Buchanan Mines and decided to abandon the business. It may seem singular, but nevertheless it is the fact, that on my previous hasty examination I had selected what have since proved the three best mines, viz.: the Ray Mine in Yancey, and the Silvers, or Sinkhole, and the Buchanan Mines of Mitchell.

After Messrs. Sloane and Menden declined prosecuting the engagement, not being willing to abandon it entirely, in the summer of 1868, I caused some work to be done at the William Silvers, or Sinkhole Mine, as it has since been called. The shafts I had sunk and the tunnels driven showed an abundance of good mica. Being obliged to leave, I contracted with the foreman, who was managing the workmen employed, to save the blocks of mica, which were more than sufficient to pay the expenses of the operation. I learned, however, that soon afterwards he, having heard that some members of his family were sick, abandoned the work and left the mica lying on the ground. As I was then in very bad health, I did not feel able to superintend the work myself, and [as I] was not in condition to employ suitable agents, I decided to abandon the enterprise and surrendered my contract to Mr. Silvers and told him to make some new arrangement.

Mr. Heap, who has been the largest operator in the mica business, informed me that he had been induced to go into the business by this circumstance. A horse driver, on his return, knocked up one of the blocks of mica left on the ground and carried it to Knoxville in the autumn of 1868. On seeing it, Mr. Heap made inquiries as to the locality, obtained a lease from Mr. Silvers and commenced operations there. His success encouraged others to embark in the business, Mr. Garrett Ray being one of the first to begin in the early part of 1869, at a place where I had taken some specimens. The working gradually spread to other localities in these and other counties.

For additional and fuller information, I refer you to a publication of mine in the printed volume of my writings and speeches which you can find in the libraries at Chapel Hill. It begins on page 130, headed *Old Diggings for Mica, etc.* The name of Mr. Silvers is misprinted there. That publication will give you, probably, the additional matter you desire. It was originally published in the *Asheville Expositor* at the time of its date, April 8, 1873.

* * * * * *

Hoping that this statement may be sufficient for your purpose, I am

Very truly yours, etc.

T. L. CLINGMAN.

Prof. F. W. Simonds.

From the above letter it will be seen that the location of the mines was not 'largely accidental;' on the contrary, that Clingman made the preliminary investigations for a purpose, which was to discover commercial mica, and that he succeeded. But, as has often happened, he failed to grasp the prize almost within his reach. Ill health and a want of capital caused him to abandon the enterprise, and strangers, profiting by his preliminary work, reaped a substantial reward.

FREDERIC W. SIMONDS.

SCHOOL OF GEOLOGY,
UNIVERSITY OF TEXAS, July, 1896.

SCIENTIFIC LITERATURE.

Manual of Lithology: Treatment of the Principles of the Science with Special Reference to Megascopic Analysis. By EDWARD H. WILLIAMS, JR., E. M., F. G. S. A., Professor of Mining Engineering and Geology, Lehigh University, South Bethlehem, Pa. With six plates. Second Edition. First Thousand. New York, John Wiley & Sons. 1895.

In reviewing this work particular attention ought to be paid to its objects and to the system of education that has given it birth. The criticisms may seem severe, but they are aimed only at educational methods that the reviewer considers radically wrong, even if circumstances force him to give seeming countenance to them.

The principal points here noted are two: (1), the neglect of considering the student in preparing a text-book, and (2) the habit of spreading instructors over too extended a field.

A text-book to be of practical use to students must be clear, concise and accurate in its statements. In an observational science it should indicate in the most unmistakable language the

appearances of the objects, their points of difference and their resemblances. The beginner ought to have the way smoothed off for him and every turning in the road explained. The discipline for the student should not come in the labor of mastering the principles of the science, but in applying them. Time is too short and too valuable to require the learner to spend all his time in clearing his path from the stumps, stones and other rubbish the instructor has left there, either from incompetence, ignorance or indolence. It is this unnecessary rubbish left in the way that wastes the time of our pupils and causes so many of them to graduate before they have really learned anything so that they can apply it.

The preface to Williams' Manual informs the reader in substance that the book is designed to teach beginners to distinguish the different kinds of rocks by means of the naked eye and ordinary lens, and to inform engineers about the various uses of rocks.

Looking at the first object—the student's use—the following sentence, culled from many, will give an idea of the lucidity of expression employed: "It may also be advanced that it does not require a greater amount of heat to metamorphose the walls in the one case than in the other, and that it is as easy to suppose the walls heated before the stoppage of the flow, either by the length of time during which the flow passed or from the fact that the whole region was heated to a point just below metamorphism (by orogenic or other causes) before the fracture and intrusion took place, and that the intrusive supplied the needed increment for metamorphism" (p. 3). This doubtless was one of the 'hot times' frequently heard of, but never before known to produce geological metamorphism through their length. This explanation will not only clear matters up for the beginner, but will assist the physical geologist in solving some of his most difficult problems.

How much attention could the author have paid to the needs of students, when, alone of all the manuals relating to the microchemistry of minerals, he refers to the French one of Klément (misspelled Klémert) and Renard, a publication that has long been out of print, and so rare that the reviewer has not been able to secure even a single copy after years of endeavor.

The only proper place mineralogy, as such, has in a text-book of lithology is when the space is devoted to pointing out the modes of occurrence of the minerals in rocks and the methods employed for their macroscopic identification.

In this book the first is briefly done and the latter hardly at all, while the chief portion devoted to mineralogy falls into the category usually known as 'padding.' The part of the work relating to the general definitions is its most valuable portion, although the statements here are deficient in clearness and precision, while much unnecessary matter has been introduced.

In the rock descriptions what beginner could macroscopically identify an obsidian by being told as its definition that it was 'a compact glass of varying color and luster, of a high acidity, and with content of chemically combined waters never more than one per cent.' (p. 114)? Or how is the learner to distinguish amphibolite from hornblende schist when the massive and schistose states occur almost in the same hand specimen, if he is guided by these definitions? 'Amphibolite, a granular aggregate of dark green to black hornblende with more or less quartz, and sometimes chlorite.' 'Hornblende-schist, a granular and schistose aggregate of the above minerals with similar silica and specific gravity.'

Throughout the book the descriptions and definitions of the rocks are not clear and accurate for macroscopic work, so that the beginner can find any clues to lead him on through the labyrinth. No directions are given to show him how he may avoid errors, and the characteristic appearances of the rocks are almost unnoticed.

It is such teaching as this, the reviewer believes, which crowds a student's head with a mere jumble of words, but leaves him destitute of any real knowledge of their application.

Although this is the second edition, the critic cannot see that the work has any use or place in the class room or laboratory. He regards it as one of the most worthless manuals on macro-

scopic lithology he has ever seen, and wonders how such a book could have been written by any man who had the slightest comprehension of a beginner's needs or who ever spent a day in a lithological laboratory.

Most of the plates that illustrate the book are of no use to the beginner, since, as a rule, no one except an expert could tell what rock they were intended to represent. The craze for photographic illustration in students' text-books, started by Rosenbusch, is one that should be frowned upon, in every case, except when the characters stand out boldly. The true way to assist the student is to have the plate show him what he is to look for. For this purpose it needs to be diagrammatic and exaggerated, so that the salient points will be grasped readily. In the present system the picture is commonly far more confusing than the original. A text-book is one thing, a volume illustrating original investigations another. The plates, poor as many of them are, in Harker's excellent little book, are of far more real value to a beginner than are any series of photographic prints ever published.

Turning to the engineer's side of this work, he will find it limited to a trifle over eight pages. This contains, for its space, quite a little useful information, but it is altogether too brief to be of much value. It is a great pity that this part could not have been enlarged and the remaining portions condensed.

No attempt is here made to point out the lame system of classification, the evident want of accurate acquaintance with lithological literature, or even with the rocks themselves. The reviewer's duty is not to criticize the book as a scientific treatise, but as a text-book for students wishing to obtain a working knowledge of rocks. The critic can but consider the work as a paste pot and scissors production, in which the materials were culled without judgment or real knowledge; and is the natural and legitimate result of a system in this country which allows in a university one man to hold two chairs, each of which demands all of his time and energy, however able he may be. Particularly is the system wrong when the two chairs are so diverse as mining engineering and geology. The subject of geology alone is too vast even for a Baconian genius to do justice to it. It contains within its limits two parts or two sciences so different and so great that no college or technical school, and far less a university, can hope for a creditable standing in the geological world, which permits its geological department alone to be covered by one man, however eminent he may be. The butter has to be spread too infinitesimally thin for such a tremendous slice of bread.

The author of the work in question is not to blame, since nothing different ought to, or could, have been expected under the circumstances.

The only thing that the work can here be recommended for is, as a convenient manual in English, for the experienced lithologist to refresh his memory on some points.

M. E. WADSWORTH.

MICHIGAN MINING SCHOOL.

AMERICAN LINGUISTICS.

Langue Tarasque; Grammaire, Dictionaire, Textes. Par RAOUL DE LA GRASSERIE et NICOLAS LEON. *Bibliothèque Linguistique Americaine.* Tome XIX. pp. 293, Paris, Maisonneuve. 1896.

Die Maya-Sprachen der Pokom-Gruppe. ZWEITER THEIL. *Die Sprache der K'ekchi Indianer.* Von DR. OTTO STOLL. Pp. 221. Leipzig, Kohler. 1896.

The above are unusually valuable additions to the science of American linguistics. They present two North American languages hitherto little known to scholars, by careful analyses, according to the most approved methods of modern research.

The Tarascas were the native population of the State of Michoacan in Mexico when it was first discovered by the whites. They belonged among the semi-civilized tribes, though the language they spoke had no relationship to the Nahuatl, nor to any other on the continent. They erected important structures of stone, brick and mortar, and were sedentary and agricultural in habit.

Their language is characterized by the present writers as 'elegant and harmonious, rich and poetic.' Its phonetics are not difficult and its