at least he might have told us how to apply the circumspection.

Like many another victualler of youth, he has very dark views about the hungry camper, or, as he sadly calls him, the 'stomach-man.' He thus exhorts him by picturing the perfect primal man: —

"In reference to this subject, this fact should be kept in view. The type man, the formative man, was symmetrical. Neither his intellectual, nor his sensual, faculties predominated. Temperate in all things, he appreciated and enjoyed the beautiful, the euphonic, the fragrant, the relishful and the eupathic. He suffered, — but to him his task was not onerous; he enjoyed, — but his fruition did not engender ecstasy. Virtuous, — he met what was before him with fortitude. Brave, — he triumphed in every struggle for right. From birth till death, all was satisfactory, all was enjoyable."

The most of the book is filled with accounts of short excursions in New Jersey. They are commonplace enough in their matter, and are only interesting from the indescribably queer tone that pervades them. There are many singular criticisms on the manners and customs of the folk at the summer resorts on the Jersey coast: they are vulgar enough, but the pervading queerness of the text makes them interesting.

This essentially worthless little book meets a growing interest in the free life that the camp alone can give the summerer. Our country with its abundant wildernesses, with the tolerance of its country folk for what would in other lands be called trespasses, lends itself to this charming method of travel. It is much to be desired that some master of the fine art of decent living in rough conditions should give us a manual for the guidance of beginners in its mysteries.

ETHNOLOGICAL PSYCHOLOGY.

Zur naturwissenschaftlichen behandlungsweise der psychologie durch und für die völkerkunde. Von A. Bastian. Berlin, 1883. 234 p. 8°.

The idea pervading all of the more recent publications of Adolf Bastian is to establish a science of psychology of nations upon the data of modern ethnography. The all-pervading influence of nature forms and shapes peoples, nationalities, and their customs and habits; and therefore ethnology must become a natural science, — the physical science of the mind as manifested in the development of each nation in particular, and all the nations taken as a whole. The withdrawing of ethnology from metaphysical influences, under which it has labored since it was made a scientific study, is possible only when a sufficiently large material has been collected among the nations of the globe and the records of history to establish on it incontrovertibly general principles, which will be found to rest on natural science, and not on philosophic speculation. Some parts of the vast field of ethnology are still obscure as to their real significance, because the material to judge from is too scattering and scanty. Bastian's most recent work contains a series of seven articles, mainly on Polynesian subjects, which uphold and illustrate his ideas concerning ethnology, as stated above, with a full array of the most erudite comparisons. The author's extensive travels have furnished him with a stock of ethnographic facts which none has equalled in our century, and which he readily compares on almost every page with notices derived from the classic writers. Concerning the progress traceable on the social development of man, the writer shows, that, considered as an individual, the single man is of very small account in the primitive horde. The first stage is the tribe, based on consanguinity with exogamic marriage. This stage passes into that of *civitas*, or citizenship, whenever the country becomes agricultural. Social connection is no longer determined by family ties, but by the extent of the district, country, or commonwealth to which the individual belongs. When tribal organization becomes loose, then blood-revenge, and similar primeval customs, also disappear. The concise style of Bastian is not always what we should desire: at times it becomes rambling, a heavy phraseology obscures its lucidity, and the pressure of thoughts cannot find words enough to give vent to their rapid flow. Such defects as these are more prejudicial to the literary success of Bastian's numerous publications than the typographic errors which the proof-reader has allowed to disfigure their texts, especially the classic quotations.

STOKES'S SCIENTIFIC PAPERS.

Mathematical and physical papers. By George Gabriel Stokes, M. A., D. C. L., L L. D., F. R. S., professor of mathematics in the University of Cambridge. Reprinted from the original journals and transactions, with additional notes by the author. Vol. ii. Cambridge, *University press*, 1883. 366 p. 8°.

Vol. i. (328 pages) appeared in 1880, and contains the papers, arranged in chronological order, which were published by the author between April, 1842, and December, 1847. The earliest date in vol. ii. is March, 1848, and

the latest, March, 1850. Vol. iii. is stated by the publishers to be in press.

Of the papers reprinted in these first two volumes, only two of the more important are of a purely mathematical character, and these treat of the properties and methods of computation of infinite periodic series such as arise in many physical problems, which series were first systematically employed and explained by Fourier in 1822. Fourier's treatise [1] is to-day the best introduction to a knowledge of this kind of analysis, besides being one of the most brilliant expositions, in any branch of science, in existence. With the exception of a single paper of 42 pages, upon a differential equation relating to the breaking of railway bridges under loads moving at high speeds, the remaining papers all come under the head of fluid motion in one way or another, and include extensive discussions of the fundamental dynamical equations of motion of perfect fluids, of viscous fluids, and of elastic solids. These discussions treat, among other subjects, the theory of oscillatory waves, the equilibrium of the earth in a fluid state, the variation of the force of gravity on its surface, and the undulatory theory of light.

The work of Professor Stokes in hydrodynamics is of special importance in correcting and rediscussing the results obtained by Lagrange and Poisson, and in paving the way for the more modern developments of Helmholtz and Thomson in vortex motion, and of Maxwell in electricity and magnetism.

[1] Analytical theory of heat. By JOSEPH FOURIER. Translated, with notes, by Alexander Freeman. Cambridge, 1878.

But the papers of Stokes which are probably of most interest to the mathematical physicist of to-day are those upon the undulatory theory of light, in which he has added essentially to our knowledge of the constitution of the luminiferous ether by showing how the phenomena of aberration may remain unaffected by the fixity or motion of the ether, as also by his investigation of the theory of diffraction, by which he has sought to decide whether the vibratory motion of a plane polarized ray lies in the plane of polarization or at right angles to it.

By these investigations, and by others, among which may be noticed that of the colored rings of Newton, he has explained difficulties in Fresnel's undulatory theory, and essentially improved it.

The treatise of Verdet,[1] which is the most complete and important exposition of the undulatory theory yet written, gives a complete bibliography of this subject, extending to many hundred titles, from which the reader can correctly estimate the labors of Professor Stokes in this field.

The lifelong labors of Professor Stokes have given an immense impulse to mathematico-physical research in England; and the republication of these papers by the syndics of the Cambridge university press is a graceful and well-deserved tribute to the Nestor of the greatest mathematical school in the world.

[1] Leçons d'optique physique par E. Verdet. Paris, tome. i., 1869; tome ii., 1872. The following translation and revision to date is in process of publication: Vorlesungen über die wellentheorie des lichtes, von E. Verdet. Herausg. von Dr. Karl Exner, Braunschweig. Bd. i. 1881.

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

GOVERNMENT ORGANIZATIONS.

Geological survey.

Geologic work in the South Atlantic district. — Owing to the as yet incomplete state of the topographic work in the southern Appalachians, the systematic geologic survey of that section has not yet been commenced. However, several geologic reconnaissances have been made, and considerable collections of paleontologic material have been sent into the main office of the survey. During the season of 1883 Prof. H. R. Geiger examined the geologic structure of a considerable portion of Virginia and West Virginia. During the latter part of July he was in the eastern part of Virginia, but in August transferred his field of work to Greenbrier county, W. Va., where he studied the formations that are exposed between the Greenbrier River and the Lewis Tunnel, just east of Alleghany station, W. Va. A collection of Devonian fossils was made. In September his work was carried into Alleghany county, Va., where a careful examination was made of the rocks so well shown there. The thickness, dip, etc., of the beds were obtained, and an excellent series of typical specimens secured. In October the field was extended northward to Rockingham county, but bad weather impeded the operations. Through November a special study was made of the foldings in the limestones that lie between the Blue Ridge and North Mountain, and a careful comparative examination made of the limestones of Rockingham and Rockbridge counties, Va.

Professor Ira Sayles was assigned to the northeastern part of Tennessee, and adjacent portions of Virginia and Kentucky. The early part of July was spent by him in the examination of the caves near