

the first half is elementary enough for text-book purposes, and will be found very attractive to general readers, while in the latter the author travels over the ground of very complex research, of immediate interest to nobody but the scientific specialist. The history of spectrum analysis is excellently written, onward from the very beginnings in the time of Kepler, who, in his 'Dioptrice,' was the first to show that, by allowing a beam of sunlight to fall suitably on a three-sided prism, the colors of the rainbow might be artificially produced. For all that, the birth of the science may be and is taken as coincident with the labors of Newton, and due prominence is given to Wollaston and his discovery of the necessity of the slit—that simple but all-important adjunct of the modern spectroscope. Coming down to our own century, the work of those pioneers in light analysis—of Fraunhofer and Brewster, of Herschel and Forbes, of Becquerel and the elder Draper—is admirably summarized; while later, in dealing with the labors of subsequent investigators, among them Kirchhoff and Bunsen, Mr. Lockyer gives "as far as possible the *ipsissima verba* of the workers whose genius we have to thank for a series of researches which has not only enabled us to study the chemistry of the sun, but has given us as its first tremendous outcome the conclusion that the sun and earth have the same chemical constituents."

Mr. Lockyer conducts the reader very smoothly along the way all prepared for his discussion of the dissociation hypothesis. With the received views of spectra analysis twenty years ago, spectra, he says, "were supposed to be as changeless as the laws of the Medes and Persians"; but it is easily shown that "where the early statements favored the view that the line spectrum of a body was always the same, and that the solar spectrum exactly matched it, further work brought out great differences in the intensities of the different lines observed—differences amounting to the complete absence of some of the lines under some conditions." The history of chemistry had been the history of simplification by heat; the law of continuity was called in, thus, to argue a further simplification of the elements themselves, so regarded. That distinguished chemical philosopher, Sir Benjamin Brodie, in his mathematical treatment of chemical phenomena, was led to assume the existence of certain ideal elements. "We may conceive," he says, "that in remote ages the temperature of matter was much higher than it is now, and that these ideal elements existed in the state of perfect gases—separate existences—uncombined." But the questions of the variations in laboratory spectra had to be settled not only, but the variations observed in passing from the spectrum of iron, for example, on the earth, to the spectrum of iron in the solar spots and storms. The time, too, had arrived when photography had to be summoned to the assistance of the spectroscopist; and Mr. Lockyer devotes a score or two of pages to the important rôle played by this art in furthering the research in purified spectra.

What follows is far from possessing general interest—it is, in fact, mainly, if not entirely, a discussion, in some parts tedious, of the dissociation hypothesis, and leads to the strong suspicion that the support of this hypothesis is the sole purpose of the book. There may be little ground for valid objection to this, but it occasions disappointment to any one who takes up the book with the expectation of finding it full of facts about the sun's chemical constitution. To discuss the dissociation hypothesis in detail is all well enough, but why not confine such discussion to the specialized journals and the proceedings of scientific societies? Some of Mr. Lockyer's elaborate chapters we should much sooner have looked for in the *Philosophical Transactions*

than in a work ambitiously entitled 'The Chemistry of the Sun.' In short, the preparation of the book seems premature—there is too much of shrewd surmise and mere opinion introduced to supply the deficiency of recognized fact. So much of the controversy with Liveing and Dewar is out of place in such a work; but whatever view of the disputed hypothesis we may incline to, we can but admire that sentiment of Mr. Lockyer's, so straightforwardly expressed, when he says: "I hold it to be the duty of a student of science who suggests a new view, to spend as much of the rest of his life as is necessary to determine whether it is true or false" (p. 402).

On the presumption that we should find in 'The Chemistry of the Sun' the fullest record of the researches of all physicists into the constitution of that body, we have looked in vain for suitable mention of the elaborate and painstaking experimentation of the lamented Dr. Henry Draper; but, so far as we have been able to find, the name nowhere receives even passing notice. His discovery of oxygen in the sun some ten years ago may not be accepted by Mr. Lockyer—it may not, in fact, be found to stand the tests of subsequent research; its entire absence, however, from a work purporting to deal comprehensively with the chemistry of the sun falls little short of a gross omission.

The lucidity of Mr. Lockyer's style is not more marked than the clearness of the abundant illustrations, noteworthy also for their aptness. Mechanically the book is not fully up to the high general standard of the work bearing the Macmillans' imprint: there are abundant slips of the types which nobody but the proof-reader is responsible for, and the press-work would not bear exhibition as a piece of thorough workmanship. Trifles, however, these are in a book of such character and extent. Taken all in all, it is a work of great moment. Mr. Lockyer writes like the thorough master he is, and chemists, astronomers, and physicists alike must thank him heartily for his newest literary effort.

*Bibliographie des bibliographies*: Supplément. Par Léon Vallée. Paris: Em. Terquem. 1887. Pp. 354, 8vo.

In 1883 M. Vallée published the work of which this is a continuation. We pointed out at the time that, with all his good-will and industry, which appeared to be great, he had made an unsatisfactory book because he had not appreciated the extent of the field in which he was laboring, and had an astonishing ignorance of the sources of information. The present Supplement is an attempt to fill up some of the gaps in the original. To a certain extent it is successful, for it contains 3,351 titles, nearly half as many as there were before; and, even allowing for the new bibliographies published between the middle of 1883 and the middle of 1886, there remain enough of the older books to testify to his diligent search, and his disposition to profit by the assistance of friends and critics. But he lacks German thoroughness. A German would have scented out every review of his work, and included in his supplement every title that was pointed out to him. M. Vallée, with a Frenchman's indifference to everything that is not French, has missed seeing the notice in the *Nation*, in which thirty-six of his omissions were pointed out—at least he has supplied only a few of the titles. Worse still, he has failed to profit by an article in the *Library Journal* (vol. viii), in which twenty other omissions were noted, and our own notice was referred to. The first oversight might be pardoned, on the ground that he could not be expected to examine all literary periodicals; but what shall be said of the failure to consult a bibliographical journal?

In one respect M. Vallée has much improved upon his original work. He has referred to many bibliographies contained in bibliographical dictionaries—both the general and the special dictionaries of artists, physicians, and the like. It is the excellent practice of the present day to give the list of the writings of the persons commemorated in these works, and a selection of the books about them. The dictionaries, therefore, become author-bibliographies, bio-bibliographies, and, in the case of artistic or medical dictionaries, subject-bibliographies, although these are of but little use, because not arranged by topics. They ought therefore to be mentioned; and M. Vallée has applied himself to this part of his task with great diligence.

The limits of bibliography are very indefinite. M. Vallée appears disposed to include the history of early printing (see No. 7267, Blades's 'List of Medals, Jettons, in connection with the Art of Printing'), which, though it gives him an easy opportunity to increase the number of his titles, only magnifies the incompleteness of his work by reason of the very large number of titles, which he has left out in the new subject. He has even gone so far as to put in Mozzani's 'Nozioni pratiche sull' ordinamento delle pubbliche biblioteche,' and fourteen other works on library management. The slightest research would have discovered ten times as many on the same subject, but it would be much harder to justify their insertion in a bibliography of bibliographies. And what claim to insertion has P. de Musset's 'Notice sur la vie de Gustave Ricard [the painter], suivie du catalogue des œuvres de Ricard exposées à l'École des Beaux-Arts'; or Bourcard's 'Les estampes du 18e siècle, école française, guide manuel de l'amateur'; or 7320, Bouchet's 'Catalogue des dessins d'Étienne Martellange précédemment attribués à François Stella'; or 6898, Dezallier's 'Abrégé de la vie des plus fameux peintres'; or 7056, Barrt's 'Mémoires sur les sculpteurs des Pays-Bas'? If catalogues of paintings, drawings, and engravings are to be called bibliographies, M. Vallée must prepare a supplement ten times larger than the present. We doubt whether No. 7356, a history of Bassano, in which thirty-eight pages are devoted to the "Lettere e scienze, pittori, scultori, incisori," contains enough bibliography to pay for the six lines M. Vallée gives it. The only approach to bibliography in the two volumes of Lucy Aikin's 'Life of J. Aikin' (No. 6928) is a list of his works two pages long. How many more titles have been pitchforked in in this way, we cannot say. Enough instances have been given to show that the author is deficient in discrimination.

The plan, as we have said, is faulty and poorly carried out; but the technical part of the work is generally well done. We notice a few slips of not much importance. The Portuguese *litteratura* becomes a French *littérature* in No. 7345; and in 7347 "bief-records" is an evident misprint. No. 7341, a bibliography of Cantu (*sic*), is centered under the first word of the title, Bozza. A note states that it is by A. Manno; but under Manno, where there are many other titles, this is not referred to.

*The High-Caste Hindu Woman*. By Pundita Ramabai Sarasvati. With Introduction by Rachel L. Bodley, A.M., M.D., Dean of the Woman's Medical College of Pennsylvania. Philadelphia, 1887.

It is a striking face which looks at us from the frontispiece of this book, and one is almost prepared by it for the striking history of its owner. About thirty years ago she first saw the light in the forest of Gungamul, among the Western Ghauts. To that hermitage her father, Ananta

Shastri, had carried his child-bride, her mother, in order that he might be free to pursue his revolutionary resolve to educate his wife. As a boy in Poona, he had been filled with wonder at hearing the wife of the reigning Peshwa recite Sanskrit poems; and the possibility of female education had dawned upon him. Unable, on account of family prejudice, to carry out his project with his first wife, after her death he fled from civilization, literally into the jungle, taking his second girl-wife (but nine years of age) with him, that he might unrestrictedly follow his ideal. Amid hardships and perils the years passed by, and the little Lakshimibai grew to womanhood, having eaten of the tree of knowledge. When children came to them, the parents gave themselves devotedly to their education. To the mother alone fell the task in the case of the youngest, and Ramabai's earliest memory is of being awakened in the morning twilight to learn and repeat the daily lesson before the household labors had begun. Afterwards, in the wide wanderings of the pilgrimages on which the whole family went, the girl saw and learned more both of men and books, becoming mistress of four languages besides the Sanskrit. Upon the death of her parents, she and a brother journeyed through many parts of India as pilgrim-advocates of female education. In Calcutta, Ramabai began audaciously to lecture on the sacred books. The pundits of the city summoned her before them for an examination, from which she bore away the title *Sarasvati*, fairly wrested from them. Left a widow after a brief and happy wedded life, she has since given herself to the cause of Hindu female education. Going to England, she was there about three years, studying and acting as Professor of Sanskrit in the Woman's College at Cheltenham. Drawn to this country early last year to witness the graduation in medicine of the first high-caste Brahman woman who ever came to the United States, Dr. Anandibai Joshee, she has remained here studying and lecturing, hoping to be able soon to return to India to execute the plan which she sets forth at the end of this book.

What she has written seems to us altogether admirable. She has given a clear, calm, and simply direct account of the life and place of a Hindu woman, in society and religion; has shown the strangling effect upon the mothers, and the destroying effect upon the race, of the social customs bulwarked by religious sanctions, and has especially emphasized the pitiable condition of Hindu widows, of whom the last census shows that there are in India nearly twenty-one millions, over half a million being under nineteen years of age. To these Mrs. Medhavi's educational plans chiefly look. She hopes to open houses for young and high-caste child-widows, "where they can take shelter without the fear of losing their caste or of being disturbed in their religious belief, and where they can be taught to become teachers, governesses, nurses, and housekeepers, in order to help them make an honorable and independent living." It is her belief that she can already count upon a measure of native support for her project, and that if she can successfully conduct one such establishment for ten years, the future of female education in India will be secure. Her lectures have been given as a means of obtaining funds for the cause she has at heart, and this book is privately printed that the money derived from its sale may be devoted to the same end. We are deeply impressed with the strength, good sense, and lofty purpose of this writer. Her English is remarkable—even allowing for a possible revision. In method and style the author of the 'Introduction' might well learn from her. She has real grip and movement in her argument. She does not write as a visionary. In her, certainly, the Sphinx no longer crouches in stone.

*The Story of Assyria*, from the Rise of the Empire to the Fall of Nineveh (continued from 'The Story of Chaldea'). [The Story of the Nations.] By Zénaïde A. Ragozin. G. P. Putnam's Sons. 1887.

WE have had repeated occasions, without being sparing of criticism, for praising single volumes of "The Story of the Nations" as in one or more respects superior to most of the preceding ones. In this instance we must speak more broadly, and say, that were the whole collection as well done as the work before us, it would be, in our estimation, as a whole, incomparably more valuable than it is. The author has succeeded in her endeavor to make a history teeming with revolting or dry-as-dust details poetically attractive, and a popular book, mainly destined for those ignorant of the subject, brimful of information even for scholarly readers. In this she has been partly aided by her enthusiasm for the history of the ancient nations of the Mesopotamian regions, as revealed by the explorer's pickaxe and the decipherer's ingenuity, and partly by the clever device of drawing into the compass of her task as much that is, in one way or other, kindred or contiguous, and also worth knowing, as the widest stretching of the meaning of her title would permit. Whole chapters—see those inscribed "The Sons of Canaan"—are devoted to topics non-Assyrian, but slightly illustrative of Assyrian national relations and conceptions, and interesting in themselves. By so doing, the unity of the book as a special history has been somewhat impaired, but its value as a member of the series, which is collectively to form a universal history, immeasurably enhanced. Copious quotations—from the Assyro-Babylonian inscriptions, the Bible, and recent histories—lend additional variety to the 'Story,' the telling of which they have also rendered more easy and smooth. The twin volume, 'The Story of Chaldea,' is constantly referred to.

Mme. Ragozin's favorite guides are George Rawlinson, Lenormant, and Sayce, but many a page proves also considerable familiarity with Schrader, Delitzsch, E. Meyer, Stade, Kaulen, and other German authorities of the latest date. Perrot and Chipiez's 'Histoire de l'Art dans l'Antiquité' is her chief source of art information. The volume is well supplied with illustrations—we might say too well, for some of them are horrid pictures of royal Assyrian barbarism. It surely was not necessary to add to the picture (46) showing how "Sargon puts out prisoners' eyes"—"The Pride of Asshur" is the title of the chapter devoted to that conqueror—these words: "The ring passed through the lips with bridle attached is to jerk the head into the right position and keep it from moving" during the operation. Altogether, a little less admiration for the heroes of the cuneiform inscriptions, and a little more regard for the self-revealed untruth of their atrocious monumental bragging, would have suited us much better.

We also find the Biblical material very unevenly weighed in the author's critical balance. Had she read and digested Stade's 'Geschichte Israels' when she wrote (p. 25) what fact explained how Joseph could have become Prime Minister of Egypt, or (p. 152) that it was David who made his sanctuary "the only holy place of the nation"? We should also have preferred a more frequent adherence to Biblical spellings, when not really conflicting with the Assyrian names. If "Accad" is constantly used, why write "Kush" for Cush, and "Kutha" for Cuthah? Why "Karkhemish," which is not Assyrian, for Carchemish? "Ashkalon" (p. 150) is, of course, an overlooked slip of the compositor, as is "Zurim" for Zuzim (p. 74); "Lybia," for Libya (p. 91); "Yemen, the southeastern corner of the penin-

sula" (p. 69); "the Syrian Melkarth," for the Tyrian Melkarth (p. 133); or "Irkhulini," for Irkhulina (p. 183). In the list of "works read and consulted"—and a very creditable one it is—we find "Baudissin, W. S.," for Baudissin, W., Graf (Count); "in einzelnen Darstellungen," for "in Einzeldarstellungen," as Oncken's titles have it; and the 'History of Sennacherib' transferred from George Smith to Schrader. We must also, while giving due credit to the author for a consistent transliteration and careful revision in general, point out "Burnaburiash" and "Burnaburiyash," on page 20, and "Karduniash" and "Kardunyash," on page 170, as well as "Shebaoth" (p. 10), which is neither English nor Hebrew. The Hebrew equivalent of *copper*, *Kupfer*, is not "kopher" (p. 86), though this covers the Greek *κύπρος* in a different meaning. M. Clermont-Ganneau is not "the discoverer" (p. 216) of the Moabite stone, whatever his other merits about it may be.

*The Pleasures of Life*. By Sir John Lubbock, Bart., M.P., etc. London: Macmillan & Co.; New York: Appletons. 1887.

SIR JOHN LUBBOCK, in introducing this volume to his readers, tells them that it consists of the substance of various addresses which he has made before the young of schools and colleges, and explains his choice of subjects in general by saying that he is himself "rather prone to suffer from low spirits," and hence he has taken the opportunity frequently of "dwelling on the privileges and blessings we enjoy"; and he reprints some of these speeches, with considerable revision, "hoping that the thoughts and quotations in which I have myself found comfort may perhaps be of use to others also."

The character of the book is thus admirably stated, with the sincerity and directness which charms throughout the whole of the too brief pages. The tone is serious—there is much from the old sources, the great moralists of the past; but one feels in it all that best of the reader's pleasures—continuous contact with a cultivated mind and a kindly nature. He quotes in one place the remark of Nasmyth: "I have heard much about the ingratitude and selfishness of the world. It may have been my good fortune, but I have never experienced either of these unfeeling conditions." And then he adds on his own account, "Such also has been my own experience." This is one of those unconscious strokes of simplicity that endear a writer to his reader, by virtue of the temperament and habits which they reveal without thought. The same naturalness pervades the volume, and the personality of the author, always present but never self-asserting, wins upon the reader with a power beyond that of his "thoughts and quotations," and turns the old counsels of perfection into the advice of a friend. His own thoughts partake of the quality of his quotations from the sage philosophers: "We must be careful, then, how we choose our thoughts; the soul is dyed by its thoughts." "If we are ever in doubt what to do, it is a good rule to ask ourselves what we shall wish on the morrow that we had done." These are fair examples of his homely but truthful *sententiae*. Speaking of the blessing of friends, he says: "I do not quite understand Emerson's idea that 'men descend to meet';" and he goes on to question the Emersonian conception of the necessity of aloofness for the soul, with a power so cogent, from his own humaneness and humility, that, without realizing it, he strikes far into one of the great weaknesses of Emerson, who wrote of friends almost as a naturalist writes of bugs. Occasionally he makes an acute criticism—by the way, as it were—which in a single phrase holds many ideas, as when he parenthetically charac-