

NJS Presents***Museums, Archives, Artifacts, and Documents*****In This Issue:*****South Jersey Fossil Collection Donated to American Museum of Natural History*****By Michael Bernstein****DOI: <https://doi.org/10.14713/njs.v8i2.292>**

Between 1970 and 1987, Michael Bernstein collected marine fossils from previously known localities in Cumberland, Salem, Gloucester, Camden, and Burlington Counties, and from a few localities he discovered. Most of the specimens are invertebrates, although shark teeth, reptile bones, wood, and a fine coprolite were also found. The bones include two adjoining peripherals from the carapace of a sea turtle, found in 1985 at the dinosaur locality in Haddonfield and donated to the New Jersey State Museum (Registration No. 85.34.2.2.1 dated July 3, 1985). In November 2021, his invertebrate collection (about 640 lots in total; 550 curated) was donated to the American Museum of Natural History in New York for permanent preservation. In this piece, Michael discusses highlights from the collections.

Professionals and amateurs have long pursued paleontology in the seaward-dipping strata that intersect Earth's surface in the coastal plain of New Jersey, especially along the inner coastal plain. A directly accessible and *in situ* fossil locality can be a natural exposure in a creek bed or a creek bank, or an excavation such as a roadcut. An indirect occurrence consists of dislodged material from an inaccessible source, such as spoil that remains from the excavation for an irrigation pond. These examples, and others, are represented in the collections I recently donated to the American Museum of Natural History in New York. The localities from which I acquired

the materials include old classics that no longer exist, in addition to localities I believe I discovered pristine. The fossils date from the Late Cretaceous to the Miocene.



Snails from a creek bank exposure of the Marshalltown Formation near Auburn, Salem County.



Innermost portion of a coiled nautilus from the Navesink Formation, in spoil from trenching for the construction of a sewer in Sewell, Gloucester County.

The collection was amassed over the course of years, under all different circumstances. In one instance, a friendly property owner in Blackwood, Camden County, actually encouraged me to break into the ledge in his front yard in order to expand the parking area for his vintage cars. He said the backhoe he had used could go no further. This hardened sand was alive with *Oleneothyris*, a brachiopod better known from the valley of Crosswicks Creek. The property also had an artesian

well. Some of the well water was wasted to the ground surface in order to relieve pressure on the household plumbing. In the summer heat, I sipped cold artesian water flowing steadily from a plastic hose, 20 feet from a fossiliferous ledge I had been invited to rip into with a crowbar and sledgehammer. This was truly a geologically remarkable New Jersey property. Special thanks to the late Dick and Florence Gibson.

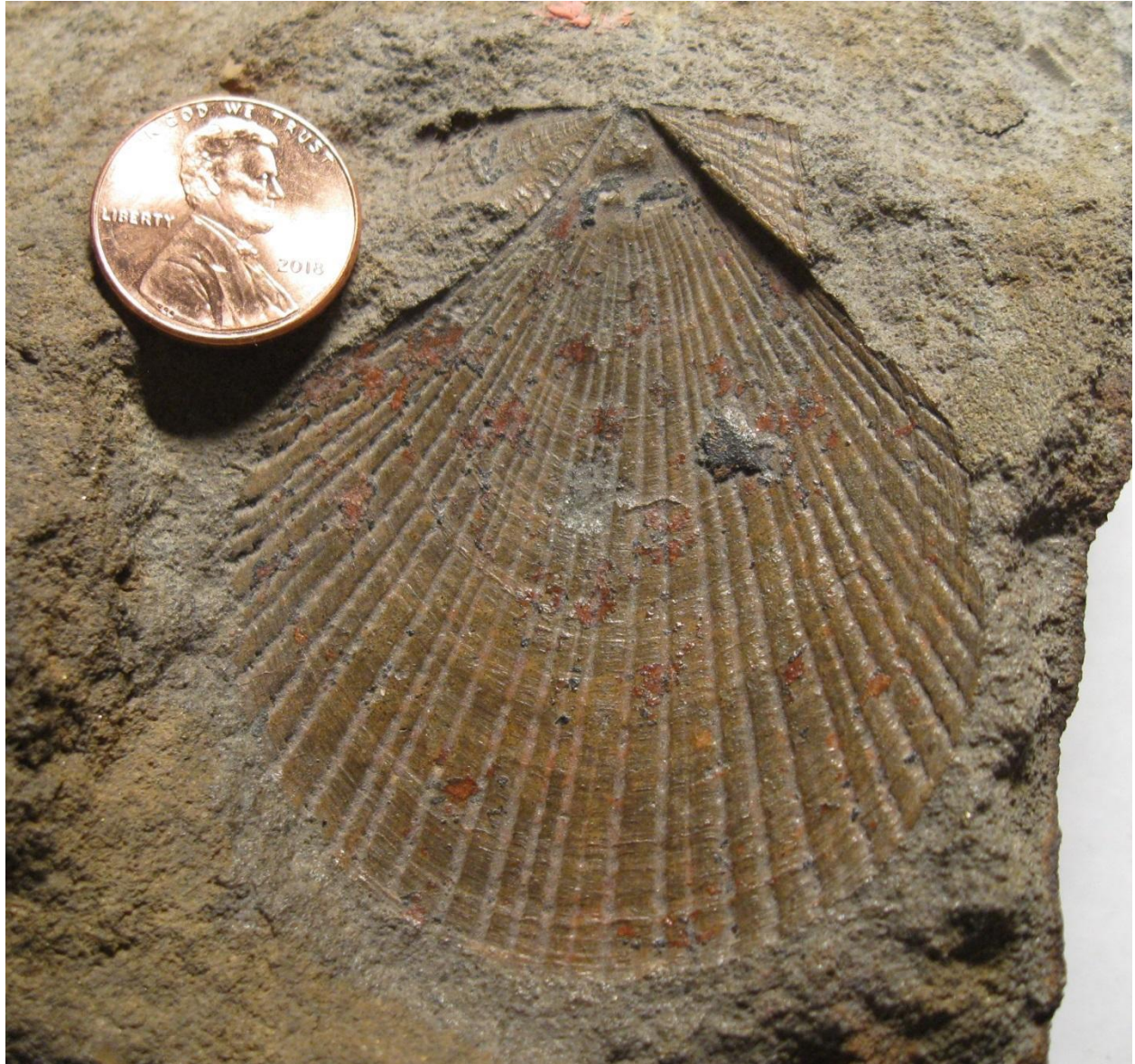


A rare find: articulated portion of the stem of a crinoid (a sea lily) from a creek bed exposure of the Navesink Formation near Barnsboro, Gloucester County. This indurated stratum of large oysters and squid was also exposed in the classic roadcut locality at Mullica Hill, 2.8 miles away.



Perfectly preserved silvery-smooth *Anomia* (jingle shells) from a tiny waterfall exposure of the Marshalltown Formation near Swedesboro, Gloucester County. The vicinity of Weller's classic locality of 1907.

In my opinion, the most enjoyable and productive fossil collecting in New Jersey happens in the Vincentown Formation if and where this Caribbean sea bottom is loose enough to pass through a specially constructed sieve (bug screen in a plastic milk crate). Large echinoids (sea urchins, for which the Vincentown is world famous) can be spotted in the field, while hours can be spent at the table picking crab claws, snails, brachiopods, bryozoa, foraminifera, shark teeth, starfish segments, sea lily stems, and tiny sea urchins from the wet-sieved material. A geographically exotic outlier occurred where I chanced upon this limey sand and its fossils in spoil from the excavation of a watering hole for a horse near Welchville in faraway Salem County, many miles from the defining “type” locality at Vincentown in Burlington County.



A fine impression of the scallop *Chlamys* from the Marshalltown Formation, in the floor of a lateral borrow cut near Auburn, Salem County. Fill was needed when the nearby New Jersey Turnpike was being built.

For decades, collectors enjoyed easy access and fine fossils in the small slope of the Merchantville Formation that remained at the former brickyard in Maple Shade, Burlington County. About 20 years ago, a building was shoehorned into that area, obliterating the exposure. To stop the gully that was threatening his driveway, a homeowner poured a concrete apron over a beautiful exposure of the basal Vincentown shell bed near Woodstown, Salem County. It had been in the scientific literature for decades. Both localities are represented in the collection.



A little scallop grown on the concentric plan, in contrast to the size and radial design of *Chlamys*. From the Woodbury Formation at the dinosaur locality in Haddonfield, Camden County.

I believe I discovered the exposure that is the source of the four gastropod casts on the first photograph in this article. The landowner, Harry Kirschling, reasonably required and duly received some duplicate specimens.

Since we're near Auburn, look at the Woodstown, New Jersey, topographic quadrangle map. See the linear, parallel tributary valleys aligned southwest to northeast along the Gloucester County side of Oldmans Creek. Their directional and intermittent development attests to the banded structure and varying erodibility of the strata. But the same strata are present along the Salem County side. Why aren't similar tributary valleys present over there? The microclimate along the south-facing (Gloucester County) side of the main valley resulted in enhanced erosion. The eroded material accumulated at the toe of the slope and pushed the channel to the southwest, undercutting the Salem County side of the main valley and thereby producing the steep embankment shown there on the topographic map. At least that's the theory I read.



A natural aura enhances a good impression of the clam *Eucrassatella*. From a creek bed exposure of the Kirkwood Formation in Fairton, Cumberland County. A unique locality documented in 1934, when dredged slabs were reported. Here the rock isn't as lithified as the Cohansey quartzite found in the field in Greenwich and at "stone quarry" at Greenwich Pier, but they all host the same mollusks that are familiar to the Shiloh Marl, dug long ago in pits near Jericho and Shiloh. The author thinks he found an *in situ* body of abundantly fossiliferous rock in the creek at Fairton in 1975 or 1976.

In October 2021, Melanie Hopkins and Neil Landman of the American Museum of Natural History (AMNH) accepted my offer to donate my New Jersey invertebrate fossil collection. Anastasia Rashkova of the AMNH and Matthew Garb of Brooklyn College took custody of the collection on November 10, 2021. Ownership was formally transferred on February 22, 2022. Bushra Hussaini managed the integration of the collection. I am grateful to the AMNH for preserving this collection and making it available for use for decades to come.



Not included in the AMNH donation: the author's shapely 1.5-inch coprolite, appropriately from the sewer excavation in Sewell. Unashamedly posed on a custom-made glass throne, this turd is likely reptilian.



Growth rings in the fossil driftwood from Blackwood. Width, about three inches.

I had previously donated specimens to other entities. Around 1977, I found a small log protruding from the greensand marl along a creek bank in Blackwood. (This was where I chanced to meet the man who took me to Dick Gibson's place.) A tree from long-vanished terrain somewhere to the west had been carried out to sea. It eventually sank to the bottom and became buried in the seafloor sediment that is the Hornerstown Formation. I hope the rings can tell something about the type of tree it was, and the climate in which it lived. As a bonus, this piece of fossil driftwood had been bored into by shipworms, which are actually clams. When I burned a sliver for curiosity of the odor, neighbors thought we were smoking pungent hashish. I thought it smelled more like burning rubber. The lot consists of two halves of a six-inch-long piece of heartwood—the innermost core of the tree—and a few natural casts of the borings. The whole lot was donated to the Peabody Museum of Natural History at Yale University in August 2018 (Accession No. YPM 12763).



Buy one, get one free: “shipworm” borings in the driftwood from Blackwood.

Much of that donated collection is documented in four articles published in *Northeastern Geology* during the 1980s.¹ The contents are limited to basic descriptions of the localities and the species found. The interpretations of stratigraphy are tentative. Now that the collection is in the hands of professionals, a far better accounting can be made. I hope it may be of use to many, maybe even some of you *NJ Studies* readers one day.

Michael Bernstein received a BA in geography from Glassboro State College in 1982. His 31 years of employment as a Phase I environmental site assessor included investigations at the Air Force Flight Test Center (Edwards Air Force Base) and the Civilian Flight Test Center (Mojave Airport) in California during the 1990s. In 2006, Mike assessed four industrial properties in Germany, which included facilities built in Stuttgart in 1938 as part of Hitler's rearmament program. (In 2021, Mike was granted German citizenship under a legacy law.) Other properties of historical interest that he assessed include PECO's Richmond Generating Station (1926) in Philadelphia, a 1942 synthetic rubber plant in Texas, and the original (1916) portion of the Sun shipyard in Chester, Pennsylvania. Subjects of his articles in Nautical Research Journal include the Sun shipyard, Cramp's shipyard in Philadelphia, the Merchant Shipbuilding yard in Bristol, Pennsylvania, the American International shipyard (site of Philadelphia International Airport), phantom shipyards on the Delaware River and Arthur Kill, and publications of the Emergency Fleet Corporation during World War I. He also writes briefly but often on a broad range of

¹ Michael R. Bernstein, "Fossiliferous Sandstone at Fairton, Cumberland County: Local Biostratigraphy and Lithostratigraphy in the Miocene of Southern New Jersey," *Northeastern Geology*, 6, No. 3 (1984): 174–178; Michael R. Bernstein, "Local Invertebrate Assemblages in the Upper Cretaceous Marshalltown Formation along the Valley of Oldmans Creek in Southern New Jersey," *ibid* 10, No. 3 (1988): 202–215. Bernstein, "Taxonomic and Stratigraphic Interpretation of Exogyrid Oysters (*Exogyra*, *Amphidonta*) in the Upper Cretaceous Woodbury Formation in Southern New Jersey," *ibid* 8, Nos. 1 and 2 (1986): 4–12; Michael R. Bernstein, "Paleontologic and Biostratigraphic Survey of the Vincentown Formation (Paleocene) along the Valley of Big Timber Creek in Southern New Jersey," *ibid* 9, No. 3 (1987): 133–144; Michael R. Bernstein, "Local Invertebrate Assemblages in the Upper Cretaceous Marshalltown Formation along the Valley of Oldmans Creek in Southern New Jersey," *ibid* 10, No. 3 (1988): 202–215.

subjects in the Society for Industrial Archeology Newsletter (Michigan Technological University, Houghton, Michigan). Mike Bernstein semi-retired in 2020.