the limits to which he has confined himself. One will find in this work a strong appreciation of the remarkable papers of Oliver Heavyside and valuable chapters on the Elements of Hydrodynamics. Teachers will highly appreciate the introduction of such chapters in a work on electricity, for one of the principal difficulties in reading Maxwell's book arises from his obscure use of hydrodynamical equations. Indeed, I am tempted to regard this portion of Professor Gray's book as the most valuable to the student, leading him to see the importance in the modern treatment of electrical theories, of hydrodynamics, and compelling him to grapple with Lamb's classical work on this subject.

The author has embodied without essential change Hertz's mathematical discussion of electric waves, and further discussion of this subject is promised in the second volume. We, therefore, cannot venture to criticise his treatment of this subject. It is evident that he intends his treatment of this growing subject to be a full one, for the first volume before us contains Lorentz's remarkable theoretical prediction of Zeeman's discovery of the doubling and tripling of spectral lines in the magnetic field. We know of no other text-book at present which has incorporated the work of Lorentz, or one which contains such a well digested account of the fundamental equations of the electrodynamical theory of light. We confess to a certain feeling of disappointment at the author's treatment of electrostatics and of the vexed subject of displacement currents; perhaps in the imperfect state of our knowledge no better or fuller treatment is possible. Possibly the second volume will contain an analysis of Professor J. J. Thomson's theory of polarization and tube of force, and of Helmholtz's theory of ions.

The author has selected fundamental experiments with care, and the practical electrician will find much apart from the mathematical treatment which will interest him, notably a full account of Lord Kelvin's mariner's compass. A young electrical engineer who studied Maxwell's treatise with me ten years ago told me that when he first entered into the employment of a great electrical firm he was afraid to leave his copy of Maxwell where it might be seen, for fear that he would be considered a man in the clouds, unfitted by the study of mathematical theories to cope with practical problems of electricity. He now, however, leaves his copy boldly on his desk and in the workshop. Such has been the advance in the study of electricity among the new schools of electricians. And probably a copy of Professor Gray's treatise will be seen in the workshop along side that of Maxwell.

JOHN TROWBRIDGE.

Review and Bibliography of the Metallic Carbides. By J. A. MATHEWS. Smithsonian Miscellaneous Collections, 1090. City of Washington, 1898. 8vo. Pp. 32.

The Chemical Section of the American Association for the Advancement of Science in 1882 appointed a Committee on Indexing Chemical Literature, and in 1884 the Chairman of that Committee reported an agreement entered into with the Smithsonian Institution whereby the latter consented to publish Indexes to Chemical Literature upon recommendation of the Committee. The booklet under review forms one of this series. Mr. Mathew's plan has much to approve; he gives a synopsis of the methods of preparation, physical and chemical properties of the known carbides, considering them in alphabetical order, and following each are the references to the literature bearing thereon.

Examination of this review shows that Henri Moissan has contributed more to our knowledge of the metallic carbides during the last five years, thanks to his electric furnace, than all chemists had done in previous years. The production of acetylene gas from calcium carbide seems to have been announced first by Wöhler in 1862. No commercial use was made of this fact, however, until about 1893, when the Willson Aluminum Company, in this country, while experimenting upon the reduction of the alkali earths by means of carbon, found that calcium carbide was formed; this was regarded as a waste product until its properties of readily decomposing with water and yielding acetylene gas established its commercial value. Mr. Mathews, writing in 1897, says: "The cost of production is still rather high and the chances of acetylene gas being generally introduced for lighting pur-

poses in the immediate future are not very bright."

In a postscript to the Review the author gives the literature down to March, 1898, which includes no less than eight books on the subject published in Europe.

It is unfortunate that Mr. Matthews uniformly omits initials of authors' names, for Berzelius, Wöhler and Moissan this is well enough, but we notice the names of Brown, Clarke and Jones, who certainly need initials. However, the Review is a welcome addition to chemical bibliography.

H. C. B.

Brown Men and Women, or the South Sea Islands in 1895 and 1896. By EDWARD REEVES. London, Swan, Sonnenschein & Co. 1898. With sixty illustrations and a map. Pp 294.

The author of this account was born in New Zealand, and from early days was acquainted with the peoples of the Pacific island-world. In 1895–6 he made two voyages to several of its archipelagoes, the Friendly Islands, the Samoan, Fijian, Society and Cook groups, jotting down his observations and clicking his camera as occasion offered. His attention was especially attracted by the social condition and prospects of the native population. This he claims to depict with more accuracy and a better knowledge than most previous writers.

The result may be briefly stated. He considers that they would be far better off if European civilization, and especially the Christian religion, were not forced upon them. His particular antipathy is the missionary. That wandering worthy he regards as the evil genius of Polynesia, and he repeatedly urges that subscriptions to 'foreign missions' should be stopped once for all. There is little of interest in the ethnographic observations, although the author must have had good opportunities.

D. G. BRINTON.

Memory and its Cultivation. By F. W. EDRIDGE-GREEN. New York, D. Appleton & Co. 1897. Pp. 307.

The author of this book says in his preface: "After discovering the facts which led me to write on the subject of memory, I found that I could learn a subject in about a fifth of the time that it previously took me." As he could have done it so easily, it is a pity that he did not learn something about psychology and physiology before attempting to write on these subjects. It is scarcely necessary for the scientific reader to go further than the frontispiece to understand the character of the book. This is a queer looking section of the brain, showing the 'center of sensory memory' and the 'center of motor memory' in the basal ganglia connected with the 'seat of the faculties of the mind' in the cortex. Further on we are told that there are thirty-seven of these faculties. Parental love is a faculty, but not conjugality, because 'conjugality is not likely to influence a man who hates his wife.' The book contains the stock anecdotes and mnemonic devices that may be picked up from desultory reading, and the author would doubtless pass for a man of wide information and agreeable parts in ordinary society. But it is a mystery why such a book should be published, as the last volume of the 'International Scientific Series'—a series which has maintained such a high standard and includes so many important scientific works.

J. MCKEEN CATTELL.

SOCIETIES AND ACADEMIES.

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA, JULY 5, 1898.

MR. BENJAMIN SMITH LYMAN referred to the belief that chlorophyl required light for its production and exhibited an onion which in the course of seven months, without special nourishment, had grown long, green shoots in a dark closet. A potato in the same closet had sent out sprouts, but they contained no chlorophyl.

PROFESSOR HENRY A. PILSBRY communicated the results of his recent study of the molluscan group Aplacophora, dwelling specially on the characters distinguishing it from the gastropods. The former were first believed to be worms, but the discovery of a radula in the gullet and of a nervous system like that of the Chitons places them among the mollusks. They have a straight allimentary canal, while in the Chitons it is twisted and coiled. Although