

THE OHIO RIVER FLOODS.

The flood in the Ohio Valley during February and March, 1884, reached a height unprecedented in the river's history. The overflow, in many places, spread out over miles of territory, and the devastating sweep of the waters carried away many thousands of dollars' worth of property. Towns and villages were inundated, and hundreds of people were driven from their homes. There was, in consequence, much suffering, and the damage to property is incalculable.

It has become a matter of vital importance to the public that the causes of the frequent recurrence in late years of the destructive overflows of the Ohio River should be thoroughly understood. The discussions of the question have been theoretical, with little of the essential basis of facts educed by thorough investigation. There have been various theories advanced in the newspapers, some of which are worthy serious consideration.

That the causes of the floods in the Ohio Valley are due wholly to recent conditions is not absolutely true, because it is evident from alluvial deposits that floods have occurred in the Ohio Valley long before the existence of the country was known to white men; but there is no doubt that recent conditions, topographical and atmospheric, have, in a large measure, contributed to the causes of the great and devastating freshets that have swept over the valley in late years.

Mention has been frequently made of an unauthenticated tradition among the Indians, that the waters in the Ohio River once rose to a height little below the level of some of the highest hills along the course of the stream, but the tradition in itself is worthy of no consideration more than mere mention. There is good scientific evidence, however, in the deposits along some of the small tributary streams, which have undoubtedly been left by backwater from the Ohio River. These deposits indicate evidence of glacial floods, but Dr. George Sutton, who has given some time to a careful investigation of the subject, expresses the opinion that "it is also probable that they present evidence that there have been occasional floods in the Ohio River much higher than any that have occurred since the country has been settled." Consequently, regardless of the existence of supposed recent causes, floods in the Ohio River *are likely to occur again*, for the same reasons that they probably did hundreds of years ago.

The general history of the great floods in the Ohio Valley, during the present century, and the matter of the heights reached by the water, and the seasons of occurrence, is embodied in the following:

AT PITTSBURGH.

Year.	Month.	Ft.	In.	Year.	Month.	Ft.	In.
1832	February	35	0	1877	January	23	7
1847	February	26	0	1880	February	22	0
1867	March	22	6	1882	January	21	9
1875	August	21	9	1883	February	27	6
1876	September	23	3	1884	February	33	4

AT CINCINNATI.

Year.	Month.	Ft.	In.	Year.	Month.	Ft.	In.
1832	February	64	3	1877	January	53	9
1847	December	63	7	1880	February	53	2
1867	March	55	8	1882	February	58	7
1875	August	55	4	1883	February	66	4
1876	January	51	9	1884	February	71	$\frac{3}{4}$

AT EVANSVILLE.

Year.	Month.	Ft.	In.	Year.	Month.	Ft.	In.
1832	February	46	7	1877	January	41	5
1847	January	45	6	1880	February	42	10
1867	March	46	3	1882	February	44	9 $\frac{1}{2}$
1875	August	41	10	1883	February	47	9 $\frac{1}{2}$
1876	January	43	0	1884	February	48	$\frac{1}{4}$

The foregoing shows that three of the greatest overflows in the history of the river, since the settlement of the valley, have occurred in the last three years, at the same season. The cause is attributed to the removal of the forests and the drainage of the farm land, in the valley, by tiling. The forests, it is claimed, were absorbents of the water that now rushes down into the river, and the speed of its flow is aided by the washing of the soil from the strata of solid rock beneath. However, this alone is not a satisfactory explanation of the cause of the freshet. The forests had not been removed when the flood in 1832, one of the greatest in the history of the river, occurred. The changes in the topographical condition of the country in the region of the headwaters of the river have unquestionably quickened the drainage, but there were other and more apparent conditions which contributed to the causes of the freshet. A heavy snow had fallen upon the mountains during the winter, and a remarkably low temperature, in one instance dropping to 22 degrees below zero, caused the formation of ice from the source to the mouth of the river. When the thaw began the accumulated snow and ice of the winter sent an immense volume of water down into the channel of the river, accompanied

by a warm rain, throughout the valley, of two weeks almost steady continuance. It was impossible for the river to give immediate outlet to the accumulated water-fall of the season throughout the whole of the valley. The existence of the primitive forests would not have been a sufficient absorbent to have prevented the flood.

There may at any time be a combination of conditions which would produce a freshet in the Ohio River many times higher than any that has yet occurred. If the winter begins early, freezing the ground to a depth of two feet, which would be equivalent to two inches of water, and with warm rains in February upon the accumulated snow-fall of the season, all of which would be no violation of natural laws, a volume of water would be sent into the channel of the river, which would cause an immense overflow. These conditions are likely to arise in any year.

The means of preventing future overflows is a question that needs more thorough practical study than has yet been given it. Hon. Robert S. Taylor, of Indiana, a member of the Mississippi River Commission, in an address before the Merchant's Exchange, of St. Louis, in January, 1884, expressed views in relation to the improvement of the Mississippi River, which are quite apropos in this connection. "The effect of outlets upon the flood levels and upon the river channel," Mr. Taylor says, "has been the theme of great controversy for a generation past. There is a class of aquatic doctors who regard the Mississippi in every time of flood as sick, whose diagnosis of the case is dropsy, and whose remedy is tapping. Bills have been introduced in Congress, and vigorously pushed, to provide for the making of vast outlets by artificial means. The opponents of such measures have claimed that the effect of such diminution of volume in the river is, to lessen its energy and transporting power, and so cause deposits of sediment, which choke up the channel, increase the flood heights, and thus make the last state of the river worse than its first. These views have been supported by many observed facts, and by what seemed to be unanswerable reasoning. Nevertheless, there has been felt by intelligent students of the question a strong desire for more facts, and for facts based on observations so made as to afford the highest possible guarantees of their accuracy."

The existence of forests has but little influence upon the aerial currents which produce the continental storms. Some of these continental storms are over a thousand miles in extent, and deposit over the country the moisture absorbed by atmosphere from the ocean. "It is these continental storms which produce our great floods," remarks Dr. George Sutton, "and a sufficient amount of rain falling in a short time will produce a flood, whether it falls in winter or summer, or on prairie or forest land. The great aerial ocean surrounding the globe in our latitude is always in motion, and this motion upon an extended scale produces fluctuations and variations in our climate, bringing about the wet and dry seasons, the cold

and dry seasons, the cold and the warm years, the floods, the droughts, the storms and tornadoes. The fluctuations produce, one year, floods in the Missouri, at other times in the Mississippi, and at other periods along the valley of the Ohio River. They occur at all seasons of the year—in the winter, when the ground is frozen and covered with snow, and also in summer, as we remember the flood in 1875, when thousands of acres of corn land along the valley of the Ohio River were overflowed.”