who wish to make themselves acquainted with mathematical methods in a limited time. The importance of mathematics for all branches of natural science will certainly increase the more our knowledge progresses and increases in complexity, because it becomes more and more difficult to draw conclusions by non-mathematical reasoning. A book of such character as the one described can certainly therefore claim to be of great importance.

R. Beutner

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Chloride of Lime in Sanitation. By Albert H. Hooker. First Edition. New York, John Wiley & Sons. 1913.

One of the most striking developments in the art of water purification during recent years has been the rapid increase in the use of chloride of lime as a disinfectant. It has been found that astonishing results may be obtained by the use of surprisingly small quantities of this substance. In clear water, such as that of the Great Lakes, the application of eight to ten pounds of this chemical to a million gallons of water is sufficient to destroy practically all of the bacteria. Larger amounts are required for waters which contain organic matter, in some instances nearly one hundred pounds per million gallons being used. Bleaching powder is also being used to some extent in the disinfection of sewage. Here, also, it has an important field of usefulness.

The rapidity with which the use of this substance has come into popular favor is indicated by the publication of the present work devoted exclusively to the use of chloride of lime in sanitation, and consisting chiefly of abstracts of articles published in various scientific journals. Four hundred of these articles are quoted and the essential points of each briefly stated. The author deserves credit for having brought these various papers together. It would be a tedious matter for any one interested in this topic to obtain so much information by his own search. Looking for omissions the reviewer finds that the compilation has been unusually well made.

The abstracts are prefaced with an interesting discussion of the general subject by the author, who gives first a history of the manufacture of chloride of lime and then an account of the method of its use in water purification and for other purposes of general disinfection. In this he is somewhat inclined to minimize the advantages of the use of liquid chlorine. He regards the action of bleaching powder as one of oxidation and does not believe that chlorine acts by itself as a disinfectant in any other way than by liberating nascent oxygen. Some may be inclined to question this. One of the most valuable sections of the book is that which gives directions for dissolving bleaching powder for its practical application. Comparatively little is said in regard to the corrosion of metals by the use of this chemical.

The book is well indexed and will prove an invaluable reference book to sanitary engineers.

George C. Whipple

The Plant Alkaloids. By Thomas Anderson Henry, Superintendent of Laboratories. Scientific and Technical Department, Imperial Institute. Philadelphia, P. Blakiston's Son & Co. 1913.

So long as there is a science of botany, phytochemistry will constitute a perfectly justifiable phase of chemical thought and of chemical investigation. Though for a time, after Kekulé's enunciation of structural chemistry, phytochemistry was looked upon as being not fully up to date as compared with organic synthesis, it is again coming to its own. Since Emil Fischer has pointed out that some of the most interesting problems of organic chemistry are those that are intimately related to biochemistry, phytochemistry has once more become a respectable science even in the eyes of the synthetic chemist.

The present activity in this field is manifested not only by innumerable special researches, but by the rapid growth of book literature. Thus Czapek's "Biochemie der Pflanzen," Euler's "Grundlagen und Ergebnisse der Pflanzenchemie," and Wehmer's "Pflanzenstoffe," which have appeared within a short

period of six years, are indications of the attempts that are being made to bring together between the two covers of a book the modern knowledge in this field.

Most of the recent books, however, are content to present more detailed accounts of restricted phytochemical groups. Next to the literature on the volatile oils, on the fatty oils, and on the carbohydrates, which have received special consideration, no doubt, because of their industrial significance, the alkaloids have attracted considerable attention.

While the fatty oils and carbohydrates represent decidedly restricted groups of chemical compounds, the volatile oils and alkaloids represent much wider fields, chemically speaking. Biochemically, however, these two groups have been regarded as of much less importance than the carbohydrates and fatty oils. This has, however, not lessened their inherent chemical interest, which has always been appreciated. However, their physiological significance has also grown with our increasing chemical knowledge of the compounds of these two groups. Physiological interest is no longer restricted to skeleton-producing or energy-producing materials. It has broadened and by no means to the disadvantage of the science.

It has been said that modern pharmacology owes its existence to the discovery of the alkaloids. Hence one is not surprised to find the pharmacological aspect of the alkaloids receiving consideration even in a treatise that is predominantly chemical. For the same reason the pharmaceutical aspect of the subject has been given due consideration by the author of the book under consideration. Yet there is a purely phytochemical point of view that deserves more careful study than it has commonly received.

That the author of "The plant alkaloids" should follow conventional lines is possibly to be expected. That he himself does not find satisfaction in so doing becomes only too apparent from various statements that might be quoted from his introduction. From a purely chemical point of view, the alkaloids, like all other carbon compounds, should be classified in accordance with the definition that organic chemistry is the chemistry of the hydrocarbons and their substitution products. Thus the conflicts and the irrationalities of a classification based on the so-called typical groups would be avoided. From a botanical point of view, the alkaloids of a family should be considered together, totally irrespective of the nuclei they are supposed to contain. Thus and thus only can genetic relationships be brought out satisfactorily. Such a treatment not only proves satisfactory in the consideration of a single phytochemical group, but it tends to destroy the arbitrary boundaries of these groups.

Nevertheless, we welcome the author's new treatise. It may be claimed that it would be better to revise one of the older texts on the subject. That such revision becomes necessary very often in these days of great research activity is apparent to all who have occasion to use these texts. However, if a new text brings the subject matter up to date, it, as a rule, not only fulfills this important requirement, it is also apt to do more. It usually introduces new points of view at least here and there. For this reason we often welcome a new text rather than the up-to-date revision of an older one.

E. K.

THE TEMPERATURE ASSIGNED BY LANGLEY TO THE MOON

IN his last publication on the lunar temperature,[1] Langley receded from his previous estimate "according to which the soil of an airless planet at the moon's distance

[1] "The Temperature of the Moon. From Researches made at the Allegheny Observatory." *National Academy of Sciences*, Vol. 4, Part 2, Third Memoir, 1889. Two editions of this work were printed. One is said to be "by S. P. Langley," the other "by S. P. Langley and F. W. Very." To prevent misapprehension, I will state that the memoir was the joint work of Mr. Langley and myself. A note written by Mr. Langley, explaining that my name had been omitted from a place on the title page with his own by an oversight noticed too late for correction, was, by some irony of fate, tacked on to the wrong edition, the one which did have my name on the title page.