

The Forest Industry of Finland.

IN a recent number (No. 8, 1928) of the *Oxford Forestry Memoirs*, Mr. W. E. Hiley discusses the "Forest Industry of Finland," his brochure being based on a visit to the Finnish forests last year. It has become a curious practice with some of the younger writers on forestry questions to treat pre-War investigations as either non-existent or of little importance. Thus in his paper Mr. Hiley writes: "Much has been written in the English language about Finnish forestry and the timber trade, and English readers can acquire a good general knowledge of these subjects without leaving Britain. But so far, very little information has been available with regard to the economics of Finnish forestry." Mr. Hiley does not define his term 'economics,' but a perusal of his interesting memoir fails to exhibit any marked departures from the lines of articles which appeared in 1911 in the publications of the Geographical Society of Finland. Several of these articles were from the pens of experts such as Prof. A. K. Kajander, P. W. Hannikaiven (then Director-General of State Forests), and A. B. Helander (Inspector of Forests). These articles were dealt with in the English press and in some cases by men who had a personal acquaintance with the Finnish forests.

Although, as Mr. Hiley says, the State forests of Finland are mainly confined to the northern parts of the country, the richer and better forests to the south being largely in private ownership, yet by 1910 the annual receipts from the State forests amounted to £660,000 with an expenditure of £195,000. Under the Czarist regime, however, the policy towards Finland was one of repression in industrial development, and the forest administration was starved. It may be mentioned that the species consist principally of Scots pine, spruce, and white birch, with a little aspen, grey alder, and pedunculate oak.

Since 1917, when Finland freed herself from Russia, there has been a remarkable progress in forest development and timber exploitation on up-to-date lines, with the result that at the present time she is one of our best suppliers of soft woods and has taken a leading place in the European timber markets. This development, and the startling rapidity with which it has proceeded, has proved of high interest to those acquainted with the country and its pre-War position. Mr. Hiley has taken full advantage of the opportunities so kindly afforded him by the Finnish Government

officials, and his memoir will prove of value to all interested in this matter. It will suffice here to indicate some of the main divisions of his subject; namely, ownership of the forests, administration (State forests, joint stock company forests, private forests), silviculture, felling and extraction, sawmills, economics of forest management, costs and prices, and finally a few remarks on the forest policy of Finland. The latter are of special interest, since the author here gives us the present-day forest policy of the Government.

The State recognises that its first duty is to maintain the timber increment (the forests providing the most important of Finnish exports) so as to preserve the great timber industry of the country, whilst maintaining the necessary supplies of wood for home consumption. In 1926 the value of timber and other forest products exported amounted to 85.4 per cent of all Finnish exports. As regards home consumption, all who have visited the country will have been struck by the universal use of timber. Outside the larger cities all buildings are almost entirely constructed of wood. It is estimated that 60 per cent of the wood felled is used in the country, representing a *per capita* consumption of 260 cub. ft. per annum, or about ten times more than the consumption in Britain. Wooden fences replace hedges, and the railway engines are of course fuelled with wood, coal being too expensive. The new policy in the State forests is to take an increasing share in the conversion of timber, whereas formerly the trees were sold standing, or felled and hauled to the rivers. The State now owns a controlling share in two important timber companies and has several sawmills of its own, including a large and modern mill at Veitsiluoto at the mouth of the Kemi River, in the extreme north of the Gulf of Bothnia.

The income from, and expenditure on, the State forests has increased progressively since the country became independent and a more rational policy was introduced, the figures for 1924 being respectively about nineteen and twenty-eight times the amounts for 1910. Some dissatisfaction is being manifested at the State entering into competition with the mercantile community; but in the present stage of this important industry in the country the policy would appear to be a sound one. In conclusion, Mr. Hiley's brochure may be commended as meriting a study by all interested in the soft wood timber trade.

Chemical Analysis in the Public Service.

'SAFEGUARDING'—in a non-political sense; safeguarding of health, of justice, and of revenue—relies to an ever-increasing extent on the services which can, under cautious yet confident direction, be rendered by chemical science. The report of the Government Chemist for the year ending Mar. 31, 1928, abounds in examples of such service to the various departments, and in certain respects to the Government of Northern Ireland, the High Commissioner for India, the Crown Agents for the Colonies, the Dominions Office, the Corporation of Trinity House, the Commonwealth of Australia, and the High Commissioner for Southern Rhodesia. The work for most of the departments is carried out at the laboratory at Clement's Inn Passage, London; the laboratory at the Custom House naturally deals specially with customs samples, some of which, together with excise samples, are examined at chemical stations established at the more important seaports. In addition, the laboratory at the Geological Survey Museum is maintained, and work for the War Office is per-

formed at the Supply Reserve Depot laboratory at Deptford.

The total number of samples examined during the year was 491,039, an increase of 21,397 over that of the preceding year. In addition to this purely routine analysis—if such a term can be properly applied to so heterogeneous a collection of samples, involving the most varied and detailed methods of examination—a considerable amount of work has been done in connexion with the revision of existing methods and the investigation of new methods of detection and determination of substances; moreover, the Government Chemist (Sir Robert Robertson), his deputy, and staff serve on various official committees, and from time to time are called upon to give evidence in legal proceedings.

The report shows, for example, that exceptional care is necessary in the sampling of milk supplied in bottles, the absence of air space rendering mixing difficult; that forty samples of fresh milk in churns imported from the Continent were satisfactory; and

that although only 45 per cent of the samples of imported cheese examined had been prepared from whole milk, in the absence of regulations relating to the marking of skimmed milk cheese no action could be taken in respect of the remainder. On the other hand, out of 69 samples of condensed milk or milk powder, seventeen had been prepared from skimmed milk without being so declared on the package, as required by law.

More than fifty samples of river water, muds, and effluents were examined from the point of view of fish life and the effect of pollution on fish and fish food. Incidentally, North Sea herring and sea water were found to contain traces of arsenic. A sheep's jawbone containing teeth with a metallic lustre, popularly believed to be a deposit of gold, was examined; the metallic sheen appeared to be due to the effect of light on a laminated crystalline structure mainly composed

of calcium phosphate. In 50 per cent of the samples of non-alcoholic beer the amount of proof-spirit present exceeded the legal limit of 2 per cent, and 14 out of 36 samples of herb beer, ginger beer, etc., contained alcohol ranging from 2 to 5 per cent of proof spirit.

The silk and artificial silk duties have in many cases necessitated much detailed examination of goods. Saccharin is searched for in all likely preparations, and is indeed found in a large proportion of imported substances, usually containing some other dutiable ingredient. Large stocks of tea in bonded warehouses on the banks of the Thames had to be re-examined on account of damage caused by floods. It is also worth recording that more than 200 milligrams of radium were recovered during the year from accumulated stocks of disused luminous compass dials etc., and the product was concentrated into a high-grade salt.

The Embrittlement of Boiler Plates.

IN the issue of NATURE for May 7, 1927, p. 686, an account was given of work which had been carried out at the Experimental Research Station of the University of Illinois over a period of several years. The authors, S. W. Parr and F. G. Straub, showed that the embrittlement of boiler plates takes place as a result of the simultaneous action of a tensile stress exceeding the elastic limit, and of a concentrated solution of caustic soda. The amount of the latter required exceeds, however, anything which could normally be present in the boiler water itself, but this concentration can occur in the seams where the plates have been riveted together, and it is in this locality that embrittlement cracking takes place.

Bulletin No. 177 by the same authors confirms the earlier work, both by laboratory tests and in actual boiler practice, but carries the question of the inhibition of the embrittlement a good deal further. It was shown in the earlier paper that, provided the amount of sodium sulphate in solution in the water was sufficient, embrittlement could be prevented. The American Society of Mechanical Engineers has recommended, therefore, that the water in boilers should be maintained with a ratio of sodium sulphate to total alkalinity, calculated as sodium carbonate, of not less than the following: For a working pressure in the boiler up to 150 lb. per square inch, 1 to 1; from 150 lb. to 200 lb. per square inch working pressure, 2 to 1; and above 250 lb. per square inch, 3 to 1. It is doubtful whether any case of brittleness has ever been observed in boilers where these conditions have been fulfilled.

The authors in their later paper have pointed out in a very clear manner the danger which may ensue as the result of the addition of water-softening materials, such as soda ash or zeolite, in the absence

of adequate supervision, and give numerous examples of failures in boilers which have resulted from the use of these materials without proper control. From the very large number of cases of boiler embrittlement which have come under their examination, the authors state that 10 per cent only were the result of embrittlement by natural water, 20 per cent occurred with water treated with soda ash, and no less than 70 per cent with water treated with zeolite. The presence of sodium chloride in the boiler water is also shown to accelerate the attack very greatly.

Attempts to prevent the formation of caustic soda in the boilers by the addition of organic matter have been made, but with no success in the authors' hands, since it is impossible appreciably to retard the decomposition of the sodium carbonate by this means. Apparently the most successful method of preventing brittleness is by the addition of soluble phosphates: a solution of sodium phosphate containing 0.6 gram of the PO_4 radical per litre has been shown to prevent cracking even where a steam pressure as high as 500 lb. per square inch has been used, and where the mild steel has been subjected to a tensile stress of 45,000 lb. per square inch, together with a concentration of sodium hydroxide of roughly 300 grams per litre. In a check experiment, using the same conditions apart from the addition of the phosphate, fracture occurred in the steel in twenty-four hours. It is stated that a United States patent has been taken out to cover this use of sodium phosphate. Other substances, such as chromates, tannates, acetates, etc., may also possess value in this connexion.

The authors have been unable to find any steel, otherwise suitable for boiler plates, which is resistant to the embrittlement resulting from the simultaneous action of stress and caustic soda attack.

The Public Health.

THE ninth Annual Report of the Ministry of Health, 1927-28,¹ is a mine of information on various aspects of the public health. It is divided into five sections, one of which comprises the report of the Welsh Board of Health, and a series of appendices. The five main divisions deal with the public health, local government and finance, administration of the poor law, and National Health Insurance and Contributory Pensions. Among the general subjects in the section on public health, reference is made to the coming into force of the Therapeutic Substances Act, 1925, and the passage of a Bill through Parliament to amend the Mental Deficiency Act, 1913, to allow of the treatment of young persons suffering

from the after effects of encephalitis lethargica: mental defectiveness is now defined as a condition of incomplete development of mind existing before the age of eighteen years, whether inherent or caused by disease or injury. Work has also been commenced to investigate the causes of maternal mortality and puerperal fever: the maternal mortality rate has been almost stationary in Great Britain for the last twenty years, indicating that special efforts must be made to reduce it.

In the section on the inspection and supervision of food, it is noted that the demand for milk of high hygienic quality continues to increase. Although the addition of preservatives to articles of food is now restricted, a few samples out of the large number taken, chiefly sausages and other meat products, were

¹ "Ninth Annual Report of the Ministry of Health, 1927-28." Pp. 292+xviii. (London: H.M. Stationery Office, 1928.)