OUTCROP

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Geology Stops: New York City

By Andre Scheinwald

Editor's Note

The summer travel season is upon us so we thought that we would bring you some lessor known exhibits and sites to view along your way.

For those of you heading east to the nation's financial district - one of RMAG's newest members and our newest associate editor shows brings you some geologic relief amidst the concrete.

By the time this publishes, I will have moved to Denver from New York and as a personal sendoff I am writing a series of pieces on places of geologic interest starting on the East coast. These are all personal accounts, so at times there will be a lack of geographic continuity. I will be starting this series with four stops in New York City; focusing in and around Central Park, as well as uptown Manhattan.

The first stop of interest is on the southeast corner of 68th St. and Madison Ave. The closest way to get there is by taking the 6 train to 68th St. and walking west on 68th towards Central Park West. What you will find is not in situ, as it is the building itself. The building is composed of fossiliferous limestone with visible fossils such as crinoid stems and brain coral. One does not have to look hard; in fact, you can even see the texture of the building in Google street view. As we all know, whoever chose this building material did so poorly. You can see the structural damage from the high weathering rate of limestone in the region. What I hope the reader learns from this is that interesting geology is all around us. I have learned from this observation to pay more attention to the buildings I pass and have found interesting rock types such as oolitic limestone and sandstone with bedding.

After the first stop you can continue on to Central Park West and take the entrance into the park just south of 67th St. and 5th Ave. Follow the path west approximately 480ft (or ~146m) to find an outcrop of schist with exact coordinates of 40.769500°, -73.971000°. Depending on whom you ask, schist in the NYC region is classified as either one or two different types: Manhattan schist only, or Manhattan schist and the Hartland Formation. Whatever the case may be, this specific schist outcrop contains prominent bands of quartzite, large specimens of muscovite, and pegmatite intrusions. The outcrop is the result of sediment deposition during the Cambrian and metamorphosed by the Taconic Orogeny, 450 MYA (Merguerian and Merguerian, 2004.) Also of interest is that this outcrop appears to be a Roche moutonnée based on the smooth up-slope of the outcrop

and craggy downslope. A Roche moutonnée is a glacial weathering feature with the up-slope caused by glacial abrasion and the craggy downslope from glacial plucking due to pressure melting and refreezing of the ice. Rough observation from this one outcrop indicates that glacial motion followed a northeast to southwest direction created during the Pleistocene.

Another stop in Central Park is on the east side closest to the 59th St. and Columbus Circle entrance, accessible from the 59th St. station using the A,B,C,D, or 1 train. On the northwest corner of Heckscher Playground you will find another outcrop of schist with glacial striations running from northwest to southeast, possibly indicating a series of glacial advancements during the Pleistocene as it traces a different direction than the previous stop. This outcrop is known as Umpire rock or Rat rock, and also happens to be a good location for bouldering in the city. At either

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location in Central Park I do not recommend trying to take any samples with a rock hammer. It is frowned upon and quite possibly illegal in the parks.

The last location is at the northern tip of Manhattan in Isham Park right next to the A train 207th St. Station. Along the length of Isham St. between Broadway and Seaman Ave. are outcrops of Inwood Marble which were metamorphosed from limestone during the Taconic Orogeny (Merguerian et al., 2011). These outcrops are a stark contrast to Manhattan schist in the area due to their low lying, heavily weathered nature. Feel free to take samples of marble that have weathered off the outcrop or are loose enough to pry off.

New York City has a variety of geologic features that beckon a geologist's attention in quieter sections of the city. Some of these are the glacial Roche moutonnées in Central Park molding schist outcrops and the Inwood marble formations in northern Manhattan's Isham Park. Those of you familiar with the city and its' geology may be questioning: "What about the Palisades sill? Or the Fordham gneiss? Or the minerals you can collect at Tubby Hook?" My response is that the city has a rich and varied number of geologic landmarks waiting to be observed and researched by interested geologists visiting the area. So much so that one could write a short book on everything that can be found.

That's not to say that books have not been written on the subject. Three resources that I have not personally read are Mannahatta: A Natural History of New York City, published by Harry N. Abrams in 2013 and available for $18.71 on Amazon; Geology and Engineering Geology of the New York Metropolitan Area, published by the American Geophysical Union in 1989;and The Geology of New York City and Environs, by Christopher J. Schuberth published in 1968.

References

Merguerian, C., Merguerian, M., and Cherukupalli, E., 2011, Stratigraphy, structural geology, and metamorphism of the Inwood Marble Formation, northern Manhattan, NYC, NY: in Hanson, G.N., chm., Eighteenth Annual Conference on Geology of Long island and Metropolitan New York, 09 April 2011, State University of New York at Stony Brook, NY, Long Island Geologists Program with abstracts, 19 p.

Merguerian, C., and Merguerian, M., 2004, Geology of Central Park-From rocks to ice, http://www.geo.sunysb.edu/lig/Conferences/abstracts-04/merguerian/Merguerians2004.pdf (accessed April 29, 2014) «

Volunteer Position for the Managing Editor for Outcrop Open

We are seeking a volunteer to assume the position of managing editor for the RMAG monthly newsletter *Outcrop*. Applicants must be experienced geoscientists capable of identifying and capturing stories of interest to the membership both within and outside of RMAG activities. The managing editor coordinates the production of the *Outcrop* with the RMAG staff and editors working directly with the layout artist. Availability to proof and cycle material and edits quickly is a must. Inquiries should be directed to Kristine Peterson @laramidegeo.com, the current managing editor, or Larry Rasmussen, RMAG Publications Committee Chairman, larryR@whiting.com. «