALORE :—

Thirty-nine years : Highest, 63·99 inches in 1867.
Lowest, 16·00 inches in 1838.
Year preceding, 44·30 inches.
Year following, 32·40 inches.

MYSORE :—

Thirty-nine years : Highest, 52·80 inches in 1852.
Lowest, 15·80 inches in 1840.
Year preceding, [no record].
Year following, 33·10 inches.

NAGPORE :—

Twenty-nine years : Highest, 65·31 inches in 1831.
Lowest, 25·49 inches in 1868.
Year preceding, 57·75 inches.
Year following, 33·38 inches.

JUBBULPORE :—

Thirty-two years : Highest, 77·78 inches in 1850.
Lowest, 35·12 inches in 1848.
Year preceding, 44·96 inches.
Year following, 46·92 inches.

It appears almost impossible to over-rate the significance of these figures. They make this, at least, clear, that, given a sufficiency of storage, and this, Sir Arthur Cotton confidently asserted, again and again, is possible almost everywhere in India, there might always have been enough water for the preservation of a certain proportion of crop, enough to maintain the people in their homes and their villages.

[1] In spite of this phenomenally slight fall (it was never again so low, 40·58 inches, no famine, being the nearest), the official records say, "Scarcity, nowhere amounting to famine."