

related to mineral deficiencies of land types and the relation between soil, climate and cultivation of the principal crops in Ontario, while the Department of Pathology and Bacteriology has continued its studies of bovine mastitis and the parasites of sheep.

### The Carnegie Institution of Washington

THE Yearbook of the Carnegie Institution of Washington, July 1, 1936–June 30, 1937, contains the reports of the Executive Committee and of the president for the year ended October 31, 1937, together with reports on investigations received up to December 10 and a bibliography of publications issued during the year by the Institution or of the Institution's staff through all channels (Washington: Carnegie Institution of Washington). The president's report again refers to the relations between science and social problems and to the importance in society not merely to appreciate the difficulties in interpretation of the influence of science but also to be aware of the interdependence among social elements in the same way that we are aware of the interrelations among elements involved in the unity of Nature. The Geophysical Laboratory has continued researches to determine with all possible precision the underlying causes of geological and geophysical phenomena. A major advance in the terrestrial-magnetic research is reported by Dr. J. A. Fleming, in the proof of the association of a special type of magnetic disturbance and sharp fade-outs of high-frequency radio-wave reflections with bright eruptions in the solar chromosphere. With this advance, the Mount Wilson Observatory was also associated, and the Observatory also expanded greatly the scope of solar investigations with the rapid increase in solar activity. The Division of Plant Biology has continued to study the ecology of the Great Plains and its bearing on the agricultural and human population of that area. The Division of Animal Biology has made several observations fundamental to the cancer problem, and the value of diverse approaches by different groups of workers is well illustrated in this work as in reports from the Divisions of Embryology, the Nutrition Laboratory and the Department of Genetics in the field of endocrinology.

### Technical Colleges of South Africa

THE Carnegie Corporation of New York has lately issued a critical study by Dr. F. H. Spencer of the technical colleges of South Africa. Dr. Spencer has had experience of technical education in Great Britain, and this has enabled him to make some interesting comparisons. The technical colleges provide (a) full-time pre-apprenticeship courses for pupils aged 14–17 or 18, (b) part-time courses for apprentices and others already at work. The place accorded in the full-time courses to general cultural work is, by British standards, inadequate, geography being dropped after the first year, while history, even from the economic point of view, does not enter the picture. The part-time courses, which are everywhere the largest part of the technical college work, are dominated by the Apprenticeship Law. This enactment

has conferred on South Africa some of the benefits which in Great Britain should have resulted from the clauses of the Fisher Act providing for daytime continuation education from 14 to 18. In South Africa, despite a certain amount of recalcitrance, the Apprenticeship Law is an undoubted success. Apprentices attend ordinarily about eight hours a week of which half is taken from day-time working hours. The great merit of the system is that the compulsory attendance is almost universally followed up to an advanced stage by a not unsatisfactory proportion of the apprentices. This advanced stage, at least for the constructional trades, is comparable with university work, and those who pass through it to the national certificate stage "will furnish the 'non-commissioned' staff of industry who are as essential to success as the management"

### The Belgian Grid

IN *Electrical Industries* of July, W. Fennell gives a review of the salient engineering features of the Belgian Grid, which began by the co-operation in 1919 of isolated supply companies. These companies, mostly in the southern and eastern provinces (Liège, etc.), happened to be in close contact with heavy industries. They realized the existence of by-product power 'going to waste' at the large industrial works and saw that in some cases it would be economical to use this power rather than to build large power stations or extend small ones. A power production combine was formed to further the interests of manufacturers who had blast furnace and coke oven gas and process steam available greatly in excess of their own power requirements. In addition, they had engines used as stand-by plant, much of which would not be necessary if the various works' plants were interconnected. The electricity supply companies also had means of utilizing the waste power. This combine has spread so that it includes practically the whole country under a grouping system. All the undertakings and associated works are linked up into two networks, north and south, which are themselves interconnected. The production of power, while remaining under local control, is directed by a national co-ordinating company. The tariff applied to plant owners is based on the principle that the amounts they pay or receive are equal to the reduction or increase of expenditure entailed in their installations by running in parallel, compared with independent working. The success that Belgium has attained as a competitor in the steel and chemical industries indicates that this co-operative experiment, now twenty years old, has been a substantial contributory cause.

### Conservation of Natural Resources

UNDER this title, the American Association for the Advancement of Science has issued a selected list of literature dealing with various aspects of the subject. Almost too late, rather than too soon, the United States is becoming conscious of the significance of the vast subject of conservation. The very word is itself