the right 52%, the left 36%. (2) In both right- and left-handed lunging, the body had gained in grace and coordination of movement. (3) The probable errors of both hands had been markedly decreased as the result of the practice of the right hand.

Cross-education may be the result chiefly of changes wrought in the central nervous system. In the tapping, in which a minimum of muscular strength is required, the gain is about equal on both sides. In the test of strength a smaller proportional gain was found in the side not practiced. The transference of peripheral effects cannot be ignored altogether, since in the dumb-bell test there was a decided increase in the girth of the arm not practiced, and in its power to resist fatigue.

The facts may be explained as the result of two factors: (1) the close nervous connection, through motor centers, between symmetrical muscle groups on opposite sides of the body and between groups related in function or position; (2) the development of general will power and attention, through the practice of one form of volition.

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SCIENTIFIC BOOKS.

The History of Mankind. By FRIEDRICH RATZEL. Translated from the second German edition by A. J. BUTLER, M.A. With introduction by E. B. TYLOR, D.C.L., F.R.S. London, Macmillan & Co. 1898. Colored plates, maps and illustrations. Volume III. 8vo. Pp. 599.

The first edition of Ratzel's 'Völkerkunde,' which has been in our libraries for ten years, is divided into three substantial parts or volumes, the third of which is taken up with the more cultured peoples that are outside of the age of steel and steam. For some reason or other, the order of the work has been changed in the English edition. The higher American peoples are thrust out; Africa obtrudes itself into Volume III., so that it really commences on page 149. It is with the remaining pages that we have here to deal.

The proper appreciation of this volume and, indeed, of the whole work, demands of the reader familiarity with his Peschel, Friedrich Müller, Brinton and Keane, and he would do well to have near by a set of Standford's Compendiums. It is not a treatise on ethnology—the work would be vastly improved by a few tables showing the connection and affiliation of peoples —but a discussion of human artificialities in relation to certain culture areas.

The eastern hemisphere presents to the student a number of arenas on which the drama of mankind has been enacted. On these, races come and go, but Nature's life repeats itself and the forces of progress and reaction are imperceptibly active in them.

In speaking of this play of culture-influences between Africa and Asia the author develops the Erythræan, or Red Sea group of peoples. In contrast with Dr. Brinton's emphasis upon the Hamite and West African forces, Ratzel looks eastward for the predominating influences.

The arena for the sharp conflict between nomad pastorals and settled tillers is found in a broad strip of territory extending diagonally from 10° to 60° north latitude and from the Atlantic to the Pacific.

India is for the author a region where races have been broken up, pulverized and kneaded by conquerors. Doubtless a pre-Dravidian negroid type came first, of low stature and mean physique, though these same are, in India, also the result of poor social and economic conditions. Dravidians succeeded negroids, and there may have been Malay intrusions, but Australian affinities are denied. Then succeeded Aryan and Mongol, forming the present *pot pourri* through conquest and blending.

Northward of India, as suggested, the settled Iranian and the nomad Mongol furnish to the author the best opportunity to study and develop the thought ever dominant in his mind. In the history of mankind the lots fall diversely, but to each race its task is assigned, and none is left without opportunity of casting its threads into the great fabric.

In southeastern Asia, Ratzel sees a great

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