Ceylon. He begins by telling us that he is getting to be an old man, and it is now or never with him as regards a journey in the tropics: but when, in the next breath, he informs us that his advanced years number eight and forty, we are quite amused at his premature old age. When he tells us, in the first chapter, how the Berlin academy refused to give him any aid on account of the challenge he had thrown to it on evolutionary speculations, we laugh with him. We see his amusement as he writes upon seeing wild apes for the first time: "Comparing them with the dirty and naked begging priests at our feet, they seemed to me a highly respectable ancestry for them." His German nationality, too, is ever apparent. Now we see it when he describes his German companions, or more frequently when he delights in his allusions to 'the indispensable black tail-coat and white necktie' of old England, or to the English 'chimney-pot' (*cylinderhut*), which he considers, 'of all head-coverings, the most hideous and insufficient.' He enjoys telling of English gluttony as compared with German temperance, of the Englishman's love for money with his exorbitant prices, and finally ends with the terse statement, 'Unsonst ist in Indien nur der tod.' But even his admiration for Germany does not prevent him from giving tribute to the faculty which England has exhibited as a colonizing power.

The scientific results of the Ceylon journey are not apparent. He travelled quite extensively through the island, continually swelling his collections, and finally established a rough laboratory at Belligam, where he worked hard for six weeks, filling his large cases with specimens from land and sea. But beyond the statement that the fauna of Ceylon agrees closely with that of the Philippine and Fiji group, the zoölogist gets little scientific knowledge. His account of the botany of the island is more extensive; but even this is largely made up of artistic descriptions of the magnificent vegetation which so vividly impresses a traveller in the tropics. That the journey was made by Haeckel is, however, sufficient proof that it was more than a pleasure-excursion. He brought back large cases of specimens, of which he says little, but which will, in years to come, undoubtedly be a source of much valuable information to the scientific world.

The book is not intended to be a scientific production, but rather a pleasant account of a naturalist's travels; and as such it is a success. A book of travels is usually dry and uninteresting after the first few chapters; for, however interesting new places may be to the traveller, to keep up a novelty in description soon becomes an impossibility. Haeckel has not entirely overcome this difficulty, but he introduces variety in the shape of personal anecdotes and observations. He is successful, too, in selecting most interesting points for description; and this, together with his boundless love for nature, which is so evident in every line, makes the closing chapters of his book much less wearisome than is usual with books of like nature. He reserves his account of the people until toward the end, and thus gives a series of bright chapters as the close of his stay at Belligam; and, by the continual introduction of people and incidents, he succeeds in keeping the reader's attention better than is customary. But, in spite of all, the last chapters of the book will invariably be glanced over in a hurried and cursory manner.

The translation by Clara Bell is on the whole good, though she has evidently been hard pressed to find expressions which will translate Haeckel's superfluity of adjectives. In some cases she seems to have been unable to find English expressions which give any idea of the German. One hardly gets the idea from the phrase 'worthy and fair reader,' which is conveyed by the German, '*Du, geneigter leser, und noch mehr, vererhte leserin.*' Though she has not followed the German very closely in her translation, yet she has succeeded in conveying to the English reader a tolerably good idea of Haeckel's flowing, free, and confidential style. The wonderful success of Haeckel's writings has proved that his method of writing and dealing with scientific subjects is a most attractive one; and this edition of his visit to Ceylon, partly on account of the freedom of the translation, but more largely because of the nature of the subject treated, will give to the English reader a better idea of his style of writing than any other of his translated works.

REMSEN'S THEORETICAL CHEMISTRY.

Principles of theoretical chemistry with special reference to the constitution of chemical compounds. By Ira Remsen. Revised edition. Philadelphia, *Henry C. Lea's Son & Co.*, 1883. 242 p. 12°.

In preparing this new edition of his little book upon 'Theoretical chemistry,' Professor Remsen has extended quite materially the second part, which treats of the constitution of chemical compounds, and which forms its most distinctive and attractive feature. Many of the alterations, however, will hardly be regarded as improvements by those who believe

that a clear and definite presentation of chemical theories is quite essential to their proper comprehension. While it is manifestly highly important that the student should not only be acquainted with the facts upon which chemical theories rest, but should also appreciate fully the nature of conclusions reached by inductive reasoning, still a constant reiteration of the doubts, uncertainties, or conflicting evidence, which surround the various hypotheses, seems to us ill advised in an elementary text-book.

Although structural chemistry in a certain sense is independent of the valence hypothesis, still this hypothesis was one of the earliest and most natural inductions resulting from the study of the constitution of chemical compounds, and is so interwoven with the present theories, that any attempt to exclude it rigorously from a discussion of the subject merely adds an unnecessary complication. We confess that we do not think the ordinary student will read with much interest the pages devoted to structural formulae, or 'proofs' of their correctness, if he chances to see beforehand the opening sentence of the retrospect which follows (p. 232).

"A study of the preceding chapters on constitution will show that no absolute meaning is to be attached to the word. Constitutional formulas are those which suggest certain reactions, and recall analogies. The formula CH_3-OH does not mean that hydroxyl (OH) is necessarily present in the compound, or that CH_3 is present, but that the different parts of the compound bear such relations to each other that when the compound is decomposed, it acts as if the parts were united as the formula indicates. The formula suggests possibilities; it may not represent realities."

If the author be correct, and "it cannot be denied that we are now in a period of chemistry which may fairly be called one of *formula worship*" (p. 100), it is very certain that formula worship has been of vastly greater service to chemistry than agnosticism is ever likely to be.

We fail to see that any advantage is gained by the introduction of new conventional signs in place of those already in common use, to represent the linkage of the carbon atoms in the olefinet and acetylen series (pp. 202, 206); nor can we understand why the double linkage of the nitrogen atoms, which the author apparently accepts, since he uses the old sign (=) in his formulae for the azo- and the diazo-compounds (p. 222), stands upon any more trustworthy experimental basis. Furthermore, we cannot help expressing our surprise that the author should have ventured the statement, "Of the substitution products of benzene, which contain three substituting groups, more than three varieties have been observed" (p. 208), which seems a bit of rashness hardly consistent with the caution elsewhere displayed.

THE CORNELL MATHEMATICAL LIBRARY.

Cornell university library. Special lists, No. 1. Mathematics. Ithaca, N.Y., 1883. 92 p. 8°.

THIS classified list of works, with index, includes some twenty-five hundred titles relating to mathematics, and such allied subjects as astronomy, engineering, and physics. These books form what is known, from the name of the donor, as the 'Kelly mathematical collection.'

An examination of the list shows that it consists of books actually purchased within the past few years, with good judgment, and a conscientious endeavor to cover, so far as practicable, the immense field of mathematical research, past and present, as evenly as possible.

It comprises, besides many rare and valuable works not readily accessible to American students, the collected works of the great masters of analysis, and the more important mathematical journals.

The mathematical capabilities of American youth are quite equal to those of Germany or England; but the facilities offered them by our universities for the study of this grandest of sciences are in general far behind those found abroad. When the professors and teachers of mathematics in this country shall themselves become lifelong cultivators of mathematical pursuits, and shall have the same average proficiency as those abroad, there will be no difficulty in accomplishing results in the mathematical training of college students fully equal to any attained elsewhere. But such professors and such students cannot be without libraries such as this is the beginning of. We can but express our deep satisfaction with this good work in the interest of sound learning.

WEEKLY SUMMARY OF THE PROGRESS OF SCIENCE.

MATHEMATICS.

Kummer's surface.—Professor Cayley, in a brief note 'on the sixteen-nodal quartic surface,' remarks, that Riemann's theory of the bitangents of a plane quartic leads at once to a very simple form of the equation of the sixteen-nodal quartic surface; viz.,