The Allegheny River Ice Gorge, Winter of 1926

By W. S. Brotzman

[U. S. Weather Bureau, Pittsburgh, Pa.]

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 1½ miles below Brandon, Pa., the river stage being 4 feet at Franklin. Ice from the upper river lodged against this gorged ice, 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 330 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 18 feet, with ice still running. At Franklin this was lodging against the original gorged ice. On the morning of the 21st the stage at Franklin was 16.8 feet, and the gorged from Franklin to 1½ 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 gorged ice 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 gorges 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 1½ 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.

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. Frankenstein 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 Dis-...