



SATURDAY, APRIL 1, 1933

No. 3309

Vol. 131

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Editorial and Publishing Offices :

MACMILLAN & CO., LTD.

ST. MARTIN'S STREET, LONDON, W.C.2

Telephone Number: WHITEHALL 8831

Telegraphic Address: PHUSIS, LESQUARE, LONDON

Advertisements should be addressed to

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Telephone Number: City 1266

The Severn Barrage Scheme*

THE long awaited report on the practicability of the proposal for the establishment of a great hydro-electric power generating installation near the mouth of the Severn, to be actuated by the tidal waters of the estuary in conjunction with an impounding dam, generally known as the Severn Barrage Scheme, has, at last, appeared. Interest in the matter may be expected to revive with the publication of the report and especially when the Cabinet pronounces its decision thereon, but much of the keen attention which was excited by the original promulgation of the project has died down during recent years. It was put forward in 1920, in unusually glowing terms, by the Ministry of Transport, and advocated as a means of opening up a "vista little short of a revolution in the industrial life of the West and Midlands of England" and of bringing "within the reach of all classes of the community the blessings of light, purity and power". In political and labour circles, with an enthusiasm, which neglected, perhaps, to take into account the limitations and delays inherent in the realisation of constructional undertakings of great magnitude, it was hailed as a heaven-sent inspiration for the immediate absorption of a large bulk of unemployed labour. These highly coloured expectations have given place to a more sober and reflective outlook.

In the intervening period, the scheme has been receiving careful and painstaking investigation by a Committee of the Economic Advisory Council, of which Lieut.-Col. J. T. C. Moore-Brabazon, M.P., is chairman. The technical features of the project not unnaturally presented a number of complex problems, some of them of quite a novel character. It is claimed in the report that this is the first tidal power scheme of any magnitude to be investigated in any part of the world in which a solution of the problems has been indicated. No reliable judgment, therefore, could be formed on the feasibility of the project, until the whole of the physical conditions and the constructional details had been examined from a strictly scientific and economic point of view. The results of the execution of the work were bound to be too far-reaching and drastic in their repercussions on a variety of important interests for it to be treated otherwise than with the most serious attention. The professional men associated with the deliberations and conclusions of the Committee

* Economic Advisory Council. Severn Barrage Committee Report. Pp. 28. (London: H.M. Stationery Office, 1933.) 6d. net.

were Sir John Snell, Sir Basil Mott, Sir H. P. Douglas, Prof. A. H. Gibson, and Mr. T. Shirley Hawkins: these names are a sufficient guarantee that this duty has been faithfully and consistently performed. Theoretical calculations have been supplemented by the operation of models and experimental apparatus of a very elaborate character in an endeavour to arrive at a true picture of the results.

As the outcome of its labours, the Committee has issued a carefully considered verdict on the technical side of the undertaking. Following the lines of the interim report of 1929, the Committee finds that there are no insuperable difficulties, geological or otherwise, in the way of the construction of a barrage, and it indicates a suitable site for the structure at the English Stones, on a line approximately parallel to the existing Severn Tunnel. It states, however, that a power station at the barrage, dependent entirely on tidal action, would not produce electrical energy at a cost which could compete economically with energy generated at selected coal-fired stations. On the other hand, with an auxiliary scheme of water storage, which the Committee has examined for a suggested site in the Wye Valley and finds to be quite practicable, it is considered possible to produce a supply of electrical energy, somewhat less, it is true, than that obtainable from the barrage alone, but still of considerable proportions and adequate to meet one thirteenth of the total likely requirements of the whole country in 1941 (estimated at 21,000 million units) at a cost which would be only two-thirds of that due to generation at equivalent coal-fired stations. This would mean the substantial saving of between a million and a million and a quarter pounds per annum.

The capital sum required for the realisation of this outstanding enterprise is of correspondingly colossal dimensions, remarkable even in these days of Brobdingnagian finance. With auxiliary features—roads, railways and harbour facilities—it is estimated to run to over fifty millions sterling. Moreover, the scheme cannot be conjured into existence by the stroke of a magician's wand: it will take fifteen years of steady and persistent effort, during which it is estimated that the number of men employed on construction and manufacture will increase gradually from 2,000 in the first year to 12,000 in the tenth, thereafter rising rapidly to a maximum of 27,800 in the thirteenth year. The Committee does not anticipate that the work could be commenced before

1937, consequently no effective operation would be realised before 1942. In cases of all major engineering works, a great deal depends on the accuracy of the forecasts of time and outlay. In the present instance, the premises for these forecasts are attended by rather greater uncertainty than usual, and it is of interest to note that the allowance for contingencies in the expenditure is 12½ per cent. Moreover, the rate of interest for loans has been calculated at 4 per cent, although the present market rate for Government guaranteed loans is about 3½ per cent. The Committee wisely emphasises the risk of unforeseen difficulties and the danger that the estimates may prove inadequate.

Not the least important consideration in the investigation, apart from the main object of the scheme—the generation of cheap supplies of electricity—has been the probable physical effect of the construction of a solid barrier across the Severn estuary and the consequent interference with the established regimen of the tidal region and the upland water discharge—an interference which may bring about changes affecting in greater or less degree the navigable approaches to the docks at Avonmouth and the port of Bristol in the seaward portion and the transportation conditions to and from the port of Gloucester above the barrage. This aspect of the matter has been carefully investigated by Prof. A. H. Gibson with the aid of a large scale tidal model in an extended series of experiments, from which it would appear “that a barrage would not injuriously affect navigation *below* the barrage”, while, “even without dredging, a barrage would not seriously affect navigation *above* the barrage at any time of the tide, and would appreciably improve it at low water”. How far this pronouncement, founded as it is on relatively minute movements of silt-laden salt water in a model on a distorted scale, will go to alleviate or dispel the apprehensions entertained by the authorities of the ports of Bristol and Gloucester, it is difficult to say, but they will undoubtedly require to be convinced in no uncertain way that their important trade interests are not likely to be prejudicially affected by the proposed undertaking. A strong point in support of the general reliability of the model experiments is that they have satisfactorily reproduced the main conditions in the estuary at the present time after a period of operation representing seventy-eight years of past history.

Another matter of public concern is the question

of floods, which, in the upper reaches of the Severn, are often of a serious character. Fears have been expressed that control of these visitations would be rendered more difficult by the existence of a barrage. The report states that, on the contrary, the model experiments show that a barrage would provide a means of reducing inundations in times of flood. Prof. Gibson's reports on the operation of the model do not accompany the Committee's Report; they will be awaited with interest for the additional light they will throw on the methods by which these important conclusions have been reached.

Sanitation has not been overlooked, and it is satisfactory to have the assurance that the barrage would not seriously affect the question of sewage disposal. With reference to the auxiliary features of the scheme (docks, roads, railways and other transport facilities), it is pointed out that, in combination with a supply of cheap electricity, they may lead to the establishment of new industrial centres, which, as potential sources of trade, offer the prospect of financial return on the outlay.

The foregoing is a necessarily brief review of the principal conclusions arrived at by the Barrage Committee as a result of prolonged and praiseworthy researches. After pronouncing a favourable opinion on the practicability of the scheme from a technical point of view which is sure to command general professional assent, the Committee is careful with judicial impartiality to direct attention to other considerations of a non-technical character "such as the social, economic and industrial reactions of the scheme upon the district", which lay outside the terms of reference and therefore did not concern the Committee in drawing up its report. These considerations are admittedly of the highest importance and will have to be carefully taken into account before the country can commit itself to an outlay of the magnitude suggested. The prospect of a great augmentation of power at favourable rates of generation is undoubtedly attractive, especially to a community like our own, which is dependent on its industrial output for its livelihood and prosperity, and faced nowadays with the fierce competition of other nationalities. None the less, it is essential to exercise due circumspection before the country embarks on an enterprise which, for good or evil, will leave a permanent impression on its surface and an indelible record in its history.

B. C.

International Economics

The Means to Prosperity. By John Maynard Keynes. Pp. 37. (London: Macmillan and Co., Ltd., 1933.) 1s. net.

NOTABLE in themselves, and doubly notable for their appearance in the *Times*, Mr. Keynes's recent articles on "The Means to Prosperity" have now been rounded off by a short introduction and conclusion and republished. Mr. Keynes's thesis in essence is the familiar argument that schemes of capital development or, as he terms it, loan-expenditure, are the only available means for creating employment, stimulating demand, raising prices, and so extricating the world from the present depression. Since loan-expenditure by public and semi-public bodies for housing, transport and similar capital works normally absorbs a large proportion of the activity of the capital goods industries, and since private business will not enlarge its demand for capital goods until *after* prices and turnover have increased and profits have become reasonably assured, Mr. Keynes urges that the loan-expenditure which the present situation demands should be embarked on by Government, first through reversal of the contractionist policy which has prevailed for the past year and a half, and then through the launching of new schemes of needed development.

Such schemes, Mr. Keynes argues, by reducing outlay on the dole and increasing the national income and therefore the yield of taxation, will benefit the Exchequer and stimulate industry generally. Since, however, no country by single-handed efforts can increase the volume of employment sufficiently, and since contradictory policies in various countries would cancel the advantages of expansionist efforts, in order to bring about world recovery fresh loan-expenditure must be undertaken simultaneously in all important countries by international agreement. The difficulties and fears of central banks, and the shortage, outside France and the United States, of internationally acceptable means of payment, would however prevent the expansion of credit which must accompany reviving trade. In order to solve this problem, Mr. Keynes advocates the issue by an international authority of gold notes to a total of 5,000,000,000 dollars which, allocated to each country in appropriate proportions against corresponding gold bonds, would