



FINAL REPORT

"River For All Seasons"- 1983-1984

The objectives of the 1983-1984 request to the Foundation included:

1. Conducting 240 programs for 10,000 people
2. Educating the populus of Westchester about the importance of the Hudson River
3. Photo documenting the program
4. Preparing written materials for the program

During the period of the grant there have been over 250 programs conducted by Hudson River Educator Christopher Letts. Groups such as: elementary schools, cub scouts, garden clubs, 4-H clubs, senior citizen groups, etc. have been the recipients of Mr. Letts' programs. By May 15, 1984 the attendance objectives were fully met.

Attached please find several examples of school children's work, newspaper articles and thank you letters all of which support the fact that the objective of educating the populus of Westchester County about the importance and significance of the Hudson has certainly begun in earnest. As part of this education project two slide shows were developed for use at the Tarrytown Lighthouse. One of the slide shows is on the history of the lighthouse itself and the other is about the Hudson River. These slide shows are used whenever groups are given tours of the lighthouse and have also been very useful when indoor programs had to be given because of inclement weather. (See attached text.)

Many slides have been taken of Mr. Letts at work in order to complete the photo documentation of this project. One of the staff from the Westchester County Department of Parks, Recreation and Conservation has put together a short slide show to illustrate the different programs which are conducted by Christopher Letts.

Mr. Letts has prepared written curriculum materials for use specifically by other instructors. The titles of the curriculum materials are:

1. The Tarrytown Lighthouse
2. Interpretive Beachcombing
3. Georges Island Park
4. The Living River

As per my discussion with Jon Cooper we have re-allocated some of the funds from one budget line to another. The County of Westchester will pay the cost overrun of \$200.

(please see attached financial summary)

In our opinion this program has been a huge success and has satisfied all the goals and objectives of the 1983 - 1984 program.

THE LIVING RIVER

This program is directed toward introducing an audience to the fact that the Hudson River in its broad lower reaches is very much alive. Not only is the Hudson home to an impressive variety of living things - the sheer quantity of life, the biomass, is bound to amaze. Due to diverse habitat types and almost unlimited food supplies, among other factors, the river continues year after year to surprise those who study its life forms.

Kingsland Point is a fortuitous location for studying the living portion of the river. It is a way station in the migration routes of many forms of animals, some easily observed. Tide, weather and season play major roles in the movements, incidences, and activity levels of river organisms, and much can be added to river life studies by interpretation and explanation of the effects of those forces. This exercise is a complex matter, however, and in fact I am often puzzled myself by the presence or absence of some life forms. We'll just have to go on keeping records for a few years, asking questions and analyzing our experiences, in order to provide a few more answers. No part of Hudson River lore is more fascinating, more compelling to the public at large, than the on-site collection and observation of macro-organisms.

Of all the programs developed for Kingsland Point Park, this one requires the greatest amount of advance preparation at the site. I am comfortable with about an hour of prep before the audience is greeted, though I often guarantee that I will have certain key critters on hand by making arrangements a day or two in advance.

Procedure: Equipment list. Seine; D-frame dipnet; plankton net; several enameled pans; 2 5-gallon buckets; pint-sized wide-mouthed jar + lid; eel pot; killifish trap; crab traps (recreational or commercial or both); 2 pairs of waders; magnifying lenses; soft forceps; medicine dropper.

Visit the site at least one hour before the program is to begin; notify gate attendants that a program is being held. Put out LIGHTHOUSE PROGRAM MEETS HERE signs at south end of parking lot. Ascertain direction of wind and condition of both beaches. If wind is strong from the southern quarters, perhaps the bathing beach is the best bet. If from the northern quarters, the sheltered beach at the GM gate is the place to be. Public programs or those involving more than 30 people are most easily done at the bathing beach because of ease of access and amount of observation space available. Whatever your choice, be sure you have keys for the gates to both beaches in case the wind does a sudden change just about the time the program gets under way. This is likely when a front is moving through, when winds are variable for several hours preceding the program, and just about the time the tide changes. Strong winds can mess up your act by distorting your communication, by making people uncomfortable, by making seining impossible, and by piling up "dirt" in windrows along the shore to foul the net.

Set the appropriate collecting devices. The plankton net can be set by suspending it from the lighthouse bridge, from the breakwater at the bathing beach, or from the bridge just to the north of the admission booth. You have to monitor this net to be sure that it doesn't lie on the bottom. Pay it out into the current so that it maintains a position in the water column; you can fine-tune as the strength of the current waxes and wanes. The crab traps can be set from the lighthouse bridge or the boat deck of the lighthouse, as can the eel pot/killi trap. Access to the lower mill pond can be gained by obtaining the key from park personnel and using the overpass across the railroad tracks. The pond is loaded with eels and many other fish. Bait fish traps with chicken bones, stale bread, fresh meat. Bait crab traps with fish. Crab traps are effective from July - September. Fish traps will be effective from April - November, depending on water temperatures.

Be sure that waders are dry and unripped!

Before you proceed to meet your group, make a final decision on which beach you will use, and more or less assemble your equipment there. A little stage setting is not amiss here. Re-set plankton net and fish or crab traps in such a way that they are handy but inconspicuous, close by your chosen beach. Be sure that you have "security".

Collect your group, and proceed to a point near where you will do your program. Explain to people that the Hudson is a rich and important food producing source, a vital link in marine sports and food fish chains. Some important species spawning in the Hudson are shad, herring, menhaden, anchovies, and other clupeids; striped bass; Atlantic sturgeon. These fish tend to "run" up the river in the spring months, lay their eggs, and return to the ocean, leaving the eggs and later larval and juvenile fish to mature on their own as they slowly make their way downstream. The Hudson is like a lake in many ways, especially in the mid-river reaches where much of the spawning occurs. Tides and river currents wash drift material down seven miles, then back six. It has been calculated that under summer river conditions, it would take a month or more for an object to drift from Albany to the Battery. At the same time, nutrient-rich water from up-river mingles with brackish water in the shallows of Haverstraw Bay and the Tappan Zee, and this well-mixed nutrient broth absorbs huge amounts of solar energy, resulting in rapid growth conditions - first of plants and plankton, then of small vertebrates and invertebrates, and finally of top-of-the-food chain organisms like crabs, striped bass, and cormorants. This system is amazingly fertile, many times more so than the very best agricultural land to be found anywhere.

The tidal effect of the Hudson is felt to the head of navigation for ocean-going vessels, at Albany, and even beyond, to the locks at Troy, New York. Though tides rise and fall that far north, and some oceanic fish make their way up river that far, the salt water influx usually extends to a point just north of the Hudson Highlands, and rarely as far as Poughkeepsie. The interface between salt and fresh water, the so-called salt front, is in flux through most of the year, working its way up the river during flows of lesser strength from the river, and being pushed downstream as runoff from rainfall and other precipitation increases. Sometimes the river is essentially fresh as far south as the George Washington Bridge, even almost to the Battery, in times of freshets.

Salt-loving fish retreat and advance as this interface moves up and down the river. This explains the presence of such fish as trout, bass, pike, and sunfish far downstream in the spring of the year. It also sheds light on the appearance of marine fishes far up the river during summer months...jack crevalle, needlefish, ladyfish, bluefish to name but a few. All together, the Hudson sports a 185 species of fish (1983 update) with the list increasing every year.

Proceed to beach site, and establish the rules of the game: no one touches the organisms without permission, and draw a line in the sand beyond which no one can advance. Next, stick a piece of wood or rock at the water's edge, as a tide marker (have someone do this for you) and refer to it later, to illustrate how fast the tide rises and falls. Climb into waders and select an assistant from the audience to don the other pair. While waiting for them to be ready, take the plankton tow, drag it back and forth through the water a couple of times, and empty contents into two or more pans (who will know that the net was working for an hour or more before you picked it up?) Have a couple of bystanders unroll the seine, and invite people to use the magnifying glasses and to observe the animals in the plankton pans while you seine, cautioning them again not to touch the fragile creatures. They should find a variety of life forms depending on the variables in the environment at the time. While they are engaged, run a couple of seines, bringing the hauls ashore at some clear place close by the spot where the audience waits behind the line. Again, a couple of volunteers can help you pick up the fish and other animals in the net and put them either in the viewing tank or in buckets.

People usually are pretty excited about this time, and it takes some fast talking and maneuvering to keep them behind the line and under control. I try to display one type of organism at a time, dealing briefly with its life history and place in the river scheme. This goes for animals found in the net as well as plankton products. If their interest in the seining process is high, I often relinquish my waders to someone else and let them run a couple of more seine efforts while I talk with people about what we've found so far.

Some of the things you are likely to get: killifish, white perch, striped bass, sticklebacks, spottail shiners, young of year clups and bluefish, juvenile flounder, small eels, tomcod, white catfish. Have someone you can count on take the dip net and probe around the base of rocks and pilings, and sweep through any weeds growing within reach. They will come up with small fish, glass shrimps, gammarus, Harris crabs, and other invertebrates. The plankton tow will yield fish eggs, fry, and a wide variety of zoo- and phytoplankton from microscopic to a size observable with the unaided eye. There are stories in all of these.

If you have crabs and eels in the pots, now is the time to do the gee-whiz stuff and pull those in (or have someone take on the chore for you). A pot of squirming eels gets everyone's attention. Don't forget, during the growing enthusiasm, to insist that organisms be treated respectfully, and to return to the water those creatures you do not intend to use in your teaching. Eels are tough, and I put them in buckets, and invite (not without control!) people to try to pick them up, one at a time. Blueclaw crabs are real attention getters, and have a life cycle that gets people romantically involved, believe it or not.

I invite children in the group to have the honor of releasing our various short-term subjects of study.

Now is the time to make some points about edibility of fish in the Hudson, about the importance of the sport and commercial fishery of the river, and the impact of the Hudson as a nursery on coastal fisheries.

The public is welcome to fish at any Westchester County Park facility where fishing is not expressly forbidden; this is the case at any of the four parks on the Hudson, all of which are renowned for good fishing of one kind or another. Kingsland Point is known for perch, tomcod, and striped bass. Croton is famous for striped bass fishing, and good numbers of bluefish and even flounder are caught there in summer months. George's Island area has a reputation for blue crabs and perch, and that holds true all the way down to Oscawana Island.

Thank people for coming, invite and entertain questions, and ask if someone would like to help rinse equipment and carry to the car. Accolades for the wader wearers, of course! Don't forget to lock the gates behind you when you leave.

GEORGES ISLAND PARK

Actually an island until the middle of the nineteenth century, it was turned into a peninsula by the construction of a causeway through marshy shallows. This joined the mainland with the rocky headland known now as "area 6." The causeway was built to facilitate the shipping of bricks from several brickyards operating close by. For more than half a century, Georges Island was one of the focal points of the important Westchester County brickmaking industry. The surrounding countryside is liberally dotted with ponds and small lakes, representing clay pits that were filled with water when the harvesting of clay ceased. At least five different brickyards operated on Georges Island. As you walk the shoreline from the launching ramp to the ball field, you will see multitudes of brick fragments. Most of these bricks were discards, placed along the shoreline to firm the bank and retard erosion. Even a century ago, the big steamers and tugs sent destructive wakes against the shoreline, eroding precious land. "Red beaches" are a common site along the Hudson's shores, from Wappingers Falls to Tarrytown. If you walk the shore at low tide, you have a chance of finding bricks of the "face" grade, bearing the insignia or names of the brickyard owners. Five have been identified at Georges Island: Gornley, E.S.B. Co., Frost, E.D.B., and Murray.

The story behind the name "George's Island" has it that the brickyards were worked largely by Black workers. In those days, they were indiscriminately addressed as "George," and the brick working area became George's Island, and now, after passing out of private ownership into federal hands, and thence to the county in 1959, it is called Georges Island.

It is most helpful to have a copy of NOAA chart 12343, Hudson River; New York to Wappinger Creek, and copies of the map of the park, and the nature trail guide for the park. Charts are available at most Westchester marinas, and at Morretti's, in Peekskill. Park maps and nature trail guides are available either at the entrance booth or the park office, without charge.

The nature trail guide deals with a portion of that projection into the river called "V.A. Point." Although in some disrepair (1984) it offers a lovely, mildly strenuous half-mile loop through several plant succession phases, with a wide variety of vegetation. As you traverse that portion of the trail which borders the river at the tip of V.A. Point, you will note glacial signatures on the face of the tough ingenious rock of the Cortlandt complex which makes up V.A. Point and Georges Island Headland. Large numbers of oyster shells mark sites of Indian (Native American) camping grounds. As recently as a century and a half ago, large numbers of oysters existed in the Hudson, from the Highlands to the mouth. As evidenced by tremendous quantities of discarded shell along the shores of the river, the Indians considered this seafood a staple and used it freely. How did they open the oysters? Probably as we do, with a twisting motion of a sharp tool. The shells show no signs of being broken or burned. Note the small size of the shells, relative to commercially harvested oysters of this age. The small, thick shells suggest long slow growth, suggesting marginal conditions. Although living residents of Westchester County recall harvesting oysters from the river half-a-century ago, changing environmental conditions doomed

the shellfish long before that. One good guess would suggest that development in the Hudson watershed has so changed the patterns of flow and runoff as to cause the species to perish for lack of salinity. Erosion of land and riverbanks and corresponding siltation in river shoals has surely been an important factor.

The Indians who consumed these oysters were members of the Algonkian language group. The Kitchawoncks controlled the river from Croton Point to Peekskill. Within two hundred years of the arrival of the first European settlers, the Native Americans had been displaced from their lands and way of life. Algonkian is now a dead language, and remnants of the tribes of the lower Hudson exist in small pockets far from the Hudson Valley.

In 1683, Georges Island and surrounding lands passed from Indian ownership into the hands of Stephanus Van Cortlandt, a wealthy New York merchant. He bought a number of tracts of land and ultimately owned all but 2,000 acres of Westchester County, including the Hudson River shoreline from Croton Point to the Hudson Highlands. After two generations, the land passed through marriage into the hands of the VerPlanck family, where it remained until the mid-nineteenth century.

It was Phillip VerPlanck who left "Haverstraw" to his son, Jacobus, in 1767. Haverstraw translates as "oat straw" in reference to the agriculture of the area. "Haverstraw" is now known as Verplanck Point, but the name lives on in a village across the river, and in the broad Haverstraw reach of the Hudson River, stretching from Ossining to Verplanck.

Take the chart and go to the western end of the point, due west of the shelter in area #6. Spread the chart out, orient it and anchor it. The point of land half a mile northwest of you is called Montrose Point, after an early owner of the land. During the American Revolution, it was known as Parson's Point, and was owned by the minister of the Reformed Dutch Church in the area.

Montrose Point was the site of an Indian village where large oyster shells were found. The shells were dated by means of radiocarbon technique, and found to be 6,500 years old. Evidently, the environment at that time was quite suitable for rapid oyster growth. Beyond Montrose Point lies Verplanck Point, named after the VerPlanck family, also former owners of Goerges Island.

Between Verplanck Point and Montrose Point lies Greens Cove. Issac Green started a brick manufactory there in the 1830's. The cove was formerly larger and deeper, and afforded an anchorage for Hudson's vessel, the Half Moon, on October 1, 1609. Hudson was on his way down the river after having penetrated as far as Albany. At Greens Cove, Indian visitors pilfered some small articles and tried to escape with them. Hudson's crew pursued, fired upon the Indians, and several were killed. The Half Moon's passage down the river was marked with several other violent incidents in which the Indians suffered all the losses.

The view due west across the river shows Stony Point Bay, with Stony Point directly to the north. The chart shows clearly how the river is constricted between Stony Point on the west bank and Verplanck Point on the east. Just to the north loom the mountains of the Hudson Highlands. The Highlands were called "The Key to the Continent" during the Revolutionary War. Verplanck and Stony Points were known as the "Gates of the Highlands" as indeed they are today. The "King's Ferry" ran across the river between them.

In 1779, the American war effort was not going well. The patriots were outnumbered, ill-equipped, and had suffered a number of defeats. Morale was poor. Washington called upon General "Mad" Anthony Wayne to consider an assault against the purportedly impregnable fort at Stony Point. When asked if he would lead the assault, Wayne is said to have replied, "General Washington, I'd storm Hell if you would prepare the battle plan."

At midnight, July 15, 1779, after careful planning, a painstaking approach, and a few minutes of bitter hand-to-hand fighting, the American troops captured Stony Point. No matter that it could not be held, and had to be abandoned to the British after three days. Americans had gone against seasoned British troops under difficult circumstances and won a sound victory. The news went out, and the British war effort lost more than dignity and six hundred men-at-arms taken prisoner.

The view south from Georges Island is of Haverstraw Bay. On the East bank, Croton Point extends halfway across the Hudson, the remnants of a lateral moraine bequeathed by the Wisconsin glacier. Further south, at Tarrytown, the massive Tappan Zee Bridge reaches across the river to Piermont. Reference to the river chart will help to identify the headlands on the west bank: to the west, High Tor dominates. The bluff across the river from Croton Point is Hook Mountain.

Walk from the headland back through the parking lot to the point on Dutch Street where an isthmus was constructed, connecting the original island to the mainland. To the south of the road lies a tidal marsh, with water levels that fluctuate in accordance with the river tides. This area of the Hudson is famous for blue claw crabs, and many bushels are taken here each summer and fall by crabbers. The mature crabs come into the shoal areas off the marsh to shed and mate. The marsh is a prolific food source for fish and crabs. To the north of the road is "Swan Pond," a freshwater marsh. The swans that nest here each year have relatively poor nesting success, due to a population of large snapping turtles that share the pond with them. This stretch of road is a good place to observe many kinds of birds, mammals, reptiles, and amphibians. Scoop nets plied on each side of the road bring up dramatically different organisms, particularly in late summer and early autumn when salinity in the Haverstraw Bay is at its peak.

At the west end of Swan Pond, a trail leads into the marsh. It is a loop trail, ultimately leading to the park office. On the map of Georges Island Park you will note two ponds to the north of Swan Pond.

Follow this trail, and you will shortly find yourself circling the banks of the larger pond. For reasons obscure, this body of water is known as Whoppee Lake. It was dug as a by-product of the clay harvesting carried on by the brickyards. Like many of the clay ponds in the area, Whoppee is "bottomless." That simply means that water table and relatively crude pumps in use in the last century precluded going deeper than about 75 feet for clay. After that, the pits were allowed to fill with water, and the clay harvesting was carried on elsewhere. The smaller pond was known as Crystal Pond, and served as a water supply for the birckworks.

The half-mile trail winds through marsh, around the larger lake, and along an upland trail, making this a great place for studying tracks, birds, botany and aquatic life. A grove of mazzard cherries near the far end of the trail suggest a former homesite. The area is used by many species of animals, including most of the common larger vertebrates of the county. Spring and fall migrations find interesting assemblages of shore birds and wading birds in the area.

ON THE BEACH - INTERPRETIVE BEACHCOMBING

We are all beachcombers to some degree, though some of us have developed (or yielded more readily) to this trait more than others.

The beaches of the Hudson have wonderful stories to tell. We don't have to travel hundreds or thousands of miles to enjoy this tantalizing pastime. Half a dozen beaches on the Hudson River in Westchester County give evidence that the river links us to people hundreds of miles away. We are linked to the mountains and the tributary streams, to ocean commerce, to the primal rhythm of the tides. The Hudson begins and ends the life cycles of pelagic fishes great and small, and provides food for multitudes...and the story can be found on our beaches. The history of humankind along the Hudson can be pieced together from human refuse left along the shores, and our present day problems and pleasures bespeak themselves in the mute evidence cast upon our river beaches.

One of the beauties of this program is that it is always fresh. One never knows what will be splashed up on the shore, and there will always be surprises. The program lends itself wonderfully well to audience participation. It requires almost no preparation, no equipment, and the folks can take home their souvenirs afterwards - the next load of treasure will be coming in with the next big tide, only a few hours or days away.

Procedure: Arrive at the site at least half an hour before show time. Croton Point is the best beach for this program, and Kingsland is also good. Place your program signs, and notify gate personnel and parks staff of the program, specify the meeting place! Be sure that your key works on the gate lock.

I divide the program into three parts. Phase 1. Introduction and greeting, explanation of the program. People should understand that the river is tidal, and what that means. If weather allows, I draw pictures in the sand on the beach to illustrate how the forces of the moon and sun and paths of the earth, moon and sun control tidal forces. Do not ignore river current and runoff, and effect of wind from various quarters on the tide. (For example, heavy runoff will cause unusually high tides. A strong wind from the south will hold the high tide in, prolong the flood and do much to nullify the strength of the ebb.)

Tidal force is found in every body of water, from goldfish bowls and your tissue fluids to the great Pacific Ocean. Tidal force in the Great Lakes amounts to only a few millimeters of rise and fall. The earth rises and falls under our feet due to tidal influence, and our atmosphere bulges many miles in response to the set of forces controlling the tides.

The next thing to do is to challenge people to find mysteries on the beach. You don't want everyone coming back with Schlitz cans and seagull feathers. Try to get them to open up their minds, to see questions and puzzles as they look at the beach. If you can get this across, the success of the program is assured. If you don't, you are still gambling. Don't forget to have someone put in a tide stick as soon as your group reaches the beach. I sometimes do it myself, with some flourish and no explanation. After a few minutes, call attention to the rise or fall of the tide. If your Phase #1 being acted out on the beach, have someone put in another stick. People have to look out at a receding tide and see a series of several sticks arching down the beach to the water line.

Phase #2 can begin with the tide stick exercise. Do a little arithmetic and explain that the lunar day is almost an hour longer than ours, so the tides advance about an hour each day, and how long was it since the last high (or low) tide, and how long until the next? High tides and slack water can be a pain, so you might want to check your Eldridge to get a dropping tide for the programs. Next, walk down the water line with people, note wave action, effect of wind, particle sorting, "dirt" along the water line, shipping going by, anything at all to let people satisfy their need to shake the kinks out down by the water. They need some time to just look things over. Try to keep the group together up to this time, because stragglers far down the beach are going to cause problems. Phase #2 now continues as you call people around you and point out the drift line from the last high tide. There are puzzles and mysteries here, tell them, and you can tell some pretty strange stories about some of this stuff. What you would like is for each person to open up their minds, and walk down the beach, looking and thinking, and pick up two (2) objects to share with the rest of the group. You are going to give them two minutes, or four, or six...whatever you think will work without having the group come apart. Help them to spread out, point out that they might find far different things at the wash line than up on the storm beach, just move people around and get them into it. You may have to tell them that you don't want to see a hundred beer cans - anything to get them to think for themselves.

At the right intervals, call out "one minute left" "do it fast, thirty seconds!" "OK, let's find out what you've got."

Phase #3 - get it organized. You have to find someplace to sit where all can see what is going on. This works best with groups of fifteen to thirty. Now you start picking out objects and telling people what they are. Sometimes I separate man-made from natural, and then again into biodegradable and nonbiodegradable. You want to make a point here about natural cycles and recycling, and about the permanence of plastic, the unpleasantness of pollution. If you don't want to deal with unmentionables, make a couple of runs up and down the beach before showtime, and cull the unmentionables from the beach. They'll be there, for sure. You will probably get shells of small ribbed mussels and barnacles. You can point out that these are marine and brackish water organisms, and that the fresh water in winter and spring kills them off, so that a new crop has to start each year. You will get oyster shells...these are often very old, perhaps many hundreds of years old. As far as we know, no oysters now grow north of the George Washington Bridge, for several reasons, the least of which is "pollution" as we commonly use the phrase. Shells, driftwood, and other organic material will show signs of wear and tear from water and sand. Point out rounded edges and polished surfaces. You will have beach glass and can point out how it has been smoothed and dulled...glass is made of silica, as is most sand...the glass is turning back into sand. You may get plastic shot cups or shot shells, and that bespeaks duck hunters far to the north. Fishing tackle is common, as are fish bones, and you can talk about the huge and important fish stocks the river holds. Brick fragments mean brickyards, and loads of bricks brought down to the city by sloops and steamships. Beyond that, it reminds of the time when the Hudson was dammed at the Hazzano Narrows to form glacial Lake Hudson, where huge quantities of clay settled out, providing the

material for that important industry, brickmaking, here in the Hudson Valley. Feathers will mostly be from ducks and gulls in residence, but the Hudson is a flyway, and loons, mergansers, and geese from far away use our river as a part of their annual migratory route. You may be presented with bits of old boats. Plastic is bound to show up, and metal containers, glass jars and bottles. Make a pitch for recycling, against littering, and talk about toxics in the environment if you are so inclined.

As you move around the tables, respond to sometimes URGENT requests to have a special object examined, you will find that the fever will last for a good half hour, and you will probably be besieged with questions long after you feel the program has lasted long enough. You might be lucky enough to have someone astute enough to present you with a handful of sand...farsighted indeed, to bring the beach to represent the beach! One thing I did forget...when you are on the beach, have each person pick up a handful of sand, and rub it hard between their palms for a few seconds, and then ask them how it feels. When you are looking at beachworn objects, recall that experience and ask what sandpaper is made of. The light will dawn.

Invite people to take away with them the objects they have found. Make a point of getting all unwanted debris into trash receptacles before you leave. Have another look at the tide markers and let the group tell you what is happening. Lock the gate behind you.

TARRYTOWN LIGHTHOUSE AT KINGSLAND POINT PARK

I advise picking up your group at the south end of the parking lot. LIGHTHOUSE PROGRAMS MEET HERE signs are appropriate if the program is open to the public, and should be mounted at least half an hour before the program is to start. Of equal importance: notify whomever is on duty in the admission booth that there is a program on that day, and tell them where and when people should meet for the program. This approach works for all programs, not just the basic lighthouse tour.

En route to the GM property, ask people to remain in a group after they pass through the gate. Depending on how much assistance you have that day, and how restless the natives are, you can decide to lock the gate behind you or to leave it open. If you are working with a special reservation group and the park is in use by other people at the same time, I advise locking the gate behind the group.

After following the walkway southwest around the corner of the GM treatment tanks, you are awarded a good look at the lighthouse. Close to about one hundred yards, and take advantage of the opportunity to pull the group around you again, and to point out such features as the taper of the structure, the lightening rod, and the boat davits.

This is a good place to make the observation that more than half of the lighthouse structure by mass is below the water level, and by far the most of it by weight. The structure is based on a stone and concrete filled iron cannister, the circumference of which is outlined by the outer perimeter of the boat deck railing, and the depth of which extends some 20 feet below mean low water level, into the riverbed.

Why was the lighthouse positioned here? A partial answer is found in the January 5th, 1884 issue of Scientific American, under the article heading, "New Lighthouse on the Hudson River."

"A short distance below the water level a good foundation of gravel was found, upon which was laid a mass of concrete confined by a cylinder of iron, and extending sufficiently high to be above the reach of the greatest tides, and of ample strength to resist the action of the ice. This is solid, with the exception of the cellar, which is divided into four compartments by walls which is divided into four compartments by walls of masonry radiating from the center."

The gravel mentioned in the preceding quote is a legacy of the once powerful Pocantico River, and of its mightier kin, the Croton River, some six miles to the north. Fed by meltwaters of the Hudson Valley lobe of the Wisconsin glacier, both these streams scoured their valleys wider and deeper and deposited the debris in delta-like masses at their mouths. Tidal action and river currents spread the material up and down the river, creating shallow areas off Tarrytown which were considered dangerous to shipping, and which are still known as the "Tarrytown Shoals."

The next step is to proceed with your group to the steel bridge, and to cross to the blacktopped platform. Pause here, and point out that the distance walked from the park gate to the lighthouse, about a quarter of a mile, was the closest point to land. Lighthouse keepers actually landed their boats at a point still farther from the lighthouse, almost due east of the tower, a little south of the mouth of the Pocantico River. Very little remains of the original shoreline contours. The Pocantico River was relocated many years ago when auto plant construction was underway. Once it carried sloops and periaugers to the Phillipse Manor millpond, loaded with wheat and flour for distant markets. Now it enters the Hudson with a whimper, a few yards north of the admissions booth. Commercial dredging for shipping channels, filling for the railroad right-of-way, and for factory foundations and interminable parking lots has gobbled up many hundreds of acres of erstwhile river in North Tarrytown and Tarrytown.

I find that it works best, at least in good weather and with groups larger than two dozen, to spend some time outside on the platform discussing lighthouse history and related subjects, and to concentrate on the lives and living patterns of the keepers and their families upon entering the building. It is well to remind your audience more than once that when the lighthouse structure was created, the scene at which they are looking was very different indeed. Sailing vessels still were very much a part of the scene, although the handsome Hudson River sloops had seen their heyday. The equally famous and lovely steamboats were at the zenith of their time on the river. The railroads and barges that would replace them as workhorses and conveyors of people were in operation, and perhaps more a part of the scene than today. Steam tugs were making their appearance. The dominant feature of the riverscape today, the Tappan Zee Bridge, was not even a pipe dream at that time...probably rivermen would have slapped their legs in mirth at the thought of a bridge crossing more than 3 miles of water. The function now filled by the bridge was usurped from the Nyack-Tarrytown ferries, which crossed the river many times each day during open water seasons.

Long strings of Erie Canal barges, long and low and made of wood, were drawn up and down the river by the tugs. Families lived on the barge cabins, perched aft of the cargo holds. The holds were loaded with the produce of factories and farms from the Midwest. Small boys in riverfront towns like Tarrytown were drawn to the river like pins to a magnet, to view the marvels of the world spread out before them. Beside the railroad engines and the ferry boats, sailing vessels large and small, even to clippers and whalers, could be seen on the Hudson. The steamboats were the pride of the Valley...some were four hundred feet long, with magnificent furnishings and sidewheels as tall as a four story house. And how the adventuresome among them must have envied their canal-traveling peers, the sons of bargemen.

A feature of the river scene that was more dominant and more important during the years the lighthouse was working can still be seen, low against the water and under the west span of the bridge. Piermont Point, extended by bulkheading and filling to a distance of a mile out into the river, was the railhead for the old Erie Railroad. Creating the Point was a huge labor, but it made Piermont a bustling place for decades. The Point is now owned by Lamont Laboratories, and serves as a berth for their oceangoing research vessels when they are in port. It is also a fine spot for birding, and for fishing and crabbing as well. If you are lucky, you might see a tall mast rising more than 100 feet into the air at the pierhead. That would be the Hudson River Sloop Clearwater, going about her business of carrying folks out into the river on canvas wings, to help them understand a little more about what we must save of this wonderful resource.

To the north on the east shore, with a riverward extension of a mile, is Croton Point, another Westchester County park. This bright jewel of the County-owned parklands is famous for providing some of the best striped bass fishing in the world during the spring and fall runs of stripers. A walk on the beach there reveals evidence of human works extending back thousands of years, into prehistory. Piles of native oyster shells are found in many places on the northern end of the point. Red brick fragments along the beaches remind us of the famous Underhill Brickyards. Sloops and schooners sailed from Croton Point by the thousands over the years, some bound for New York with deck cargos of bricks, others with wine, apples, and even castor oil, for ports far away and over the sea.

Still working with your group on the observation platform, point out that when construction of the lighthouse started in 1882 there was nothing for at least a quarter of a mile but water, water, water. A decision was made to build a lighthouse on the north end of the Tarrytown shoals in 1849, but conflicts over the acquisition of land, and differing opinions as to where the light should be placed delayed construction for more than 30 years. At last, a tender and a barge, dispatched by the U.S. Lighthouse Board of the Department of the Treasury, arrived off Tarrytown. The lighthouse actually arrived in "kit" form.

It was assembled from the anchored vessels and construction scaffolding attached to the lighthouse foundation. We don't know just how long construction took, but the process spanned two years. When the structure was completed, down to the kitchen fixtures and a pier for tying up the boats, the total cost was something under \$21,000. Keeper's pay, by the way, was in the neighborhood of \$500.00 a year well into the 20th century. No wonder so many of the lighthouse keepers up and down the river took other jobs on the side, despite government regulations declaiming against the practice.

Finally, on October 1, 1883, former schooner captain and Tarrytown resident Jacob Ackerman, as official lighthouse keeper, noted in the logbook: "New light established and lighted for the first time, and all worked well." As far as we know, that light failed only once, during 75 years of service...but more of that later.

At this time, take people across the bridge and into the first floor of the structure, pausing outside the door to point out the maker's name and city in the iron work over the door.

This is where it gets difficult if you have more than 30 people. It doesn't do to take more than that inside at one time. Ideally, one PRC person remains on the first floor, and one or two more take folks up into the structure. Most of the information must be imparted on the ground floor, since rooms become smaller and line-of-sight communication more difficult as the structure is climbed.

On the ground floor: The Tarrytown Light was the southernmost in a series of 8 Hudson River lights, and the only tower-shaped structure. It is one of 5 extant, and the only one now open, or likely to be opened, to the public. All the Hudson Lighthouses were family stations, designed to be occupied full time by their keepers.

The cellar is closed to visitors. It contained the cistern, the coal cellar, storage space, and in later years a furnace. This suggests all sorts of things about the life you led in a lighthouse! Coal? Note the stovepipe opening in the bulkhead. That was how lighthouse dwellers cooked and kept warm. Cistern? Of course, that supplied the water for cooking, washing, and drinking. But how was the water obtained...remember, we are at least a quarter of a mile from shore. Light? Kerosene lanterns...no electricity until 1942. No telephone until 1952! Coal was brought by the tender, once a year, a ration for each lighthouse. Water was brought by the rain, with luck. Water rationing was something you learned to live with...dishes were done once a day, or less often during the dry seasons. In real emergencies, a tender might bring a load of water to be pumped into the cistern. Even a century ago the Hudson was polluted relative to drinking quality. Of course, during half of the year the water is salty...the ocean is but a few miles away, after all.

We know that as many as five people lived in the lighthouse. Hey kids, what do you do after school and on weekends? Out here, where would you play baseball? How about visiting friends, dancing lessons, riding a bike? Dad was always waiting at the dock with a boat when school was out. If you were cooking dinner and ran out of something...well, it was a long way to the store. More than a quarter of a mile across the water in warm weather. And what about winter? Across the ice! But wait...how long does it take for a river like this to freeze solidly enough to take a walk upon? Days, at least, and often weeks. And the process is in reverse in the spring when the ice goes out. You would miss a lot of school, and the mail would pile up at the post office. Would you run out of milk and eggs? No television, no telephone, no back yard, just you and your family in a little round tower 55 feet high.

The first floor was where most of the living was done. Kitchen, laundry room, dining room, project room, office. Everything had to be kept spic-and-span. Keepers took great pride in high ratings during inspections, which might come at any time. Government inspectors actually performed white glove inspections.

Draw attention to the center support column. Note that it is hollow, and inside it, like a giant grandfather clock, hung pendulums attached to a mechanism designed to ring the fog bell at two minute intervals anytime visibility was less than one mile, be it day or night.

