there the matter ends, save under the head of bibliography for geographical distribution, where the list of nine, not all American, begins with Schweinitz and includes Berkeley, Curtis, Ellis and Peck. It is noted that Dr. Burrell is credited with first discovering a plant disease of bacterial origin; namely, 'the shrivelling o pears' in 1880 due to *Micrococcus amylovorus*.

The total number of described species of fungi is given as 40,000, an estimate founded upon the Sylloge of Dr. Saccardo.

Under the chapter upon geographical distribution it is stated that the fungi are not yet well enough known to more than conjecture as to their distribution on the earth. China is still an unknown land and India but little better, and Africa is a 'dark continent' so far as fungi are concerned. The fleshy fungi are mostly in the temperate regions. Nearly the whole of the Amaniteæ groups of exceedingly poisonous toadstools are rarely met with in the tropics.

Under classification some of the salient points are introduced, as naked and covered spores, perfect and imperfect forms and the character of the spore covering. While not accepting the classification offered by Brefeld in full, Dr. Cooke recognizes its influence and summarizes it in tabulated form. In the same chapter a page and a half is given to the drawing of lines of contrast between lichens and fungi, and the first page of the introductory chapter states, "It is now known that aquatic fungi are not an impossibility, that algæ may grow in damp atmosphere and that some portions of the substance of lichens may be derived from their matrix." From these statements the student would gain no encouragement to incline toward the modern theory of the fungo-algal conception of lichens.

The book is printed upon unusually heavy paper with uncut edges and weighs about three pounds. Half the size and bulk would make it many times more companionable.

While the faults have been most largely pointed out, the book cannot but be useful and aid the collector to reach the conclusion expressed in the last sentence of the work: "The whole history of one species worked out with perseverance and intelligence will present the key to a knowledge of many kindred species and always prove to be a valuable contribution to science when the names of species are changed or forgotten." When this fact is realized in the collector he becomes a working factor in the strict sense for the advancement of his science. BYRON D. HALSTED.

A Preliminary Report on the Geology of South Dakota. By J. E. TODD. South Dakota Geological Survey. Bulletin No. I. Sioux Falls, South Dakota. 1895. Pp. viii, 172. Plates V., figures 2, and preliminary geologic map of South Dakota.

In the above report Prof. Todd, who is the State Geologist, has summarized what is known of the geology of South Dakota. The author's studies of the geology of this State began in 1881, since which time his connection with the United States and State Surveys has enabled him to examine in the field most of the geological formations found in South Dakota. The work is written in popular form in order that it may serve as a geological guide to the citizens of the State; but in its pages is also found matter of value to the teacher and geologist.

The report contains a chapter devoted to each of the following topics: Introduction, topographic features, sketch of the geology of the State, eruptive rocks, geological history of South Dakota, and economic geology, while the description of the geological formations of the State occupies four chapters, making ten in all. Prof. Todd finds that the following systems are represented: Huronian, Cambrian, Lower Silurian, Carboniferous, Triassic, Jurassic, Cretaceous, Tertiary and Quaternary, while 25 feet of shales in the vicinity of Deadwood is referred doubtfully to the Devonian. On consulting the geologic map it will be seen that about two-thirds of the State is covered by formations belonging to the Cretaceous system, of which the Colorado group is first in area and the Laramie second. After the Cretaceous system the Miocene of the Tertiary is second in areal extent, and the Huronian third.

Among minerals of economic value, gold is the most important, the Black Hills in 1893 producing $4,000,000. The author says that the oxide of tin (cassiterite) 'occurs very generally.

in the granite rocks about Harney Peak,' but there is no statement in reference to the production of the mines in this region, the development of which has been a subject of general interest. The best building stones of the State are the red Sioux quartzite of the Archæan, while in the Black Hills is the gray or reddish Dakota sandstone of the Cretaceous, which is said to compare very favorably with the well known Berea stone of northern Ohio.

The State Geologist expresses the hope that this Bulletin 'may be but the first of a long series' that will be published by the State, and the geologists of the country heartily echo this wish. It remains for the prosperous agricultural States of the 'Great Plains' to remove the stigma resting upon them in having neglected for so many years the study of their natural history and geology. It is not true, as has been popularly supposed, that they are comparatively barren in mineral resources, and, furthermore, there are problems of the greatest scientific interest awaiting investigation. The failure by the Dakotas, Nebraska and Kansas to provide for adequate geological surveys is in marked contrast to the liberal support which such surveys have received from the tier of States to the east—Minnesota, Iowa, Missouri and Arkansas—surveys which have accurately described the geology of those States and made known their natural resources, the development of which has added greatly to their wealth.

C. S. PROSSER.

Die Chemie der Zuckerarten. By DR. EDMUND O. VON LIPPMANN. Braunschweig, Vieweg und Sohn. 1895. Pp. xxvi+1176.

In 1879 von Lippmann published in the *Zeitschrift des Vereins für die Rübenzucker-Industrie des Deutchen Reichs*, a memoir entitled 'Monographie der Zuckerarten.' This valuable compilation was practically a summary of all that was known at that time about the more important carbo-hydrates; it filled about seventy quarto-pages of the journal in which it appeared.

Three years later the author followed the treatise named with a book, 'Die Zuckerarten und ihre Derivate.' This was based on his former publication and aimed to present all known facts regarding the physical and chemical properties of the different sugars.

The unexpected and certainly unprecedented growth which sugar chemistry experienced within the decade following the issue of this work, made a new, up-to-date, issue of the same greatly needed and desired. Numerous requests to undertake this task were addressed to its author and these wishes were finally responded to by the publication of the work forming the subject of this notice.

Die Chemie der Zuckerarten has its subject-matter divided into four parts, which, in turn, are subdivided into sections.

The first three parts are given to, respectively, the mono-, the di- and the tri-saccharides. The fourth part contains discussions on: the constitution, configuration and synthesis of the sugars; the relations of optical and calorimetric constants; the origin of the sugars in plants; the physiological importance of the sugars.

The saccharides are arranged and discussed in sequence according to the number of carbon atoms they contain. Thus, of the mono-saccharides, the bioses, sugars having two atoms of carbon, are first considered; next come the trioses, the tetroses, the pentoses, etc.

The hexoses (the $C_6H_{12}O_6$ group) are divided into the aldo- and the keto-hexoses; the former exhibiting the aldehyde-structure, the latter containing the characteristic ketone-group. Dextrose (d-glykose) is a representative of the former, levulose (d-fruktose) of the last-named class.

No less than 234 pages are given to dextrose. This may indicate the thoroughness which characterizes the whole work.

The most important of the di-saccharides, is of course, sucrose (cane sugar). The author devotes 244 pages to its consideration. Lactose, maltose and iso-maltose are also given exhaustive treatment in this part of the book.

The leading representative of the tri-saccharides is raffinose. This substance, melecitose and a few other carbo-hydrates of analogous constitution receive the attention due them, and are folllowed by the learned and able disquisitions on the constitution, configuration and synthesis of the sugars, etc., previously mentioned.