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Editorial Notes

In this issue we have a paper from our past president giving particulars of our country's industrial expansion under the planning system. We are happy to note that inspite of the numerous difficulties mentioned therein some substantial progress has been achieved.

The wide area of the world over which our land is spread and the vast population it hold imposes on us a duty to maintain good communications and good relations with the rest of the world for the mutual benefit of all so that distressing deficiencies of any area may be easily and sympathetically relieved by surplusses from other areas. For this purpose it is necessary that coastal ports and all navigable channels leading thereto be regularly developed, improved and carefully maintained. A very important factor that deserves greater attention than has been given to it in the past is the preservation of the depth of the navigable channels and the draft necessary for ships to transport the required goods economically.

60 FEET DRAUGHT.

Investigation into the relation between the cost of transportation of goods by sea and the draught of the ships that bear them have shown that it will be economical in the future, so far as the ship is concerned, to carry merchandise in vessels with a draught of 60 feet.

This conclusion was arrived at by The late Sir John Biles, Professor of Naval Architecture at the University of Glasgow, and his assistant Dr. Robb, (recently retired holder of the Chair of Naval Architecture) there, and the matter has been brought up on several occasions in the past by Sir John Biles :

1. Evidence before the Dominions Royal Commission in 1913 and 1914;

2. Thirteenth International Congress of Navigation at London in 1923;

3. Discussion at the Institute of Naval Architects in London in 1930 on a paper read by Prof. T. B. Wilton of Liverpool University on the "*EFFECT OF GROWTH IN SIZE OF CARGO SHIPS ON DOCKS AND THEIR EQUIPMENT, WITH SPECIAL REFERENCE TO LIVERPOOL DOCKS.*"

4. Paper read at the seventy second session of the Institution of Naval Architects in Paris in 1931 on "*THE DRAUGHT AND DIMENSIONS OF THE MOST ECONOMICAL SHIP.*"

This question has a particular bearing on the depth of entrance to and water in docks and should be taken into consideration when arrangements for the development of ports of India are being planned.

The subject was reviewed with particular care by Dr. Robb and Sir John Biles when a discussion took place in Parliament and in the Port of London Authority regarding the construction of a tunnel under the Thames and the depth to which the Tunnel should go in order not to interfere with the Port of London in future, and the conclusion arrived at then was that in the future (one could not say how near) the most economical ship would be one drawing 60 feet of water, and the only limitations to the creation of that ship were, first, sufficient market to supply the ship with cargo, and second, the depth of water in the docks, the entrance to the docks, and the entrances to the harbours; and incidental to that was the question of the amount of cargo that could be turned out of a ship per hour.

The cost of deepening and maintaining the approaches to inland harbours may be determined from the general rule that cost of ports increase in proportion to the cube of the draught, as demonstrated in a paper by Sir Leopold H. Savile at the International Congress of Navigation in 1923, referred to by Sir John Biles in his reply to the discussion on his 1931 paper at the I.N.A. meeting at Paris.

At present the greatest draft available is not more than 30 ft. at Calcutta, 30 ft. at Colombo, 33 ft. at the Suez Canal, or 40 ft. in American Ports. But draughts of ships are gradually increasing. They have increased steadily from 16 ft. a hundred years ago to 34 ft. round the cape, and 40 ft. on the North Atlantic trade. Correspondingly. important docks have been gradually increased to make them capable of taking vessels of larger draught. It would not be wrong, therefore, to expect that further increase may take place in future and to remain prepared for that increase and avoid costly alterations later on. There is on record a case where difficulty was felt by the Mersey Dock and Harbour Board which was not prepared originally for such large increases of draught. They had hoped at first to take these vessels by pumping water into the docks. But this method raised the top of these vessels so high above the sheds that it became difficult to load and unload them. Later it was decided to deepen the docks by digging out the Bottom and when the work was in progress it was found that the foundation of the Dock Walls became exposed and these had to be rebuilt with added expense. Care should be taken to avoid the necessity for any such additional expense by Indian Ports in future. Gradual deepening of all ports and navigable channels leading thereto should be taken on hand, as a matter of regular routine, and arranged for by all authorities concerned with the finances of the Ports.

It is on record that by organised efforts of River training and Dredging empowered by Legal Enactments it has been possible on the Clyde to improve the river and increase the bed so that between Port Glasgow and Glasgow, a distance of 10 miles, where vessels drawing only 4 ft. 6 inches were unable to ply in 1770, by 1806 vessels drawing 8 ft. 6 inches could safely proceed and by 1914 vessels drawing upto 29 ft. 6 inches could be accommodated.

This shows an increase in depth by about 2.33 inches per year. The depth of the Suez Canal was increased from 26 ft. in 1869 to 34 ft. 6 ins. in 1913, i.e. about 2.32 inches per year. The depth of the River Liffey was increased by a system of Training Walls at its Mouth 7 feet in 30 years, i.e., about 2.8 inches per year.

On the River Hooghly, however, the Maximum draft available was—

30′—0″ in 1955.
30′—6″ in 1956.
29′—9″ in 1957.
27′—0″ in 1958.

The draught was even less than 26 ft. for—

217	days	in	1955	going	down	to a	minimum	of	20′—0″	on occasion.
197	„	„	1956	„	„	„	„		20′—0″	„ „
214	„	„	1957	„	„	„	„		20′—9″	„ „
355	„	„	1958	„	„	„	„		18′—6″	„ „

It is urgently necessary that a concerted effort be made to adopt a regular scheme whereby the River may be gradually improved by narrowing at the mouth, straightening the bends and deepening the river both by training walls and by dredging. If this can be done at the above rate of 2.3 inches per year, we would get an increase of 2.3 ft. depth in 12 years and 11 ft. 6 ins. in 60 years which is worth trying for by means of a dozen Five Year Plans. This would give us a depth on the Hooghly which would allow a draft of 38 ft. 6 ins. Though this is far short of the ideal 60 ft., it would be enough for the largest passenger vessel afloat at present, the "Queen Elizabeth," and therefore deserves urgent consideration by the planning authorities. With the continuance of dredging and training the ideal should be reached in less than 200 years time by the end of the 37th Five year Plan.

Nuclear Engineering.

We are now at the commencement of a new era in power development with the discovery of atomic energy and its adoption in power-plants on land and sea for generation of electricity and/or propulsion of ships. As experience in our country in this line is limited, we publish herein some extracts from other publications with which we have been favoured and for which our thanks are due.

During the last 3 years several full scale Nuclear Power Stations have come into commission on land and sea; a larger number are under construction and more under consideration and a vast amount of literature on technical, commercial and safety aspects of Nuclear Engineering for peaceful purposes which deserve to be read has accumulated. This may be judged from the papers presented at the International Conference on the Peaceful Uses of Atomic Energy at Geneva in 1958, and those published by the Joint Panel in Nuclear Marine Propulsion (which have been kindly presented to our library by the Institute of Marine Engineers, London). Various types of reactors with varying economy are being adopted and experimented upon in different countries.

The first full scale nuclear power station was installed at Calder Hall, in U.K. in 1956.

This station after operating successfully for a short period suffered a mishap when operation was suddenly interrupted by fracture of some mechanical parts which necessitated destruction of the milk supply of the district as a precautionary measure against contamination by Nuclear outfall. After necessary repairs the plant has been in successful operation since then without any adverse consequences.

There are four main types of reactors that are in favour at present. In U.K. and France gas cooled, graphite moderated reactors, are being developed with improvements in design by increases of rating and output leading to reductions in Capital Costs.

In U.S. use is being made mainly of the Pressurised Water reactor and boiling water reactors. The boiling water reactors show a reduction in Capital Costs of 30 per cent or so over the pressurised water reactor.

In the U.S.S.R. Pressurised Water reactor and also a graphite moderated water cooled reactor is being used with provision for super heating in the latter type.

A fast reactor to develop 100-M.W. of electricity is being built in the U.S. and one to develop 250-M.W. is being planned by the U.S.S.R.

Large scale fast reactor experiments are also due to be commissioned in 1959 in the U.K. and in 1960 in the U.S.

Load factors, Capital charges, power costs and the price of enriched Uranium fuel vary greatly from country to country. Nuclear power is not as yet competitive with conventional stations using coal, natural gas, or Hydro electricity any where.

But it is expected that with gradual reduction in Capital costs due the developments in progress and improvements in technology in sight nuclear power will break even with conventional commercial power by 1968 in U.K., where fuel costs are high, by 1978 in U.S., where fuel costs are lower and by dates in between these in other countries, varying according to prevailing rates of the various factors there.