

Triangulation Station Disboro 1839; Recovery 1982

by Wendy Lathrop, P.L.S.

In the early days of our nation, there were no good maps of the coastline for navigators or the militia to use. In 1795, the U.S. Congress wrote a resolution requesting that President Thomas Jefferson authorize a survey to map the New York-New Jersey coast. This map would reduce the number of shipwrecks and benefit the military in planning defense. The resolution authorizing this first coastal survey was passed in 1807, but the work did not begin until 1816.

A Swiss-born geodesist and mathematician, Ferdinand Rudolph Hassler, was named the first superintendent of this U.S. Coastal Survey. He set up a system of triangulation to ensure that the edges of any charted location would align with the edges of adjacent areas. This new system of coordinated surveys became the first U.S. Coast and Geodetic Survey of the domestic waters of our nation.

Hassler established a triangulation network from New York City to Philadelphia, consisting of 18 coordinated points, a system later expanded to cover the entire nation as it exists today. In 1830, a ceramic cone was buried on Disboro Hill in Millstone Township, Monmouth County, New Jersey, as a monument control point in this system. The crew was headed by Hassler himself, and a description of its location, written in 1869 by J. Farley (there is no original text available of any description written by Hassler in 1839), is as follows:

On the farm owned in 1840 by John Disboro and in 1869 by James A. Perrine. It is on what is now known as Disboro's Hill, about 4 miles S.E. of Hightstown, Mercer County, and on the road from Hightstown to Freehold. In 1869 the signal pole was found leaning at a 45° angle against a cedar. It had rotted off at the surface and 3 feet of the butt

remained in the ground. Excavation showed that the cone had been displaced to make place for this pole. From the buried part of the pole, which was allowed to remain in position, the following measures were taken: Apple tree trunk 1869 (Bearing tree in 1838) S 70° W, 44 feet; cedar tree, S 47° W, 35 feet; cedar, N 5° W, 20.7 feet; cedar N 20 feet; locust, N 70° E, 10 feet; two cedars S 39° E, 12 feet; cedar S 37° W, 34.5 feet; cedar S 58° W, 45.5 feet. From the old apple tree trunk to the third cedar is 53 feet; from the third cedar to locust tree 20 feet; from locust tree to two cedars, 13 feet; from two cedars to next to last mentioned cedar, 33 feet; and between last two cedars, 18 feet.

In 1931, the site of Disboro was revisited; the following report was filed on it:

Disboro Hill was visited. No marks of any kind were found. No definite information as to what part of hill, which is of some extent and covered with scattering brush, the old station was located on. From reports of a search in 1869 and the failure to get any information in the community about it, it is thought that the original station has been destroyed. If a later station has been established and used, nobody has seen or knows anything about it.

In 1935, the site was again visited. It was decided that Disboro was impossible to relocate, and a second monument, this time a brass disc set in concrete, was set in what was thought to be the approximate location of the original Disboro cone. This new point was named Disboro 2, and two reference monuments were set nearby to aid in future recoveries. The following descriptions were written after this second monument was set:

DISBORO 1—Due to incomplete information furnished concerning Disboro, it was impossible to determine its exact location. A roughly shaped cone was found 3 feet below the surface of the ground, which probably indicated the approximate location of the old station, Disboro.

DISBORO 2—Disboro 2 is 4 miles southeast of

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Hightstown on the summit of Disboro Hill, on the property of the Lutheran Memorial Park Cemetery. In a tangle of briars, bushes and trees, 8.8 feet east-southeast of a 14-inch oak tree, 36.8 feet north-west of a 12-inch oak and 22.0 feet northwest of a 12-inch cherry tree. The three trees are blazed with triangles. The mark is stamped "Disboro 2 1935" and projects 3 inch, notes 1a and 7a.

To reach the station from Manalapan General Store on State Highway 33 at the east edge of Manalapan (which is 6.7 miles by road from the center of Freehold) go west on State Highway 33 for 0.3 mile to T-road left at sign "Perrineville 1.3". Turn left and go 1.2 miles to T-Road and sign "Perrineville 2 1/2 Miles-Clarksburg 5". Turn right and go 1.3 miles to cross road. Continue straight ahead, leaving pavement and go 1.2 miles to cross road. Continue straight ahead 0.6 mile on pavement again to dirt cross road (mailbox marked T. Pullen on left), turn right and continue to red barn, pass between barn and corn crib. Continue on dirt road passing along fence line at west end of wheat field. Continue to northwest corner of wheat field, turn right, go 1.5 mile along north end of wheat field. Turn left and go 0.15 mile on dim cleared road to station to left.

Reference Mark No. 1 is 93.60 feet (28.529 meters) east of station, and 3 paces northeast of twin cherry tree. Mark projects 3 inches, note 11a.

Reference Mark No. 2 is 57.87 feet (17.639 meters) south-southwest of station. Mark projects 6 inches, note 11a.

No azimuth mark was set at this station.

A 64-foot tower will clear all lines observed at this station.

No prominent natural objects visible from the ground.

Distance between Reference Mark No. 1 and Reference Mark No. 2 could not be measured on account of trees.

OBJECT	DISTANCE		DIRECTION 0° 00' 00"
	FEET	METERS	
R. M. No. 1	93.60	28.529	40° 24' 35"
R. M. No. 2	57.87	17.639	328° 15'

Finally, in 1936, a third recovery crew visited the site. This time, both the original cone and the second monument were found. Two reference markers were set for Disboro 1, the two stations Disboro 1 and 2 were tied together, and the following new descriptions were written by H. B. Hanken:

DISBORO 1—Recovered in fair condition and undisturbed.

The original description is inadequate.

The station mark is a hollow truncated cone of thinly glazed gray pottery, of the distinctive type used by Hassler, about 8 1/2" outside diameter and 1/2" thick at the top or small end, buried 18" underground in densely packed yellow sand. A segment consisting of about one third of the cone has cracked off due, presumably, to frost action, but remains in place.

The cone was left undisturbed. After photographing and referencing, it was covered with earth to the same depth as formerly. No surface mark was set. Two additional reference marks were established, consisting of standard bronze reference disks set in concrete posts, stamped "Disboro 1839 R. M. 3" and "Disboro 1839 R.M. 4". From the station, distances were measured and directions determined as follows:

OBJECT	DISTANCE	DIRECTION
STONY HILL		0° 00' 00"
Disboro 2	102.43 feet	34° 44' 03"
Disboro R. M. 3	35.20 feet	129° 22' 03"
Disboro R. M. 4	32.06 feet	229° 18' 45"
Disboro 2 R. M. 1	13.14 feet	350° 29' 25"

To reach the station, proceed from the Manalapan General Store, on N. J. Highway #33 6.7 miles from the center of Freehold, west on N. J. #33 0.3 mile to a "T" road left at sign Perrineville 1 1/2 miles; Clarksburg 5. Turn right go 1.3 miles to cross road. Continue straight ahead, leaving pavement and go 1.2 miles to cross road. Continue straight ahead .6 mile on pavement, again to dirt cross road (mail box marked T. Pullen on left), turn right and continue to red barn, pass between barn and corn crib. Continue on dirt road passing along fence line at the west end of the wheat field. Continue to northwest corner of wheat field, turn right. Go .15 mile along north end of the wheat field. Turn left and go .17 mi. on dim cleared road to station which is located at the highest point of the hill, on the property of the Lutheran Memorial Park Cemetery.

DISBORO 2—Station and reference marks recovered as described in good condition, 4 miles south-east of Hightstown. At the station, an additional angle was measured as follows:

OBJECT	DISTANCE	DIRECTION
		0° 00' 00"
Disboro	102.43 feet	238° 03' 15.3"

In the summer of 1982, the Professional Land Surveyors Association of New Jersey members were discussing possible activities to mark New Jersey Surveyors Week in October, a week the governor had proclaimed to commemorate the professional contribution

This paper describes a project which was submitted for consideration for the National Society of Professional Surveyors (NSPS) Land Surveyors Project of the Year Award for 1983. Wendy Lathrop was first runner-up.

of surveyors to society. The theme of the week was to be "The Pathfinders: Past, Present and Future." The idea of recovering an historic marker had been discussed before, but this time more interest was shown when Harold Neil, Jr., and Bruce Blair brought up the topic at a PLSANJ monthly meeting. Harold knew of a marker in our area, Disboro, that was possibly still intact and able to be recovered.

After the meeting, no real action was taken on recovering Disboro, so Harold and Wendy (author) got together to get the necessary information and organized a group of volunteers to do the field work. Neil had access to the recovery sheets with the old descriptions of Disboro 1 and 2, since he works in the State Geological Survey office, and he also had copies of the control sheets showing the approximate location of Disboro on Disboro Hill. After setting a preliminary schedule of procedure for the recovery of Disboro, Harold and Wendy set about recruiting volunteers to help do the actual search.

And so, on Saturday, August 28th, three surveyors—Harold, Wendy, and Fred Losowski—set out to try to pinpoint the vicinity of Disboro 1.

Armed with the 50-year-old descriptions of Disboro 1 and 2 (which were the most recent and promised a "tangle of briars, bushes and trees" with a bit of time to thicken up), a control map of the area showing the geodetic monuments in the area, and several machetes, we set out for Millstone Township in three vehicles. After circling the area several times looking for the highest spot which is where Disboro 1 was assumed to be, we all piled into Harold's truck and encircled the area again, traveling up Perrineville Road along the farms at the base of the hill to try to pinpoint the high spot, and around the back of the hill on Disbrow Hill Road. On Disbrow Hill Road, we found what appeared to be a dirt road leading up to the hill, so we pulled in and started walking. We passed through an old concrete entryway, not knowing its significance, and noted various pieces of buried curbing as we climbed upwards along a trail.

We later discovered there had been an old cemetery built but never used due to its out-of-the-way location. We had found the Lutheran Memorial Park Cemetery, called for in the 1936 description.

As we climbed further upward, the "trail" ended and we had to cut our way through the vines and brush to try to find the highest point to begin our search. When we got to a ridge, there were several large trees that might possibly have been those called for in our antique descriptions. After guessing how much larger a tree would be after 50 years, we measured from several likely prospects and cut through heavy briar to our possible site. Many scrapes and scratches later, with no promising reference marks uncovered, we decided that it would be better to try to follow the 1936 description of Disboro 2 up from Perrineville Road, rather than look by luck for our main quarry, whose only ties were to trees and briars (and we had found plenty of both).

Harold drove us back around the hill to the D'Amico Brothers farm at the base on Perrineville Road, and we all piled out to look for someone to ask for permission to forage in the forest. Our first encounter was with several of the farmers' children, who had not seen the monuments but were excited about the age of them. When the farmers arrived, one said he had seen several markers up in the woods while hunting about 9 years ago, and the other suggested we go down behind the orchards to a ravine that was less "briary" than other areas, and follow that to deer trails we could follow to the top. We three "city slickers" had no idea what a deer trail looked like, but we bravely headed around the orchard to the back where the ravine came in, following a general direction similar to our plotting of the 50-year-old path described for Disboro 2 (between the corn crib and red barn, and around the wheat field to a dim cleared road, which we were to follow for 0.15 mile to our reference trees to find Disboro 2). When we headed into the woods, there appeared to be a "dim cleared road" or deer trail, depending on the vividness of our

combined imaginations, but Wendy tied bits of fluorescent pink flagging on trees along the way as a precautionary measure. As we progressed further into the woods, all pretense at seeing a trail dropped, and we hacked our way further upward until Harold, who was slightly ahead, yelled back that he found the first thing that looked like a deer trail; in fact, he continued, it looked like a highway compared to what we had just struggled through. Slight pause, and then laughter. As Wendy poked out of the woods onto our highway, Harold asked, "Do you know where we are?" Whereupon, Wendy began laughing too, as we all suddenly recognized our wide "machee-teed" trail from the morning with the dead end where Wendy had given up just to our left. As we headed back down our beribboned trail, Harold consoled us on our lack of deer-trailing skills by saying surely someone had called Wendy "dear" at some time, consequently, we had found a "dear" trail.

We headed back to the D'Amico farm to tell them we would have to come back another day. One of the brothers suggested we check with Mr. Davison at the next farm down the road. A life-long resident of the area and 97 years old, he may have seen something in the hills to help us out.

Mr. Davison was a pleasant, white-haired old gentleman who was very apologetic that he could not remember seeing anything like what we were describing, but he had not been deer hunting up on the hill for the last year and a half. We were looking for a clue to the description calling for a mailbox with the name "Pullen" opposite a drive leading to the farm at the base of the hill where Disboro 1 and 2 are located, and Mr. Davison was more than happy to tell us about the families who had lived in the area.

After leaving Mr. Davison, we decided to regroup on Saturday, September 11th, to look for Disboro 1 and 2 again. Harold was unable to join us on our second day, but we had additional help from Conrad Brenfleck (Connie) and Americo (Merc) Lucchi. We split up into two groups, Merc and Connie heading up the hill together, while Wendy and Fred started a traverse from two geodetic monuments on Perrineville Road towards the point behind the orchard on the D'Amico farm which led to the deer path to the top.

Before starting the traverse, Fred and Wendy went up to the J & S Grains Farm adjoining the D'Amico Brothers farm for permission to travel on that property and use the farm trail. The owner was very interested in our search and said he had once seen a large marble monument behind his property with "Perrineville" inscribed on it, but that he had not seen what we were looking for. He showed us his original deeds, dating back to 1725, because he was very interested in the history of his farm. He then led us to a clearing in the woods behind his farm, which he thought may have been suitable for building the survey towers we had described to him. Unfortunately, we didn't see any trees that seemed to match our description near this clearing. We thanked him and returned to our traverse.

Meanwhile, Merc and Connie were scrambling through the briars trying to find the high point in a manner similar to our earlier attempt. Merc excitedly showed us the yellow sand under his nails from an isolated spot he and Connie had found up on the hill. This was interesting to us because the description for Disboro 1 said the cone had been set in densely packed yellow sand, which was unlike the soil of the area. Unfortunately, there were no other references in the area of the sand that matched the description, but we kept the area in mind.

By the end of the afternoon, Wendy and Fred had traversed down to the earlier mentioned deer path entry to the woods, while Merc and Connie had retraced the description beginning point from Freehold to Perrineville Road by car to verify that we were in the right vicinity. Hot and tired, we decided to try again in a few weeks.

Meanwhile, Harold had found some clues to the 1939 rediscovery of Disboro in his State Geodetic Survey files. A sketch showed an angle turned up from the same geodetic monuments we had been working from on Perrineville Road, and a distance traversed to the cone. Fifty years is a lot of time for a cut line to be grown over, but Harold and Wendy thought this might be the best approach the next time out.

We reported our progress at the September monthly meeting of the Professional Land Surveyors Association of New Jersey,

and mentioned our next plan of attack. Several members of our society voiced interest in participating in the next search, and arrangements were made to go out again the next weekend.

This time, we were fully equipped to do long-distance traversing, complete with walkie-talkies, various calculators and lots of brush-cutting equipment. We met early Saturday morning to have breakfast in Hightstown, and then proceeded caravan-style to the site. Our team included Harold, Wendy, Connie, and Merc, this time joined by Bruce Blair and his daughter Dawn, and Ron McClear of Somerset County, who also brought a Wild T-2 for us to use.

From Ron's setup on Perrineville Road, we could see where we had to go into the woods, so we left him at the instrument with a radio and drove back behind the cornfield of the J & S Grain Farm. After finding a reasonable entry to the woods in the vicinity of Ron's line of sight, we set a traverse point and prism and radioed back to Ron to locate our point. After turning two sets of angles (2 direct and 2 reverse readings) and shooting the distance with an electronic distance meter, Ron set his backsight and drove up to meet us on the hill, while Harold and Wendy calculated the coordinates of our traverse point so we would know in which direction to proceed to Disboro 2. It had been decided to look for Disboro 2 first so we would not disturb or accidentally harm Disboro 1 in our enthusiastic search. Since the monuments were 102.43 feet apart, once Disboro 2 was recovered we could approach Disboro 1 with care. After Ron set up on the new point and turned up our calculated angle, everybody took machete or brush-hook in hand and started hacking through briars, bushes, and small (and not so small) trees. The cutting was pretty vigorous, and by noon we were all worn out but excited to know we were only 500 feet from Disboro 2.

Connie, Bruce, and Dawn had to leave, so Ron, Merc, Harold, and Wendy continued on for several hours more, getting thoroughly scratched up and exhausted in the process. When Ron announced at 4 p.m. that he had to leave, taking his instrument with him, the three of us remaining calculated the coordinates of the traverse point we had just set.

When we found we were only 284 feet from our destination, we looked at each other and agreed that we were too close to stop, and there was still plenty of light. The only problem was that we had no instrument, and the deflection from our last point to Disboro 2 was calculated to be 31 degrees. Merc stood up and looked down the cut line and said, while judging with his arms, "Well, here's 90°, half of that is 45°, 31° would be about here. Let's head for that big tree." So we set out with our cloth tape and machetes, clearing out a not-so-straight path of least resistance to the tree, which was standing off by itself. We reached the tree as the sky was clouding up, and dusk began to fall, but the excitement built as we found large blazes on 2 sides of the tree. Wendy began hacking the briar away from one blaze, and Merc from the other, but we froze when we heard a loud "clink" as Merc's machete hit something on the ground about 8 ft. from the tree. Harold and Wendy rushed to Merc's side and we started pushing away the undergrowth. As the brass disc beamed up at us from the ground, we all began yelling and dancing round Disboro 2, smiling until our faces hurt. Trudging back down our meandering outline in the increasing darkness and light, misty rain, Wendy complimented Merc on his well-calibrated arms and eyes, and the three of us talked non-stop until we split up to go home.

Now that we had Disboro 2, we were only 102.43 feet from our goal, and it was no longer unreasonable to think we could pinpoint it.

As we prepared for the final leg of our search, to be completed during New Jersey Surveyors Week, Harold contacted Ralph Poust of the National Geodetic Survey to be present for recovery and resetting of Disboro 1. He also contacted the landowner, who said he wanted to be present at the historic moment, and sent out a press release from the governor.

Meanwhile, he sent one of his crews out to clean up our cut line so the site would be accessible to all the surveyors and others interested in the project. We announced at our October meeting of PLSANJ that the recovery would take place on Thursday, October 14th, and invited everyone.

Harold had borrowed a videotape ma-

chine to film various parts of our search throughout the weeks, and on this final day, he filmed the turning of the last distance to where Disboro 1 was calculated to be. Harold and his crew of state workers were joined by Ralph Poust and Merc in this last bit of measurement, but they all felt anxious when the pinpointed area turned out to be a depression in the soil possibly indicating the monument had been disturbed. Carefully probing by hand for the cone, they were watched by various surveyors, the landowner, David Marrus, and his associate, Dennis Hingston, a British land surveyor. About 18 in. down, they found the top of an 8 in. diameter grey glazed ceramic cone, our treasure. Stakes were set at the top of the pit above the cone, and a bridge set to mark the exact center of the area encircled by the cone. This was checked by placing a piece of paper on the top edge of the cone to take an impression and to find the exact center. As they dug deeper, the 24-in.-high cone was exposed, cracked in several places, as mentioned in the 1939 recovery description, but all pieces were whole and no chips were missing. As it was carefully lifted out of the pit, cleaned off, and photographed, we discovered an unexpected second cone just below the first one, a sub-station not called for in either the first or second descriptions. The center of this was compared to the center of the first and was also carefully dug out. This one was a 9-in.-diameter grey glazed ceramic cone, 10 in. high, in perfect condition. After we all took turns having our picture taken with the cones, Ralph began setting a brass disc sub-station in concrete in the pit, while Harold's crew continued looking for the reference markers for the two monuments. It was discovered that one has a bad angle, being 180° out, so the description would have to be revised, but both references for both monuments, a total of 4 RM's, were recovered the same day. Meanwhile, Ralph set the surface marker for Disboro 1, a brass disc in concrete.

Prior to the final uncovering of Disboro 1, Harold had sent out a press release announcing what we were going to do and that we had already recovered Disboro 2. Although there was no press on the site at the time of actual recovery, the *Windsor-Hights Herald* sent a reporter, Peggy Nolting, to in-

terview Harold. He took her to the site and retraced our steps from the road, through the farm and woods, to the locations of Disboro 1 and 2. This interview was filmed by Peggy's crew and was played as a 3½-minute news item on local cable TV.

Our own videotape was forwarded to Wind & Whalebone Media Productions of Princeton, N.J. We are hoping that we have enough footage that our tape can be made into a short program on this project, to be shown to surveyors and surveying students when interest is expressed.

The monument is on long-term loan from the Federal Government to the New Jersey State Museum at Trenton and is displayed with a plaque which is engraved with an explanation of the cone's significance, donated by Berntsen Inc. of Madison, Wis. Both PLSANJ and NJSPLS have access to the cones for displays and seminars, should the need arise, and the State Museum has offered to lend a lidded case to protect the cones when on display.

ACKNOWLEDGMENT

In conclusion, we would like to thank the following individuals and organizations for their help in the recovering process: Americo Lucchi, Lanning Engineers; Fred Losowski, Nassau Surveying; Conrad Brenfleck, Nassau Surveying; Bruce Blair, self-employed, and daughter Dawn; Ralph Poust, Mark Maintenance for National Geodetic Survey; Ron McClear, Somerset County Engineer's Office; Ron Kuzma, N.J. Geological Survey; Jeff Olsen, N.J. Geological Survey; Jim Smith, N.J. Geological Survey; N.J. Geological Survey, for use of vehicles and equipment; Somerset County Engineer's Office, for use of equipment; Nassau Surveying, for use of vehicle and equipment; Lanning Engineering, for use of cutting tools; Berntsen Inc., for donation of plaque for display with monuments; N.J. State Museum at Trenton, for accepting responsibility for care of monuments; Wind & Whalebone Media Productions, for editing our videotape into presentable form.

APPRECIATION

This paper is dedicated to Harold Neil, Jr., the other half of the coordinating team to recover Station Disboro. Although we worked together for months on the recovery project, his busy schedule did not allow us to make this paper another joint venture. Hopefully the excitement and historic importance of our work is a tribute to our shared interest in surveying. ■