marine, then alternating brackish and fresh, and finally wholly fresh. This, of course, implies the occurrence of great physical changes upon the North American continent during the Cretaceous and Eocene periods, which, however, did not interrupt sedimentation in a large part of its interior.

Dr. White has also done stratigraphic geology an important service in his concluding remarks upon the value of fresh-water fossils in geological determinations.

"The differentiation of the mollusca into generic, family, and ordinal groups, and the diversification of specific forms among these groups, are immensely greater in marine waters than in any other. In brackish waters it is much less than in the open marine, and in lacustrine waters the minimum of differentiation is found. The large collections of fossil mollusca which have been made in different parts of the world indicate that this slight tendency to differentiation among fresh-water mollusca has always obtained in past geological time; also, that types once established have persisted through a long series of geological periods. Therefore it has become known that fossils of fresh-water origin are of little value, compared with those of marine origin, as indices of the true geological age of the strata containing them. In consequence of this, the real value of fresh-water fossils as aids in the study of stratigraphical geology has been underestimated. While it is admitted that these fresh-water forms are of little value in determining the geological age of strata, they are really of as great importance in the study of local, and even of continental, geology as are any other fossils. Indeed, it would be quite impracticable to ascertain whether the waters in which formations have been deposited were marine, brackish, or fresh, except by the character of the contained fossils.

"Fresh-water formations of considerable extent can only be produced upon continental areas, and they consequently record phases of continental history of which marine formations give no indication. In western North America the fresh-water deposits rival in extent and thickness the great marine formations; and it would have been impossible to arrive at the knowledge of them which we have now attained except by a study of their fossils. Each of these great lacustrine formations has its own distinguishing fauna, the uniform character of which over great areas is quite remarkable. So large has been the area of some of the fresh-water seas in which these deposits were formed, and so uniform the conditions under which they existed, that the geographical distribution of species in them has been nearly or quite as great as the average of that of marine mollusca. For example, some of the species of the Laramie group have been found at points more than a thousand miles apart; and in the fresh-water Eocene groups the molluscan fauna is practically identical at points as much as 200 miles apart."

The Margin of Profits. By EDWARD ATKINSON. New York, Putnam. 12°.

MR. ATKINSON'S writings on practical economy are among the best that we have. They are always interesting and suggestive, and frequently contain information and advice of much value to those for whom they are intended. They are not original in a scientific sense, and do not profess to be, Mr. Atkinson being a man of business rather than of science; yet all his arguments rest on a scientific basis, and on carefully collected statistics. He is, moreover, in hearty sympathy with the toiling poor in their efforts to improve their condition in life — indeed, most of his writings are inspired by this motive; yet he freely criticises them when he thinks their efforts are in the wrong direction.

The book now before us contains an address delivered before the Central Labor Lyceum of Boston, together with a reply made on the same occasion by Mr. E. M. Chamberlin, and Mr. Atkinson's rejoinder to the same. The special object of the work is to show, first, that the margin of profits, that is, the share of the capitalist in the products of industry, is much smaller than workingmen generally suppose; and second, that the progress of industry and the increase of capital, while benefitting the capitalist, of course, benefits the laborer far more. To prove and illustrate the first of these propositions, he cites the example of the cotton manufacture, in which the amount of capital used is larger in proportion to the product than in any other industry; so that here, if anywhere, we might expect the profits to be unusually large. Yet, according to Mr. Atkinson, who is thoroughly informed in the matter, the profits are but a very small portion of the cost of the goods. He says: "When you buy 40 yards of cotton cloth at $2.50, you pay the owner of the mill 15 cents profit, but you also pay about 15 cents more to other people for profit; that is, 30 cents profit in all; and you pay $2.20 directly for labor" (p. 28). This statement he proves by an analysis of the process of production, illustrating the same by a chart.

He then goes on to show how greatly the working classes have gained by the improvements that have taken place in production and the consequent increase of capital. He gives it as his opinion, and economists generally hold the same view, that "there has never been a period in the history of the world in which there have been so many important new inventions or so many applications of previous inventions, all tending to human welfare, as in the last twenty-five years" (p. 109). And these improvements, though at first chiefly beneficial to the few, are now, he thinks, tending rapidly and largely to the benefit of the many. He cites some statistics showing that during the past twenty-five years the cost of living has been greatly reduced, while the wages of workmen have largely increased.

Mr. Chamberlin's reply to Mr. Atkinson is very feeble indeed, not one of his opponent's arguments being met, nor any new ones of value advanced. That Mr. Atkinson's views are in the main sound there can be no doubt; yet the scientific relations of capital and labor are not yet thoroughly understood, and until they are we cannot tell precisely how improvements in production and increase of capital affect the different portions of society. Mr. Atkinson is doing important service, however, in calling attention to the service rendered to society by capitalists, inventors, and other brain-workers, and which laboring men are liable to overlook or underestimate. He gives also valuable hints on the subject of personal and domestic expenditure, showing that the poorer classes might save much more than they now do without diminishing their present enjoyment in the least. The whole book, in fact, though containing little that is new of a scientific character, cannot fail to be of use to workingmen, as well as to all others who are studying the labor question from a practical point of view.

Die Klimate der Erde. Von Dr. A. WOEIKOF. 2 vols. Jena, Costenoble. 8°.

DR. WOEIKOF, professor of physical geography in the University of St. Petersburg, is well known to American meteorologists as the author of the general explanatory essay in Professor Coffin's 'Winds of the Globe,' published after the death of the latter by the Smithsonian Institution. He has also been a frequent contributor to the Austrian and German meteorological journals and to other scientific periodicals outside of Russia, and his essays on the climate of the glacial period have attracted much attention from geologists. He has travelled and observed widely abroad, as well as read exhaustively at home. Students of physical geography are therefore to be congratulated that he has condensed the results of his labors in a general work on the climates of the earth, and also that an authorized German translation of the Russian original has appeared; for it is a positive loss to science when an experience as wide and well trained as Dr. Woeikof's is not recorded as far as may be in transmissible form.

The first volume of the work includes a series of chapters on matters of general importance, several of which have been republished elsewhere, so agreeable are they in style and treatment. The chief headings are, 'Pressure and Winds, including a Consideration of Temperature Changes in Vertical Currents;' 'Atmospheric Moisture and Precipitation;' 'Influence of Snow and Ice on Climate;' 'Temperature of Bodies of Water and their Climatic Influences;' 'Daily Variations of Temperature, Moisture, and Wind;' 'Variation of Temperature with Altitude, with Particular Regard to the Effect of Topographic Form on Temperature Changes;' 'Effect of Climate on Vegetation and of Vegetation on Climate;' 'General Statement of the Distribution of Temperature and Pressure over the Earth.' There is nothing of text-book style in these chapters: they are rather essays than lessons, fit for reading by the well-informed meteorologist rather than for study in

school. Reading of this sort is greatly needed in all branches of science, and nowhere more than in meteorology. Look, for example, at the account given of the effects of melting ice and freezing water on the temperature of the adjacent air. The effects appear either in time alone, or in both time and place. When lakes freeze, they retard the early winter fall of temperature, and when they melt they retard the spring warming by an equal amount: this effect is constant in place, but varies in time. On the other hand, when snow falls, the liberation of energy in its freezing affects the temperature of the air at some distance above the earth's surface, making it warmer than it would have been if condensation had not taken place; but the same snow, melting afterwards on the ground, keeps the air there from warming as much or as soon as it would had the snow been absent. Here, then, is an effect that varies in place as well as in time. It is like carrying ice from New England to India: if this once famous industry had been extensive enough, it would have raised our mean temperature, and lowered that of the torrid zone where the ice melted.

The second volume of the work is given to a general geographic account of climate. Here a comparison naturally arises with Hann's 'Klimatologie,' that appeared a few years ago. The subjects treated are identical; the difference is only in the plan of treatment and in degree of emphasis given to one part or another by the two authors. Dr. Hann made free use of original accounts by travellers and foreign observers, and inserted abstracts of their writings in smaller type, after presenting his own general statements; he also included the various climatic tables in the text, alongside of the paragraphs that they illustrate. Dr. Woeikof reduces the records that he consults to common form, and postpones all tables to the end of the book, where they appear with numerous diagrams that have small representation in Dr. Hann's book. Preference between two methods such as these is probably a matter of taste, my own being for that followed by the Austrian author; but the other will doubtless find equal approval. The absence of sufficient reference to earlier authors makes both books less useful than they might have been; but the insertion of the references would have materially increased the size of the volumes, already large, and I believe it was for this reason that they were omitted.

The duplication caused by the almost simultaneous appearance of these two books on one subject can only be regarded as a great advantage. They were independently prepared by leading specialists; and the careful reader, who wishes to think as well as to quote, will gain a solid, stereoscopic comprehension of the subject by approaching it from these two slightly different points of view.

Foods and Food Adulterants. Part I. Dairy Products. (U. S. Dept. Agric., Bull. No. 13.) Washington, Government. 8°.

THIS bulletin, which has been prepared by H. W. Wiley, chemist, is devoted chiefly to a discussion of the best methods of detecting the adulteration of dairy-products, that of butter being treated with greater detail than any other. During the past year the division of chemistry has been supplied with apparatus for photo-micography, and most of the illustrations, twenty-four in number, are the work of the division. Great benefit has been derived from this method of fixing the photographic appearance of the crystalline character of butter and butter substitutes. The illustrations show the crystalline appearances of butter, beef-fat, lard, butterine, and oleomargarine, and are well executed. The bulletin contains the text of the act of 1886, passed by Congress, defining butter, and imposing a tax upon, and regulating the manufacture, sale, importation, and exportation of, oleomargarine; also a detailed history of artificial butter from its first manufacture by Mége-Mouriéz, in 1870, to the present time. The writer of the bulletin believes, that, while a great deal of artificial butter has been thrown upon the market, that has been carelessly made, and therefore harmful to the health, still a butter substitute, made carefully out of the fat of a perfectly healthy bullock or swine, is not prejudicial to health. This opinion is supported by quotations from the leading authorities, such as Professors Morton, Chandler, Barker, and others. The best methods of butter and milk analysis are described in detail, both microscopical and chemical. Other bulletins are being prepared, and will soon be issued, treating of condiments, sugar, sirup and honey, drinks and canned goods, flour and meal, tea and coffee, and baking-powders.

Milton's Paradise Lost. Books I. and II. Ed. with introduction and notes, by M. MACMILLAN. New York, Macmillan. 16°.

THE difficulties of Milton's works are so great, owing to the Latinized structure of his style and his many learned allusions, that they require a commentary almost as much as the ancient classics do. Nor have our scholars neglected to provide such helps; yet for school purposes most of them leave much to be desired. The little book before us is one of the best works of the kind that we have seen, and will help to make the reading of Milton both easier and pleasanter. It is confined to the first two books of 'Paradise Lost,' which the editor rightly considers the grandest portion of Milton's works. The notes are accurate and very exhaustive, as may be seen from the fact that they fill eighty-four pages of the volume, while the text fills only fifty-four. Almost every thing is explained in them that a student would need to have explained, and the explanations are simple and clear. An introduction of moderate length gives an account of the conception and composition of 'Paradise Lost,' together with some judicious criticisms on the poem. The book may be heartily commended for educational use.

Schiller's Wilhelm Tell. With Introduction and Notes by G. E. FASNACHT. London, Macmillan. 24°.

Schiller's Wallenstein. Part I. Das Lager. With Introduction and Notes by H. B. COTTERILL. London, Macmillan. 24°.

MESSRS. MACMILLAN & CO. have, in the two books named above, made valuable additions to their Foreign School Classics series. The Wallenstein is preceded by a well-written historical sketch of the origin and character of the thirty-years' war. The difficulties in reading Wilhelm Tell do not lie in Schiller's style and diction. These are throughout transparently clear. Not so the subject-matter. The reader's progress is delayed at almost every step by historical allusions, provincialisms, topographical and meteorological terms, for the elucidation of which even the advanced student needs to have a complete cyclopædia at his elbow. All this reference-hunting involves a great waste of time, and this little edition of the work has been edited with the view to placing these side-lights at the disposal of the reader.

Higher Algebra. By H. S. HALL and S. R. KNIGHT. London, Macmillan. 16°.

THE present work is a sequel to the author's 'Elementary Algebra for Schools.' The first few chapters are devoted to a fuller discussion of ratio, proportion, variation, and the progressions, which in the former work were treated in an elementary manner. The discussion of convergency and divergency of series always presents great difficulty to the student. To render this the more intelligible, the authors have introduced a short chapter on limiting values and vanishing fractions. In the chapter on summation of series they have laid much stress on the method of differences and its wide and important applications. Permutations and combinations and the theory of probability have received due attention, also the theory of determinants and their applications. The last chapter contains all the most useful propositions in the theory of equations suitable for a first reading.

Naturae Veritas. By GEORGE M. MINCHIN. London, Macmillan. 16°.

WE learn from the author's preface that in this poem he has related certain things, which, in a temporary absence from this earth, he received from a being who, having completed the change of existence, had attained to a knowledge of the universe far transcending the capacity of man. The poem is descriptive of the author's supposed stellar visits in quest of information, which should lay at rest his doubts in regard to the dissipation of energy. Unfortunately the journey was without result.

The Owens College Course of Practical Organic Chemistry. By J. B. COHEN. London, Macmillan. 16°.

THIS little book on organic chemistry will be received with favor, doubtless, and has already received the high indorsement of Prof. Henry E. Roscoe and Prof. C. Schorlemmer. Any course of practical organic chemistry leading up to original work must mainly consist in a careful preparation of a well-selected series of organic compounds. Dr. Julius Cohen has in this little book collected such