SCIENCE.

FRIDAY, JULY 17, 1885.

COMMENT AND CRITICISM.

An appropriation of fifty thousand dollars was granted by the legislature of Pennsylvania, at its late session, to continue the state geological survey for 1885 and 1886, and the governor has signed the bill. The board of commissioners of the survey asked for ninety-two thousand dollars, to which the senate agreed; but it was reduced by the house to the above sum. It will be expended chiefly on the anthracite regions. A final report by Prof. J. P. Lesley will close the series of reports, giving, in a condensed form, a summary of the whole, — a most difficult but exceedingly useful and popular volume.

The legislature made short work of the difficult and troublesome question of how the large accumulation of printed reports of the survey shall be disposed of, by voting the books to themselves. They reduced the number to be hereafter printed, and disposed of them in practically the same way; reserving, however, a sufficient number for distribution to public libraries, colleges, and for exchange with other states and countries. The system of selling the reports has been abolished, as the large number of gratuitous copies interfered with the sales. The large number of small volumes of these reports, and the manner in which they will be scattered broadcast through the state, will soon render it difficult to collect a perfect set; but the great size of the edition will always make them cheap.

The faith of the earlier geologists, that the whole earth was built according to the European pattern, has received in other parts of the world many severe contradictions, of which our country has furnished a good share. Years ago, the thousands of feet of Appalachian sediments, and the undisturbed position of the typical New-York series, ran counter to beliefs prevalent at that time in England and on the continent; and later explorations have continued the process of broadening our geological understanding by bringing to light one example after another of structures and occurrences that violate the European precedents. The 'great break' between paleozoic and mesozoic formations is passed over quietly in the Rocky-Mountain region by a mighty series of strata following conformably from Cambrian to cretaceous. The Laramie controversy began, in good part, in the belief that the deposits in question must be either cretaceous or tertiary, and could not be neither or both. And in paleontology our many-toed horses, if the diminutive quadrupeds deserve that name, and the sharp-toothed birds, if those strange-winged creatures may be so called, confirm the change from Cuvier's teachings to Darwin's.

In structural geology the contradictions are as marked. The old dispute concerning craters of elevation has new and unexpected light thrown on it in the local upheavals of the Henry Mountains, where lateral intrusions of lava blister up the overlying strata. At a time when the theory of direct vertical elevation by underlift was going out of fashion in some quarters, the enormous upheaval discovered in the horizontal rocks of the Colorado plateaus restored it to a firmer place than it ever had. The theory of the ice-cap, or, in other words, the idea that areas of glaciation were limited southward by latitude lines, found its first serious check in the absence of every thing but local ice-action among our Cordilleras, due west of a much lower region that had been heavily glaciated. The attitude of faults that is 'normal' in some countries is directly abnor-

mal in others, and the name is an unhappy misnomer.

Finally, the rule stated in the latest English text-book of geology, that faults give rise to little or no topographic feature, so that their existence would commonly not be suspected, is conspicuously violated in the northern part of the Great Basin, over an area about as large as England. In this region, as well as in others of similar structure farther south, the faults break through all formations, including the recent; and the heaved masses stand up, bordered by abrupt cliffs that have not retreated perceptibly from the line of fracture. The depressions among the tilted blocks are occupied by numerous lakes, which are thus, in respect to origin, as novel as the distinct forms of the faults themselves; for, among the thousands of lakes in other parts of the world, it is difficult to name half a dozen examples whose origin is so directly due to this kind of displacement.

VISITORS TO SWITZERLAND in the last twenty years have seen one characteristic part of that charming country at a disadvantage. The glaciers that the guides or their fathers remember seeing well advanced into the valleys have been found greatly reduced in size, shrinking back a thousand feet or more from their fresh-looking moraines, and uncovering broad surfaces of bare rock and gray rubbish, not attractive to the general visitor, however interesting they may be for the glacialist. The little huts built a few years ago at the foot of the ice, for the reception of tourists, have been left quite out of place, as the ice melted away uphill behind them. Now the good news arrives that a good number of glaciers have come to a halt in their retreat, and that for two or three years an advance has been observed. This is well for our children, who may now see the glaciers in good size again in ten or twenty years, if the advance is as persistent as the retreat that preceded it.

LETTERS TO THE EDITOR.

The sculptures of Cozumalhuapa.

THE suggestion in *Science* (vol. v. p. 524) that the shell-carvings figured by Mr. Holmes in the last report of the bureau of ethnology may indicate a common origin with those of Cozumalhuapa, will naturally lead to the inquiry, What branch of the American race executed the latter?

Unfortunately this is not easily answered. Perhaps we may proceed most safely by the method of exclusion. When Cozumal was discovered, three entirely dissimilar stocks occupied the immediate vicinity. The locality itself was held by the Cakchiquels. According to their annals, as preserved by the native chronicler, Francisco Ernantez Arana Xahila, they had occupied that territory but shortly before the Spanish conquest, driving out either the Xincas or the Pipiles, both of whom continued to live at no great distance. The Pipiles were a Nahuatl-speaking colony, of the same blood and language as the Aztecs, and were skilled in the same arts. The Xincas, on the contrary, were a savage people, whose culture-words were borrowed from either the Pipil or the Cakchiquel tongues. They may therefore be excluded.

The Cakchiquels were one of four tribes closely allied in language, culture, government, and geographical position; the others being the Quiches, the Tzutuhils, and the Akahals. They were familiar with picture-writing, stone-cutting, the metallurgy of gold, silver, and copper; erected massive buildings of stone and mortar; and were adepts in carving designs and weaving cloth. They certainly had the technical ability to execute such work as that on the slabs of Cozumal; but what is lacking, is evidence that it is in the style of their art. It differs very widely from that of Palenque and Copan.

The deficiency here pointed out is one most desirable to have filled. The vicinity of Iximche and Gumarcaah, the ancient capitals of the Cakchiquel and Quiche nations, might still yield a harvest to the persevering archeologist, in spite of the reports of Mr. Stephens. The Archbishop Garcia Pelaez, writing in 1850, stated that the government of Guatemala had 'recently' caused a careful survey, with maps and drawings, to be made of these remains (*Memorias para la Historia de Guatemala*, tom. i. p. 15); but I cannot learn that these were ever published, nor have my correspondents in Guatemala been able to ascertain the whereabouts of the originals. I may also add, that I have endeavored in vain to find out what became of the manuscripts left by Dr. Habel, the discoverer of the remains at Cozumal. Many of his notes had not been published, and it is quite possible that they would throw further light on this interesting question. D. G. BRINTON.

Media, Penn., July 2.

The geology of natural gas.

Prof. I. C. White's article on the geology of natural gas (*Science*, June 26) must necessarily attract no little attention from those who have never been in the oil and gas regions of south-western New York, western Pennsylvania, and eastern Ohio, where these wonderful and natural products are obtained; and also from those who are familiar with its commercial value and usefulness, but who have never made a study of the geological phenomena connected with its occurrence. In fact, the geology of this interesting region is so imperfectly understood by some of our leading professional geologists, who have never had