



# Friends of the Old Croton Aqueduct

*Newsletter*

**No. 10, December 2001**

## Operating the Aqueduct

*Robert Kornfeld, Jr.*

*Histories of the Aqueduct often stop with the completion of its construction. This account gives an overview of the system's operation in the succeeding decades. - Ed.*

The Old Croton Aqueduct was built out of desperation during an economic depression and without consensus on a long-term plan. There were jurisdictional disputes between the state and city, and there was no existing agency to which to turn over the completed aqueduct. The Water Commissioners had been appointed to build the aqueduct, not to operate it indefinitely.

**A new Department.** After the Aqueduct went into service in 1842, Chief Engineer John B. Jervis agreed to stay on part-time at half-salary for six years until the High Bridge was complete. Myndert van Schaick, who had been the prime mover in the decision to build the Croton Aqueduct back in the early

1830s, stepped in to head Aqueduct operations in 1848 when the Water Commissioners turned over the completed works to the city. He organized the Croton Aqueduct Department, which was inaugurated in 1849. Alfred W. Craven was appointed Chief Engineer, a position to which he dedicated his life for 20 years.

The Croton Aqueduct Department was governed by a three-man board, which included the Chief Engineer. There were two Assistant Engineers, one of whom was the Resident Engineer. The 41-mile-long Aqueduct was divided into eight divisions and a Superintendent assigned to each. (James Bremner, who lived and worked in the Overseer's House in Dobbs Ferry, was Superintendent of the Fourth Division.)

There was also a Keeper for the Murray Hill Reservoir and originally a Keeper for the Croton Fountain in City Hall Park as well. Other engineering personnel such as construction inspectors, and workers like masons and laborers, were paid hourly and not listed as department employees.



*Section of the Croton Aqueduct showing manner of inspecting.  
(From "Croton Water," Scribner's Monthly, Vol. 14, 1877, pp. 161-176.)*

**Unbridled growth.** When the Aqueduct was designed in the 1830s it was not expected that the city's population would reach one million within a century. The planners had used an assumption of 20 gallons per day per capita. In fact, people started using 90 gallons per day per capita after the Croton Aqueduct Department built sewers throughout the city. Before sewers were installed there was nowhere for wastewater to go, especially in low-lying neighborhoods – the Croton River threatened to turn the city into a swamp!

To accommodate the city's unbridled population growth in the mid-19th century, the Aqueduct was operated way beyond its original design capacity. Modifications were made to reinforce the top arch and buttress embankments, but the Aqueduct was still overstressed.

By the 1870s, each Superintendent was required to inspect the masonry along his entire division of the aqueduct twice each day. This was an exterior inspection done on foot or horseback to look for cracks and leaks. Repairs, except for the worst emergencies, had to be done without shutting off and restarting the water (a procedure that took days). There was a planned shutoff for an annual inspection, a grand procession through the aqueduct tunnel of the Chief Engineer and his assistants, followed by a frenzy of repair work.

To conserve water, the supply leaving the reservoir in Central Park was restricted to prevent the water going out faster than it came in. Low pressure deprived many upper-floor apartments of service entirely. When there was a fire, the Superintendent of the Central Park Reservoir was immediately telegraphed. He would open the gates to increase pressure for firefighters' hoses.

**A stressed system.** Benjamin Silliman Church, Resident Engineer of the aqueduct for over 22 years, spoke to the Westchester County Historical Society in 1882. He described the main-

tenance of the Aqueduct during this critical period: "Leaks began to appear, frequently gushing forth suddenly, and threatening serious consequences."

Lobbying for construction of the New Croton Aqueduct, Church went on to describe the dangers of operating the Old Croton Aqueduct at its



Benjamin S. Church

## George Zobebelein

The Friends learned with regret of the death on May 13, 2001, of George Zobebelein of Grandview-on-Hudson. Among his lifelong activities as an advocate for trails in the region was his participation as a founding Board member and first Treasurer of Friends of the Old Croton Aqueduct when it was incorporated in 1989. He was a steady friend and always-available adviser in the early years of the organization.

An article by Gary Haugland about George in the July/August issue of *Trail Walker*, published by the New York-New Jersey Trail Conference (of which he was a past president), describes his effectiveness and astounding array of activities on behalf of trails in the Hudson Valley. He was a particular devotee of the Long Path:

"Through his relentless advocacy, he helped secure the extraordinary status that the [Long Path] has in Rockland County, where the trail is on the official planning department maps and must be considered in all development proposals that impact its route."

Achieving similar status for the Aqueduct trail in Westchester County and all the villages, towns, and cities through which the trail passes would be a fitting goal for us all to strive for. - Ed.

maximum capacity:

"A sudden rise in the Croton Lake, unless watched by the keeper having charge of the gates, might prove just the excess of pressure it was powerless to bear; and should six inches or a foot more water enter the aqueduct, and cause the arch on the weakest embankment near Tarrytown to give way, and fall in, such sudden check to the flow, and backward pressure, would occasion a shock which would throw down the roof-arch of the aqueduct on the embankment above, and in this manner they would fall in, one after the other, like a row of bricks, all the way back to Croton Dam.

"...This is not just a theoretical danger....On one of these occasions of a sudden rise such a disaster was prevented by the keeper, who, by chance, made an unusual midnight inspection, and found the watchman soundly sleeping, with an empty whiskey bottle beside him."

Until the New Croton Aqueduct went online in 1890, there was no alternate source of water in case of such a collapse. As Church stated in the same address, "New York City would have been reduced to extremities that imagination fails to depict."

## Friends to Publish Second Map

Friends of the Old Croton Aqueduct will soon embark on the preparation and publication of a map-and-guide to the route of the Aqueduct from the Yonkers-New York City line to its distributing reservoir, at the present site of the New York Public Library in Manhattan. The map will be a companion to the Friends' award-winning color map, published in 1998, of the 26 miles of the Aqueduct from the New Croton Dam to the city line, now comprising Old Croton Aqueduct State Historic Park.

The new map will complete the story of the 1842 engineering marvel, 41 miles long in total, that brought New York City its first supply of clean, plentiful water and thus contributed to its rapid growth.

At the time, the developed part of New York City, the area first served by Croton water, consisted of Manhattan island from the Battery to about 20th Street.

From the city line there is a visible walking route through city parkland, paved and unpaved, atop parts of the Aqueduct's six to seven mile course through the

Bronx, which in 1842 was still part of Westchester County. The water tunnel then crossed the Harlem River on the High Bridge, the city's oldest existing bridge, and entered Manhattan in what is now High Bridge Park, where there remains about a mile of visible trail. One then needs a guide to "read" and follow southward the handful of remaining traces of the Aqueduct's presence.

Graphics, design and cartography will again be in the hands of Robert Romagnoli, who designed the Friends' first map. Robert Kornfeld, Jr., will be in charge of research and concept development; Charlotte Fahn will again be editor and project manager. A generous

foundation grant has been received to underwrite the project. The Friends invite readers to send in their ideas and suggestions for the new map. (Address to C. Fahn, Friends of the Old Croton Aqueduct, Overseer's House, 15 Walnut St., Dobbs Ferry, NY 10522, or [czfahn@yahoo.com](mailto:czfahn@yahoo.com), or call 914-478-3961.)

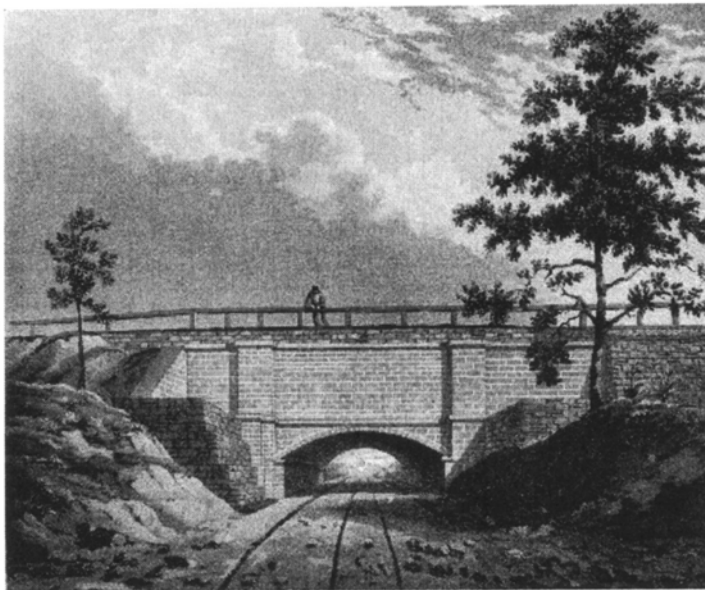


*The distributing reservoir of the Old Croton Aqueduct, at Fifth Ave. And 42nd St, c. 1900 (Photo by R.L. Bracklow, Collection of the New-York Historical Society)*

## State Funds Quarry Trail from Aqueduct to Hastings Waterfront

The right-of-way of the inclined railroad that brought Hastings marble from the quarry adjoining the Aqueduct to Hudson River sloops for transport all over the east coast will be coming back to life, thanks to a state trails grant.

At an August 17th press conference in neighboring Draper Park (feature 47 on the Aqueduct map), Governor George Pataki announced a grant of \$75,000 toward the village's estimated cost of \$100,000 for building a trail along the route of the early 19th century train



*"Croton Aqueduct at Hastings" (From: Illustrations of the Croton Aqueduct by F.B. Tower, J.W. Hill, artist, 1843).*

tracks, now long gone. The tracks can be seen passing under the Aqueduct in an engraving (left) published in 1843, a year after the Aqueduct opened.

With an interpretive plaque, Quarry Trail could offer insight into the local social and economic history of the early 1800s. The booklet *Know Your Village* notes that "Workers, mostly Irish, quarried the rock and lived nearby. Narrow gauge tracks carried blocks of stone down the steep bank to a stoneyard at the riverfront. The

## State Funds Quarry Trail (continued)

marble was then carved and shipped out by boat." The trail may embody one of the oldest rail lines of the various rails-to-trails projects in this region.

Quarry Trail will be about 600 feet long, from the Aqueduct to Southside Ave. near the Zinsser Bridge, at present the closest direct access across the Metro-North tracks to the Hudson shore. The village's long-term plans call for a new pedestrian bridge that would directly connect the new trail with the waterfront. The trail will pass through the beautiful old stone archways under the Aqueduct and Warburton Ave. Hastings Trailway volunteers will help build and maintain the trail.



Hastings Mayor Lee Kinnally stated that the new trail, in providing waterfront access from the Aqueduct, would be an important link between Hastings' past and its future. The Governor said "he could not think of a village that's been more aggressive" in making trail connections. State Senator Nicholas Spano was ready to declare the governor an honorary citizen of Hastings, since this is the second trail grant the village has received from the state this year.

Fortunately, Hastings has also turned its attention to the present sorry condition of the quarry, all too noticeable to visitors viewing the site of the new trail.

### Friends Spark Review of Hastings Quarry Landfill

Aqueduct users who traverse the popular Hastings segment of the trail cannot fail to have noticed, and sometimes smelled, the unsightly piles of yard waste and other debris climbing ever higher in the historic marble quarry right next to the trail. The quarry is south of Washington Ave., a bit south of the Jacques Lipchitz Studio (feature 48 on the Friends' trail map).

In response to a letter from the Friends, raising concerns about both the esthetic aspects of the landfill for trail users and its potential threat to the physical

*Aerial view showing Aqueduct right-of-way passing over railroad line from stone quarry. Tracks are gone but right-of-way is still visible. Source: Historic American Engineering Record - see Web article, p. 7. (Photo by Jack Boucher, 1978)*

integrity of the masonry water tunnel itself, the Hastings Board of Trustees took up the subject at its October 11th meeting. Quarry neighbors gave vivid accounts of the burdens of living near this village facility, stressing abuses by illegal dumpers, smells, and health, safety, and environmental issues.

There was general agreement that the time is right to address the problem, both because the landfill, in use now for decades, is reaching capacity, and because the quarry is to be one end of an exciting new village trail, just funded by the state, that will connect the Aqueduct with the Hudson River waterfront.

For the short run, the Trustees committed the village to an immediate improvement in security and operations at the landfill. A review of options to address the long-term questions of where and at what cost village yard waste can be dumped once the landfill is closed will also be undertaken promptly. Hopefully, with eventual capping, grading, and landscaping, the site - which once was a landscaped park - could become a green neighbor to the National Historic Landmark Aqueduct. The Friends will stay involved as the village proceeds.



## A Tribute to Water System Guardians

In light of strengthened security for the New York City-Westchester water supply system following the September 11th attacks, we reprint here from our December 1998 issue the text and photograph of a great stone monument in Sleepy Hollow Cemetery (feature 17 on the Friends' map) to those who guarded the water supply during World War I. Thanks to Louise and Ted Hutchinson of Sleepy Hollow for originally providing this material.

Walk north a bit shortly after entering the main gates of the cemetery on Route 9 to visit the monument. The plaque reads:

*This rock symbolizing the regiment which raises it hewn from Bonticou Crag on the line of the Catskill Aqueduct by the storms of ages was erected here marking the spot where one of its fatherless boys was buried by the regiment at the request of the mother a helpless widow and*

*as a memorial to those who made the supreme sacrifice in the service with the First Provisional Regiment guarding the 100 miles of the water supply system of the City of New York from Ashokan to Hillview during the Great War.*

1917 1918 1919

Frank De Costa

Born Sep 29 1900 Died Dec 3 1918

Additional information has been gleaned from a 1962 news clipping. According to this source, Private Frank DeCosta died in a field hospital in Ossining of influenza, and the 40 names inscribed on the monument are the casualties of the First Provisional Regiment. Listed on the other side of the monument are the military units that participated in the Regiment.

The same article states that 8,000 enlisted men and 150 commissioned officers guarded the water supply; that the Reverend Charles Baldwin, for 37 years rector of St. Mary's Episcopal Church of Scarborough, was a chaplain of the regiment; and that the monument was unveiled on March 23, 1919 on a plot donated by William Rockefeller (whose estate, Rockwood Hall, was nearby).



*Monument to First Provisional Regiment in Sleepy Hollow Cemetery. (Photo by Ted Hutchinson)*

## National Register Plaque Unveiled at Jerome Park Reservoir

A handsome bronze plaque was unveiled at a ceremony at Jerome Park Reservoir in the Bronx on September 22nd to commemorate the designation of the reservoir as a National Register District. To quote from the report nominating the reservoir for the National Register:

" . . . The historic and architectural significance of the Jerome Park Reservoir has been grossly underestimated, and its prominence in the history of the Croton Aqueduct system has not been acknowledged. Originally planned in 1875, and designed and constructed over the following thirty years, it was one of the major works of the Croton Aqueduct system . . . It is

the largest and most significant body of water in the Borough of the Bronx. . . .

"The purpose in constructing the Jerome Park Reservoir was to create a storage and distributing reservoir along both the Old and New Aqueducts. It would provide water to the city if either or both of the Aqueducts had to be shut off for repairs."

Major roles in achieving this honor were played by the Jerome Park Conservancy, especially Robert Kornfeld, Jr., chair of its Preservation Committee and author of the nomination report, and the New York State Office of Parks, Preservation and Historic Preservation. The plaque reads:

### JEROME PARK RESERVOIR NATIONAL REGISTER DISTRICT

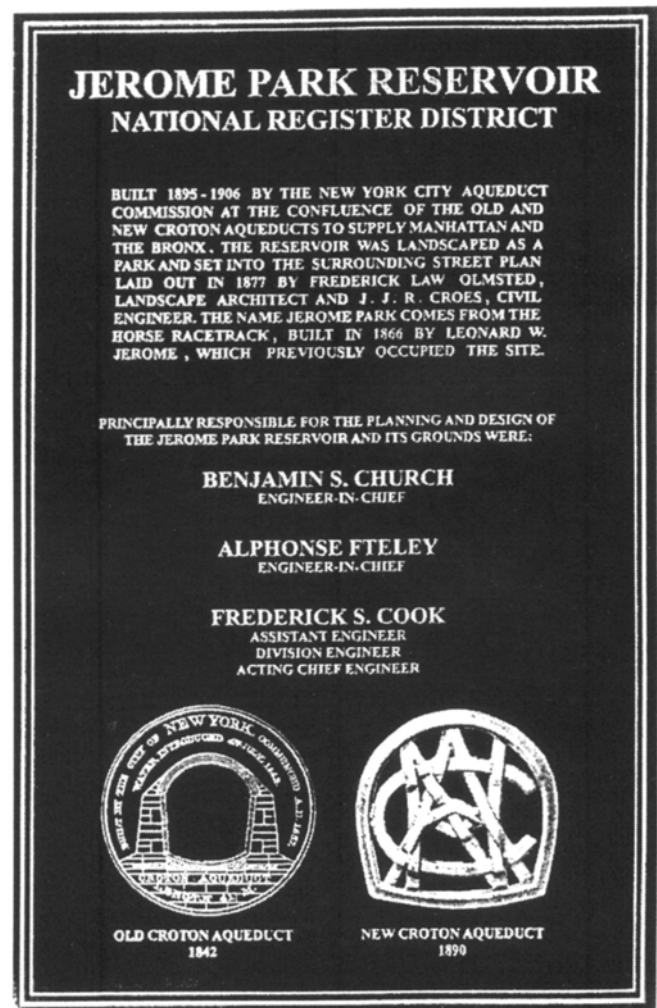
BUILT 1895-1906 BY THE NEW YORK CITY AQUEDUCT COMMISSION AT THE CONFLUENCE OF THE OLD AND NEW CROTON AQUEDUCTS TO SUPPLY MANHATTAN AND THE BRONX. THE RESERVOIR WAS LANDSCAPED AS A PARK AND SET INTO THE SURROUNDING STREET PLAN LAID OUT IN 1877 BY FREDERICK LAW OLMSTED, LANDSCAPE ARCHITECT AND J.J.R. CROES, CIVIL ENGINEER. THE NAME JEROME PARK COMES FROM THE HORSE RACETRACK, BUILT IN 1866 BY LEONARD W. JEROME, WHICH PREVIOUSLY OCCUPIED THE SITE.

PRINCIPALLY RESPONSIBLE FOR THE PLANNING AND DESIGN OF THE JEROME PARK RESERVOIR AND ITS GROUNDS WERE:

BENJAMIN S. CHURCH  
ENGINEER-IN-CHIEF

ALPHONSE FTELEY  
ENGINEER-IN-CHIEF

FREDERICK S. COOK  
ASSISTANT ENGINEER  
DIVISION ENGINEER  
ACTING CHIEF ENGINEER



*The medallion on the bottom left is for the Old Croton Aqueduct, 1842. The one on the right bears the intertwined initials of the New Croton Aqueduct, 1890.*

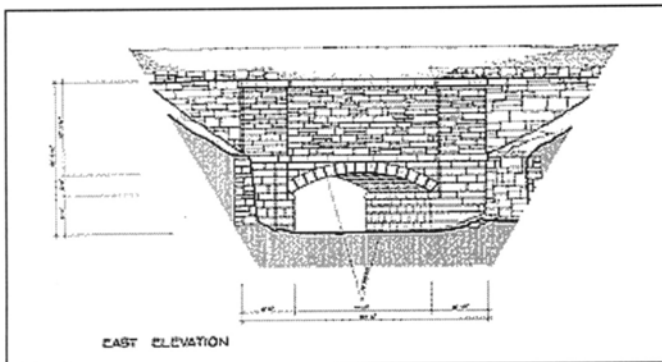
## For WEB Users . . .

**Help Needed!** The Friends are seeking help from a knowledgeable volunteer who can get our Web site up and running. The text is ready and a good supply of images available. If you have experience in designing and installing a site and can donate some time, please leave a message for Holly Daly at 914-478-1857.

**Library of Congress' Aqueduct Images on the Web.** The Library of Congress is digitizing the entire list of Historic American Building Survey/Historic American Engineering Record reports and putting them on the Web for free downloading. This includes data pages, measured drawings, and high-resolution images. The images from the report that nominated the Old Croton Aqueduct as a National Historic Landmark are included. The site is at:  
<http://memory.loc.gov/ammem/hhhtml/hhhome.html>

**Suggestion:** Click on "Keyword" to do a keyword search. Then, on the line "Search Descriptive Information," type in "Croton Aqueduct" and click "Search."

Structures in many Aqueduct communities and images of the New Croton Dam are included. The sample below and on p. 4, for the quarry railroad bridge in Hastings, don't do justice to the quality and impact of some of these images on the screen. Aqueduct fans who visit this Web site have a treat awaiting them.



*Section and east elevation of quarry railroad bridge.*

**Newsletter Editor:**  
 Charlotte Fahn, 914-478-3961

**Associate Editor:**  
 Mavis Cain, 914-693-0529

*Please send in your news items, reminiscences,  
 and historical tidbits.*

For information about the trail and Old Croton Aqueduct State Historic Park, call the **Historic Site Manager**, Brian Goodman, at 914-693-5259.

## Aqueduct Map Makes Giving Easy

Looking for an easy gift with a local flavor? The award-winning, full-color map-and-guide of the Old Croton Aqueduct published by Friends of the Old Croton Aqueduct fits into a holiday stocking or regular business envelope. It is simple to give at home or mail to a friend, and can be purchased at the following locations:

**Cornelia Cotton Gallery**, 111 Grand Ave., Croton-on-Hudson

**Art Barn**, 211 North Highland Ave., Ossining

**Ossining Heritage Visitor Center**, Joseph G. Caputo Community Center, located next to the trail, Ossining

**Borders Books**, 162 East Main St., Mt. Kisco

**Hudson Office Supply**, 21 Main St., Tarrytown

**Tarrytown Cycles**, 11 North Broadway, Tarrytown

**Arcade Color Copy Center**, 22 Harwood Court, Scarsdale

**Becker's**, 57 Main St., Irvington

**River Gallery**, 39 Main St., Irvington

**Cary's Pharmacy**, 105 Main St., Dobbs Ferry

**Corey Glass Picture Framing**, 3 Main St., Hastings-on-Hudson

**Good Yarns**, 8 Main St., Hastings-on-Hudson

**The Office Ink**, 572 Warburton Ave., Hastings-on-Hudson

**Hudson River Museum Shop**, 511 Warburton, Yonkers

**Urban Center Books**, 457 Madison Ave. (Between 50th and 51st Sts.), Manhattan

For mail order, send a check for \$5.25 (\$4.50 plus 75 cents shipping and handling) for the first map and \$4.50 plus 50 cents for each additional map to Friends of the Old Croton Aqueduct, Overseer's House, 15 Walnut St., Dobbs Ferry, NY 10522.

**Aqueduct Note Cards Available.** A box of 15 note cards and envelopes with the drawing shown on the next page can be purchased for \$5 at the Cornelia Cotton Gallery in Croton-on-Hudson (tel. 914-271-6802).

## MEMBERSHIP COUPON BE A FRIEND!!

Your tax-deductible contribution helps to protect and preserve the trail.

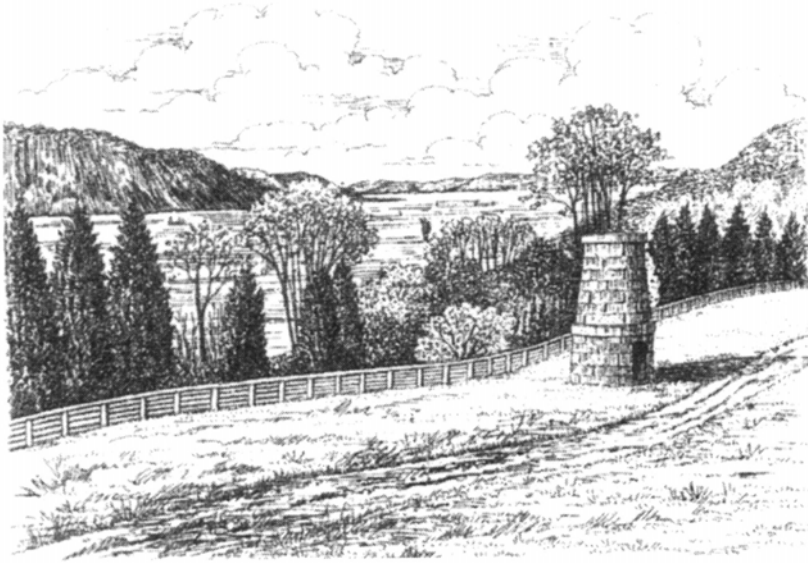
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| <input type="checkbox"/> <b>Renewal</b>          | <input type="checkbox"/> <b>New Member</b>        |
| <input type="checkbox"/> <b>Friend \$10</b>      | <input type="checkbox"/> <b>Family \$20</b>       |
| <input type="checkbox"/> <b>Good Friend \$50</b> | <input type="checkbox"/> <b>Best Friend \$100</b> |

Please make check payable to *Friends of the Old Croton Aqueduct*. Send it with this coupon and your name, address, and day and evening telephone numbers to the Friends at Overseer's House, 15 Walnut St., Dobbs Ferry, NY 10522-2109

Name \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_



*Adapted from an illustration in the article "From Croton to Town" in Appleton's Journal, Vol. 8, No. 171, July 6, 1872, pp. 16-22, for use on Aqueduct note cards (see p. 7).*

## Friends of the Old Croton Aqueduct

is a private, non-profit, volunteer organization formed to protect and preserve the Old Croton Aqueduct (Old Croton Aqueduct State Historic Park). The Aqueduct, completed in 1842, provided New York City with its first public supply of clean drinking water. It is a National Historic Landmark, one of the great engineering achievements of the 19th century. Old Croton Aqueduct State Historic Park encompasses the portion of the Aqueduct located in Westchester County. From the New Croton Dam to the New York City line it spans 26.2 miles, linking the Hudson River communities of Croton-on-Hudson, Cortlandt, Ossining, Briarcliff Manor, Sleepy Hollow, Tarrytown, Irvington, Dobbs Ferry, Hastings-on-Hudson and Yonkers. The Friends work to raise public awareness of the Aqueduct and trail, and to secure the resources that will enable this historic greenway to remain unspoiled in perpetuity.

Friends of the Old Croton Aqueduct  
Overseer's House  
15 Walnut Street  
Dobbs Ferry, NY 10522

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