

THE ALLEGHENY RIVER ICE GORGE, WINTER OF 1926

624.14 (282.272)

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The cold weather during the last week in December, 1925, made considerable ice over the Allegheny River, especially at the headwaters. Light rains and high temperature during the first week in January caused the ice to break up on the 6th and 7th, and during the night of the 7th ice was running from the headwaters to the mouth of the river at Pittsburgh.

On the 8th the ice became gorged on a small island about 15 miles below Franklin, Pa., and $1\frac{1}{2}$ miles below Brandon, Pa., the river stage being 4 feet at Franklin. Ice from the upper river lodged against this gorge, and by the morning of the 10th the river channel between Brandon and Franklin was filled with ice from shore to shore to a depth of from 4 to 9 feet. The river continued rising at Franklin, due to backwater, a 9-foot stage being reached on the morning of the 10th, and 11.7 feet on the morning of the 12th.

Cold weather now set in, the temperature being below zero much of the time, and lasted until January 18. During this period the river discharge diminished until the backwater reading was only 7.6 feet on the morning of the 18th. The gorged ice in the channel was frozen into a solid mass resting on the river bed.

The river bed in this stretch of the Allegheny River averages about 800 feet in width, but at a point one-half mile below Indian Bend, near the lower end of the gorge, the river narrows rather abruptly to 350 feet. The bed is very stony; at low stages only about one-third of it is covered with water. These conditions made a favorable anchorage for the ice throughout the length of the gorge.

During the afternoon and night of the 18th, under the influence of higher temperatures, the new ice that had formed above Franklin during the cold spell began moving. The river rose rapidly at Franklin, reaching the flood stage, 15 feet, about noon of the 19th, and a crest stage of 20.3 feet by 5 a. m. of the 20th. At 6 a. m. of the 20th the gorged ice a short distance below Franklin began flowing over the original ice pack, piling the ice still higher near Brandon and for 6 miles above. The stage at Franklin soon dropped to 13.4 feet, with the river full of ice, but by 5 p. m. it had again risen to 16 feet, with ice still running. At Franklin this was lodging against the original gorge. On the morning of the 21st the stage at Franklin was 16.8 feet, and the gorge extended from Franklin to $1\frac{1}{2}$ miles below Brandon. The river channel was filled with ice to a depth of 12 to 25 feet, anchored on the river bed.

Cold weather again set in on January 22, and continued with only a few brief interruptions and with temperatures frequently below zero until February 25. Much new ice formed above Franklin, and practically solidified the 15-mile gorge.

Rains and warm weather on February 25 and 26 started another ice movement in the main river, from Warren, Pa.; to Franklin, and from the principal tributaries between Franklin and Warren. The small passages which had been worn through the large gorge were quickly jammed, and the water and floating ice began backing up in the vicinity of Franklin. By 9:20 p. m. of February 26 the low-lying sections of Franklin were inundated, and the top of the ice at the Franklin River gage registered 24 feet. At 8 a. m. of February 27 the top of the ice stood at 22.1 feet at Franklin, and the gorge extended from Brandon to Tionesta Creek, 41 miles.

The gorge readings at Franklin remained above the flood stage until March 5. At 8 a. m. of the 6th the water stage at Warren was 2 feet, and at Parkers Landing, below Franklin, 2.8 feet, while the ice-gorge stage at Franklin was 14.5 feet. Estimating from the stages above and below Franklin, it is believed that the actual depth of water at Franklin on the morning of March 6 was not more than 2.5 feet.

On March 20 rains and melting snow started another rise. During the night of March 20 the ice at Franklin was lifted to the flood stage, and during the next 12 hours moved downstream about $1\frac{1}{2}$ miles, impinging on the ice below, leaving the river open at Franklin, but, on the following morning, at a stage of 20.6 feet on account of backwater from the gorge. This ice movement carried out three spans of the Citizens' Traction Co. bridge at Big Rock, about a mile below Franklin, the piers having become firmly embedded in the ice.

Meanwhile the ice above Franklin was lodged on a small island at the mouth of French Creek and on sand bars and shallow flat places between Franklin and Oil City, Pa., forming the "Oil City Gorge," which backed the water up to the highest level ever known in Oil City. The downtown streets were flooded and much damage resulted. This gorge menaced railroad and highway bridges near Oil City and caused much anxiety in Franklin lest it should break before the Franklin gorge.

Fortunately for Franklin, during the 22d and the 23d, the breaking up of the gorge below Franklin continued, large sections of the lower end at Brandon floating away, until at 4:00 p. m. on the 23d only 5 miles of the original 15-mile gorge remained, near Sandy Creek and Indian Bend. At 5:40 p. m. of the 23d the last section moved out, and the Allegheny Valley was free of a menace which had overhung it for 74 days. About one hour later the Oil City gorge followed.

The damage at Oil City was estimated to be about \$500,000, and at Franklin about \$100,000. Much of this loss was sustained by the Pennsylvania Railroad Co., whose tracks parallel the gorge throughout its length; by the local oil companies, through flooding of oil wells; and by other industries in the low-lying sections. Office buildings, stores, and residences were considerably damaged.

Efforts were made by the Pennsylvania Railroad Co. and the cities of Franklin and Oil City to remove the gorge or cut a channel through it sufficiently large to relieve the dangerous situation, by the use of explosives, especially of thermite.

Dr. H. T. Barnes, of McGill University, Montreal, Canada, the inventor of thermite, was engaged to conduct the work. He arrived at Oil City on March 3, and after a consultation with city and railroad officials proceeded to determine "key" locations where the thermite might be most effective. He then ordered a ton of it, which was shipped from Pittsburgh to Oil City that same night. In explaining the action of thermite, Doctor Barnes said: "It is nonexplosive and non-inflammable. After ignition in the container it generates heat at the rate of 5,000 ° F. in 10 seconds, and contact with the ice causes an upheaval which is followed by disintegration. The heat is forced into the ice so rapidly

that the ice has not time to melt, with the result that it explodes. It continues its disintegrating process for a period of 24 hours and weakens the gorge wherever placed."

Meanwhile, more than a hundred charges of dynamite were placed in the ice by the Pennsylvania Railroad Co., at Brandon, where the depth of ice was 12 feet. The first charge was set off at 11 a. m., March 4, and the dynamiting was continued until March 9, when a channel almost a mile long and 100 feet wide had been blown through the supposed neck of the gorge.

The first use of the thermite was at Venango Yards, some 6 miles above the dynamiting operations at Brandon on March 4. The 200-pound charge caused a heavy explosion, and a spectacular display of fire, smoke, and steam, but apparently little melting of the ice.

Thermite was used almost daily between Brandon and Venango until March 9, when, in the words of a Pennsylvania News staff reporter, "Movement of the gorge was

abandoned in the hopelessness of the insurmountable task."

On March 20, when the rain and warm weather caused the river to back up behind the gorge, as described above, Doctor Barnes began using thermite near Brandon. The gorge finally yielded, as previously related.

This is believed to be the first time thermite has been used for the purpose in this country, a matter of historical interest.

Opinions as to the effectiveness of the thermite in breaking up the Franklin gorge differ widely. Pennsylvania Railroad Co. engineers believe that the use of thermite at the strategic points was responsible for a decided disintegration of the ice, which resulted in the final breakup. Others, who were in close contact with the use of both dynamite and thermite, are of the opinion that the ice would have gone out at the same time from natural causes and with no more damage to property if neither had been used.

551.58 (755)

THOMAS JEFFERSON ON THE CLIMATE OF VIRGINIA

In 1788 the firm of Prichard & Hall, in Market Street, between Front and Second Streets, Philadelphia, published Thomas Jefferson's "Notes on the State of Virginia." Through the kindness of Dr. H. C. Frankensfield we are able to reprint a portion of this fascinating old work, the only change in form being the use of the modern lower-case "s." Let Jefferson himself write the rest of this introduction:

The following Notes were written in Virginia in the year 1781, and somewhat corrected and enlarged in the winter of 1782, in answer to Queries proposed to the Author, by a Foreigner of Distinction, then residing among us. The subjects are all treated imperfectly; some scarcely touched on. To apologize for this by developing the circumstances of the time and place of their composition, would be to open wounds which have already bled enough. To these circumstances some of their imperfections may with truth be ascribed; the great mass to the want of information and want of talents in the writer. He had a few copies printed, which he gave among his friends: and a translation of them has been lately published in France, but with such alterations as the laws of the press in that country rendered necessary. They are now offered to the public in their original form and language.

Feb. 27, 1787.

QUERY VII

A NOTICE of all that can increase the progress of human knowledge?

Under the latitude of this query, I will presume it not improper nor unacceptable to furnish some data for estimating the climate of Virginia. Journals of observations on the quantity of rain, and degree of heat, being lengthy, confused, and too minute to produce general and distinct ideas, I have taken five years' observations, to wit, from 1772 to 1777, made in Williamsburgh and neighbourhood, have reduced them to an average for every month in the year, and stated those averages in the following table, adding an analytical view of the winds during the same period.

	Fall of rain, &c. in inches.	Least & greatest daily heat by Fahrenheit's thermometer.	WINDS								Total
			N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	
Jan	3.192	39½ to 44	73	47	32	10	11	78	40	46	337
Feb	2.049	41 47½	61	52	24	11	4	63	30	31	276
March	3.95	48 54½	49	44	38	28	14	83	29	33	518
April	3.68	56 62½	35	44	54	19	9	58	18	20	257
May	2.871	63 70½	27	36	62	23	7	74	32	20	281
June	3.751	71½ 78¼	22	34	43	24	13	81	25	25	267
July	4.497	77 82½	41	44	75	15	7	95	32	19	328
August	9.153	75¼ 81	43	52	40	30	9	103	27	30	334
Sept	4.761	69½ 74¼	70	60	51	18	10	81	18	37	345
Octo	3.633	61¼ 66½	52	77	64	15	6	56	23	34	327
Nov	2.617	47¼ 53½	74	21	20	14	9	63	35	58	294
Dec	2.877	43 48¾	64	37	18	16	10	91	42	56	334
Total	47.038	8 A. M. 4 P. M.	611	548	521	223	109	926	351	409	3698

The rains of every month, (as of January for instance) through the whole period of years, were added separately, and an average drawn from them. The coolest and warmest point of the same day in each year of the period were added separately, and an average of the greatest cold and greatest heat of that day, was formed. From the averages of every day in the month, a general average for the whole month was formed. The point from which the wind blew was observed two or three times in every day. These observations, in the month of January for instance, through the whole period amounted to 337. At 73 of these, the wind was from the North; at 47, from the North-east, &c. So that it will be easy to see in what proportion each wind usually prevails in each month: or, taking the whole year, the total of observations through the whole period having been 3698, it will be observed that 611 of them were from the North, 558 from the North-east, &c.

Though by this table it appears we have on an average 47 inches of rain annually, which is considerably more than usually falls in Europe, yet from the information I have collected, I suppose we have a much greater proportion of sunshine here than there. Perhaps it will be found there are twice as many cloudy days in the middle of Europe, as in the United States of America. I mention the middle parts of Europe, because my information does not extend to its northern or southern parts.

In an extensive country, it will of course be expected that the climate is not the same in all its parts. It is remarkable that, proceeding on the same parallel of latitude westwardly, the climate becomes colder in like manner as when you proceed northwardly. This continues to be the case till you attain the summit of the Alleghaney, which is the highest land between the ocean and the Mississippi. From thence, descending in the same latitude to the Mississippi, the change reverses; and, if we may believe travellers, it becomes warmer there than it is in the same latitude on the sea side. Their testimony is strengthened by the vegetables and animals which subsist and multiply there naturally, and do not on our sea coast. Thus Catalpas grow spontaneously on the Mississippi, as far as the latitude of 37° and reeds as far as 38°. Perroquets even winter on the Sioto, in the 39th degree of latitude. In the summer of 1779, when the thermometer was at 90° at Monticello, and 96 at Williamsburgh, it was 110° at Kaskaskia. Perhaps the mountain, which overhangs this village on the North side, may, by its reflexion, have contributed somewhat to produce this heat. The difference of temperature of the air at the sea coast, or on Chesapeak bay, and at the Alleghaney, has not been ascertained; but cotemporary observations, made at Williamsburgh, or in its neighbourhood, and at Monticello, which is on the most eastern ridge of mountains, called the South West, where they are intersected by the Rivanna, have furnished a ratio by which that difference may in some degree be conjectured. These observations make the difference between Williamsburgh and the nearest mountains, at the position before mentioned, to be on an average 6½ degrees of Fahrenheit's thermometer. Some allowance however is to be made for the difference of latitude between these two places, the latter being 38° 8' 17" which is 52' 22" North of the former. By cotemporary observations of between five and six weeks, the averaged and almost unvaried difference of the height of mercury in the barometer, at those two places, was .784 of an inch, the atmosphere at Monticello being so much the lightest, that is to say, about one-thirtieth of its whole