Work as Chief Engineer, Mysore*

Sir M Visvesvaraya

Mr M McHutchin, M.I.C.E., Chief Engineer, Mysore, was due to retire from service in June 1909. The question of appointing a successor was under the consideration of the Government of Mysore when I returned to Bombay from my American tour about the 10th April 1909. Mr. V. P. Madhava Rao, C.I.E., who was Dewan of Mysore until 31st March 1909, had sent to my Bombay address a telegram asking me to join service as Chief Engineer, Mysore. As I had entered into a regular engagement with the Hyderabad Government I had to go there to fulfil it. Moreover, Mr. Madhava Rao had sounded me previously and knew I had no intention of joining the Mysore service.

After about a couple of months, Mr. T. Ananda Rao, who had in the meantime succeeded Mr. Madhava Rao as Dewan, sent me a letter on the 24th May 1909, in the course of which he wrote:

"His Highness would be glad to secure your services in view of your high qualifications and distinguished services and of the fact you are by birth a Mysorean ..."

"His Highness is confident that should you accept the offer now made to you, you will find ample scope both for your energy and talents in developing the vast irrigation of the land of your birth. His Highness is aware that you attach greater importance to opportunities for rendering public service than to mere official emoluments. Such opportunities will be open to you in works and projects which have to be carried out in Mysore."

As I had no intention of taking up service I asked for a fortnight's or three weeks' time to consider the offer before sending a reply. In the same letter I enquired "whether there was any prospect of Government encouraging industries and technical education in the State on a larger scale than they were accustomed to and utilizing my services in that connection." I added that I had made a special study of those two subjects in my foreign tours. The reply I received was that such encouragement was in His Highness' programme and that His Highness would avail himself of my suggestions as opportunities arose.

I joined the Mysore service as Chief Engineer on 15th November 1909. Mr. T. Ananda Rao, the Dewan, was very considerate and helpful during the whole time I worked with

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him. At the beginning I met with difficulties in making appointments. A high officer in the Public Works Department sent me a list of names of persons to be newly appointed and in support or justification he gave the names of several high officers in the State to whom the candidates were related or from whom recommendations had been received. The list had to be sent back to the officer for the names to be arranged according to the precise technical and educational qualifications of the candidates after further investigation. By enquiry and discussion, candidates were finally selected, priority being given to merit and qualifications as far as they could be ascertained.

Mysore had a large number of fine reservoirs and tanks, mostly of small size. A new reservoir of an unusual size had been constructed with a masonry dam, at a place called Marikanave, on the northern border of the State. Irrigation under this tank was being practised for some time. It was found that the cultivators were using the water none too economically and not by measurement and by this practice they not only failed to benefit the crops but had rendered the region malarial. When I heard of this, I tried to introduce the Block System of irrigation I had previously developed on the Bombay side with the imprimatur of the Indian Irrigation Commission of 1901-03, but the cultivators were secretly opposed to any change and, as had happened in Poona, the civilian officers also sided with them. There was a strong prejudice in favour of over-watering and as it was no easy thing to face opposition from both civilian officers and cultivators, particularly when I was new to the administrative practices of the State, the reform contemplated was not strictly enforced. I fear the irregular methods of water distribution under the Marikanave Reservoir have not received proper attention from responsible officials to this day.

His Highness the Maharaja encouraged the two developments I had urged prior to accepting office, viz., technical education and industries. The Government appointed a committee for each of these. In regard to technical education, the committee consisted of Mr. J. Weir, Inspector-General of Education, and three other Indian officers of the State. I worked as Chairman and our work resulted in a report which was submitted to Government in September 1912.

The Cauvery Reservoir (Krishinarajasagara)

The next important project that I took up was the construction of a reservoir dam across the river Cauvery. About the year 1902 Hydroelectric Works had been constructed at the Sivasamudram Falls on the Cauvery to utilise the natural flow of the river for power generation. On an average about 13,000 h.p. was being generated of which I 1,000 h.p. was supplied to the Kolar Gold Fields at a distance of about 90 miles from the Sivasamudram

anicut. The supply at Sivasamudram fluctuated, sometimes going down so low as less than 100 cusecs. There was a proposal to build a reservoir at a village called Kannambadi, about 10 miles west of Seringapatam, but no design of practical value had been actually prepared. Fresh surveys were undertaken for constructing a large reservoir, with a view to utilising the storage both for power generation and irrigation on an extensive scale in the Cauvery Valley. As I had visited large irrigation dams like the Assuan Dam in Egypt in the course of my tours and I had also done some work connected with designing large reservoirs in the Bombay Presidency and in Hyderabad, it did not require much time for me to prepare suitable designs and a complete project both for irrigation and power generation best suited to the requirements of the Cauvery Valley in Mysore.

The Sivasamudram Hydroelectric Power Station had been constructed during the term of office of Sir K. Seshadri lyer as Dewan with the help of the Public Works Department under the special supervision of Major A. C. J. De Lot Biniere, R.E., then Superintending Engineer in the State service.

The Managing Agents of the Kolar Gold Fields found the power supply they were receiving insufficient and unreliable on account of the varying small flow at Sivasamudram in the hot weather. As I was also Secretary to Government in the Electrical Department, I discussed the power supply problems with the representatives of the Managing Agents, Messers. John Taylor and Sons of the Kolar Gold Fields, in association with Mr. H. P. Gibbs, the Chief Electrical Engineer. After this discussion, the size of the reservoir as well as the stages of construction necessary were fixed with a view to supply water both to Sivasamudram Power Station and for all irrigation that could be practised in the Cauvery Valley within the Mysore State.

A masonry dam, 124 feet high, was designed to hold a storage of about 48,000 million cubic feet of water. This was to be utilised to irrigate eventually 150,000 acres of land and generate power to the extent of about 80,000 h.p. Apart from the supply to the Kolar Gold Fields, there was demand for additional power to meet the requirements of lighting and industries in the towns and cities situated in the river valley.

The design aimed at the construction of a lake with a masonry dam, 8,600 feet long, 130 feet high above the river-bed and 140 feet above the lowest foundation. The bed width at the foundation level was 111 feet. The catchment area of the river above the dam site was found to be 4,100 square miles and the average annual flow of water through the river gorge at the dam site was estimated at 220,000 million cubic feet.

The hydro-clectric power supply in the pre-reservoir period was, as stated already, 13,000 h.p., of which 11,000 h.p. was made available to the Kolar Gold Fields. Messrs. John Taylor and Sons, Managing Agents of the Kolar Gold Fields, asked for additional power to the extent of 5,000 h.p. for five years and of 10,000 h.p. later, subject to notice being given in the near future. Enough water was provided in the reservoir to generate up to 20,000 h.p. in the first instance at Sivasamudram, including the power which was being previously supplied. Another project was also planned to generate power more advantageously below but close to the Sivasamudram Falls, at a place called Shimsha. It is enough to state here that when completed these two stations were expected to generate 80,000 h.p. This supply is now being fully utilised.

I must state here that after the reservoir project was ready, no sanction was forthcoming from His Highness the Maharaja for some time. Some of the officers of the State, perhaps, dissuaded His Highness from spending as much as Rs. 253 lakhs, which was the estimated first cost of the project at the time. Such a large amount the State had never spent before on any single project. The Dewan, Mr. T. Ananda Rao, was, however, whole-heartedly in favour of the proposal. When I felt that I might not be able to influence His Highness the Maharaja, the thought occurred to me of retiring from the State service. I took short leave and proceeded to Northern India on a holiday. On my return I found there was no change in the atmosphere and no enthusiasm for new works and schemes. In these circumstances I kept aloof and confined my activities for some time only to the punctual execution of the routine duties of my office.

Noticing my altered attitude His Highness the Maharaja sent for me while he was camping in Bangalore and enquired why I was not interesting myself in new works and developments as I used to do before. I told His Highness the truth, that I was disappointed with the facilities given me to carry on new works and progressive developments. As there was no work in the State to be enthusiastic about, I wanted to leave the service. His Highness' reply was: "Don't be hasty, I will do what you want." He asked me to meet him at the capital (Mysore City) the following week. There His Highness was pleased to adhere scrupulously to his promise and sanctioned, after full enquiry, every one of the proposals I had submitted to Government. The principal proposal amongst them was the reservoir scheme. I did not know whether His Highness the Maharaja or his other advisers consulted outside engineers or not, but it served my purpose to find that the scheme submitted by me to Government was sanctioned without any addition, omission or alteration.

The next difficulty on the reservoir scheme was with the Government of Madras. That Government had prepared a project of its own for a reservoir on the same river at Mettur, about 60 miles below Kannambadi, measured along the river. The impounding of the waters of the higher valley made this scheme unworkable because they could not get all the water that they had hoped to store. When our reservoir was proposed, they had to change their designs, which they were unwilling to do for some time. We appealed to the Government of India and insisted on our securing our rightful share of the waters of valley. We had carefully calculated what that was. I believe the Government of India engineers were favourably impressed with our claim. We appealed to Lord Hardinge, the Viceroy, to permit us to proceed with the construction. This permission was given; but it was for the first stage only, namely, a height of 80 feet. We nevertheless started building the dam with the bottom width required for the full height we had originally designed, namely, 124 feet. Construction was started with a wider foundation and we stated that as we believed our claim was correct and just, we took the risk. Eventually, as a result of the award by an Arbitration Committee, we were able to proceed with the work according to our original design. We had the good-will and support of Lord Hardinge, the Viceroy, and of Sir Hugh Daly, the British Resident in Mysore, to both of whom our grateful acknowledgments for helping us in this matter are due.

The following extract taken from my address to the Mysore Representative Assembly on the 7th October 1916 explains the points in dispute which were referred to the Arbitration Committee, and their award:

"There appears to be considerable misconception, particularly among the inhabitants of the Cauvery delta in the Tanjore and Trichinopoly Districts, regarding the effect of this award. Statements have been made in the Press and at public meetings that the decision has been too favourable to Mysore and injurious to the interests of Madras. This view probably found currency with the public, partly on account of the technical character of the points involved in the dispute and partly because, owing to the delicacy of the situation, it was not possible to contradict earlier the one-sided agitation that has been going on in the Madras Presidency.

"At present the total area irrigated in the Cauvery Valley within Mysore territory is 115,000 acres. The corresponding area in the lower reaches of the river within the Madras Presidency is 1,225,500 acres; that is to say, 92 per cent of the area irrigated by the river lies in the Madras Presidency and only 8 per cent in Mysore.

"Three-fourths of the total water-supply of the river passes through the Mysore territory,

but, as stated above, the benefits derived by the State are wholly incommensurate with the high proportion of the total flow contributed by Mysore.

"A large surplus flow in the river goes to waste into the sea, year after year, after meeting the needs of both Mysore and Madras irrigation. The Mysore project is intended to store only a small portion of this surplus.

"While the Mysore reservoir is intended to hold a storage of a little over 48,000 million cubic feet, proposals have been matured by the Madras Government for constructing a reservoir of double this capacity practically from the same catchment at a point within the Madras Presidency just outside the Mysore boundary.

"The extension of irrigation proposed within the Mysore State is only 150,000 acres. The Madras project, on the other hand, contemplated the extension of the already large irrigation in that Presidency by 320,000 acres, that is to say, by more than double the area which will be irrigated by the Mysore reservoir.

"These two facts, viz., that there is ample surplus water in the river and that the Madras Government had themselves proposed the construction of a storage reservoir of a capacity double that of ours and for the irrigation of more than double the area contemplated by us, afford unmistakable proof that, with suitable regulation of storage, the construction of our reservoir would in no way interfere with the existing irrigation. It is admitted on all hands that Madras is entitled only to as much water as is required to safeguard its existing irrigation."

When we promised that the storage reservoir would be constructed by 1st July 1915, Messrs. John Taylor and Sons felt sceptical as regards our capacity to do the work in time. They had also under consideration an alternative thermal power station. When, however, the work was completed and water was supplied to the Power station according to promise, the Company expressed their satisfaction at the work that had been done and conveyed their deep obligations to His Highness the Maharaja.

In the very first project report submitted by me on 5th May 1911, my anticipations on the prospects of the scheme were expressed in these words:

"Once commenced, the scheme opens up a vista of possibilities of ever-increasing value to the State. But the speed with which developments take place will not be spontaneous, but must depend entirely on the energy and foresight displayed by the responsible Government in improving the market for power and extending irrigation. Having regard to the

indirect revenue to the State by the increase in the productive power of the country, a work like this would be justified even if it paid no more than 3 per cent. But the promise of extraordinary direct returns from power at commencement, and the opportunity it affords of building up a great irrigation project from the sale proceeds of power, form a combination of advantages rarely vouchsafed to such undertakings in any part of the world."

This reservoir work has certain unique characteristics found nowhere else in India, and they are:

(1) It is the largest reservoir ever built in India up to the date of its construction in 1912, either during the British Administration or before.

Note: The Mettur Reservoir on the same river, built by the Madras Government, is much larger, but its construction commenced in July 1925, i.e., some 13 years after the Mysore Reservoir was put in hand.

(2) A tunnel, about l ¾ mile long, has been pierced through a hill range to take the left bank Cauvery Canal through. It is believed to be the largest irrigation canal tunnel found anywhere in India.

(3) The Krishnarajasagara Scheme partakes of the character of a multi-purpose project. It may be regarded in essence as a miniature T.V.A. (Tennessee Valley Authority) Scheme in America.

The functions it performs are:

Nearly 100,000 acres of land are already brought under irrigation–more will follow.

It supplies power to the gold fields in the Kolar District.

It supplies electric light and power to the cities of Mysore and Bangalore besides a large number of towns and villages in the State.

It has led to the extensive cultivation of sugarcane which, combined with power, has rendered possible the Mysore sugar mills industry, one of the largest of that class of mills in India. It produces power to run the cotton mills in Mysore and Bangalore and various other industries of lesser importance.

(4) Some three years ago, the Chief Engineer in Mysore furnished, at my request, a statement of the economic purposes served and the remunerative character of the scheme to the State. The capital invested in the entire scheme was about Rs. 10½ crores. The direct and indirect benefits to the population amounted to about Rs. 15 crores a year and the Government was getting an annual revenue (taking both direct and indirect revenue into account) of about Rs. 1½ crores, representing nearly 15 per cent on the capital.