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The Forestry Commission*

THE fifteenth annual report of the Forestry Commission presents a record of the work carried out by the Commissioner since its establishment in 1919. The fifth and the tenth annual reports gave similar general reviews of the work done in the first and the second quinquennium respectively.

The wide and expanding scope of the work which is being carried out by this young and energetic Government Department is shown at a glance by the full 'contents' of the report before us. In spite of its fifteen years of existence, the Forestry Commission is still merely in the first phase of its existence; the Commission, like the forest, cannot be regarded as full fledged and in full working order until a complete forest rotation has run its course, and, as is well known, a forest takes many decades to reach maturity. The Transfer of Woods Act, 1923, however, placed fifty-six thousand acres of existing forest under the care of the Forestry Commissioners, and this brings under their administration the whole range of forestry practice. Nevertheless, the chief function of the Commission is meantime to create and re-establish forests adequate to supply at least part of the needs of Great Britain in timber of economic value.

At September 30, 1934, the Commissioners had under their charge approximately 909,000 acres of land, which gives an indication of the progress made since 1919. A further idea of the progress being made in afforestation by the Commissioners is afforded by the number of manual workers employed in their forests. The summer minimum in 1920 was 210; and the winter maximum in 1920–21 was 935. In 1934, the summer minimum had increased to 3,015, and the winter maximum of 1934–35 was 4,020. The intermediate figures of employment show a steady increase during the intermediate years, and as time goes on the numbers are bound to increase not only as the area under forest expands, but also as the plantations approach the thinning stage. These operations will involve cutting, haulage, preparation, and road, rail and to some extent sea transport to the mines and other timber consuming centres. A drop of a thousand or two in the figures of unemployment is hailed with delight as a sign of economic progress and recovery. This new national industry, set upon its feet by the establishment of the Forestry Commission, is undoubtedly pulling its weight.

The funds at the disposal of the Commissioners are being deposited in a safe bank. If we look at the question from the point of view that it is not the forester but Nature which produces the timber, we get a clearer idea of the economic basis of forestry. The forester by his labour and a certain amount of capital outlay in material produces conditions which enable Nature to become his ally in the direction he desires. Once he has placed the right tree in the right environment, natural growth factors such as sunlight and temperature, with a suitable amount of air and soil moisture, enable the living machine to get to work and from the carbon dioxide of the air and a small amount of mineral food materials from the soil, timber, which consists mainly of carbon, is produced. The raw material is cheap and abundant. The carbon from the air costs nothing and the small quantity of minerals from the otherwise idle soil is being put to a useful purpose, and as time goes on the productive capacity of the soil is improved, under suitable sylvicultural management. Surely then, something for nothing, with

* Forestry Commission. Fifteenth Annual Report of the Forestry Commissioners for the year ending September 30th, 1934. (London: H.M. Stationery Office, 1935.) 2s. net.

raw material inexhaustible, if properly used, is an attractive proposition. The forest capital is increasing in direct ratio to the rate of growth of the trees. The forester organises the industry in which Nature supplies the driving power and the raw material. The trees are his 'workmen', which if properly treated are busy night and day with no 'off' time or unemployment. There are therefore, surely, a few concerns in which money, especially national funds, can be applied with more safety or greater mutual benefit to all.

A perusal of the Forestry Commissioners' report shows that everything possible is being done in regard to land acquisition and planting, education, research, and the development of forest technique. Research and experiment in regard to the production of timber under varying conditions, the establishment of new plantations, the treatment, protection and utilisation of established plantations, have already led to improved and more efficient methods of practice. Sound methods of practice depend upon as complete a knowledge as possible of the biology of our trees and of the forest as a whole. One of the weak points in British forestry until now has been our almost complete neglect of the study of the relationship between our trees and soil. This has been due mainly to lack of men and facilities, but it will be remedied in the future, as the Commissioners have made a grant to the Macaulay Institute for Soil Research at Craigiebucklar near Aberdeen for the investigation of forest soils, including questions relating to the fertility of forest tree nurseries. Such investigation, in conjunction with studies in forest biology, is the safest method which is likely to lead to improvement in the productive capacity of our existing forest soils and to bring many extensive areas at present considered doubtful or unsuitable for tree growth into a fit state for afforestation.

Nor is the æsthetic aspect of forestry being neglected. The provision of future national forest parks is being kept in mind. The forests are still too young to permit of general access by the public, but in due course suitable areas will be opened up for health and recreational purposes. The Commissioners are co-operating with the Director and staff of the Royal Botanic Gardens at Kew in the formation of a new arboretum at Bedgebury near Goudhurst in Kent, away from the smoke and fumes of London. The arboretum is being laid out to show fine specimen trees singly and in groups. At Benmore in Argyllshire, an estate comprising 10,200 acres was gifted to the Forestry Commission in 1925 by Mr. Harry George Younger, and three years later he generously augmented his gift of land by creating a trust known as the Younger Benmore Trust, the income from which is used for the maintenance of the gardens and grounds, which are now open to the public. The gardens, by arrangement with H.M. Office of Works, have been placed under the control of the Regius Keeper of the Royal Botanic Garden, Edinburgh. The rest of the estate is administered by the Forestry Commissioners.

Forest worker's holdings, which were not part of the original programme of the Commission, were started in 1924 as a scheme of land settlement, but since 1931, the creation of new holdings has been restricted to such as are essential to the proper working of the forest. The number of forest workers resident on the holdings is 1,176, and including their families there is a total residence on the holdings of 4,978. Figures compiled from careful records show that, as a whole, the holders, most of whom started with no capital, now own live stock to the value of £43,173.

In co-operation with the Ministry of Labour, instructional centres and camps have been established, about twenty-eight in all, near land belonging to the Commissioners. Each centre accommodates about two hundred men, who are drawn from areas of heavy and prolonged unemployment, and are given a three months' training course to develop physical fitness. The type of manual work provided for the trainees consists mainly in clearing sites for forest roads, quarrying stone and laying road foundations, the building of bridges and culverts, land drainage, scrub clearing and grubbing roots—constructive work which will be of permanent value.

A series of four sketch maps illustrating the progress of the acquisition of forest units at the end of each five years from 1919 until 1934, shows an increase from eighteen units in 1919, to one hundred and eighty-six units in 1934.

Under the exceptionally difficult conditions, especially in rural areas, which have existed since the War, it is not surprising to learn that afforestation by private owners has not come up to the expectations of the Acland Committee Report. The Commissioners have done their best to come as near as possible, in the circumstances, to the provisions for the acquisition of land laid down in that report, but much leeway in both State and private effort still remains to be made up, and

surely now is the time when the State can, with present and future advantage, speed up the development of forests and forestry.

In presenting this review of their first fifteen years' work, the Forestry Commissioners are able to show a creditable record of achievement. The foundation for the future development of State forestry has been well laid and, as time goes on, we shall begin to reap the increasing benefits, industrial, economic and social which cannot fail to follow a wise forest policy. This report is of outstanding national importance, and the reader who is interested in the development of forest policy in Great Britain will, we feel sure, conclude that the interests of the country in this respect are in safe keeping.

Inductance, Capacitance and Frequency Measurement

The Measurement of Inductance, Capacitance and Frequency

By Albert Campbell and Dr. Ernest C. Childs. Pp. xxiv+488. (London: Macmillan and Co., Ltd., 1935.) 30*s*. net.

WHEN we consider that all matter is composed of electric ions which are in constant oscillation, it is evident that the study and measurement of electrical oscillations must always remain a leading feature of physical investigations, and the measurement of inductance, capacitance and frequency over an enormously large range must form a major part of laboratory testing. But this wide range of frequency, from a few cycles per second to the hundreds of acoustic measurements, the millions of wireless signalling, the billions of thermal and luminous radiation, and the trillions of X-rays, calls for constant development of such methods as different sections of the frequency range are utilised, so that the number of methods of measurement is already legion and must become even larger in the future.

However familiar the laboratory worker may be with certain methods, he is unlikely to select the method which is most suitable for any particular purpose, without a comprehensive survey of all the various methods and devices now available; and a single volume in which they are described and critically compared has long been needed. Mr. Campbell's inventiveness and long experience in this sphere renders him specially qualified to write such a volume, and in conjunction with Dr. Childs he has produced a book which should be at hand in every test room, and is likely to remain the standard work on the subject for many years to come.

Those who are familiar with Mr. Campbell's articles in the "Dictionary of Applied Physics" will recognise the simple concise manner in which the various methods and instruments are described; all essential theory being included without redundant detail or complexity. These articles form the nucleus of the present volume; but the sections dealing with vibration galvanometers and inductance and capacitance measurements have been greatly expanded, and the value of the book has been greatly enhanced by the addition of a long chapter on frequency measurement, and, especially, by four chapters on alternating current potentiometers. The latter addition is especially welcome, as, in spite of the great convenience, universality and range of alternating current potentiometers, they have hitherto been little used, and it is to be hoped that this account of them and indication of their many applications will conduce to their wider appreciation and use.

A brief opening chapter on alternating current theory is followed by one on sources of current which describes various forms of alternators, interrupters, microphone and tuning fork hummers, arc and valve oscillators, and frequency stabilisers. Chapter iii, on measuring and detecting instruments, includes electrodynamometers, alternating current galvanometers, thermal instruments and telephones, amplifiers, rectifiers and valve-voltmeters; while Chapter iv, on vibration galvanometers, describes practically all the types which have been devised, with their theory and application. Resistances for use in inductance measurements are dealt with in Chapter v, which includes all the best-known types of anti-inductive resistances, including tubular forms, but reference might have been made to the extremely valuable tubular resistance of A. E. Moore which is the only perfectly non-inductive one.

Inductance measurements occupy Chapters vi–xiv, commencing with the calculation of inductances both by rigid methods and the most convenient approximate formulæ, and passing on to the construction of mutual inductances, including of course the valuable Campbell types of absolute standards and variable inductors; transformers; construction of fixed and variable self-inductors; electrical networks and bridges; measurement of mutual inductance; testing of transformers; measurement of self-inductance and