most excellent means of education and instruction to the inhabitants by interesting them in the local phenomena and the history of the mountains and the rocks forming them.

The physiography is by Cleveland Abbe, Jr., and the geology by Cleophas C. O'Hara. The county is in the western part of the State, embracing parts of the Allegheny Plateau and the Great Appalachian Valley. The rocks exposed in the plateau district are of Carboniferous and possibly Permian age and have been folded into a flat northeast-southwest syncline. The upturned resistant Pottsville conglomerate forms the eastern edge of the plateau in a straight even-crested ridge, and the interior of the plateau is composed of the softer overlying rocks protected in the syncline to the west. The Ridge district, embracing that part of the county in the Great Appalachian Valley, is composed of Silurian and Devonian rocks folded into numerous open parallel northeast-southwest folds, generally with steeper dips to the northwest, but not overturned or overthrust. Erosion has produced long parallel sharp-crested ridges separated by narrow valleys.

The remains of two physiographic plains have been recognized in the topography. The older, called the Schooley Plain, is preserved only in the crests of the higher ridges. The younger, called the Shenandoah Plain, is represented by the tops of low ridges and knolls between 900 and 1,100 feet elevation along the margins of the larger streams. This latter plain consisted of broad valleys between high ridges which were not reduced during that cycle of erosion. Two terraces of recent date were observed in the stream gorges, marking temporary halts in the downward cutting of the streams. Some very interesting stream adjustments are described. The geologic history of the region is also interestingly presented.

Among the mineral resources mentioned, the more important are coal, fireclay, cement rock and iron ore. Excellent steam coal has been mined in the county for many years, and the district is known as the Cumberland-Georges Creek Basin. Several important beds are mined and are distributed vertically through the Pottsville and Coal Measures. The Big Vein or 14-foot Vein occurs in the upper part of the series, and is noted for its great size, purity and fine steam quality. The report on the economic products is by Wm. B. Clark, C. C. O'Hara, R. B. Rowe and H. Ries.

The soils of the county are represented on the geological map, the subdivisions corresponding to the divisions of the underlying rocks, but a separate legend giving the descriptions of the soils. Mechanical and chemical analyses of the various soils are given in tabular form and their value for agriculture is discussed. Clarence W. Dorsey is the author.

The hydrography and the remaining subjects presented in the report, as well as the soils, were surveyed in cooperation with branches of the U. S. Government and the reports are presented by members of the government corps.

The volume is handsomely printed and illustrated with half-tone cuts in the same excellent manner as in former publications of the Survey. The atlas accompanying the report is a high-grade lithographic production. The topographic map is that prepared by the U. S. Geological Survey in cooperation with the State. The colors and patterns used on the geologic maps are the same as those used by the U. S. Government and the results obtained are very pleasing. The publication by counties, however, makes it necessary to dissect the maps awkwardly and print them on three sheets, and makes the folio of unhandy size.

GEORGE W. STOSE.

WASHINGTON, D.C.

SCIENTIFIC JOURNALS AND ARTICLES.

THE *American Geologist* for May contains a biographical sketch of Elkanah Billings with portrait by Henry M. Ami. Dr. J. B. Woodworth contributes an article on 'Cross-Banding of Strata by Current Action.' He describes micaceous bedding in the glacial sand near Lake Walden and attributes its formation to the vertical movements of the water about the crest of a current mark. This is followed by 'A Historical Outline of the Geological and Agricultural Survey of the State of Mississippi,' by E. W. Hilgard. This is followed by 'Reviews of Recent Geological Literature' and 'Scientific News.' The June number contains the follow-

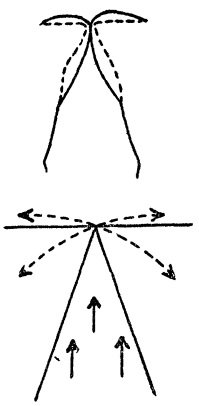
ing articles: 'The Ontario Coast Between Fairhaven and Sodias Bays,' by J. O. Martin. Some peculiar features of the landscape due to the rapid erosion of the glacial drumlins along the shore line are described. 'Eighth Session of the International Congress of Geologists, Paris, 1900,' is written up by Persifor Frazer. 'Two New Genera and Some New Species of Fossils from the Upper Paleozoic Rocks of Missouri,' by R. R. Rowley. Mr. Rowley describes two new genera of blastoids and proposes the names *Lophoblastus* and *Carpenteroblastus*, following which he describes two new species of the first, one of the second, and fourteen of the other genera of fossils from the same region. The article is accompanied by a plate. 'Ore Formation by Surface Decomposition,' is discussed by C. R. Keyes, in which he concludes "that with the exception of possibly a few isolated unimportant instances ore concentration does not generally take place through surface decomposition of rock masses, in areas such as the Ozark lead and zinc region." 'Gold and Other Minerals in Iowa,' by Samuel Calvin. The author undertakes to destroy the fallacious ideas that gold, gas or oil exist in paying quantities in Iowa. He also exposes the fallacy that any so-called geologist with a drilling outfit is to be trusted in his predictions to a public-spirited community.

DISCUSSION AND CORRESPONDENCE.

THE LARYNX AS A MUSICAL INSTRUMENT.

THE wide prevalence of the mistaken notion that the vocal cords vibrate in the axial direction of the larynx makes it desirable to point out that observations by the laryngostroboscope—a combination of a laryngoscope and an adjustable intermittent source of illumination—have proved to the contrary for the male chest register. With this method it is possible to follow a vibration slowly through its phases. This has been done by Musehold, who reports that in singing in the chest register the cords touch along their whole length; that in loud tones the edges have a slightly rounded form, especially in the middle, indicating strong contact in the middle and weaker contact at the ends of the glottis; that in weaker tones the line of contact appears even and thin while the top of the cord becomes flatter; that the edges of the cords move out sidewise and not in the axial direction of the larynx. Two of Musehold's diagrams are reproduced here. The upper one shows the bunching of the cord edges due to the firm contact; the lower one is an indication of the way the air pressure in the trachea presses the cords apart.

In connection with the remarks of Professor Le Conte on a previous occasion, it is interesting to note that with the same method Musehold was able to observe the lips of a performer on a horn, with the result of seeing that the lips vibrate as cushions and not in the direction of the axis of the horn.



In Professor Hallock's interesting communication in the last number of SCIENCE, the microscopic section of one of the cords is correctly given, but the diagram of the supposed way in which the muscle turns into a thin sheet is certainly incorrect. It is hardly the place here to give a summary of the facts in regard to the action of the vocal cords and the nature of the vowels in speech and song; I have stated in a previous communication that the proof is clear and complete that a vowel both in speech and song is not essentially a fundamental from the cords with a series of overtones reinforced by the vocal cavities. I may, perhaps, be pardoned for saying that I have given a digest of the many investigations on this and related subjects in a work on experimental phonetics now in press.

E. W. SCRIPTURE.

YALE UNIVERSITY,
July 26, 1901.