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Editorial

Street flooding in Calcutta.—Almost every year during the rainy season from May to October, some of the streets in Calcutta are flooded knee-deep after a heavy shower of rain and traffic is held up or dislocated, thus causing great inconvenience to the public. The blame for this state of affairs is often attributed to those in charge of the city's drainage. But we have evidence that the problem of efficient storm water disposal has been constantly exercising the minds of the city's Drainage Engineers; and now we have before us (published elsewhere in this issue) a paper on the subject, entitled "Street Flooding in Calcutta and Proposed Remedies," read before the Association of Engineers on the 11th March 1938 by Mr. P. C. Bose, Executive Engineer, Drainage Department of the Corporation of Calcutta.

The paper shows that it is really the existing system of drainage which is at fault due mainly to the difficulty of forecasting the intensity of rainfall and the amount of storm water to be disposed of.

The rainfall in Calcutta is not uniform. The average taken over a period of as long as 20 years gives no certainty. While it was expected that street flooding would occur on not more than two days in the year, there has actually been more than seven occasions in one year in which streets were flooded.

The paper describes the steps which are being taken by the Corporation of Calcutta and the Calcutta Improvement Trust to minimise flooding and expresses confidence in their success, but does not promise complete prevention of flooding. It is to be hoped that further steps will be taken to ensure this also.

Purification of Water.—Impurities in drinking water are known to be the cause of many diseases that are common among us. Some of them are even fatal, such as Typhoid and Cholera. It is highly desirable therefore to have a good knowledge and understanding of the method of purifying water, and we are fortunate in having from the pen of Mr. A. C. Banerjee of the Corporation of Calcutta a contribution on the subject. It is published elsewhere in this issue.

Hydro-Electric Development.—India has become fairly well noted for the magnitude of her Hydro-electric schemes. The abundance of rainfall, the existence of large catchment areas at great heights, and the possibility of obtaining high head drop constitute the sources of power that is available in many parts of India, and the necessity of utilising this power is increasing more and more as the years go by, owing to the gradual failure of other sources of Power.

The calorific value of *Indian Coalfuel* is at best 12,000 B. TH. U. and there are few Indian mines that can claim more than 11,000 B. TH. U. for their coal. This can hardly bear comparison with Welsh Coal which contains over 13,000 B. TH. U. Many of the Indian Mines have had to close down owing to the formatin of dangerous, explosive gases. Some have had to be sealed up owing to the outbreak of fire. Some are still burning away. Judging from the rate at which coal is being consumed and the results of prospecting it would appear that, unless more seams are discovered, the best quality of Indian Coal would be exhausted in about forty years' time. Complete reliance on Indian Coal is therefore out of the question.

Oil has not been discovered in India in quantities large enough to make her self-sufficient, and what little of it she does possess is mostly under foreign control. For these reasons Hydro-electricity seems to be the most suitable form of power to utilise for Indian purposes—agriculture as well as manufacture.

Most of the Hydro-electric schemes undertaken in India appear to have turned out successful financially as well as technically. Most of them commenced with provision for the supply of greater power than was actually in demand at the time of opening. But the demand has increased rapidly and it has now become necessary in some cases to undertake extensions to the existing plants.

The main difficulty felt at present in establishing suitable schemes in any locality is the lack of suitable records of rainfall and run off from which to determine accurately the power available and the catchment area required to provide against variations of rainfall. It is desirable that more observation posts be established throughout the country.

The most successful of the established schemes appears to be the *Pykara—Hydro-electric* scheme near Ootacamund on the Nilgiri Hills. This scheme was formally inaugurated on the 5th April 1933, and though not originally designed with the object of making profit it has yielded even in the fourth year of its working, 1936-37, a net surplus of 9.8 lakhs, a return of over 6 per cent. on its capital outlay, a return larger than that anticipated for the tenth year. The power demand too has so far exceeded anticipations that extensions have had to be undertaken within barely two years of operation. In 1936-37 the power demand on the plant amounted to 13,600 K.W.

The most noticeable feature of the *Pykara* scheme is the unusually high vertical drop of 4000 feet, 3080 feet of which have been utilised for the present with a reserve left for the future. With the available water supply 100,000 horse power could be developed.

A new project, known as the *Malakand Hydro-electric* scheme, completed at a cost of about Rs. 64 lakhs, was declared open by H. E., the Viceroy, Lord Linlithgow on April 23. This scheme has the advantage of the supply of the upper *Swat Canal* with a natural fall at the southern end of the *Benton Tunnel* and is likely to prove to be one of the cheapest per kilowatt of capicity. The *Upper Swat Canal*, it will be remembered, was constructed for the irrigation of the North-Eastern Part of the Peshawar Valley, and brought from Tribal territory into Indian territory through the hard Muscovite Granite of the Malakand Range by a two mile long Tunnel under the Malakand Pass, known as the *Benton Tunnel*. The Tunnel itself cost Rs. 22¼ lakhs to build, the boring alone running to about 11 as a cubic foot. In all, Rs. 2.12 crores were spent on the whole Irrigation scheme to provide for the irrigation of an area of slightly over 300,000 acres. But actually the area irrigated in the first year of opening was only 7,500 acres and though this has gradually risen till at present it extends to over 200,000 acres, yet the return is only 2.1 per cent. on the outlay and the canal is still working at a loss. A much improved return is however expected as development progresses.

Competition in the Engineering Profession.—The fact that many Engineering contracts are being taken up at incredibly low rates by contractors who have never had "the fortune of studying in any Engineering Institution" seems to have become a cause for alarm to some students of Engineering in the Bengal Engineering College at Sibpur, Howrah. An Editorial paragraph in the beautifully produced B. E. College annual of 1938, written in rather strong and somewhat uncontrolled language, attributes these low rates to bad designs, the use of "cheap" materials, and the ignorance of the general public. It expresses the fear that "qualified engineers" because they would not

condescend to such deception would "have to go starving" unless some thing were done to prevent this type of Competition. It suggests the formation of an Association of Engineers which will have a rule passed by the Government making it impossible for anyone to practise privately as a contractor or obtain employment under any organisation unless his name be registered with that Association as an "Engineer."

The success of such a scheme will depend to a great extent on the legal definition of the term "Engineer." At present there is no proper definition and anyone who practises the engineering profession is recognised in law as an engineer. Then there is the difficulty of having the Association itself recognised as a proper organisation with which registration should be made essential, and finally, there is the difficulty of forming that very Association itself, as it will depend on the agreement of successful private practitioners and public servants to pay subscriptions to an Association whose aid they do not require.

These remarks are likely to appear extremely discouraging to those students who are just about to complete their College course. But there is really no reason for Engineers with advanced education to be alarmed at any kind of Competition from those who have not had the advantage of their education, for such people can never take up contracts of importance, requiring engineering skill, without the employment of at least one educated and trained engineer; and no responsible person, firm or public body will ever place contracts of any great concern to them with anybody without engaging an experienced engineer for supervision. Employment of educated engineers is therefore assured.

It is true that certain types of construction appear often to be carried on without the employment of any engineer worth the name. But they are mostly those types that have been familiar for centuries and were well known before any engineering Institution was established. The fact that they are carried out successfully and without infringement of the established safety and health regulations shows that for those types of construction the necessary standard of education is such as can be obtained without entry into an Engineering Institution; and those students whose ambition is no higher than to make such constructions their main profession might just as well discontinue their studies at college and descend at once into that lower field of competition and so save the time and the money they might otherwise feel they have wasted in acquiring knowledge that they do not intend to use. Competition from this source is one that is not at all to be dreaded by those who have with diligence completed their regular college course.

Even if there were cause for alarm, the best way of winning in competition is not by the formation of cliques and the enforcement of discriminatory legislation but by being above all such questionable measures

through the achievement of a reputation for reliability, accuracy, thoroughness, quickness, and honesty. With such an achievement there will be no need to seek the aid of registration with an association for the purpose of self advertisement as an engineer: without it even compulsory registration will fail to help.

Dr. J. A. Waddell.—It is with great regret that we learnt of the death of Dr. J. A. Waddell who died on March 3. With his passing the Engineering profession has lost one its foremost members. Dr. Waddell was an American but his works were known all the world over. In his own country he was awarded several honours by the engineers there, and in other lands distinctions, decorations, and degree, from universities, professional societies, and governments. His generous attitude towards the younger men in his profession was well known. Recently he took a prominent part as Chairman of the Editorial Committee of the American Association of Engineers in the production of an excellent work entitled "Vocational Guidance in Engineering lines."

Sir J. C. Bose.—We have been questioned as to why there was no reference in our last issue to the passing of such a great scientist as Sir J. C. Bose. Many think that the omission was due to the belief exisisting in certain quarters that engineers are in no way concerned with Sir J. C. Bose's work. This is not correct. The real reason for the omission was that our publication was due so long after the regretted occurrence of his death that all reference at that time appeared to be out of date. It does not mean that we do not appreciate his works. Though they are not generally recognised as having any connection with engineering yet our view is that there is a great possibility of his scientific researches like all other scientific researches being made use of at some time or other by the engineer when the need arises.

Sir J. C. Bose's best known researches are those connected with plant life. But those researches commenced with and were really the outcome of his investigations regarding the fatigue and revival of materials subjected to the passage of Hertzian waves. The crystal that is used in wireless telegraphy as a "crystal detector" for the "Radio" receiving set was discovered by him after trials of various substances. The manner in which a crystal lost the property of detecting after a few days' continuous use and regained the same after a certain interval impressed him with the idea that an apparently inanimate object such as that crystal had been fatigued by constant use and revived by suitable rest. It was this idea that led him to investigate the manner of fatigue and revival of other substances, and in the course of these investigations he was so captivated by the behaviour of plants that to the end of his life he became engrossed in researches regarding them and his original subject was never again taken up by him.

The delicate and sensitive apparatus with which he carried out his epoch making experiments were all invented and made by himself in his own laboratory. Those instruments have the property of indicating and automatically recording the slightest motion in any part of plant by magnifying mechanisms similar to those of the Tangent Galvanometer and Aneroid Barometer.

Apart from the researches for which Sir J. C. Bose was famed, those instruments of his are themselves of very great interest. They may be seen at the Bose institute where they are exhibited. They show what an inventive mind Sir J. C. Bose had, and, had this been turned towards Engineering problems, we might have had many of them solved, and many interesting machines to help construction.

But, whatever may be the general opinion regarding the utility of Sir J. C. Bose's Scientific discoveries, his munificent gifts to the university and various charitable institutions must compel universal attention to his generosity and gain for him perpetual recognition as a benefactor of mankind. May his soul rest in peace.

Mr. N. L. Das Gupta

We have to record with regret the untimely death of another of our Associate members, Mr. N. L. Das Gupta, taken away from us while still in his Thirties. He was a frequent contributor to our Journal on the subject of Pulverised fuel and we share this loss with his bereaved family.