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CHAPEL FARM ESTATE

RIVERDALE. BRONX, NEW YORK

SEQR #89PR111 CEQR #85-355-X 325 X

CULTURAL RESOURCE INVESTIGATION STAGE 2 AND QUARRY INVESTIGATION SURVEY (QIS)

Prepared For:

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CHAPEL FARM ESTATE RIVERDALE. BRONX COUNTY, NEW YORK

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CHAPEL FARM ESTATE STAGE 2 REPORT

INTRODUCTION

On January 4, 1993, Philip LaPorta, in the company of Gail T. Guillet, principal of CITY/SCAPE: Cultural Resource Consultants, and Cece Kirkorian, one of the principals of Historical Perspectives, Inc. examined the *Chapel Farm Estate* site as part of an on-going Stage 2 investigation. The proposed project area, containing approximately 15 acres, is located on the eastern edge of Riverdale in the Bronx. It is bounded by Fieldston Road to the east; by 253rd Street on the north; by Iselin Avenue to the west; and by 250th Street to the south. At the present time, the site is wooded. No structures are presently standing on the site, although there is surface debris, providing evidence of the buildings formerly located on the site. It appears that all of these structures were associated with the religious community, the Order of the Living Christ, which previously owned the property. Throughout the site there are paths, stone walls, and cultivated plant material, all indications of the garden once located here.

The *Chapel Farm Estate* site, located on the Riverdale Ridge, highest point in the Bronx, ranges from an elevation of approximately 260 feet to 280 feet above sea level. The topography of the project area falls off from this high point towards the Hudson River on the west and Van Cortlandt Park on the east, toward 250th Street on the south, and 253rd Street on the north. In general, the topography of the site is extremely steep, with extensive bedrock outcroppings of schist (referred to in Mr. LaPorta's accompanying memorandum as "country rock"), containing veins of quartz. Over much of this bedrock, presumably as part of the gardening activities mentioned above, a considerable amount of soil has been deposited.

Prior Investigations: Stage 1A, Stage 1B and Stage 2 Reports

The first phase of the investigation at *Chapel Farm Estate* was the preparation of a Stage 1A Cultural Resource Report by CITY/SCAPE: Cultural Interpretations (subsequently known as CITY/SCAPE: Cultural Resource Consultants). As a result of the research undertaken for this report, a number of prehistoric archaeological sites located near the project area were identified. There were four sites identified by Beauchamp in the late 19th century, including:

- 1. A large site, approximately 14 acres, in Van Cortlandt Park, west of the Van Cortlandt Lake, containing bowl-shaped fireplaces, shells, and four skeletons. Nearby were another nine burials. In addition there were artifacts of bone and stone, a shell heap was located on the topmost knoll southeast of the lake.
- A shell heap reported east of Fieldston Road and north of 247th Street. The street named Indian Road may indicate the general location of this traditional site.
- Another shell heap located north of West 247th Street and west of Pascal Avenue. (Pascal Avenue is no longer indicated on the Bronx street map.)
- 4. and a shell heap located on the Hudson River north of the Riverdale Station.

Arthur Parker, writing in the 1920's, includes in his list of Indian sites in the Riverdale section, the Van Cortlandt Park village site west of the lake cited by Beauchamp, and a village site located at the mouth of Tibbett's Brook, which Beauchamp does not mention. More recently, the Riverdale Archaeological Project, a now defunct program of Wave CITY/SCAPE: Cultural Resource Consultants

Hill Environmental Center, has located several prehistoric sites in Riverdale Park, a narrow strip of land located on an alluvial terrace that parallels the Hudson River. Work, which began in 1985, has identified these sites as shell middens, but they have not yet been dated.

On the basis of the above information, a Stage 1B Archaeological Reconnaissance of the Chapel Farm Estate site was undertaken by CITY/SCAPE: Cultural Resource Consultants (formerly CITY/SCAPE: Cultural Interpretations) and Hartgen Archeological Associates. Using the standard parameters for such a study, all areas of the site with slopes that were not in excess of 15% were examined for prehistoric and/or historic cultural resources. The result of this investigation was the discovery of one area that appeared to contain a prehistoric site. Hartgen Archeological Associates prepared the Stage 1B report, which recommended a Stage 2 investigation of the prehistoric site.

In the Winter of 1991, CITY/SCAPE: Cultural Resource Consultants, Hartgen Archeological Associates, and Historical Perspectives, Inc. performed a Stage 2 investigation of the area containing the prehistoric site (See Map 3 of Stage 2 report). Quartz debitage was collected, along with a small collection of culturally derived tools, including a number of bifaces, cores, and scrapers. No diagnostic materials, i.e., dateable projectile points and/or charcoal for radiocarbon dating, were found at the site. Historical Perspectives, Inc. prepared the catalogue of the material from the site. At the suggestion of Daniel Pagano, archaeologist for the New York Landmarks Preservation Commission, Historical Perspectives, Inc. also consulted with Ernest Wiegand, who independently examined the collection. Based on the preponderance of quartz at the site, it was Wiegand's opinion that the Stage 2 investigation had identified a lithic reduction site dating to the Late Archaic period. The draft report for the Stage 2 investigation was prepared by Historical Perspectives, Inc.

During the Stage 2 investigation, Daniel Pagano visited the *Chapel Farm Estate* site. As a result of this visit, he questioned the conclusion that *Chapel Farm Estate* contained an *in situ* prehistoric site. He suggested that the prehistoric cultural material might have been trucked in with soil, perhaps as part of the horticultural activities associated with the gardens maintained by the Order of the Living Christ. Alternatively, he suggested that it was possible that what was being identified as prehistoric cultural material might be the result of historic activities on the site, i.e., builders shatter. His questions were based on the following considerations: while quartz tools and debitage arc not uncommon in the Bronx, having been found in the shell middens at Throgs Neck and in nearby Riverdale Park, all that quartz was thought to have been derived from glacial quartz cobbles (Skinner 1919; Smith 1950). Given that assumption, it would be anticipated that any prehistoric quartz lithic reduction site would contain quartz cobbles and abundant evidence of quartz cobble cortex. Since the prehistoric site at *Chapel Farm Estate* contained a quantity of quartz block and shatter, but virtually no cortex and very little material that appeared to have been derived from cobbles, the *Chapel Farm Estate* site did not fit the known profile for prehistoric sites in the Bronx, and had, therefore. to be justified.

Present Investigation: Quarry Investigation Survey (QIS)

During the time that the initial Stage 2 report was being reviewed by City Planning and the New York City Landmarks Preservation Commission, it came to the attention of Hartgen Archeological Associates, who reported their observations to CITY/SCAPE: Cultural Resource Consultants, that, while the material found at *Chapel Farm Estate* did not fit the known profile for prehistoric sites in the Bronx, it did fit the pattern for a prehistoric quarry site. Because, as has been noted, it was thought that the quartz used in coastal New York was usually derived from quartz cobble, the presence of quartz debitage in coastal New York and in Riverdale Park in the Bronx had not suggested the presence of previously unidentified prehistoric guarries in the area.

To investigate the possibility that the Chapel Farm Estate site might contained a prehistoric quartz quarry, a visit to the site was made on November 9, 1992 by Gail T. Guillet and Philip LaPorta, a geologist with an archaeological background, and an expert in prehistoric quarry technology. First, the area containing the prehistoric site was investigated. Although previous investigation had not identified hammerstones at the site. Philip LaPorta immediately pointed out that, in fact, hammerstones of various weights were evident on the surface of the site. A number of these hammerstones were of quartzite, with a small component of purple quartzite. These were identified as a preferred material for hammerstones and other types of pounding tools, since the material is dense. Next, much of the site was walked. In particular, areas in excess of 15% were investigated, since, although the methodology previously employed had excluded these areas from consideration, these were the very places where quarries might be expected. Immediately east of the mansion, near the cement pad on which a gazebo had previously stood, two large blocks of white quartz were found sitting on the surface. Although these two blocks had been recently placed in this location, Philip LaPorta identified them as being the same type of material found in the prehistoric site. Subsequent inquiries indicated that the blocks had been found nearby and lately moved to their present location. Near these two blocks, both of which weigh several hundred pounds, additional quartz blocks, weighing from 10 to 50 pounds, were found. During that visit, no quartz veins were located, but, based on his observations of the site, the presence of such veins was postulated by Philip LaPorta. As a result of this visit, it was the opinion of Philip LaPorta that the Chapel Farm Estate site contained a quartz quarry, consisting of cold emplaced quartz associated with the country rock, which was, in this particular case, predominantly Manhattan schist.

As a second stage of investigation, the material collected from the initial Stage 2 investigation was reexamined by Karen Hartgen, principal of Hartgen Archeological Associates, and Gail T. Guillet, principal of CITY/SCAPE: Cultural Resource Consultants. The tools identified by Historical Perspectives, Inc. and Ernest Weigand were separated from the other debitage, and a number of additional tools were identified. The material was then divided into four groups. One group, containing many of the tools, was taken to Robert Funk, New York State Archaeologist, for evaluation. His response is included in the Stage 2 report. (See Appendix F) A second group was taken to New York, where it was examined by a group of archaeologists, including Eugene Bosch, for the New York City Landmarks Preservation Commission. That material was then delivered to Philip LaPorta. A third group, containing a sample of the types of rock obtained at the site, was also delivered to Philip LaPorta. The fourth group, containing the bulk of the material, is presently being housed at Hartgen Archeological Associates in Troy, New York.

As a result of the questions raised by Daniel Pagano, information suggesting that the *Chapel Farm Estate* site might contain a prehistoric quartz quarry, and a meeting at the NYC LPC on December 3, 1992, another survey of the *Chapel Farm Estate* site was performed in January 1993 by CITY/SCAPE: Cultural Resource Consultants, Historical Perspectives, Inc., and Philip LaPorta. During that investigation, identified in the Stage 2 report as the Quarry Identification Survey (QIS), portions of the area containing the quartz blocks (See Stage 2, Map 6: QIS 12) identified by Philip LaPorta during the field reconnaissance in November, were excavated, revealing a flagstone walk lined with quartz blocks. (See Stage 2: Appendix E, Photo QIS 12) The site was examined again for quartz veins, and several were located and photographed. (See Stage 2, Appendix E, Photos QIS 1-7, & 9) The largest of the veins found was located immediately south of the mansion house. (See Stage 2, Appendix E, Photo QIS 9) At each outcrop of quartz, including at the mansion house, hammerstones and other tools were found on the surface of the ground.

In mid-January 1993, the *Chapel Farm Estate* site was again examined and, on this occasion, the investigation was expanded to include areas outside the project area. In particular, the downslope areas in the vicinity of the Russian Embassy compound and the Fieldston area were driven and walked. The results of that investigation are included in Mr. LaPorta's memorandum, which is attached to the Stage 2 report. (See Stage 2 Report: Appendix G)

Conclusion

Based on the information contained in his memorandum, it is the conclusion of Philip LaPorta that the investigation of the *Chapel Farm Estate* site and the surrounding area suggests that the quarry site at *Chapel Farm Estate* was potentially an extremely important resource for the prehistoric peoples living in the vicinity because it represented the intersection of two very large veins of mineable quartz. The presence of diabase hammers and anvils as well as quartzite hammerstones is testimony to the fact that extraction was extremely difficult, because the quartz veins are embedded between layers of tightly folded schist. The quartz veins exposed along the eastern slopes of *Chapel Farm Estate* represent abandoned operations or potential prospect pits and areas of exploration and testing, which are related to the exploited quartz veins outside the study area. All of these exploited veins are related to a large scale prehistoric exploitation of lithic resources in coastal New York. The presence of quartzite hammerstones, diabase pounding and anvil objects, and small dense purple quartzite hammerstones are all evidence for a common mining practice involving a well-understood technology.

It appears that the quartz veins located on the *Chapel Farm Estate* site and in the surrounding area represent a previously unidentified lithic resource utilized by the Native Americans living in coastal New York. This conclusion calls into question the assumption previously made that glacially derived quartz cobble was the primary lithic resource in the area. Furthermore, the preponderance of quartz flakes at nearby coastal shell middens, particularly those in Riverdale Park, suggests an intimate relationship between the quarties, exploration pits, outlier exploited quartz veins. and the coastal middens. All are part of a continuum representing the subtle aspects of prehistoric subsistence, which has previously gone either unreported or misinterpreted.

CITY/SCAPE: Cultural Resource Consultants

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CHAPEL FARM ESTATE RIVERDALE. BRONX, NEW YORK SEQR #89PR111 CEQR #85-355-X

CULTURAL RESOURCE INVESTIGATION STAGE 2 AND QUARRY INVESTIGATION SURVEY (QIS)

Principle Investigators: Betsy Kearns, S.O.P.A. Cece Kirkorian, S.O.P.A.

Project Director: Faline Schneiderman-Fox, S.O.P.A.

Field Personnel: Mary Dieter Gail Guillet Karen Hartgen Michael Silva

CHAPEL FARM ESTATE RIVERDALE. BRONX COUNTY, NEW YORK

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EXECUTIVE SUMMARY

The initial cultural resource investigation of the *Chapel Farm Estate* parcel in Riverdale, New York, was performed by CITY/SCAPE: Cultural Resource Consultants and Hartgen Archeological Associates, Inc. (HAA), in June and October, 1990. The Stage 1 investigation resulted in the filing of a Report of Field Reconnaissance form by HAA. Following the Stage 1 discovery of a high concentration of prehistoric cultural materials on the parcel. Historical Perspectives, Inc., was contracted to perform a Stage 2 investigation of the site, working in continued cooperation with both CITY/SCAPE and HAA. The following Stage 2 Site Evaluation Report, Supportive Data. and New York State Prehistoric Archaeological Site Inventory Form report the findings of the research performed by Historical Perspectives, Inc.

Stage 2 field investigations (12/1990) revealed a prehistoric lithic reduction locus and also documented the degree of subsurface disturbance experienced on the hillside development parcel during the twentieth century. A subsequent quarry identification survey (1/1993) was conducted in association with Philip LaPorta, a geologist specializing in prehistoric quarries. The survey examined an associated and extensive quartz quarrying complex based on quartz veins located on the *Chapel Farm Estate* site and in the surrounding area. Such quartz veins represent a previously unidentified lithic resource utilized by the Native Americans living in coastal New York. The identification of a prehistoric quartz quarry in New York City is of research value in understanding the resource exploitation patterns of Native Americans. The significance of the *Chapel Farm Estate* quarry complex lies in the documentation of the larger procurement system so future field and lab analyses will be attuned to the complexities of lithic assemblages that do not exhibit quartz cobble cortex and to the associations, on a large-scale landscape, between quarry features.

In consideration of both the degree of subsurface disturbance documented for the *Chapel Farm Estate* site and the need for dissemination of information on the quartz quarry process, it is recommended that, prior to further development, the Chapel Farm quarry and staging areas be thoroughly described and mapped in relation to the vein outcrops on and in the surrounding neighborhood. Such detailed documentation will increase appreciation of a Native American lithic procurement and processing technology.

Historical Persepectives, Inc.



CHAPEL FARM ESTATE CULTURAL RESOURCE INVESTIGATION

Stage 2 Site Evaluation Report

Applicant Name:

Cece Kirkorian, S.O.P.A. and Faline Schneiderman-Fox, S.O.P.A. for Mr. Robert Kahn, Kahn Associates

Historical Perspectives, Inc.

Affiliation:

Chapel Farm Estate

Project/Facility Location:

Project/Facility Name:

Project Number:

Bronx, New York

SEOR #89PR1111, CEOR #85-355-X

Introduction

The Chapel Farm Estate parcel, a private residential development of approximately 15 acres, is situated on the castern edge of Riverdale, Bronx County, New York. (See Maps 1 and 2 for site location.) As part of city and state environmental review procedures, a Stage 1A assessment of the Chapel Farm Estate parcel was performed by CITY/SCAPE: Cultural Resource Consultants [CITY/SCAPE: Cultural Interpretations] in 1990. The documentary research identified intensive prehistoric exploitation of the Riverdale section in the Bronx:

- 1. Van Cortlandt Park/2 loci (burials, bowl-shaped features, shell midden, lithic artifacts) reported by Beauchamp and Parker
- 2. Fieldston Road/247th Street (shell midden) reported by Beauchamp
- 3. W. 247th St./Pascal Ave. (shell midden) reported by Beauchamp
- Hudson River/Riverdale Station (shell midden) reported by Beauchamp
- 5. Tibbett's Brook mouth (village) reported by A. Parker
- 6. Riverdale Park (shell middens) reported by Riverdale Archaeological Project/Wave Hill Environmental Center

Chapel Farm Estate is located on the highest point in the Bronx, between 260 and 280 feet above sea level. According to state site-file searches, the property was rated as sensitive for prehistoric archaeological potential.

Based on the above considerations, Stage 1B testing was then performed by CITY/SCAPE: Cultural Resource Consultants and Hartgen Archeological Associates, Inc. All areas of the proposed development parcel, not in excess of 15% slope, were examined for both prehistoric and historic cultural resources. The field investigation (September 1990) discovered an untyped, undated prehistoric site. A total of 37 shovel tests, 40 cm. in diameter, were excavated at approximately 50 foot intervals. An "Archeological Field Reconnaissance" report, including a detailed artifact catalogue, site maps, and a New York State site inventory form was completed. The report (Hartgen Archeological Associates, October 1990) recommended a Stage 2 level of investigation on a prehistoric site encompassing approximately 3000 square feet and located within the west central section of the proposed impact area.

In order to evaluate the potential significance of the *Chapel Farm Estate* site and its nomination status for the New York State Register of Historic Places, a Stage 2 investigation was recommended to collect sufficient information to address particular specified criteria of eligibility (New York State Office of Parks, Recreation and Historic Preservation Law, Section 14.07). Major criteria include detailed site boundaries, cultural affiliation, significance, and integrity. The following pages detail the Stage 2 *Chapel Farm Estate* fieldwork and analysis that provide answers to these research questions.

Stage 2 testing, performed by Historical Perspectives, Inc. (HPI) with the continued cooperation of both CITY/SCAPE: Cultural Resource Consultants and Hartgen Archeological Associates, Inc., was designed to further define the boundaries of the site, to identify those areas possessing potentially significant concentrations of cultural materials, to expose any features, and to determine site age, length of occupation, integrity and potential ability to meet National Register nomination criteria.

Methodology

Fifteen IxI meter test units were shovel shaved by quads in ten centimeter levels noting stratigraphic sequences and changes. All soil was screened through 1/4 inch hardware cloth, and all cultural materials found either in the screen or <u>in situ</u> were collected and labeled. Since no features were encountered soil samples were not extracted. Three additional 50x50 cm. test units were excavated to discern boundaries.

Ten 1x1 meter units were excavated in a cluster in the area of highest lithic concentration. See the attached Map 3 for testing locations. Additional 1x1 meter units were excavated one and ten meters east of these, three meters north of these, and five and ten meters west of these for a total of 15 units. Three 50x50 cm. units were excavated, one five meters north of the concentration, and one each at five and ten meters south of the concentration. The soil stratigraphy appeared to be disturbed.

Testing Results

Bedrock was encountered between 20 and 70 cm. below surface, with the majority of units reaching bedrock at 45+/cm. below surface. The strata was extremely disturbed, with twentieth century cultural materials extending to bedrock. In one case a water pipe ran through the unit at approximately 20 cm. below surface. Strata was mixed with soil colors varying from 10YR 2/1, to 10YR 3/4, 10YR 4/6, and 10YR 2/2 (Refer to Appendix B). Where strata was not disturbed, off site, soil consisted of a dark brown silty humus underlain by a dark yellowish brown silty sand, followed by a strong brown silty sand.

No features suggesting prehistoric occupation were encountered and no charcoal was recovered for carbon dating. Analysis took the form of observing all lithic materials for bulbs of percussion, flake scars, and striking platforms. Tool edges were observed for obvious signs of retouch and use, none of which were immediately observed. The site consisted of nothing other than lithic material, predominately quartz, and 20th century historical debris. Refer to

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Appendix C for a complete artifact catalog.¹ Of the 15 1x1 meter units, a total of 264 +/- lbs. of quartz, and 2.5 +/-lbs. of quartz ite was recovered. The majority of quartz fragments were blocks and chunks without cortex and which appeared to result from natural or historical activities. Only a few possible identifiable tools were found. The following was noted during an examination of the lithics, performed in part by Ernest Wiegand (Archaeologist, Norwalk Community College, Norwalk, CT). Wiegand opined that the field investigation revealed a Late Archaic lithic reduction site.

ARTIFACTS	NUMBER
Possible Quartz Bifaces (whole or fragmented)	44 ·
Quartz Large Cores/Cobbles	8
Quartz Tools (ie. scrapers)	9
Quartzite Flakes:	3
Quartzite Large Cores/Cobbles	1
Sandstone Flake:	1
Possible Sandstone Gouge Tip:	1
Possible Hammerstone:	1

The following is the distribution of quartz by weight (refer to accompanying Map 4 for graphic representation of distribution):

UNIT	AMOUNT		
Unit 10	40-50 lbs.		
Units 3, 9, 12	30-40 lbs.		
Units 11, 2	20-30 lbs.		
Units 4, 5, 8, 13	10-20 lbs.		
Units 1, 6, 7, 14	1-10 lbs.		
Unit 15	0 lbs.		

The field investigations also revealed a high degree of twentieth century subsurface disturbance which confirmed the land use history outlined in the 1990 CITY/SCAPE report. When the property was owned by the Griscom family, associated with the Order of the Living Christ, it served as a religious retreat and was impeccably maintained by a crew of seven gardeners.

Comparative Analysis

According to a local archaeologist, prehistoric sites found on similar terraces in the Bronx have yielded quartz cobbles and chert tools, however it should be noted that in the 264 pounds of lithics recovered, no chert or diagnostic tools were observed. As at *Chapel Farm Estate*, these other sites have had a high volume of quartz, with many of the quartz "discoveries" discarded because they were not clearly of cultural origin (Valerie DeCarlo, personal communication to

¹ While still under analysis the field notes, site photographs, and artifacts are maintained by CITY/SCAPE, Hartgen, and HPI. Kahn Associates, 390 West 253rd Street, Bronx, New York, as owners of the property will receive all recovered artifacts. Kahn Associates will be encouraged to donate the artifacts, with accompanying research data, to an appropriate research institution.

Cece Kirkorian, December, 1990). In addition, Dennis Weiss, the Chairman of the Department of Planetary Sciences at City College in New York, states that quartz blocks and flakes from this site could be local and unworked. According to Weiss, it is strongly possible to have a quartz vein of this quality and color in the bedrock or in a secondary igneous intrusion in the bedrock. The *Chapel Farm Estate* quartz may have resulted from a shatter sequence, that is the result of glacial activity and/or weathering and/or historical landscaping. A natural shatter sequence on this type of quartz can yield the same conchoidal fractures that are the result of knapping (personal communication to Cece Kirkorian, December, 1990).

Fieldwork revealed a lack of subsurface integrity and this was noted by Daniel Pagano, New York City Archaeologist, during his site inspection. The possibility that the recovered quartz material was trucked in with soil for twentieth century gardening activities and incorporated into the decorative landscape or, alternatively, the quartz assemblage was a direct result of on-site builders' shatter was considered during lab analysis and discussed with Mr. Pagano. While quartz tool and debitage are not uncommon in the Bronx, having been found in the shell middens at Throgs Neck and in nearby Riverdale Park, that quartz was thought to have been derived from glacial quartz cobbles. Given that assumption, it would be anticipated that any prehistoric quartz lithic reduction site would contain quartz cobbles and abundant evident of quartz cobble cortex. Cobble cortex is not a feature of the *Chapel Farm Estate* inventory.

Historic landscape use of quartz blocks is not unknown. According to Sheila Charles, an archaeologist working at the Justin Morrill Homestead in Vermont, during the nineteenth and early twentieth centuries quartz rings were used in landscaping (personal communication to Cece Kirkorian, January, 1991). A ring at the Morrill Homestead property was made from large quartz cobbles, lacking cortex, which may have been quarried. Water pipes indicated that a fountain stood in the middle of the ring, one example of how quartz was historically used for decorative purposes. The water pipes found in one of the test units may indicate a similar purpose. Since the previous owners of the *Chapel Farm Estate* property maintained seven gardeners, striving to achieve a bucolic setting among rustic cottages and stone pathways, the quartz - native or exotic - may have been an element of the landscape designs.

However, the non-cobble quartz assemblage could represent a heretofore unrecognized site type in the New York City prehistoric archaeological literature. Although the material found at *Chapel Farm Estate* might not fit the known profile for prehistoric sites in the Bronx, it did fit the pattern for prehistoric chert quarry sites north of New York City. Hartgen Archeological Associates, Inc., with the assistance and expertise of Hunter College Professor Philip LaPorta. initiated a comparative analysis of the *Chapel Farm Estate* site with known prehistoric quarries. LaPorta, a geologist, trained archaeologist, and expert on prehistoric quarry technology, examined a sample of the Stage 2 assemblage and conducted a surface examination of *Chapel Farm Estate* (11/9/92). In the field he identified possible hammerstones and also quartz blocks that matched the catalogued primary flakes and he postulated on the presence of a local quartz vein, consisting of cold emplaced quartz associated with the country rock, predominantly Manhattan schist.

A second sample of the Stage 2 assemblage was taken to Robert Funk, New York State Archaeologist, for evaluation in light of LaPorta's assessment. According to Funk (11/24/92), *Chapel Farm Estate* appears to be the site of an aboriginal stone quarry and workshop. He states that "this very unusual site is definitely eligible for the National Register of Historic Places (NRHP)" (see Appendix F). In identifying National Register of Historic Places eligible properties, the National Park Service has developed criteria (A through D) by which all sites, including archaeological sites, are judged. Criterion D stipulates that National Register eligible archaeological sites must "have yielded, or may be likely to yield, information important in prehistory or history" (USDI 1985:5-6). An eligible property must also demonstrate integrity, or the ability to convey its significance, in order to be listed on the NRHP. Site integrity is

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dependent on the degree of alteration to the original site environment.

In order to address these research questions and the possible significance of *Chapel Farm Estate*, an additional field inspection to identify possible quartz veins in the broader project site area and determine, if possible, the *Chapel Farm Estate* quarry site boundaries and integrity was conducted (January 1993) by CITY/SCAPE, HPI, and Philip LaPorta. The detailed results of this examination are described in the attached memorandum by Philip LaPorta (see Appendix G).

Map 6 locates those loci on the project property associated with the quarry site identification survey. The loci can be divided into three distinct categories: (1) large, displaced quartz blocks obviously used as decorative landscape elements or as part of a retaining wall; (2) small quartz vein outcrops not associated with any surface features/artifacts; and (3) small quartz vein outcrops associated with quarrying process artifacts noted on the ground surface. The following chart lists the loci according to category. For further identification see Map 6 and the appended photographs.

LOCUS	1	2	3	4	5	6	7	8	9	10	11	12
Quartz block used as landscape clements/wall block								x		6	x	X
Sterile quartz vein outcrop	3	x		X		x				X *		
Quartz outcrop associated with quarrying activity	x				x				x			

QUARRY IDENTIFICATION SURVEY LOCUS

*QIS 10 was at the face of a possible rockshelter and not directly associated with a distinct quartz vein outcrop. A shovel test pit was excavated (1/4/93) but no artifacts were recovered.

Displaced quartz blocks were noted in 3 areas, QIS8 was a quartz block incorporated into a retaining wall on the extreme southern edge of the *Chapel Farm Estate* property (see Photograph QIS8), QIS11 were two free-standing quartz blocks (approximately 3'x 4'x 2' each) in the extended rear lawn area of the mansion (see Photograph QIS11), and QIS12 was a large area (approximately 28' x 10') adjacent to the site of a twentieth century cottage (see Photograph QIS12).

As can be seen by the QIS Photograph in Appendix E (Photograph QIS12), an examination was made of QIS12, approximately 200 feet northeast of the Stage 2 fieldwork. See Map 6 for location. A concentration of large quartz blocks adjacent to the stone steps and collapsed roof timbers of a twentieth century cottage, many of which were lying on the surface of the ground, possibly represent the "tailings," or initial reduction in a quarrying process. However, they appear to be displaced from an original reduction process area. As the leaf mat and root cover were removed from around the "tailings" block locus, a stepping-stone walkway, lined in quartz blocks, was revealed. Twenty-six aligned paving stones and steps were noted. The use of the blocks for decorative landscaping confirms the original Stage 2 findings of site disturbance.

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According to LaPorta's analysis, the megascopic characteristics of the quartz material recovered during the Stage field tests clearly match the characteristics of the quartz occurring in scattered outcrops throughout the project hillside. The survey revealed 3 quartz vein outcrops associated with quarry processing tools (QIS1, 5, 9). At QIS1, in close proximity to QIS2 on the eastern perimeter of the project knoll, a "beaked" wedged-shaped pounding stone was noted on the ground surface in direct association with a small quartz vein outcrop (see Photograph QIS1). The beak is a result of repeated sharpening or flaking. This intermediate-sized hammerstone, fashioned from a very dense variety of basalt known as diabase, is a diagnostic quarry instrument. At two quartz vein outcrops (QIS5 and QIS9) hammerstones were noted adjacent to the veins. See Photographs QIS5 and QIS9. In consideration of the degree of landscaping and use that the land has experienced in the last 100 years, it is assumed that these hammerstones are not in situ but perhaps in relative proximity to initial deposition. LaPorta identified a number of hammerstones and portable anvil stones on the surface of the surveyed area that is uncharacteristic of most reported quartz quarry sites (e.g., Barber 1981). Specifically, LaPorta identified quartzite hammerstones, diabase pounding and anvil objects, and small dense purple quartzite hammerstones.

The thorough pedestrian survey of the parcel located 5 loci of quartz vein outcrops that were not visibly associated on the surface with what Professor LaPorta recognizes as quarrying tools (QIS2, 3, 4, 6, and 7). See Photographs QIS2-4, 6, and 7. However, as fully discussed in the following memorandum (Appendix G), these east-west trending veins are all the result of one geological event. QIS10 was an examination (shovel test) of the face/talus of a possible rockshelter but yielded no prehistoric cultural materials.

It is estimated that these quartz vein outcrops along the eastern side of the project parcel, whether associated with a hammerstone or quarry tool on the ground surface, represent abandoned operations or potential prospect pits and areas of exploration and testing. The 8 identified outcrops are part of a much larger exploitation system, including the as yet unlocated *Chapel Farm Estate* quarry locus and at least two outcrops off the site. An examination of the off-site outcrops, west and downslope of *Chapel Farm Estate* and east of *Chapel Farm Estate* in the Fieldston area, are described in the appended memorandum (see Appendix G).

Conclusions and Recommendations

The Stage 2 field investigation of a lithic reduction locus, *Chapel Farm Estate*, was expanded to examine an associated and extensive quartz quarrying complex. It appears that the quartz veins located on the *Chapel Farm Estate* site and in the surrounding area represent a previously unidentified lithic resource utilized by the Native Americans living in coastal New York. This conclusion calls into question the assumption previously made that glacially derived quartz cobble was the primary lithic resource in the area. Furthermore, the preponderance of quartz flakes at nearby coastal shell middens, particularly those in Riverdale Park (see photographs with appended memorandum), suggests an intimate relationship between the quarries, exploration pits, outlier exploited quartz veins, and the coastal middens. All are part of a continuum representing the subtle aspects of prehistoric subsistence, which has previously gone either unreported or misinterpreted in the body of coastal New York archaeological literature.

Quarry sites are often situated in rocky uplands where they have been isolated from cultivation or intensive development and this has contributed to their preservation. Many quarry sites have eluded the scrutiny of both avocational and professional archeologists, because most archeologists have not been sufficiently "sensitized" to observe the sometimes subtle features that evidence lithic prospecting and quarrying activities. As a result, lithic quarries and prospects probably remain an under-reported class of prehistoric site. (Dunn/HAA 1992: 93)

All of the exploited veins identified and described above and in the memorandum (Appendix G) are related to a large scale prehistoric exploitation of lithic resources in coastal New York. The presence of quartzite hammerstones, diabase pounding and anvil objects, and small dense purple quartzite hammerstones are all evidence for a common mining practice involving a well-understood technology. At *Chapel Farm Estate* the organization of the quarry and its associated features appears to reflect the same technological arrangement seen at other prehistoric quarries in the Northeast: (1)quarry site; (2) tailings pile; (3)ore reduction area; (4)lithic reduction site.

There is no question that the identification of a prehistoric quartz quarry in New York City is of research value in understanding the resource exploitation patterns of Native Americans. As Robert Funk, New York State Archeologist, stated, the *Chapel Farm Estate* assemblage appears to be the first actual quartz quarry and workshop ever reported in New York State and possibly in coastal southern New England (see Appendix F). As established by the National Park Service criteria for NRHP consideration, *Chapel Farm Estate* can contribute significantly to our understanding of the prehistoric past. However, the site integrity has been compromised by twentieth century gardening, construction, and utility installation.

The import of the *Chapel Farm Estate* site is in the identification of an exploitation and processing system heretofore poorly documented in the New York City archaeological literature. The significance of the *Chapel Farm Estate* quarry complex lies in the documentation of the larger procurement system so future field and lab analyses will be attuned to the complexities of lithic assemblages that do not exhibit cobble cortex and the associations, on a large-scale landscape, between quarrying features.

The actual *Chapel Farm Estate* project area is only a small part of a larger quarry system. Although the quarrying stages of reduction can be grossly identified on today's project landscape, a very important factor is the disturbed nature of the *Chapel Farm Estate* hillside. As noted in the Stage 2 fieldwork and the quarry identification survey, the integrity of the *Chapel Farm Estate* has been severely compromised. Shovel tests in the lithic reduction site recorded quartz debitage in the context of a disturbed soil, e.g., water pipe installation and twentieth century demolition debris.

We recommend *Chapel Farm Estate* site documentation and research data dissemination rather than site preservation. In consideration of both the degree of subsurface disturbance documented for the *Chapel Farm Estate* site and the need for dissemination of information on the quartz quarry process, we recommend that prior to further development the *Chapel Farm Estate* quarry and staging areas be thoroughly mapped in relation to the vein outcrops on and in the surrounding neighborhood. Such a detailed map will greatly aid in the understanding of a large-scale complex and, when accompanied by LaPorta's detailed analysis of the quarrying process, increase our appreciation of a Native American lithic procurement and processing technology.

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Historical Perspectives, Inc.

Dunn/HAA

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CULTURAL RESOURCE INVESTIGATION

SUPPORTIVE DATA

MAPS

MAP LIST:

1. Project Area Location in New Ye	ork State
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2. Project Location U.S.G.S. Yonkers, NY-NJ 1979

3. Project Area Map

4. Test Locations with Artifact Distribution

5. Profile of Soil Stratigraphy

6. Quarry Identification Survey











Trench Units 8-11, East Wall



Chapel Farm Stage II

MAP 5

.

Profile of Soil Stratigraphy

APPENDIX

APPENDIX LIST:

- A. Prehistoric Site Form
- B. Record of Soil Strata in Each Unit
- C. Artifact Catalog
- D. Qualifications of Principle Investigators
- E. Photographs/QIS Photographs
- F. Correspondence, Robert Funk, State Archeologist
- G. Chapel Farm Estate Project Memorandum to Gail Guillet from Philip LaPorta, March 1993

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APPENDIX A

PREHISTORIC SITE FORM



CONFIDENTIAL

NEW YORK STATE PREHIS	STORIC ARCHAEOLOGICAL S	ITE INVENTORY FORM					
For Office Use Only - Site Identifier							
Project Identifier <u>Cha</u>	apel Farm II	Date January 30,1991					
Your Name Faline Schne Address P.O. Box 331 Riverside, C	iderman-Fox, S.O.P.A.	Phone (203) 698-1147					
Organization (if any) _	Historical Perspective	es,_Inc.					
 Site Identifier(s) County Bronx 	<u>Chapel Farm II,</u> One of the following: Township Incorporated Village	: City <u>New York</u>					
Unincorporated	Village or Hamlet Ri	lverdale					
 3. Present Owner Robe Address 390 Bron 4. Site Description (c) 	3. Present Owner Robert Kahn Address 390 West 253rd Street Bronx, New York 10971						
4. Site Description (C	neck all appropriate ca	(tegories):					
Site Stray find Pictograph Burial Surface evidence	Cave/Rockshelter Quarry Shell midden Camp	X Workshop Mound Village X Material					
Material below plow zone X_Single component	Buried evidence Evidence of features	Intact occupation floor Stratified					
Location Under cultivation	Never cultivated	Previously cultivated					
Pastureland Upland	X_Woodland	Floodplain Sustaining					
Soil Drainage: excellent Slope: flat X gentle Distance to nearest wate Elevation 180 ft.	t good <u>X</u> fair moderatestee er from site (approx.)	poor p?					

5. Site Investigation (append additional sheets, if necessary): Surfacedate(s)
Site Map (Submit with form*)
Subsurfacedate(s) <u>12/11-12/14/1990</u>
Testing: shovel X coring other unit size 50x50cm.
Excavation: unit size 1x1m. no. of units 15
(Submit plan of units with form*)
Investigator Historical Perspectives, Inc.
Manuscript or published report(s) (reference fully):
City/Scape: Cultural Interpretations
Revised Cultural Resources Report for Chapel Farm II, Riverdale, New York, June 1990.
Alverdarey Men Tork. Joune 1990.
Hartgen Archeological Associates, Inc.
Bronx, New York. Prepared for Kahn Associates, Bronx, New
York. October 1990.
Present repository of materials: Historical Perspectives, Inc., to be transferred to Mr. Robert Kahn.
<pre>6. Component(s) (cultural affiliation/dates):</pre>
Probably Late Archaic due to predominance of quartz material (no diagnostics, no charcoal samples).
7. List of material remains (be as specific as possible in identifying object and material):
The prehistoric site consisted only of lithic material, pre- dominately quartz. Of the 15 1x1 meter units, a total of 264 +/- lbs. of quartz, and 2.5 +/- lbs. of quartzite was recovered. The majority of quartz fragments were blocks and trim which appeared to result from primary lithic reduction. Only a few identifiable
following was noted during an examination of the lithics:
Quartz Flakes: 329
Quartz Biraces (whole or fragmented): 44 Quartz Large Cores/Cobbles: 8
Quartz Tools (ie. scrapers): 9
Quartzite Flakes: 3 Quartzite Large Cores/Cobbles: 1
Sandstone Flake: 1
Sandstone Gouge Tip (possible): 1

If historic materials are evident, check here and fill out historic site form. X

Scattered secondary deposits of 20th century cultural materials not considered potentially significant.

 Map references: Map or maps showing exact location and extent of site must accompany his form and must be identified by source and date. Keep this submission to 81/2" x 11", if possible.

USGS 71/2 Minute Series Quad. Name Yonkers

For Office Use Only - UTM Coordinates

9. Photography (optional for environmental impact survey): Please submit a 5" x 7" black and white print(s) showing the current state of the site. Provide a label for the print(s) on a separate sheet.

See Appendix E.

APPENDIX B

RECORD OF SOIL STRATIGRAPHY

SOIL STRATA IN EACH UNIT

Chapel Farm II

.

DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL	COMMENTS
0-3 3-13 13-52	Dark Brown Humus 10YR 3/4 MdBr FSL 7.5YR 4/6 OrBr FSL	quartz char quartz at 2 quartz no se	coal Ocmbs pil
Test Pi	t B	C010.	r cnange
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL	COMMENTS
0-3 3-14 14-34 34-38	Dark Brown Humus 7.5YR 4/6 OrBr FSL 10YR 3/4 MdBr FSL 7.5YR 4/6 OrBr FSL	Historic debris Porcelain faucet in NW corner-very distu	irbed
Test Pi	t C		
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL	COMMENTS
0-3 3-19 19-39	Dark Brown Humus 10YR 3/4 MdBr FSL 7.5YR 4/6 OrBr FSL	quartz flakes 1 quartz cobble	
Unit 1	μ. μ	•	
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL	COMMENTS
0-3 3-23 23-36	Dark Brown Humus 10YR 3/4 MdBr FSL 7.5YR 4/6 OrBr FSL	quartz flakes, cobbles, glass and historic debris	
36-46	south wall continued down	SE quad had cement f to 46 cmbs.	ooting
Unit 2			
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL	COMMENTS
0-3 3-25 25-51	Dark Brown Humus 10YR 3/4 MdBr FSL 7.5YR 4/6 OrBr FSL	Part quartz from quartz NE qu	of footin unit 1 in ad
Unit 3			
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL	COMMENTS
0-3 3-20 20-40	Dark Brown Humus 10YR 3/4 MdBr FSL 7.5YR 4/6 OrBr FSL	quartz/historic debr guartz/historic debr	is

Unit 4		
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL COMMENTS
NW & NE 0-3 3-40 ROCK	quads Dark Brown Humus 10YR 3/4 MdBr FSL	quartz/historic debris
SW & SE 0-3 3-20 20-40 debris Unit 5	quads Dark Brown Humus 10YR 3/4 MdBr FSL 7.5YR 4/6 OrBr FSL	quartz/historic debris quartz/historic
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL COMMENTS
0-10 10-20 debris Unit 6	Dark Brown Humus 10YR 3/4 MdBr FSL	quartz/historic
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL COMMENTS
0-10 10-45 45-55 Unit 7	Dark Brown Humus 10YR 3/4 MdBr SndySlt 10YR 4/6 MdBr SndySlt	quartz/historic debris quartz/historic debris
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL COMMENTS
0-10 10-20 20-30 30-44	Dark Brown Humus 10YR 3/4 MdBr SndySlt 10YR 4/6 MdBr SndySlt 10YR 4/6 MdBr SndyClSlt	quartz cobble quartz quartz pieces
Unit 8		
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL COMMENTS
0-10 10-30 30-41	Dark Brown Humus 10YR 3/4 MdBr SndySltLm 10YR 4/6 MdBr SndySltLm	quartz flakes cement footing quartz/historic in SW & NW quartz/historic quads
Unit 9		
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL COMMENTS
0-10 10-22 22-37	Dark Brown Humus 10YR 3/4 MdBr SndySlt 10YR 4/6 MdBr SndySlt	quartz flakes glass/metal quartz throughout quartz

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Unit 10	,		
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL	COMMENTS
0-10 10-40	Dark Brown Humus 10YR 3/4 MdBr SndySltLm	quartz flakes/hj quartz/historic	lstoric
Unit 11			,
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL	COMMENTS
0-10 10-40	Dark Brown Humus 10YR 3/4 MdBr SndySltLm	quartz flakes/hi quartz/historic	storic
Unit 12			
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL	COMMENTS
0-10 10-20 20-50 50-60 60-70	Dark Brown Humus 10YR 4/4 Yel/Br SndyLm 10YR 3/3 DkBr SndyLm 5YR 3/2 Rd/Br SndyLm 5YR 2/2 DkRd/Br SndyGrv1Lm	quartz flakes quartz/historic quartz/sheet met quartz below met quartz/historic	water pipe al al lge qtz chunk in wall
Unit 13			
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL	COMMENTS
0-10 10-30 30-35	Dark Brown Humus 10YR 3/4 MdBr SndySlt 10YR 4/6 MdBr SndySlt	quartz flakes quartz/historic quartz/historic	
Unit 14			
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL	COMMENTS
0-10 10-20 20-40	Dark Brown Humus 10YR 3/4 MdBr SndySlt 10YR 4/6 MdBr SndySlt	quartz/historic quartz/historic quartz/historic	cement footing in center of of unit
Unit 15			
DEPTH	SOIL COLOR AND TEXTURE	CULTURAL MATERIAL	COMMENTS
0-10 10-60	Dark Brown Humus 10YR 3/4 MdBr SndySlt	sterile	

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APPENDIX C

ARTIFACT CATALOG

STAGE II FIELD RESULTS - CHAPEL FARM II

Note: no historical materials were cataloged.

UNIT	#	ARTIFACT DESCRIPTION	TOTAL WEIGHT
1	23 7 2 1 1	Quartz Flakes Quartz Biface Reduction Flakes Quartz Bifaces Quartz Cobble Sandstone Core	8 lbs.
2	38 2 2	Quartz Flakes Quartz Cobbles Quartz Bifaces	20 lbs.
3	17 2 2	Quartz Flakes Quartz Bifaces Quartz Cores	33 lbs.
4	22	Quartz Flakes	14 lbs.
5	19 4	Quartz Flakes Quartz Bifaces	13 lbs.
6	1 1 1 1	Quartz Flake Quartz Biface Quartzite Flake Quartzite Cobble	Quartz 8 ozs. Quartzite 3 lbs.
7	1 1	Quartz Flake Quartz Cobble	6 lbs.
8	24 1	Quartz Flakes Quartz Biface	12 lbs.
9	55 6 5 1	Quartz Flakes Quartz Bifaces Quartz Tools Quartzite Flake	38 lbs.
10	23 7 1	Quartz Flakes Quartz Bifaces Quartz Tool	43 lbs.
11	20 1	Quartz Flakes Quartz Biface fragment	21 lbs.
12	37 5 3 3 1 1	Quartz Flakes Quartz Bifaces Quartz Cobbles Quartz Tools Quartzite Flake Sandstone Gouge Tip (?)	37 lbs.

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	13	32 11 1	Quartz Flakes Quartz Bifaces Hammerstone		19	lbs.
	14	9 2	Quartz Flakes Quartz Bifaces		5	lbs.
140	15 .		STERILE			
	A .	2	Quartz Flakes	. ·	3	ozs.
	В	•	STERILE			
	с	4 1	Quartz Flakes Quartzite Cobble	Quartz Quartzite	7 1	lbs. lb.

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APPENDIX D

QUALIFICATIONS OF PRINCIPLE INVESTIGATORS

CURRICULUM VITAE



Betsy W. Kearns

Address

27 Deepwood Road Darien, Connecticut 06820 (203) 655-8680

Education

BA Duke UniversityMA University of North Carolina (English)MA Columbia University (Anthropology)

Certification

The Society of Professional Archaeologists Certification specialties: field research historical archaeology

Professional Affiliations

Society for Historical Archaeology Professional Archaeologists of New York City Secretary, 1988-1989 Council for Northeast Historical Archaeology New York State Archaeological Association - NYC/Metro-Chapter Treasurer, 1984-1985 President 1985-86

Recent Publications

Kearns, Betsy W. and Cecelia Kirkorian 1990 "Protecting Sites at the Local Level", in <u>Protecting the</u> <u>Past: Readings in Archaeological Resource Protection</u>. Caldwell, NJ: The Telford Press.

1987 <u>Archaeological Resource Preservation Handbook</u>. Hartford, CT: Connecticut Historical Commission.

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1985 "Artifact Analysis, Appendix I", for "Archaeological Investigation at the Van der Ende-Onderdonk House", in <u>The Historical Archaeology of Long Island, part I - The</u> <u>Sites. Vol. VII in Readings in Long Island Archaeology</u> and Ethnohistory. G. Stone and D. Ottusch-Kianka, editors. Stony Brook, NY: Suffolk County Archaeological Association.

Kearns, Betsy W. and Cecelia Kirkorian 1985 "Empire Stores: Archaeologi

"Empire Stores: Archaeological Monitoring, Soil and Foundation Testing", in <u>The Historical Archaeology of</u> <u>Long Island, Part I - The Sites</u>. Vol. VII in Readings in Long Island Archaeology and Ethnohistory. G. Stone and D. Ottusch-Kianka, editors. Stony Brook, NY: Suffolk County Archaeological Association.

Recent Presentations

"So, You Thought Bloomies Was on Lex?".

1990 Annual Symposium Sponsored by Professional Archaeologists of New York City, New York City.

Can a Connecticut Town Protect Its Own?

1987 Annual Meeting of the Society For Historical Archaeology, Savannah, Georgia.

Pulling the Past Together: Integration of History and Archaeology. 1986 January Lecture Series, Bartow-Pell Mansion Museum, New York City.

<u>Trowels and Cameras and Pens: Archaeology is Interdisciplinary.</u> 1986 Annual Meeting of the Organization of American Historians, New York City.

Digging New York: Before We Dig.

1986 Annual Symposium Sponsored by Professional Archaeologists of New York City, New York City.

Experience and Expertise

As a founder and partner in Historical Perspectives, Inc. since 1982, Betsy Kearns has served as the Principal Investigator for numerous archival and archaeological projects. Ms. Kearns meets the professional requirements of the National Park Service and is certified by the Society of Professional Archaeologists (SOPA) which is required by some city and state agencies. Historical Perspectives, Inc. has been certified as a Woman-Owned Business Enterprise by the Port Authority of New York and New Jersey.

Ms Kearns has served as Principal Investigator on a wide range of projects. These projects entailed the preparation of publishable final reports. The following is an abbreviated list of types of work and sample jobs which include:

Environmental Impact Studies - archaeological and historical components

- 1983 Fulton Landing/Empire Stores, Brooklyn, N.Y.
- 1985 Atlantic Terminal Urban Renewal Area, Brooklyn, N.Y.
- 1986 David's Island Project, New Rochelle, N.Y.
- 1986 Arverne Urban Renewal Area, Queens, N.Y.
- 1987 Tibbett Gardens Project, Bronx, N.Y.
- 1988 34th Street Rezoning Project, Manhattan, N.Y.
- 1989 NYC DEP Bureau of Water Supply and Wastewater Control Shaft Sites, Brooklyn and Queens, N.Y.
- 1990 Battery Park City/Chambers Street, Manhattan, N.Y.

Archival Research and Assessment Reports

1987- New York City Board of Education: 15 sites in 4 boroughs 1990

Reconnaissance Surveys

1988 United States Postal Service Facility, Harrison, N.Y.

Cultural Resource Management

1990 Lake Minnewaska State Park, Ulster County, N.Y.

Field Investigations

- 1987 Connecticut Department of Environmental Protection sewer rechanneling at Great Creek, Milford, CT.
- 1987 Shorehaven Development Project, Bronx, N.Y.
- 1989 New York State Power Authority Cable Corridor Project, New Rochelle, N.Y.

A total listing of projects Ms. Kearns has completed for Historical Perspectives, Inc. is found in the company prospectus.

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Cecelia S. Kirkorian

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Education

BA Rollins College

MA University of Connecticut (Anthropology) Historical Archaeology Field School: University of Pennsylvania

Certification

The Society of Professional Archaeologists Certification specialties: field research historical archaeology

Professional Affiliations

Conservation Commission, Town of Greenwich, CT, 1980-84 Council for Northeast Historical Archaeology. Secretary, 1981-1983 Vice-Chair, 1983-1986 State Editor, 1988-1990 New York Archaeological Council Society for Historical Archaeology Professional Archaeologists of New York City Society for Historical Archaeology Society for Industrial Archaeology State of Connecticut Resource Protection Plan (RP3) Steering Committee, 1984-1990 Connecticut Historical Commission Advisory Committee on Minority and Women's History, 1990-1991 The Connecticut State Museum of Natural History, Advisory Board, 1990-1993

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Recent Publications

Kearns, Betsy W. and Cecelia Kirkorian

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Kearns, Betsy W. and Cecelia Kirkorian

1985 "Empire Stores: Archaeological Monitoring, Soil and Foundation Testing", in <u>The Historical Archaeology of</u> <u>Long Island, Part I - The Sites</u>. Vol. VII in Readings in Long Island Archaeology and Ethnohistory. G. Stone and D. Ottusch-Kianka, editors. Stony Brook, NY: Suffolk County Archaeological Association.

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"So, You Thought Bloomies Was on Lex?". 1990 Annual Symposium Sponsored by Professional Archaeologists of New York City, New York City.

Can a Connecticut Town Protect Its Own? 1987 Annual Meeting of the Society For Historical Archaeology, Savannah, Georgia.

<u>Trowels and Cameras and Pens: Archaeology is Interdisciplinary.</u> 1986 Annual Meeting of the Organization of American Historians, New York City.

Prehistoric Ceramic Sample Analysis from Southwestern Connecticut. 1985 Annual Meeting, Society for American Archaeology, Denver, Colorado.

The Fulton Landing Site. 1984 Guest Lecturer, New School for Social Research, New York City.

Experience and Expertise

As a founder and partner in Historical Perspectives, Inc. since 1982, Cece Kirkorian has served as the Principal Investigator for numerous archival and archaeological projects. Ms. Kirkorian

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- 1987 Tibbett Gardens Project, Bronx, N.Y.
- 1988 34th Street Rezoning Project, Manhattan, N.Y.
- 1989 NYC DEP Bureau of Water Supply and Wastewater Control Shaft Sites, Brooklyn and Queens, N.Y.
- Battery Park City/Chambers Street, Manhattan, N.Y. 1990

Archival Research and Assessment Reports

1987- New York City Board of Education: 15 sites in 4 boroughs 1990

Reconnaissance Surveys

1988 United States Postal Service Facility, Harrison, N.Y.

Cultural Resource Management

1990 Lake Minnewaska State Park, Ulster County, N.Y.

- Field Investigations
 - 1987 Connecticut Department of Environmental Protection sewer rechanneling at Great Creek, Milford, CT
 - Shorehaven Development Project, Bronx, N.Y. 1987
 - 1989 New York State Power Authority Cable Corridor Project, New Rochelle, N.Y.

A total listing of projects Ms. Kirkorian has completed for Historical Perspectives, Inc. is found in the company prospectus.

<u>APPENDIX E</u>

STAGE 2 PHOTOGRAPHS QUARRY IDENTIFICATION SURVEY PHOTOGRAPHS (QIS)



Photograph A: Profile of Units 2, 3, and 4, west wall.



Photograph B: Trench of Units 1-5, facing south.



Photograph C: Possible sandstone gouge tip. Note the lateral groove.





Photograph D: Unit 6, NE quad., 10-20 cmbs.. a. Quartz biface b. Quartzite flake c. Quartz flake



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Photograph E: Unit 12, NE quad., 0-10 cmbs. a.b. Quartz Flakes c. Possible quartz scraper.



Photograph F: Unit 11, SE quad., 10-20 cmbs. a.- d. Quartz flakes e. Broken quartz biface.



PHOTO QIS 1: Chapel Farm Quarry Site. Outcrop 1. Note "beaked" hammerstone placed on quartz outcrop. LaPorta considers such "beaked" hammerstones to be diagnostic artifacts on quarry sites.



PHOTO QIS 2: Chapel Farm Quarry Site. Outcrop 2.











PHOTO QIS 5: Chapel Farm Quarry Site. Outcrop 5. Note possible hammerstone used to support quartz block. This is presumably the work of gardeners rather than prehistoric peoples.



PHOTO QIS 6: Quartz vein surrounded by country rock. No board included in this photo.



PHOTO QIS 7 Chapel Farm Quarty Site. Outcrop 7.



PHOTO QIS 8: Chapel Farm Quarry Site. Quartz block used in retaining wall. An example of the use of quartz in the garden at Chapel Farm.



PHOTO QIS 9: Quartz vein surrounded by country rock. No board included in this photo. This vein is located on the south side of the mansion house. Note the possible hammerstone at the bottom of the photograph.

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PHOTO QIS 11: Chapel Farm Quarry Site. Large quartz blocks found near site of gazebo. LaPorta states that the composition of these quartz blocks, each weighing several hundred pounds, is consistent with the quartz debitage recovered from the Stage II lithic reduction site.



PHOTO QIS 12: Chapel Farm Quarry Site. Photograph looking west from collapsed roof of 20th century cottage of stone walk lined with quartz blocks. It is LaPorta's opinion that these quartz blocks are the remains of the tailings pile, a step in the quarrying process.

APPENDIX F

LETTER FROM ROBERT FUNK, NYS ARCHEOLOGIST



THE STATE EDUCATION DEPARTMENT / THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, N.Y. 12230

NEW YORK STATE MUSEUM HISTORICAL AND ANTHROPOLOGICAL SURVEYS

November 24, 1992

Ms. Karen S. Hartgen Hartgen Archaeological Associates 27 Jordan Road Troy, New York 12180

Dear Karen:

I would like to offer my opinion concerning the interpretation and significance of the unusual quartz industry represented by the collection you showed me last Friday. This Chapel Farm material is unusual in several respects.

The broken quartz objects that you found within an area about 30 feet in diameter are definitely products of aboriginal stone-working. We already know that coastal Indians depended heavily on quartz for projectile points and other tools, in the absence of good sources of chert. The Chapel Farm assemblage appears, from Phil LaPorta's discovery of a nearby quartz vein in bedrock, to be the first actual quartz quarry and workshop ever reported in New York State and, I believe, in coastal southern New England. Heretofore it seemed that the Indians' main source was the innumerable quartz cobbles deposited by glacial action along end moraines.

Among the many blocky quartz fragments and spalls you showed me were some pieces that were either discoidal cores, or stage 1 bifaces in process. Also, the quartzite cobble hammerstones, showing heavy attrition, found within the workshop area, and those found by LaPorta at the quarry face, strongly support the identification of the site as an aboriginal stone quarry and workshop.

In my opinion, this very unusual site is definitely eligible for the National Register of Historic Places.

Sincerely,

Robert E. Funk State Archeologist

APPENDIX G

PHILIP LAPORTA MEMORANDUM

PHILIP LAPORTA

CONSULTANT The Old Grist Mill Glenwood, NJ 1-201-764-4906

TO:	Gail T. Guillet
FROM:	Philip LaPorta
DATE:	March 1993
RE:	Chapel Farm Estate Project

The following memorandum is prepared on the basis of a series of visits to the *Chapel Farm Estate* site and the area surrounding it between November 1992 and January 1993. On the basis of these investigations, it is concluded that the *Chapel Farm Estate* site contains a previously unreported quartz quarry. The lithic reduction area that has been identified as a result of the Stage 2 investigation carried out by CITY/SCAPE: Cultural Resource Consultants. Hartgen Archeological Associates, Inc., and Historical Perspectives, Inc. is a part of that quarrying operation. Before describing the situation on the *Chapel Farm Estate* site, it may be helpful to identify the basic elements of a prehistoric quarry:

The Typical Quarry Site

1. the quarry, containing the material being extracted, i.e. chert beds, nodules, or pods, or, as in the case of *Chapel* Farm Estate, veins of quartz;

2. the tailings pile, located just below the quarry face, containing blocks of quarried material;

3. the ore dressing area, also located below and within approximately 50 meters of the quarry face, where large blocks are broken down into smaller blocks for transportation to the lithic reduction site - also referred to as the milling area or transition area;

4. the lithic reduction site, usually located above the quarry face or on a level terrace adjacent to the quarry face, where the reduced blocks are further broken down into sizes that can be transported off-site for manufacture into projectile points and other tools.

In general, chert quarries contain numerous hammerstones and other pounding tools of various weights, varying from a few ounces to several hundred pounds, whereas, previously reported quartz quarries have appeared to lack hammerstones. In contrast to reported quartz quarries, *Chapel Farm Estate* appears unusual in that hammerstones of

various weights and materials, including quartzite and diabase, are abundant. It is interesting to speculate whether the reported paucity of hammerstones at previously identified quartz quarries is real, or whether it is a case of hammerstones and other quarrying tools being overlooked. Previous investigations of quarry sites have indicated that many tools other than hammerstones exist in quarry areas, including modified flakes that may have been used as chisels, etc. Although tools are abundant, it should be noted that, in general, diagnostic tools, such as projectile points, are not found at quarry sites.

Field Observations and Evidence at Chapel Farm

Evidence gathered at the *Chapel Farm Estate* site suggests that the prehistoric site identified during the Stage 1B investigation is a lithic reduction area associated with a quartz quarry located on the site. Although it is presumed that this quarry was the source of the quartz debitage discovered during the Stage 2 excavations, the precise location of this quarry has not been identified. However, based on the organization of other prehistoric quarries in the Northeast. it is suggested that the quarry was located approximately 100 meters north and east of the Stage 2 excavation, where the occurrence of large blocks of quartz may represent the tailings pile (See Stage 2 Report: Photo QIS 12), which is usually located adjacent to or just below the point of extraction of the ore (See Stage 2 Report: Photo QIS 7). Surface indications suggest that the quarry location consists of at least two intersecting conjugate veins of solution hydrothermal quartz. Surface textures found on excavated blocks indicate that the quartz veins were emplaced after the primary phases of deformation in the schist had already occurred. Cold emplacement of the quartz veins permits the outer surface of the quartz to mimic the fabric and texture of the mica grains in the surrounding country rock.

Further to the north of the presumed quarry site, there are several cast-west trending veins of white quartz that have been weathered to the surface. Field observations suggest that all the quartz veins are part of one geological event that occurred very late in the deformational history of the region. To the west, on the south side of the estate house, occurs yet another vein of quartz that crops out on the surface (See Stage 2 Report: Photo QIS 9). Hammerstone fragments were found near all outcrops of quartz veins. The megascopic characteristics of the quartz recovered during the Stage 2 excavation clearly match those characteristic of the quartz occurring in scattered outcrops throughout the hillside. Clearly, the lithic reduction site is genetically related to the quartz quarry that lies directly to the east.

It must be understood that the joint surfaces within the quartz veins are essentially horizontal at *Chapel Farm Estate* and elsewhere in the surrounding area. A second generation of joint surfaces intersects the horizontal joints. creating blocks with 120° and 60° angles. These orthogonal blocks, once extracted from the vein, represent quarry blanks or preforms, which are common at *Chapel Farm Estate* in the Stage 2 excavations. The next stage of lithic reduction usually preserves some faces of the original intersecting joint surfaces. Because of the orientation of the joint surfaces, to extract the quartz, percussion or impact had to be perpendicular to the horizontal joint surfaces; simply stated, the force of impact between the hammerstone and the quartz surface would have to occur at 90° to the plane of the joint. Very rarely, however, are the planes of these joint surfaces oriented parallel to the proposed impact direction. Therefore, large quartzite pounding instruments were probably necessary to crush the quartz and separate it along joint surfaces.

At Chapel Farm, the organization of the quarry and its associated areas appears to reflect the same technological arrangement seen at other prehistoric quarries in the Northeast:

The quarry site

As noted, the quarry site is believed to be located north and east of the Stage 2 excavation, near one of the cottage sites located on the property. This location is east of the mansion house at the crest of the hill. The location of the quarry is, in part, inferred from the presence of large pieces of quartz found immediately west of and downslope from the cottage site (See Stage 2 Report: Photo QIS 12). To date, the only evidence of the quarry is an outcrop of quartz behind the site of the cottage (See Stage 2 Report: Photo QIS 7).

The tailings pile

Just to the west of the cottage site, large pieces of quartz have been found (See Stage 2 Report: Photo QIS 12). These large quartz blocks (up to 50 pounds each) represent the tailings pile, or the first stop, in the reduction sequence. Tailings piles are normally found at a position just below the quarry face, and only rarely do they ever occur anywhere other than in a downslope position. In this particular case, these blocks have been reused to line a garden path.

The ore reduction area

Intermediary between the downslope location for newly extracted ore and the upslope position of reduction sites, there will often be a transitional area where the ore is processed or further reduced into smaller chunks prior to its being carried to the lithic reduction area. To date, the site of this ore reduction or milling area has not been located, but examination of the quartz debitage from the Stage 2 excavation indicates that the transition phase of exploiting close-spaced joints was performed, because most large pieces of quartz in the Stage 2 excavation contain at least one smooth joint surface, leading to the conclusion that processing or milling of an ore concentrate was a transition step in the reduction of quartz at *Chapel Farm Estate*. The location of this transitional stage may have been carried out near the location where the Stage 2 excavations took place. If not, then the transitional step lies somewhere between the downslope position of the quartz blocks below the point of extraction and the location of the Stage 2 excavations.

The lithic reduction site

The normal location for a lithic reduction site is either directly above the quarry face or on level terraces adjacent to the quarry face and along the strike of the beds. Such appears to be the case at *Chapel Farm*, where the lithic reduction site excavated during the initial Stage 2 investigation is located above the proposed quarry location and to the south and west. In contrast to most reported quartz quarry sites, hammerstones proved to be relatively abundant on the *Chapel Farm Estate* site. However, non-portable anvils, a characteristic of many quarrying operations, were not identified.

<u>Hammerstones</u>

A special characteristic of the *Chapel Farm Estate* quarry site was the discovery of hammerstones and portable anvil stones fashioned from a very dense variety of basalt known as diabase. The presence of this preferred lithic type at the site infers a need for an extremely dense, durable substance for the extraction of the quartz, or points to the paucity of available glacially-derived quartzite in the immediate vicinity of the quarry. At *Chapel Farm Estate* several large hammerstones or hammerstone fragments were found lying between blocks of quartz tailings downslope from the proposed point of extraction. Small veins of quartz along the eastern perimeter of the hill contain intermediate size hammerstones, of which one was characteristically beaked (See Stage 2 Report: Photo QIS 1). Small hammerstones, from 5 pounds to as little as a few ounces, are very common on the surface of the Stage 2 excavation. It appears.

therefore, that the weight classes of hammerstones and diagnostic beaked hammerstone found at one quartz outcrop serve to demarcate or delineate the subdivision of tasks at *Chapel Farm Estate*.

Evidence of Quartz Outcrops from the Surrounding Area

The quartz veins exploited at *Chapel Farm Estate* are representative of a greater sequence of prehistoric mining activity that occurred throughout coastal New York during the Late Archaic and Transitional periods (5000 - 3000 BP) (Ritchie, 1959). Quartz veins were a focal point of prehistoric mining activity during this time period (Skinner, 1919). Shell middens excavated at Throgs Neck and Whitestone usually feature a predominance of largely unmodified quartz flakes as well as diagnostic tools fashioned from quartz (Solecki, personal communication, 1983). The source of this lithic material has never been well understood, and most authorities assume it was derived from glacial gravels (Claassen, 1992; Ritchie, 1959).

Field reconnaissance has revealed the presence of a number of large and small intersecting veins of quartz that crop out at *Chapel Farm Estate* and within the immediate vicinity. The quarry and associated reduction site at *Chapel Farm Estate* represent a portion of the plexus of prehistoric mining activities recently discovered in Riverdale. New York. Clouding the issue is the idea that quartz veins and associated pegmatites are not supposed to occur west of Cameron's Line in New York City. They should be abundant east of Van Cortlandt Park and rare west of the park. Recent investigations have shown that the quartz veins and pegmatites are typical features within the tightly folded schists of the Bronx and should have been common elements of the prehistoric lithic landscape. To date, the writer is not certain why their occurrence has not been reported.

West of the Site

At a downslope area contiguous with the *Chapel Farm Estate* site and near the Russian Embassy compound, there are a number of outstanding examples of exploited quartz veins. The veins range in thickness from 2 inches to more than 1 foot, and pinch and swell according to their orientation within folds. (See Photos 1-6) Abundant quartzite hammerstones and quartz debitage lie on a nearby slope. Large quartz slabs invariably bear the evidence of the horizontal joint surfaces, which are also very common on much of the reduction debitage found in the Stage 2 excavation at *Chapel Farm*. This area was examined visually, since it was not possible to enter the area.

East of the Site: The Furman Property

During the investigation of the area surrounding *Chapel Farm Estate*, a particularly outstanding outcrop of quartz, such as might once have existed on *Chapel Farm Estate*, was found. (See Photos 7-9) It is located on property belonging to the Furman family, who built their home on a steep slope on College Avenue in the Fieldston area during the 1960s. During the construction of the Furman home, the equilibrium profile of the soil readjusted to compensate for the disturbance during by the construction. The newly created severe slopes of more than 60^o rapidly weathered to their present 45^o profile, thereby unearthing bedrock that had previously been covered by several meters of soil. The newly exposed rock surfaces revealed the presence of a nearly vertical vein of quartz that the prehistoric miners had missed. The vein is approximately 5 feet high, 12 feet long, and up to one foot in thickness. It bears a glaciated surface and stands out in high relief in contrast to the softer, darker-colored schists. The color is bone white, the luster is highly vitreous, and the entire vein is intersected by a series of closely spaced horizontal joints. The presence of joints within the vein suggests that it intruded the schist during the later stages of deformation, probably along cold joint surfaces. Other quartz veins also occur as infillings within the conjugate joints, both in and beyond the immediate study area. This vein exposure is extremely important as an example of what the prehistoric landscape looked like

during the Late Archaic and Transitional periods. Such exposures were probably very common and easily recognizable in the field by prehistoric peoples.

To the left, or south, of this exposure, on shallower slopes, occurs another vein of quartz that was actively quarried during prehistoric times. (See Photo 10-12) Evidence for quarry activity includes the presence of an uneven, hacked upper surface of the vein (where the outer glaciated surface has been removed); the presence of much quartz debitage in the form of unmodified flakes; quartzite hammerstones; and a small, chipped flake chisel-like object. The exploited vein and the undisturbed vein rest side by side on the Furman property. Occurring above the exploited vein surface are exposures of folded schist whose joint surfaces were once filled with vein quartz. The veins were completely evacuated during the mining activity; only hammerstone fragments and quartz debitage remain.

Comparison with Other Quartz Quarries in Southern New England

Prehistoric guartz guarries are guarries developed within guartz veins. Such guartz guarries are loss frequently cited than other types of quarries (Dunn, 1945; Powell, 1965; Zern, personal communication). The preponderance of quartz debitage in Coastal-Late Archaic Woodland shell middens, such as those found at Throgs Neck and in nearby Riverdale Park (See Photo 13), suggests that quartz was a preferred lithic type, especially in the Lower Hudson River Valley, where chert occurs predominately as secondary sources of glacial origin. Although few quartz quarties have been reported, they possess characteristics both common to the quarty site at Chapel Farm Estate and other characteristics that render it unique. In particular, the prchistoric quartz quarties of Southern New England have been reported to contain very few hammerstones or pounding instruments employed to extract the quartz. This is not the case at Chapel Farm Estate, where hammerstones, including some of quartzite, are fairly abundant. In several cases, quartzite disks found at prehistoric quarry sites have been misinterpreted as blanks or early stage bifaces (Fowler, 1959). The writer feels that in most cases, pounding instruments and hammerstones, as well as many other elements that could be assigned to the prehistoric quarry extraction and reduction process, have gone unnoticed or misinterpreted in the literature. An argument has been put forward (Powell, 1965) that hammerstones are not present on quartz quarry sites because prehistoric miners exploited naturally occurring fractures enclosed within the quartz veins. These fractures are said to expedite the mining process and enhance the workability of thick veins of quartz embedded within metamorphic and igneous rocks. Although naturally occurring, closely spaced joints do occur within the quartz veins, they only aid in the extraction process to a minor degree. Certainly, the planes of weakness, or joints, are a principal focus of the quarry worker during the initial stages of extraction, but the extraction process still involves the employment of heavy pounding instruments. Remnant surfaces of close-spaced joints are visible on many early stage bifaces and they do serve to control the size of the extracted pieces of ore.

Comparison to the Chert Quarries in the Wallkill Valley

Prehistoric quarries in the Wallkill River Valley occur along chert-bearing strata, where chert occurs as closely spaced nodules, pods, and, rarely, beds. The chert-bearing strata is, in some ways, reminiscent in outline to the trend of quartz veins visible at *Chapel Farm Estate* in that their strike is a linear element. Large pieces of ore initially extracted from beds are found at a position below the quarry face. Only rarely do they ever occur anywhere other than in a downslope position. Reduction sites occur either directly above the quarry face or on level terraces adjacent to the quarry face and along the strike of the beds. Such is the case at *Chapel Farm Estate*. Usually, non-portable anvils are associated with these reduction sites. These may occur as large glacial erratics embedded in the soil, masses of loosened bedrock, or bedrock in place. Evidence for use of these non-portable objects as anvils comes in the form of an apron of fine flaking debris. Intermediary between the downslope location for extracted ore and the upslope position of reduction sites there will occasionally be a transitional area where the ore is processed into smaller chunks. In the case

of chert in the Wallkill Valley, several generations of intersecting close-spaced fractures are generally exploited in processing the ore into smaller and smaller workable chunks. At this point poor quality chert and gangue, or country rock, is winnowed away, leaving behind fist-sized pieces of a higher quality concentrate. The mill product from this form of concentration usually occurs as piles of irregular masses of chert attached to dolomite.

<u>Hammerstones</u>

Chert quarries within the Wallkill River Valley bear evidence for division of labor, or task subdivision, in the form of varying sizes or class weights of quartzite hammerstones. Pounding instruments up to several hundred pounds are found along the quarry face. Mechanically crushed and broken spalls of these large hammers are found in the tailings piles just below the quarry face. Wedge-shaped quartzites are often seen in the transition zones lying between the quarry and fine-scale reduction sites. These objects may be up to 15 to 20- pounds, and usually contain a characteristic projection or beak. These beaks or pointed objects are the result of repeated sharpening or flaking and serve as a diagnostic quarry instrument. Reduction sites similar to the one at *Chapel Farm Estate* contain quartzite hammerstone fragments as large as 8 to 10 pounds and as small as less than 4 ounces.

<u>Conclusion</u>

On the basis of the investigation of *Chapel Farm Estate* and the surrounding area, the quarry site at *Chapel Farm Estate* was potentially extremely important because it represented the intersection of two very large veins of mineable quartz. The presence of diabase hammers and anvils as well as quartzite hammerstones is testimony to the fact that extraction was extremely difficulty, because the quartz veins are embedded between layers of tightly folded schist. The quartz veins exposed along the eastern slopes of *Chapel Farm Estate* represent abandoned operations or potential prospect pits and areas of exploration and testing, which are related to the exploited quartz veins outside the study area. All of these exploited veins are related to a large scale prehistoric exploitation of lithic resources in coastal New York. The presence of quartzite hammerstones, diabase pounding and anvil objects, and small dense purple quartzite hammerstones are all evidence for a common mining practice involving a well-understood technology.

It appears that the quartz veins located on the *Chapel Form Estate* site and in the surrounding area represent a previously unidentified lithic resource utilized by the Native Americans living in coastal New York. This conclusion calls into question the assumption previously made that glacially derived quartz cobble was the primary lithic resource in the area. Furthermore, the preponderance of quartz flakes at nearby coastal shell middens, particularly those in Riverdale Park, suggests an intimate relationship between the quarries, exploration pits, outlier exploited quartz veins. and the coastal middens. All are part of a continuum representing the subtle aspects of prehistoric subsistence, which has previously gone either unreported or misinterpreted.

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CHAPEL FARM ESTATE

MEMORANDUM PHOTOGRAPHS



PHOTO 1: Quartz veins in association with country rock. Location is on site of Russian Embassy compound to west of Chapel Farm site.



PHOTO 2: Quartz veins in association with country rock. Location is immediately west of Russian Embassy compound fence behind supermarket.

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PHOTO 6: Quartz vein in association with country rock. Location is immediately north of Russian Embassy compound.



PHOTO 7: Quartz vein located on Furman property on College Avenue in Fieldston area. Note tightly folded country rock.



PHOTO 8: Close-up of quartz vein seen in Photo 7. Note stepped fractures.

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PHOTO 10: View of evacuated veins in country rock on Furman property. Located east of quartz vein seen in Photo 7.



PHOTO 11: Close-up of evacuated quartz vein seen to left in Photo 10. Note possible hammerstones located in fissure.



PHOTO 12: Close-up of evacuated quartz vein seen to right in Photo 10. Note possible hammerstones located in fissure.



PHOTO 13: View looking west toward Hudson River from top of shell midden in Riverdale Park. Area was littered with oyster shell. A number of hammerstone-like objects were noted.