The Ridge Rocks

Water: the Hudson River Valley

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The diagram below is a cross-section (as if you were looking at the side of half of a layer cake) of the Hudson River between Kingston and Rhinebeck, created from information provided by the New York State Bridge Authority. When the bridge was to be constructed, information was needed to establish the position of the bridge towers since the bridge, if at all possible, was not going to be a suspension type. Barges were positioned in the river and drilling rigs penetrated the mud and sand layers until bedrock was reached. The "picture" of the former Hudson River Valley took shape.

Today, there are two channels with a mud flat in the center. Anyone who has boated on the Hudson has experienced the long stands of "grass" that grows on the mud flats in the summer, sometimes catching prop blades or rudders, especially at low tide. The east and west channels may have been deepened or widened in some places by dredging in order to accommodate the large ocean-going freighters that ply the Hudson up to the Port of Albany.

Where did the clay and sand come from, and why is the outline (the cross-section) of the deep Hudson River Bedrock Channel so far below the present water level (known as mean sea level)? The answer to these two questions will shed more light on the same questions about the **Rondout** and the **Sandberg Creeks** here in our immediate valley!

Those of you who have done your homework and followed Mrs. Dumond's advice and conducted research at the *Ellenville Public Library*, or remember their studies in earth science class, may skip this paragraph about glaciers. Otherwise, please bear with me. Over the past million years there have been several periods of *glaciation*; geologists have determined that in the recent past there were four glaciers that moved through our area. The most recent glacier melted away approximately 10,000 years ago. There is much evidence of the "marks" it left on the **Shawangunks** and in the surrounding area.

During this last glacial period, the ice mass moved southward, melted and then, occasionally, built up with ice and snow and as a result of the weight of the glacier, pushed southward again. These periods or episodes have been documented in the valley to the east and on the **Gunks**. The southern and also the lateral (or side boundaries) limits of the glacier left deposits called *moraines*. The most notable are the two major remnants that created present day Long Island: the Montauk Point and Orient Point "flukes." The eastern slope of the **Gunks**, including the exposed shale deposits, served as the western boundary of the ice mass and lake. (I haven't ignored the facts that indicate that glaciers covered the tops of the **Catskills** and **Shawangunk Mountains** here and the Taconic Mountains to the east of us.)

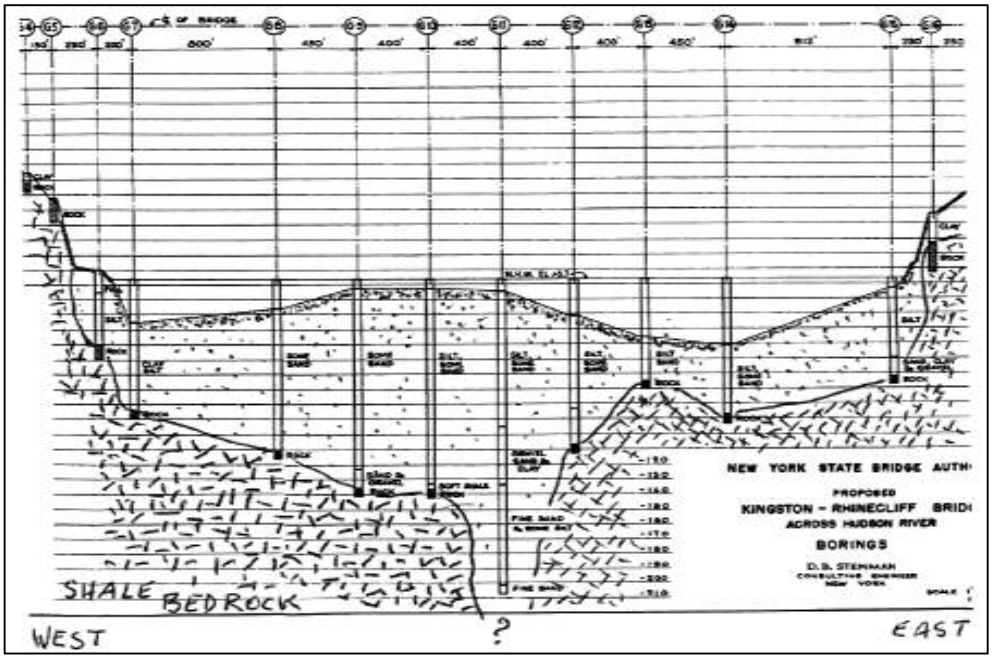
What many people do not realize is that since the water that created the glacier came from the oceans and that since the snow was not melting, water was not returning to the oceans as they do today. This resulted in the lowering of the sea water level; there is sufficient evidence to demonstrate that the sea level was over 300 feet lower than it is today. Water flowing in the area of the present day Hudson River valley created a deep gorge in the river bed. The moving glacier also assisted in deepening the valley. For instance, we know from studying the present day glaciers in the Rockies that the weight of the glaciers actually melted the ice at the bottom and streams flowed from under these massive, over-mile-thick glaciers. Thus, the bottom of the old (called pre-glacial) valley of the Hudson River is shown in the cross section where the shale bedrock begins.

Let's return to the moraines. At several times during the period of the receding glacier, the present day Hudson River Valley became damned, blocking the normal flow of water, and a huge lake was formed that geologists called Lake Hudson. Sometimes, the original channels were diverted and for a time the rivers flowed in new channels, sometime they returned to their former channel.

If one looks across the valley from above the hairpin turn, just below the **Trapps Bridge**, along **Rte. 44/55**, looking towards the southeast, when early morning fog covers the whole area, it appears just like when the last glacier covered this area as it began to melt, or waste away. Using your imagination, this scene could have been the vast Lake Hudson blocked by the moraine deposits to the south.

Some of this lake water may have found temporary exit through the **Rondout Valley** and water may very well have flowed south toward New Jersey.

Melted glacial water carrying sand and gravel flowed into this lake. The muddy and silted water was occasionally quiet enough for the suspended material to settle. Much of the clay along the shores of the Hudson that was important for the brick industry was deposited because of the presence of this lake! The clay and sand settled into the bottom of the lake and was discovered when drilling took place to locate places to construct the towers for the Kingston-Rhinebeck Bridge.



During this process here in the Hudson Valley, the glacier was also melting all along the northeast and through the northern sections of present day United States. Water was flowing back into the oceans and the sea level was rising. Thus, when the water embayed in Lake Hudson finally broke through the moraine and flowed into the ocean, the clay and sand remained where it is today.

This same sequence of events was repeated in varying degrees all over our valley, to the east and to the west of the **Gunks**. Next time, we'll investigate the glacial impact in our **Rondout Valley**.