Transgangetic family of language, with older and more recent members, the former squeezed into the sea board and the mountains, the latter spreading over the interior and along the streams to the deltas.

The Far East gives to the author his best perspective—in the remotest past, a rude stone age no better than that across the Pacific, in California; after that, three thousand years B. C., a bronze age; and then the gradual but victorious progress of the race, its customs and institutions. Japan and Korea are daughter races of Chinese culture. The closing section of this Asiatic portion of the volume is devoted to Asiatic forms of belief and systems of religion. The necessity of religion is assumed, and, as to its forms in the arenas mentioned, "they have their roots in a subsoil of widely diffused notions, in which even now leaves, flowers and seeds, fallen from the lofty trees, are reposing, dying, decaying, germinating."

Ratzel is not in ecstasies over the blessings of the age of iron and machinery. We are liable, he thinks, to overestimate the effect of metals in promoting culture. "The discovery of smelting and forging does not form an epoch. The spiritual foundations of our culture had no workers in steel."

So, the Europeans receive only a passing notice on the last few pages and are handed over to the historian.

In a work upon which the author has expended so much care and erudition one could wish that he had made more concessions to the reader. Few persons are learned enough to read the volume before us. If they desire to consult the authorities named, it is nearly unpractical, and the translation is not so helpful as the original. The illustrations are superb; they embellish and illuminate the work, but they do not greatly illustrate it. For example, the Kha flute, on page 370, after Harmand, finds no explanation for its strange combination of direct flute and reed instrument, and no example is in the national collection. As a summary of culture, however, among the peoples of the eastern hemisphere, still in the epoch of handicraft, Ratzel's third volume is not only vastly superior to such books as Wood's, which is saying little, but it places the author in the front rank among the students of culture-progress, whose pioneers were Klemm, Lubbock, Tylor and Morgan.

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Canada Experimental Farms Reports 1891–1898, Vols. 8, pp. 348, 289, 355, 422, 426, 474, 449 and 429. Illustrated.

The system of Experimental Farms of the Dominion of Canada was inaugurated in 1887, with the establishment of the Central Experimental Farm at Ottawa. Since then, as parts of the system, branch farms have been located at Nappan, Nova Scotia, for the Maritime Provinces; Brandon, Manitoba; Indian Head, Northwest Territories, and Agassiz, British Columbia. Each of the branch farms is under the direction of a Superintendent, who reports to the Director at the Central Farm, and he in turn to the Minister of Agriculture, the annual report being issued as an appendix to the report of the Minister of Agriculture. The organization of the Central Farm is somewhat like that of the Experiment Stations in this country, and the staff during most of the period covered by the above reports consisted of William Saunders, Director; James W. Robertson, agriculturist; John Craig, horticulturist; F. T. Schutt, chemist; James Fletcher, entomologist and botanist, and A. G. Gilbert, poultry manager. A foreman of forestry, W. T. Macoun, since made horticulturist, was added to the force during the period covered by the report for 1897.

At the several farms many lines of useful work are carried on, such as scientific investigations, practical field work, the study of forestry problems, etc., different problems being investigated according to the immediate needs of the farming community, but at the Central Farm the greater part of the more important scientific investigations are carried on, this institution being especially equipped for the purpose. In addition to the duties already outlined, the Central Farm has charge of the introduction and distribution of seeds and plants, a few thousands of dollars being annually expended in purchasing and distributing seed grain and forest trees and tree seeds.

The reports of the Experimental Farms give

the results of experiments in agriculture, horticulture and arboriculture, the outcome of practical work in the fields, barns, dairy and poultry buildings, orchards and plantations, as well as scientific investigations in the chemical laboratory and the results of studies of the life history of injurious insects and noxious weeds. Variety tests have occupied much of the attention of the agriculturist and horticulturist, the evident desire being to secure the best varieties for the different regions. In this way experiments in the adaptation of certain crops and varieties are conducted upon a scale impossible to the individual, and not a few valuable crops have been secured by this means. Methods of culture and the proper use of fertilizers have been quite thoroughly investigated, to the advantage of the several constituencies. In the treeless regions of Manitoba and Northwest Territories tree-planting experiments have been conducted since the establishment of the branch farms in these Provinces, and, as a result, it is now possible to suggest lists of trees and shrubs adapted for hedge, shelter and timber growth in those regions.

Among results of particular interest and of far-reaching importance noted in the last report is the account of experiments on the effect the plowing under of clovers has on subsequent crops. These experiments have been continued for four years and the beneficial effect of such procedure is plainly shown.

In connection with the variety tests of the agriculturist, attention should be called to the very excellent work done in cross-breeding of cereals. At least two score cross-bred varieties of wheat, and quite a number of varieties of oats, barley and peas have had their origin on the Experimental Farms and some of them seem to be peculiarly adapted to the region, being of more than average productivity and quite resistant to fungus attacks.

The dairy investigations and the experiments in feeding farm animals, especially steers and pigs, have been noteworthy and have led to some very practical results. In nearly every case the feeding experiments were repeated year after year and the conclusions verified.

Among the investigations made by the chemist, the comprehensive survey made of the typical soils of the different Provinces in which their physical characteristics and chemical constituents were determined stands out prominently.

The study of the life history of injurious insects and the investigation of means for combating their attacks have occupied much of the time of the entomologist and botanist. In addition, the subject of noxious weeds, their dissemination and eradication has been investigated. With such subjects as these the efficiency of any method for the destruction of these pests depends largely upon timely warnings which have been given as the emergency arose. Spraying for the prevention of plant diseases has come in for attention and the suggestions given are timely and practical.

The poultry manager has been concerned principally with studying the relative values of different breeds of fowls and their feeding and management.

Throughout all the reports the intensely practical nature of the work is everywhere manifest, the desire apparently being to give results of investigations that may be of immediate use to the farmers and others of the Dominion.

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BOOKS RECEIVED.

Naturalism and Agnosticism. JAMES WARD. New York and London, The Macmillan Company. 1899. Vol. I., pp. xviii+302; Vol. II., pp. xiii+294. $4.00.

La géologie expérimentale. STANISLAS MEUNIER. Paris, Alcan. 1899. Pp. viii+306 and 56 figures. 6 fr.

Manual of Bacteriology. ROBERT MUIER and JAMES RITCHIE. Edinburgh and London, Young J. Pentland; New York, The Macmillan Company. 1899. Pp. xviii+564.

SCIENTIFIC JOURNALS AND ARTICLES.

THE leading article, in every sense, of the *American Naturalist* for June is that of Sylvester D. Judd on 'The Efficiency of Some Protective Adaptations in securing Insects from Birds.' The author's conclusions, based upon four years' study of the food habits of birds, are that the alleged protective coloration is not the all-important factor in securing an insect from ex-