

Beebe Windmill
Village of Bridgehampton
Town of Southampton
Suffolk County
New York

HAER No. NY-67

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PHOTOGRAPHS

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Historic American Engineering Record
National Park Service
Department of the Interior
Washington, D.C. 20240

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HISTORIC AMERICAN ENGINEERING RECORD

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Photographer: Jet Lowe, 1978

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HISTORIC AMERICAN ENGINEERING RECORD

Beebe Windmill

NY-67

Location: Village of Bridgehampton,
Town of Southampton, Suffolk County,
New York

Date of Construction: 1820

Present Owner: Southampton Town

Significance: The Beebe Windmill was one of the first Long Island windmills to be equipped with a fly, regulators and cast iron gearing. It is also the only surviving Long Island windmill to which these features are original. The ogee cap of the Beebe Windmill is the only instance of a decorative design in a Long Island windmill. All these features mark a departure from local millwriting tradition and make the Beebe the only surviving Long Island windmill which compares to English windmills of the same period.

Historians: Robert J. Hefner and Gregory B. Paxton
August 1977

Transmitted by: Kevin Murphy, Historian HAER, April 1984

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I. History of the Windmill

The windmills built in England during the first decade of the nineteenth century were dramatically different from those built on Long Island. During the last half of the eighteenth century the machinery of the English windmill was revolutionized by the new technology for making accurate iron castings. When this technology was applied to the machinery of the windmill, new mechanisms were invented such as the fantail, centrifugal governors, and patent sails. Cast-iron bevel gears also became common in English windmills. These innovations allowed the English smock mill to become larger, more efficient, and easier to operate.

Samuel Schellinger introduced a number of the innovations developed in England to eastern Long Island when he built a windmill for Captain Lester Beebe at Sag Harbor in 1820. This was the first windmill in the region equipped with a fantail to keep the sails into the wind, centrifugal governors to tenter the millstones, and cast-iron bevel gearing. Although no new wind-powered gristmills were built on the east end after 1820, the innovations introduced in the Beebe Windmill were later adapted to many of the older local mills.

Schellinger brought this new technology to eastern Long Island directly from New York City. These innovations had first appeared in windmills built in and around Manhattan in the early nineteenth century. Schellinger undoubtedly learned this new technology by studying these windmills and when he applied it to the Beebe Windmill he journeyed to New York City to obtain the necessary iron castings.

It is fitting that this new technology was introduced on eastern Long Island at Sag Harbor. In the early nineteenth century Sag Harbor was the commercial center for eastern Long Island. Trade was carried on with New England, New York, and the West Indies. Sag Harbor had become a major whaling port; by 1840 it was equal to Nantucket and second only to New Bedford in the number of whaling ships it registered. Sag Harbor was wealthier and more sophisticated than the surrounding South Fork villages. It was the point of contact with the outside world, and it is not surprising that such innovations would appear there first.

Captain Lester Beebe, the windmill's builder, had been a Sag Harbor sea captain and later a prominent shipbuilder in New York City. He returned to Sag Harbor in his later years. Undoubtedly Lester Beebe was familiar with the sophisticated windmills in the vicinity of New York City.

Samuel Schellinger began building Captain Lester Beebe's windmill on 5 September 1820 and worked for 119 days, completing the mill in January. He was assisted by two apprentices, William Baker and Carl. Another carpenter who must have had a major role in building the mill was Pardon T. Tabor. Tabor charged Lester Beebe for 89 days "Work on Mill" also beginning on 5 September 1820. (1) Pardon Tabor was a skilled craftsman who made furniture, built ships, and supervised many large construction projects in Sag Harbor. Other carpenters must have assisted Schellinger on the mill as well.

Early in the project Schellinger charged Lester Beebe for "going to New York 5 days." The purpose of this trip must have been to procure articles for the windmill including the iron castings. Probably among the items he obtained are those listed in Schellinger's account book only a few pages from Beebe's account: (2)

- 1 Bolting Cloth NO 9 - 13 feet Long
- 1 Screw to lift Stones
- 1 Screw to fly speer 6 inches diameter
7 inles long - 3/4 rise - 2 1/4 inches hole
- 2 uper Spindles - about 6 1/2 feet long
- 2 under spindles 3 feet 9 inches - with regulators Compleat,
two straps for lighter staff with Screws 9c
- See about Iron shaft Mr (Ceford?)
- 25 rolers 4 1/2 by 2 1/2 to be
Shaped to a 16 feet circle
- 10 Guide Sheves 7 by 2 1/2 inches
- 8 Guide Sheves 5 - 2 inches

The first record of the mill after its construction was an advertisement in the Sag Harbor Corrector in 1825 offering the mill for sale or lease. Lester Beebe described his windmill as "built in the best manner and of the best materials with two run of burr stone and the top coverned by a fly, the whole being in excellent order."⁽³⁾ Lester Beebe died in 1832 and his brother, Jason Beebe, was appointed administrator of his estate. In 1835 Jason Beebe again offered the mill for sale. Two years later he sold it to Judge Abraham T. Rose and Richard Gelston who moved it to the commons in the center of Bridgehampton.

Rose and Gelston sold the windmill to Charles K. Norris who sold it to Major Roger A. Francis ca. 1851. In 1851, Francis constructed the Atlantic Flouring Mills in Bridgehampton. This was the first steam-powered gristmill on the south fork and was responsible for the decline in activity of some of the windmills. The steam mill and Beebe Windmill are depicted side by side in the center of Bridgehampton in a period etching and an 1858 map. The 1860 Census of Industry indicates that Francis had

\$20,000 of capital in a steam-powered mill, but there is no mention of a windmill.⁴ Francis must have been operating the windmill, however, since in 1861 he had the stocks and sails repaired.⁵

Shortly after 1861 Francis dismantled his operation, moving the steam mill building to Sag Harbor where it became part of the Maidstone Flouring Mill. Roger Francis also sold the windmill at that time to Squires Hedges Miller, Charles H. Topping and E. Jones Ludlow.⁶ A Bridgehampton blacksmith, James Havens, charged the new owners for numerous repairs of the windmill in August 1864.⁷ Squires Hedges Miller sold a half interest in the Mill to William Hand in 1866.⁸ By 1868 Hand had acquired the entire windmill as he sold it in that year to Albert E. Topping.⁹

The only documentation of the Beebe Windmill's operation is the 1870 Census of Industry.¹⁰ According to the census the windmill had one employee and operated 6 months of the year. During the previous year the Beebe Windmill had ground 2,700 bushels of wheat, 1,700 bushels of corn and 1,700 bushels of oats. The mill produced 540 barrels of flour and 146,000 pounds of feed and meal. Of 13 wind-powered gristmills listed in the 1860 and 1870 Census of Industry for Long Island, only one exceeded the production of the Beebe Windmill.¹¹

Topping sold the windmill to Lafayette W. Seabury in 1872.¹² The only indication of Seabury's operation of the windmill is a receipt indicating he sold 200 pounds of flour to S. J. Hildreth between June and November of 1880.¹³ Albert E. Topping again purchased the windmill in 1881, this time with his partner in a general merchandising enterprise, Edward A. Hildreth.¹⁴ They owned the mill for only one year and sold it to James A. Sandford in 1882.¹⁵

The operation of the Beebe Windmill under Mr. Sandford's ownership is somewhat obscure. Bridgehampton historian William D. Halsey wrote in 1935 that "Sandford put steam power in (the Beebe Windmill) so as to be independent of the winds for grinding."¹⁶ Halsey also noted that "About the year 1883 the firm of Sandford and Tiffany was organized for the purpose of carrying on a milling and feed business. They built a new mill near the railroad in Bridgehampton...It was operated by steam power."¹⁷ The assessment roles of the town of Southampton¹⁸ indicate that Sandford owned a "Mill" valued at \$1200 on 3 acres of land for the years 1883-1885. In the 1886 assessment the amount of land decreased to 1/2 acre, but the value of the mill rose to \$1500. The 1886 listing also indicated that Sandford had formed a partnership with a Mr. Tiffany in ownership of the mill. If this "Mill" is the Beebe Windmill, perhaps the change in acreage indicates that 1886 was the year the windmill was moved from the triangular commons to a site just north of the railroad tracks, opposite the Bridgehampton railroad station. Maps and numerous photographs of the late 19th and early 20th centuries document this location of the Beebe Windmill.¹⁹

The assessment of 1887 lists Sandford's and Tiffany's property as a "Steam Mill," although it is assessed at the same rate of \$1500 as the "Mill" the year

before. Possibly the steam mill was built in 1883 and listed on the assessment roll only as a "Mill" until 1887. The other possibility is that the Beebe Windmill was converted to steam power in 1886 and then listed as a steam mill. In this case the low value of \$1500 for a steam mill would be more appropriate. But two newspaper articles of 1888 seem to counter the possibility that Sandford's and Tiffany's steam mill was the Beebe Windmill.

In that year the boiler to the steam mill exploded as accounted in the Sag Harbor Express on 15 November 1888: "Tuesday afternoon an explosion occurred which wrecked the steam mill of Sandford and Tiffany. Parts of the boiler were scattered in various directions and thrown a great distance from the building."²⁰ An article appearing two weeks later establishes that the mill which blew up was probably not the Beebe Windmill. "The effects of the recent storm are seen on every hand. The arms of the old wind-mill were blown off by the wind."²¹ The Beebe Windmill was the only windmill remaining in Bridgehampton in 1888.

Oliver Osborne purchased the Beebe Windmill in the early 1890's. In June of 1893 Osborne commissioned Nathaniel Dominy VII to do extensive repairs on the mill.²² Nathaniel Dominy was the grandson of Nathaniel Dominy V who built the Gardiner's Island Windmill (1795), the Hook Windmill (1806) and the Shelter Island Windmill (1810). Nathaniel VII's account books and diaries show that he did numerous repairs on the Hook Mill which he operated from 1859 and on other East Hampton windmills.²³ Undoubtedly by 1893, Dominy was one of a very small number of craftsmen on Long Island who were capable of doing extensive work on an early 19th century windmill.

Entries in Nathaniel Dominy's Register of Weather & Doings document his work on the "B Hampton Wind Mill" owned by "Ollie Osborne."²⁴ Dominy worked from June 1893 until April 1894 for a total of 161 days on the Beebe Windmill. Although most entries are simply "To Work on B Hampton Mill," Dominy does note some of the specific tasks he performed. These are: July 1, "putting in new plates;" October 7, "put shaft in Mill;" October 20, "finish Dormer over shaft;" October 26, "put in stock;" October 28, "put in two points;" 10 November, "wage big wheel;" 10 December, "run lead on regulators"²⁵; 6 April 1894, "take down fly shaft and wage pinion." All the work which Dominy details, except the addition of lead to the regulator weights, were standard maintenance on windmills. Yet the 161 days of work indicate a much more substantial overhaul of the mill. A comparison can be made to the 152 days required to rebuild the Gardiner's Island Windmill in 1815.²⁶ In that case the new work was extensive and is clearly evident in the mill. Few features of the Beebe Windmill are clearly of an 1894 origin. It is not possible to tell, more than the detail Dominy provides, the extent of his work.

After the expense of Nathaniel Dominy VII's reconditioning the windmill, Osborne operated it for only one year. He sold the mill in 1895 to the Bridgehampton Milling Company, John C. Sayre, manager, and William Schellinger, miller.²⁷ This company ran the mill at its location north of the railroad tracks until 1911 when the sails blew off in a storm.²⁸ In 1914 the windmill was purchased by Rev. Robert Davis, who sold

it to John E. Berwind later that year.²⁹ Berwind moved the mill to his estate, on the corner of Hildreth Lane and Ocean Avenue. Berwind willed the mill to the town of Southampton, its present owner.

II. Structure and Machinery

The Beebe Windmill exhibits many innovations in windmill technology. It was one of the first Long Island windmills to be equipped with regulators, a fly and cast iron gearing. In these features and in its general appearance the Beebe Windmill is distinctly different from other surviving Long Island smock mills and is the only one which compares to English windmills of the same period.

The appearance of the Beebe Windmill is appreciably different from other surviving Long Island windmills. Unlike other mills, in which the octagonal form tapers to a circular curb, the tapering sides of the Beebe Windmill are let into a projecting circular ring, above which is the curb.

The most distinctive feature of the exterior is the ogee cap. Topping the cap is a stalk and ball finial supporting a whale-shaped weathervane. This cap is believed to be original to the mill. It would have been an appropriate feature in style-conscious Sag Harbor. In fact, the Sag Harbor schoolhouse, built in 1788, featured an ogee cap on its belfry. Also, windmills built in England at this time, especially in Lincolnshire, were often topped with ogee caps.

The Good Ground Windmill, attached to a house in Southampton, has an even more pronounced ogee cap. There is a dispute over whether this was a real windmill or was originally constructed as a design feature of the house. This windmill was not inspected for this report.

LUFFING MECHANISM

The sails of the Beebe Windmill were automatically turned into the wind by means of a fly. Although the fly, or fantail, was patented in England in 1745³⁰, it was not installed in Long Island windmills until ca. 1820. Its advantages were such that it was eventually installed on several earlier windmills which originally had some other luffing mechanism.³¹

The fly of the Beebe Windmill has 4 blades set into a star wheel of 8 sockets. Numerous late 19th and early 20th century photographs of the Beebe Windmill, and other Long Island mills equipped with flies, show only 4 blades, not 8.³² The star wheel turned an axle upon which a worm gear was mounted. The worm engaged a cast iron spur gear on another axle which turned a cap drive gear on its other end. The cap drive gear mounted inside the cap engaged with an iron curb track. When the mill sails faced into the wind, the cap blocked the fly from the wind.

But when the wind shifted, the fly blades were activated and turned the cap. When the sails again faced into the wind, the cap would again block the current from the fly, thus stopping it. The blades were angled so they could revolve in either direction.

The fly was kept in continual operation, even when the mill was shut down. This was to prevent the mill from being tail-winded, in which case the fly would be inoperative. Due to its continuous use, the fly had to be greased every few days. To accomplish this the miller had to shinny out the flystage.³³

The fly is believed to be original to the Beebe Windmill. An 1822 letter to Nathaniel Dominy V from a former apprentice documents the use of the fly in Long Island windmills by that time. (The letter appears in full in Appendix I) Charles L. Mulford wrote to Dominy from "Rensselaerville," New York, asking for "information respecting certain improvements" on windmills and notes: "I am told windmills are now constructed so as to continually face the wind by the winds own power...I understand Mr. Schellinger has built one at Brooklyn different from those at East Hampton and that the top of that turns with the wind..."³⁴ Samuel Schellinger, a millwright from Amagansett, had built a windmill with a fly by 1822. It is certainly possible that the Beebe Windmill, built 2 years earlier, could also have been originally equipped with a fly. The earliest documentation of the fly on the Beebe Windmill is Jason Beebe's 1835 newspaper advertisement which described the mill as having a fly.³⁵ This is further reason for supposing that the fly was original.

The flystage of the Beebe Windmill is currently in a bad state of repair. Three of its support timbers are rotting and the fourth has failed. The worm is out of place, and the cap drive gear is tied to the stage.

The rotation of the cap was facilitated by trolley wheels. The trolley wheels are fixed in an iron frame and rolled on iron tracks laid on the curb and under surface of the cap circle. The cap is centered by a set of truck wheels, suspended from the cap frame, which bears against the curb. A second set of truck wheels bears against the trolley wheel frame. This system of centering is also uncommon on Long Island. The local practice of centering the cap was to lap the cant posts over the curb. On a few mills truck wheels were mounted in the cant post extensions. The only other windmill with truck wheels suspended from the cap frame and bearing on the curb is the Hayground Windmill.

SAILS AND WINDSHAFT

The sails of the Beebe Windmill turned in a counter-clockwise direction. The unusual height of the mill permitted the sails to be longer than those on most other Long Island windmills. This allowed the Beebe Mill to have a higher

ratio of rpm of the stones to rpm of the sails. Data on the Beebe Windmill in this regard is compared to the Hook Windmill and the Windmill at Watermill below:

Windmill	Height (nearest inch)	Sail length (nearest inch)	rpm stones/rpm sails
Beebe	41' 5"	32'	10.2
Hook	36'	29' 6"	8.3 burr stone 7.2 rock stone
Watermill	29' 4"	23'	5.3

Because of the higher ratio of the Beebe Windmill, the stones could rotate at a high speed when the sails were turning relatively slowly. On days with a mild wind, assuming the additional sail area would provide the additional power necessary, the Beebe Windmill could operate, while the stones of other mills would not be rotating fast enough to grind.

The windshaft is also proportionally larger than those found in the other surviving windmills. The shaft is so massive that it required a three-stage weather beam to support the neck bearing. This weather beam is another unique feature of the Beebe Windmill. The present windshaft is of 4 pine timbers, cinched and bolted together. The head of the windshaft is badly deteriorated.

DRIVE SYSTEM

The brake wheel is constructed around the windshaft in clasp arm fashion. Only one other surviving Long Island windmill has a clasp arm brake wheel; this is the Pantigo Mill and it is not an original feature. The earliest documented clasp arm gear in a Long Island windmill is the great spur wheel installed in the Gardiner's Island Windmill in 1815 by Nathaniel Dominy.³⁶ Clasp arm construction produces a stronger gear than compass arm construction. Also, a windshaft could easily be replaced with a clasp arm brake wheel, whereas a compass arm wheel would have to be disassembled to replace the windshaft.

Mounted on the face of the brake wheel is a ring of cast iron beveled teeth. This and the other iron gears in the Beebe Windmill are also believed to be original; if so it is the only surviving Long Island windmill with original cast iron gearing. The only other instance of cast iron gears in one of the surviving mills is a lantern pinion and a spur gear to the internal capstan winder of the Pantigo Windmill.

Charles Mulford also asked Nathaniel Dominy about cast iron gearing in his 1822 letter: "I wish to know too if bevel gears are used for main cog wheel & crown wheel and if so who has cast them, for I think they require casting a different angle from the common bevel gears and whoever has cast them for windmills probably have patterns..."³⁷ This letter indicates that cast iron

gearing, like the fly, was just beginning to be used in windmills in America. If the Beebe Windmill had a fly it is likely that the millwright was also aware of cast iron gearing for the drive system.

The wallower is a bevel gear that is entirely cast iron. This meshing of iron with iron (the brake wheel and wallower) was avoided by experienced millwrights due to the excessive noise.³⁸ Iron on iron is again found where the cast iron crown wheel engaged two iron bevel gears on the layshafts. This indicates that the builder of the Beebe Windmill was probably inexperienced with iron gearing; further evidence for an early date.

The great spur wheel is a cast iron wheel with wooden cogs inserted. The stone pinions are of similar construction. Interestingly, the gearing in the mill is either iron on iron or wood on wood; it is never iron meshing with wood, which was the rule in English windmills of the period.

The main vertical shaft bears on a bridge beam at the second floor. This also was the common practice in England at the time, but only two other Long Island windmills have such an arrangement.³⁹ Another unusual feature of the main shaft is that it has a glut box for its top bearing. This is also the contrivance for the top bearings of the quants. The glut box is another element of the Beebe Windmill which is more "correct" by English standards than its counterparts in most other Long Island windmills.

MILLSTONES

Both pairs of millstones are French burr stones. On the under side of the south bed stone is written "L. W. Seabury," indicating that the stone was probably purchased during his ownership (1871-1881). The iron quant which runs the south runner stone is stamped "UL2ter."

REGULATOR

The regulator is a centrifugal type with an iron frame. The iron ball weights are supplemented with lead, added in 1893 by Nathaniel Dominy VII. The regulator is belt driven from a spindle which is belt driven from the main vertical shaft. Steelyards and the bridgetrees act as levers for transmitting the movement of the weights to raise or lower the runner stones by fractions of an inch.

Concave hollows cut in the central post and in the beams supporting the bed stones indicate that a regulator was once mounted on each stone spindle. This positioning of regulators may have been original to the windmill. Charles Mulford, in his 1822 letter to Nathaniel Dominy, also writes of utilizing the wind's power to "reef and regulate" the stones and indicates that he has seen this principal in operation in Flatbush.⁴⁰ The regulator, the fly and the cast iron gearing seem to have been introduced in American windmill technology at about the same time. They apparently all made their appearance in Sag Harbor in 1820 with the building of the Beebe Windmill.

GRAIN SYSTEM

The layshaft currently in place on the third floor drove a sack hoist. A trap door may be observed in the ceiling of the second floor, although it is covered by new flooring on the third story. There is no evidence that this sack hoist descended to the first floor.

A second system of lifting grain was a cup elevator which ran from the first floor to the fourth floor. The belt is missing and the elevator is cut off by recent flooring on the first story, but the wooden housing of the elevator is still intact. The elevator was powered by an iron pulley wheel on an axle with an iron sprocket. Cast on the sprocket is "Link Belt Mach'y Co. Chicago 14 in 45 Pat (782? unintelligible) 1882." The means by which the sprocket was powered is not evident.

A second layshaft, no longer in place, ran off the crown wheel to the north. Only the iron bevel gear for this layshaft remains in the mill. Although this shaft was located near the elevated sprocket, it is oriented perpendicular to the sprocket and any relationship between the two is not evident. Other machinery, which may have been driven from the layshaft, has been removed and the recent flooring has obscured any evidence.

A hopper is set through the third floor east of the south millstones and the location of a second hopper is indicated on the ceiling of the second floor east of the north millstones. At the first floor is a jog scry for sifting corn meal. The screen is missing. Also on the first floor are two grain boxes, each holding a bushel of grain. One is fed by a tin chute, the other by a wooden chute.

Footnotes:

- 1) Pardon T. Tabor Account Book, 1807-1841, manuscript, Queensboro Public Library, p. 129.
- 2) Samuel Schellinger Account Book, 1820-1823, manuscript, private collection.
- 3) Sag Harbor Corrector, 2 April 1825.
- 4) United States Census Office, 8th Census, Census of Industry, Suffolk County, 1860..
- 5) James L. Havens Account Book, 1858-1865, manuscript, Bridgehampton Historical Society.
- 6) Halsey, Sketches, p. 29.
- 7) James L. Havens Account Book, op. cit.
- 8) Land Indenture, Squires Hedges Miller to William Hand, 13 December 1866, Suffolk County Clerk's Office, Deed Liber 135, p. 52.
- 9) Land Indenture, William Hand to Albert E. Topping, 25 March 1868, Suffolk County Clerk's Office, Deed Liber 150, p. 139.
- 10) United States Census Office, 9th Census, Census of Industry, Suffolk County, 1870.
- 11) Ibid.
- 12) Assessment Roll, Town of Southampton, 1872, Southampton Town Clerk's Office.
- 13) Receipt, S. J. Hildreth to L.W. Seabury, 20 June and 9 November 1880, Bridgehampton Historical Society.
- 14) Land Indenture, L.W. Seabury to Edward A. Hildreth and Albert E. Topping, 1 March 1881, Suffolk County Clerk's Office, Deed Liber 252, p. 457.
- 15) Land Indenture, Edward A. Hildreth and Albert E. Topping to James A. Sandford, 3 April 1882, Suffolk County Clerk's Office, Deed Liber 263, p. 193.
- 16) Halsey, Sketches, p. 29.
- 17) Ibid.
- 18) Assessment Rolls, Town of Southampton, 1883-1885, Southampton Town Clerk's Office.

- 19) Photographs in Bridgehampton Historical Society, East Hampton Free Library and Queensboro Public Library. Atlas of Suffolk County (Brooklyn: E. Belcher Hyde, 1902).
- 20) Sag Harbor Express, 15 November 1888.
- 21) Ibid., 29 November 1888.
- 22) Nathaniel Dominy VII, "Register of Weather & Doings," 1887-1909; East Hampton Free Library.
- 23) Nathaniel Dominy VII Account Book, 1849- ; "Register of Wind, Weather & Doings," 1850-1858; "Register of Weather & Doings," 1887-1909; East Hampton Free Library.
- 24) Nathaniel Dominy, "Register of Weather & Doings," 1887-1909, East Hampton Free Library.
- 25) These iron weights supplemented with lead are still in the mill.
- 26) Felix Dominy, Nathaniel Dominy V and Nathaniel Dominy VII Account Book, 1807-1862, manuscript, East Hampton Free Library.
- 27) Halsey, Sketches, p. 29.
- 28) Charles A. Jagger, "The Old Mill Hill Mill and other Windmills," Southampton Magazine, Summer 1912, p. 19-20.
- 29) Halsey, Sketches, p. 29.
- 30) Stanley Freese, Windmills and Millwrighting (New York: Great Albion Books, 1971), p. 10.
- 31) Both the Hayground and Mill Hill Windmills originally had tailpoles but were converted to the fly.
- 32) Photographs of Beebe, Hayground and Mill Hill Windmill, when in operation, show four-bladed flys.
- 33) HAER oral interview with Morgan Thompson, 8 August 1977.
- 34) Letter, Charles L. Mulford to Nathaniel Dominy V, 15 April 1822, uncataloged manuscript, East Hampton Free Library.
- 35) Advertisement, The Corrector, 25 April 1835.
- 36) Robert J. Hefner, "Gardiner's Island Windmill," HAER report, 1977.
- 37) Mulford, op. cit.

- 38) John Reynolds, Windmills and Watermills (New York: Praeger, 1970), p. 41.
- 39) Gardiner Windmill (East Hampton, 1771) and Gardiner's Island Windmill (1795, bridgebeam installed 1815).
- 40) Mulford, op. cit.

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Letter from Charles L. Mulford to Nathaniel Dominy V,
15 April 1822

Rensselaerville April 15th 1822

Dear Sir.

I do some expect to build a wind mill this season at Albany for grinding corn & rye for a distillery and in case I do, I should like exceeding well to have some information respecting certain improvements said to have been made on that kind of mill since I lived with you, of which improvements you are undoubtedly acquainted with. I am told windmills are now constructed so as to continually face the wind by the winds own power also to reef and regulate the stone, as to regulating the stone I am some acquainted with the principle of the operation, having seen something of the kind at Flat Bush when I lived with you, I wish to be informed if you please whether you think this kind of machinery is profitably used and if so what additional expence in comparison with the plan used when I lived with you, I wish to know too if bevel gears are used for main cog wheel & crown wheel and if so who has cast them, for I think they require casting a different angle from the common bevel gears and whoever has cast them for wind mills probably have patterns, the man that I expect to build for is willing to have it cost him about 2000 dollars it requires no bolt altho he wishes to have it double geared and then when he chooses he can add another run of stones I should like to have you give me a particular description of the most improved plan if it is convenient and it not some general description and what mill you would recommend me to take a draught of, if it should be necessary. I understand Mr Schellinger has built one at Brooklyn different from those at East Hampton and that the top of that turns with the wind but whether it is double geared or not I have not learned there is one near New York on the New Jersey shore said to be on a very expensive plan that almost tells the time of day. but how far this multiplying machinery is profitable I dont know I am told that it is built very high grinds very fast and does work (?) I should like to have your opinion of the size and kind of stone to do work with the greatest dispatch I have not heard of your having built a mill where the top turns by the wind but perhaps you have, and if not, you have some general idea of them and perhaps have an improvement that you can suggest to me on those now in use any communications that you will please make will be thankfully received by him who is thankful for many instructions already received

my respects to all my old friends in East Hampton particularly your own family tell Mrs Dominy I see her brother often don't know but they are all well our Long Island here are hale as well as usual my brother Edward that you saw last summer is now in pretty good health do be so good as to answer this by your first mail.

Yours with respect & esteem

Charles L Mulford