vania and West Virginia entirely from the western sea; in these deposits no marine fossils are found, but only land plants and fresh-water Crustaceans and a few fresh-water mollusks."

A table showing the correlation of the Coal Measures of Arkansas and similar deposits in Indian Territory, Texas, the Mississippi Valley, Pennsylvania, China and other parts of Asia, Russia and the Ural Mountains, India and South America, closes what may be termed the first part of this contribution. The remainder, pages 25–72, consists of an annotated list of the Marine Fossils of the Arkansas Coal Measures, together with a check list showing their stratigraphic distribution and the localities of their occurrence in Arkansas and elsewhere. Nine excellent plates accompany the text. A new species of *Gastrioceras*, *G. branneri*, and a variety of *Pronorites cyclobolus*, Phillips, called *arkansiensis*, are described. A description of the trilobite *Phillipsia (griffithides) ornatea*, by Capt. A. W. Vogdes, U. S. A., quoted from the Proceedings of the California Academy of Science,* is also inserted.

By those interested in the organic side of geology Professor Smith's paper will be read with much satisfaction. The comparative study of faunas, their relations and distribution, is a line of investigation which promises much in the near future.

Frederic W. Simonds.

University of Texas.

Clay Deposits of Missouri. By H. A. Wheeler. Missouri Geological Survey, Vol. XI., 622 pp., 39 pl. Jefferson City, 1896.

The recent report upon the Missouri clays, while essentially economic in character, discusses a number of problems of wide scientific interest. Among these the nature of plasticity as exemplified in clays is perhaps the most important. Professor Wheeler finds, as a result of physical tests and the microscopic examinations of Haworth, that the fine plate theory of Johnson and Blake† is the only one which satisfactorily explains the facts, and that fineness in itself has no real bearing on the plasticity.

It is found that the fusibility of a clay is a function not only of the chemical composition, but of the fineness of grain and the density. The following formula is developed and thought to be satisfactory for approximate results, but it is held that absolute results can only be obtained by testing.

$$FF = \frac{N}{D + D' + C}$$

In this FF represents the numerical value of refractoriness. N represents the sum of the non-detrimental constituents, or the total silica, alumina, titanic acid, water, moisture and carbonic acid. D represents the sum of the fluxing impurities or the alkalies, oxide of iron, lime and magnesia. D' represents the sum of the alkalies, which are estimated to have double the fluxing value of the other detrimentals, and hence are added twice. C has the following values:

$C=1$,	clay	coarse	grained	sp.	gr.	over 2.00
$C=2$,	"	"	"	"	"	2.00 — 2.25
$C=3$,	"	"	"	"	"	1.75 — 2.00
$C=2$,	"	fine	"	"	"	over 2.25
$C=3$,	"	"	"	"	"	2.00 — 2.25
$C=4$,	"	"	"	"	"	1.75 — 2.25

There are a large number of physical tests, chemical analyses and detailed descriptions of processes, and the work is one of wide interest and considerable value.

H. Foster Bain.

* Second Series, Vol. IV., p. 589 *et seq.*

† *Am. Jour. Sci.* (2), XLIII., p. 357. 1867.

SCIENTIFIC JOURNALS.

AMERICAN CHEMICAL JOURNAL, MAY.

On Urethanes: By O. Folin. When sodium methylate is treated with acetbromamide the yield is not, as might be expected, a hydroxylamine derivative, but a urethane which is formed by a molecular rearrangement during the course of the reaction. The purpose of the author was to test this reaction, to find out if it was general and also the effect of different negative and positive groups substituted in the bromamide. As a result of a number of experiments with different radicals, it was found that the difference in the nature of the radical did not affect the reaction, which is a general one that can be used in the preparation of urethanes. The urethanes when treated with phosphorus penta-