

ICE IN THE SUBWAY.

A few days ago, when the men opened the Canal Street electric light subway, in this city, in order to put a wire in, they found the conduits full of ice and impossible to get the wire in. The difficulty was overcome by the method illustrated in our engraving. A bellows 12 inches in diameter, to which was attached a 3/4 inch iron pipe, 6 feet from the bellows. There were three coils in the pipe. Around this was built a fire. The pipe then led into the subway conduit. A man worked the bellows, forcing the air through the pipe. As it passed through the coils the air became heated, and was then forced into the conduit to thaw the ice. The electric light subway in Canal Street has five conduits, each capable of holding five cables of 100 wires each. The largest subway is the telephone and telegraph subway in Cortlandt Street. It has 116 conduits, each holding 102 wires. It is at present very nearly full. This is the first time since the subways have been built that the conduits have had ice in them.

A REMARKABLE INSTANCE OF RECENT EROSION.

BY H. C. HOVEY.

A formidable ravine has been created by erosion, at Crawfordsville, Indiana, within the memory of many living witnesses. In order to understand its peculiar features we must first recall some salient facts concerning the geology of the region. The tertiary rocks are altogether wanting. Limestones, rich in marine fossils of the lower carboniferous age, lie in nearly horizontal strata, with few signs of seismic disturbance. The soil is fertile and used to be clothed with magnificent forests, now mostly felled. The general surface is flat, or gently undulating, except as broken by glacial and post-glacial action, in the form of moraines and ravines of drainage. In other words, there are no hills caused by upheaval. Cutting through the loam and subsoil, we usually find but a few yards of gravelly clay before striking the underlying rocks.

Here and there, however, and without any marked change of the surface, the drift is found to have an extraordinary depth. Could the soil and drift of middle Indiana be wholly removed, we should find the denuded rocks carved into numerous basins, which must have been full to the brim when the great glacier of the ice age came down from the north. These pre-glacial lakes must have been frozen solid by the intense cold that heralded the glacier's approach. The advance and retreat of the ice would override the frozen basins, as well as the limestone ledges, spreading over the entire region its burden of debris brought down from the highlands of Canada. This load was made up of primitive rocks rounded into bowlders, crushed into sand, or decomposed into clay. In many cases, as we may suppose, the drift would gradually displace the contents of the basins. But in other cases the basin ice would lie for a long time buried under an arch of stratified drift, and when it finally thawed it would exist as a mass of water-bearing clay or as a subterranean lake.

The city of Crawfordsville is built directly over such a hidden reservoir. The citizens found to their surprise that while one man might sink a well fifty feet or less and find an inexhaustible supply of the purest water, his neighbor's well would be dry at a depth of a hundred feet, or else would reach some scanty vein of water impregnated with mineral impurities. The sulphur springs of the valleys also must have had a different

source from the wells of limpid water. The fact that the latter were limited to a definite area led us to conclude that these shafts touched a subterranean lake, or its equivalent bed of saturated clay or sand.

The plateau, or what may be described as such, on which the city stands, is broken along its northern boundary by abrupt bluffs of stratified drift, at whose base flows the river known as Sugar Creek. Both above and below these bluffs the stream cuts through

warning given to those on a sandy foundation, turned the drainage of the city in the direction of the bluffs. Parallel ditches were plowed from Green and Washington streets to the edge of the bluffs, and the trees and briars were cleared away. The result was a rapid and wonderful transformation. The ditches became gullies, and the gullies grew into ravines, while men went about their daily business unconcerned. As early as 1850 the writer surveyed the ravages already wrought, and noted the broad acres that had even then been swept into the river to such an extent as to modify its channel materially. He went on a fruitless errand to the authorities, who only laughed at his boyish fears.

After a while more influential voices sounded the alarm, and a sturdy fight was begun, to prevent the ruin of the northern part of the city. Strong dams were built; but the water seemed to delight in undermining logs and rocks, and in setting human ingenuity at defiance. The two ravines, from the two streets named, united at a point considerably back from the bluff, leaving a kind of island on which was a cottage and a garden as recently as ten years ago. The island is now reduced to a singular peak, sixty feet high, with a flat top only a few feet square.

As the erosion progressed it finally tapped the subterranean lake to which reference has been made. A powerful stream burst forth from the wall of the ravine, and hundreds of people went to see the alarming phenomenon. Numerous adjacent wells went dry. The stream thus suddenly created continues to flow, but with diminished volume, owing partly to the caving in of the walls of the ravine, and partly, perhaps, to the draining of the reservoir. This matters less than it might have done formerly, for now the city obtains an admirable supply of water from artesian wells.

By means of suitable sewer pipes the drainage is now conveyed to the river in a manner to obviate further washing from that cause. Washington street has also been carried down through the lower ravine to the level of the stream.

By dint of persevering efforts and incessant vigilance the work of persevering efforts and incessant vigilance the work of erosion is finally under control, so that no further injury need be feared for the beautiful and growing city on the bluffs. But the existing ravines, formed within a period of about forty-seven years, with their canyons, peaks, cliffs and terraces, look more like some region in Arizona than any portion of the Hoosier State. The accompanying illustration is from a photograph by Professor M. B. Thomas, of Wabash College.

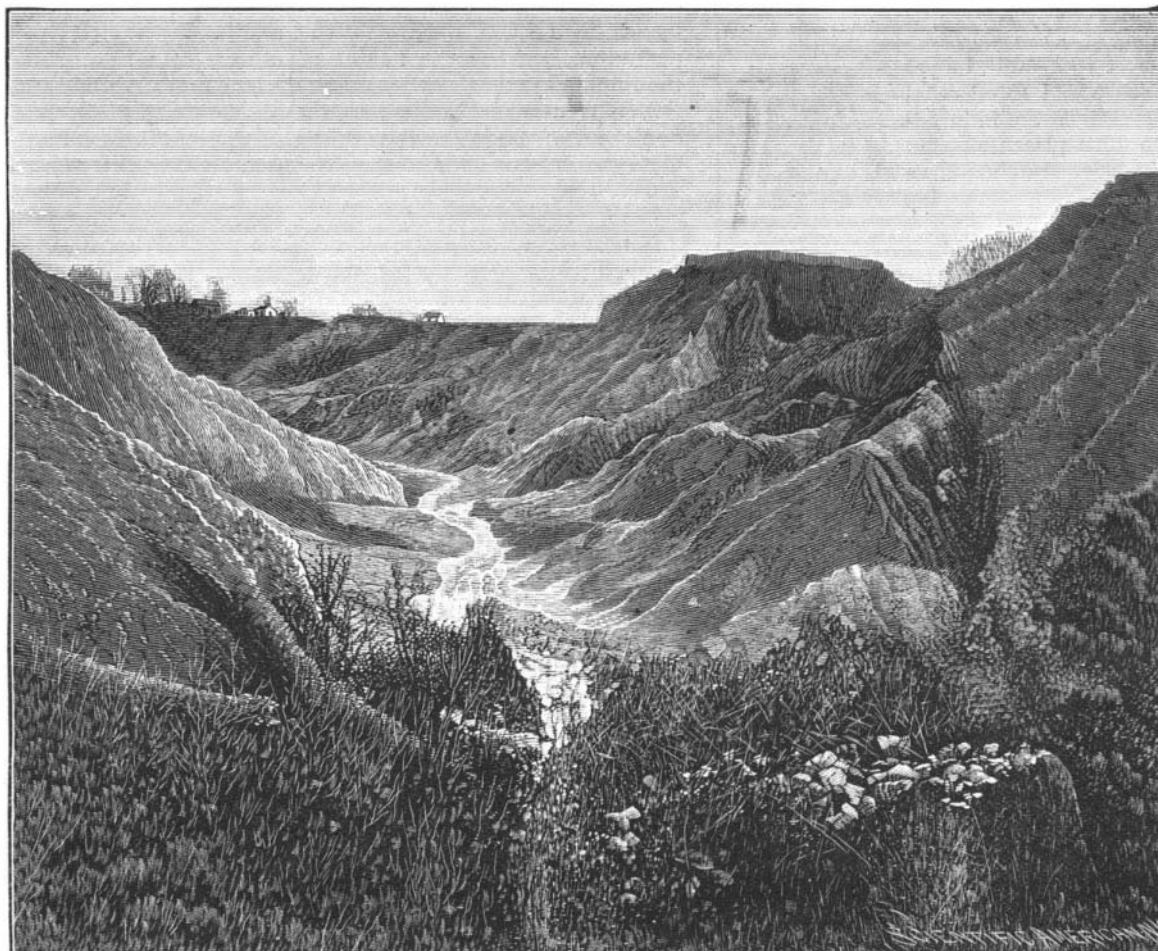
COLONEL H. W. FEILDEN, in the course of an interesting paper on animal life in East Greenland, contributed to the February number of the *Zoologist*, suggests, as he has done before, that the musk ox might with advantage be introduced into Great Britain. He sees no reason why it should not thrive on the mountains of the Highlands of Scotland. In the winter season the musk ox is covered with a long-stapled fine wool besides its coat of hair. This wool is of a light yellow color, and as fine as silk. Sir John Richardson states that stockings made from this wool were more beautiful than silk ones. Young musk oxen are very easily reared and tamed, and Colonel Feilden thinks there could not be any great difficulty in catching either old or young in Jameson's Land. The government has lately introduced the reindeer from Russia into Alaska. It would not be a bad idea to try an importation of the musk ox from Greenland.



FORCING HOT AIR INTO THE SUBWAYS, NEW YORK.

the solid limestone walls of the pre-glacial lake. Similar walls are found by going a mile or so in other directions. The depth of the ancient basin may be inferred from the fact that the bluffs now rise to the height of 60 or 80 feet above the river, while recent borings just across the stream have been made through drift to the depth of 150 feet below water level, without reaching the underlying rock. Mr. Charles Beachler is making a special study of this old lake basin, with promise of interesting results.

In my boyhood I saw those bluffs in their natural condition, as they had been kept from erosion, probably for ages, by the roots of dense thickets and great trees. But in 1845 the local authorities, ignoring the



A RECENT EROSION IN INDIANA.