2

1868

FALLS OF ST ANTHONY

DESCRIPTION OF MAP

This is a section along the centre of the stream. the horizontal scale is one inch to 200 feet, the vesical scale is one inch to 20 feet.

The Yellow is soft sand rock - the pink is clay. the brown is hard limestone the blue is to indicate the water. the green the river banks. the artificial dam is at the upper end of the limestone and the dam slopes down stream towards the shores. The lowest point down stream where the water falls over is the crest of the falls on the left bank. the next lowest the crest of the falls on the right bank, and the point farthest up is where the crest is in the axis of the stream. this was down as low as the one on the right bank before the flood of June 1867

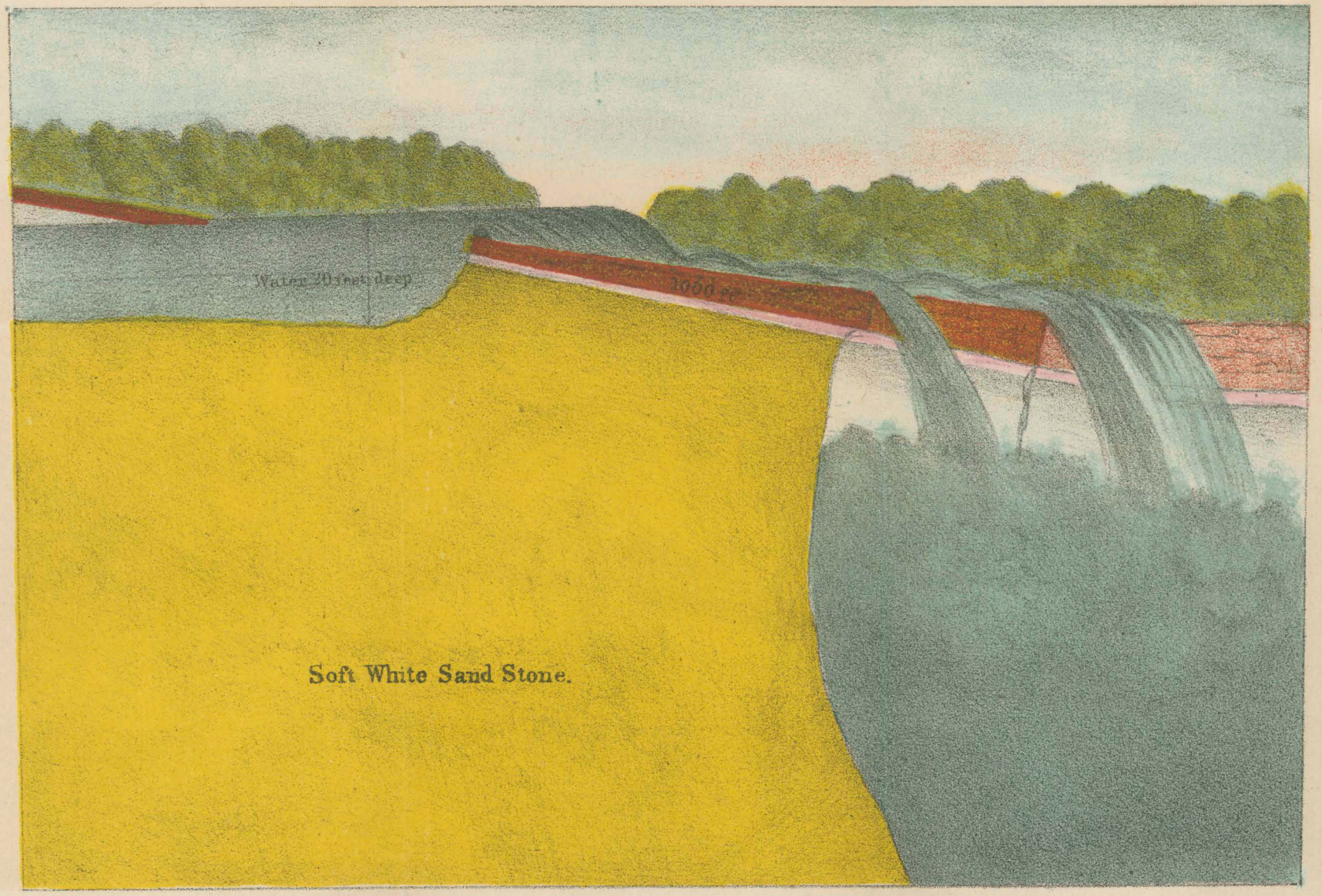
The limestone forming the protecting rock at the falls is represented rising up on the bank of the river above the dam and the river is there 20 feet deep. the sand rock (represented by the yellow) extends down over 100 feet.

Bear in mind this represents the heights on scale ten times greater than the horizontal distance

Lt Warren Corps Engrs

Missr. River
above
St A. Falls.

Gen G.K. Warren
1868


Water 70 feet deep
1000 ft
Soft White Sand Stone.

Falls of St. Anthony

Section found in office of Chute Bros. Co. accompanying statement of Wpls. & St. A Bd of Trade & copy of letter of Gen. G. K. Warren dated June 27. 1868. -

L. F. Chute.
May 18, 1910.

DEAR SIR: The annexed copy of a letter from Major General G. K. Warren, engineer in charge of Government works on the Upper Mississippi river, and of a map made by him, will show the emergency that exists for the passage of Senate bill No. 796, now before Congress, appropriating one hundred thousand acres of land in the State of Minnesota, to secure the Falls of Saint Anthony and the good navigation immediately above the same, in the Mississippi river. Since this letter was written and map made, in the absence of any freshet, a large section of the rock has fallen down, and the process of disintegration is daily going on.

For particulars relative to six hundred miles of river above the Falls, you are respectfully referred to a memorial of the Legislature of Minnesota, sent you from Saint Paul, asking an appropriation for this work.

It is hoped that this measure, so important to the northwest, will meet your approbation and support, especially as the bill provides that the lands shall be sold to *actual settlers* at *one dollar and twenty-five cents per acre:* taking no money from the Treasury, but utilizing lands on the frontier, to accomplish, under the direction of the Secretary of War, a work of great importance and pressing necessity.

Respectfully submitted, in behalf of the

MINNEAPOLIS AND ST. ANTHONY BOARD OF TRADE.

WASHINGTON, D. C., *June* 27, 1868.

SIR: I have the honor to acknowledge the receipt of your letter of the 26th instant, expressing the solicitude felt in regard to the breaking away of the rocks and recession of the Falls of St. Anthony, and asking my views concerning the formation of the falls, the danger of their destruction by successive floods, and the injury to navigation above the falls that would result from their destruction.

A brief description of the structure of the rocks at the Falls of St. Anthony is as follows:

The rock forming the bed of the river at and just above the falls is a stratum of hard magnesian limestone, having a well-marked jointed structure, so as to readily separate into large blocks from fifteen to thirty feet square. Immediately in contact, with limestone beneath it, is a layer of clay at about three feet in thickness, nearly or quite impervious to water.

Beneath this clay stratum is a very soft silicious sand-rock, easily worn away by the water, and extending downward an unascertained depth, into which the water washes deep holes below the falls. The hard capping rock is thus being undermined, especially in flood stages, and falling off in large blocks, which are subsequently broken up into smaller pieces and carried away by the current.

This is the case with nearly all our waterfalls, but the receding action is much more rapid at the Falls of St. Anthony than at any other existing fall with which I am acquainted.

It is obvious to an observer that at a distant period the falls were at Fort Snelling, the present junction of the Minnesota river, and that they have receded to their present position in the manner before described, a distance of about seven miles.

Did this same formation of rock extend indefinitely above the present falls along the river, the continued recession might only be considered as endangering the dams and mills in their present location, and not to concern the question of navigation. And, as a consequence, the prevention of this wearing away by the water might be considered a mere local interest, and to be provided for by those specially concerned.

But it so happens that the stratum of hard magnesian limestone thins out and rises entirely above the surface of the river a few hundred feet above the present crest of the falls, and further on the soft sand-rock alone is to be found in the bed of the river, so that when the action of the stream has destroyed all that remains of the hard layer, but a few days will be necessary to lower the bed and produce a continuous rapid far above, not merely destroying the present water-power, but a long reach of navigable channel.

The Water-Power Company, at Minneapolis, expended in 1866 between thirty and forty thousand dollars in an unavailing attempt to stop this wearing away. The undertaking is a difficult and expensive one, and it is but fair that the protection and extension of the river navigation should lend its aid to that of the Water-Power Company in effecting a common object.

The danger which threatens the destruction of the Falls of St. Anthony requires prompt attention.

The present condition of the falls is further exhibited by the annexed diagram.

On this diagram the banks of the river are represented in green, the water blue, the soft sand-rock yellow, the magnesian limestone brown, and clay-bed pink.

The section is constructed to cut the dam at the point farthest up the stream, from which point the dam inclines downward toward each shore. This apex of the dam is at the upper end of the magnesian limestone, above which the bed of the river is twenty feet deep.

The water is represented falling over the lower edge of the magnesian limestone in two places, four hundred feet apart; the lower one is at the place where the crest of the falls was in 1866, at which time the Minneapolis Water-Power Company put in the apron below the falls, to protect them from further wear; the upper place is where the crest of the falls was left after the flood of July, 1867, four hundred feet having been washed away in one flood, notwithstanding the attempt to prevent it. One more like freshet would probably destroy the falls, for only one thousand feet of the magnesian limestone remains, and its thickness diminishes as the recession goes on; it was eighteen feet thick at the crest in 1866, and at the present position of the crest of the falls it is about eight feet thick; hence the present pressing emergency.

Very respectfully, your obedient servant,

G. K. WARREN,
Brev. Maj. Gen. U. S. A., Maj. of Engineers.

His Excellency Hon. WILLIAM R. MARSHALL,
Governor of Minnesota.

FALLS OF ST. ANTHONY.

Description of Map.

This is a section along the centre of the stream. The horizontal scale is one inch to 200 feet; the vertical scale is one inch to 20 feet.

The *yellow* is soft sand rock; the *pink* is clay; the *brown* is hard limestone; the *blue* is to indicate the water; the *green*, the river banks.

The artificial dam is at the upper end of the limestone, and the dam slopes down stream, toward the shores. The lowest point down stream, where the water falls over, is the crest of the falls, on the left bank. The next place is the crest of the falls on the right bank; and the point farthest up, is where the crest is in the axis of the stream. This was down as low as the one on the right bank before the flood of June, 1867.

The limestone, forming the protecting rock at the falls, is represented rising up on the bank of the river above the *dam*, and the river is there 20 feet deep. The sand rock (represented by *yellow*) extends down over 100 feet.

Bear in mind this represents the HEIGHTS *on scale* TEN TIMES *greater* than the horizontal distance.

G. K. WARREN,
Maj. Engineers.

Falls of St. Anthony

copy of letter of
Gen. G. K. Warren.
June. 27. 1868.

Found in office
of Chute Bros Co.
L. P. Chute.
May 18. 1910
Halley's Comet day.