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Cecelia S. Kirkorian

Joseph D. Zeranski

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Cover Page Footnote
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INTRODUCTION

Roads are networks which bind people and communities together, reflecting the trade and transportation patterns of the regions they serve. They also influence the settlement patterns of people, commerce and industry. For these reasons, roads should not be treated merely as adjuncts to other human endeavors, but as distinct entities worthy of study in their own right. In learning more about these arteries we can gain knowledge about construction methods and technological development; but, more importantly, we can gather insights into historic transportation and communication needs and settlement interrelationships. This paper will examine a portion of a New England road system as it reflects the societal aptitudes and attitudes of a southwest Connecticut community over three centuries.

Colonial New England Roads and Concepts

New England, during the seventeenth and eighteenth centuries, was composed of colonies whose trading activities were concentrated along the coast and major rivers. New England's trading patterns, including the road system, reflected its dependency upon European goods. Taaffe, Morrill and Gould's diachronic model for network development in an underdeveloped, colonial country proposes the primacy of coastal traffic during developmental Phases 1 and 2. In Phase 1 the underdeveloped country's network consists of a scatter of small ports and trading posts along the coast; and, during Phase 2 there is a concomitant emergence of a few major routes of inland penetration and differential growth of ports and inland connections (Taaffe, *et al* 1963: 503). A tentative application of the Taaffe, Morrill and Gould model to colonial, southern New England suggests a strong correlation between the predicted and observed network development. (The distortion of the model by the dominance of the Connecticut River transportation system is acknowledged.)

While most long-distance travel and trade was by coastal ship during the colonial period, peddlers, drovers, the poor and some adventuresome travelers did use land routes. Otherwise, most road traffic was generated locally. During this period, most travel was by foot or horseback (at four miles per hour) with the introduction of ox-carts and wagons, to any degree, being an eighteenth century development (Rose 1976:1). Only at the end of the eighteenth century did stagecoaches and personal carriages become common (Dunbar 1915 I:33-47).

Roads in colonial New England were little more than swaths cut through the woods and fields with only the most obtrusive undergrowth, rocks and trees cleared away. Their centers were often lower than the edges, while stumps, boulders and fallen trees were commonplace, and quagmires abounded (Dunbar 1915 III:742). As commonland, roadways belonged to everyone and residents stored wood, stones, wagons and a wide variety of farm implements along them. Livestock grazed on the roads and fences were often placed across the road at property boundaries to confine the farm animals. Travelers were confronted with a variety of obstacles, including barways, called pents to confine livestock; intersections with no directional signs; and, impassable sections of road where travelers had to resort to axes and shovels in order to proceed forward (Mitchell 1933:9-13).

From the mid-seventeenth century, town surveyors of the roads were required by a statute of the Colony of Connecticut to oversee the upkeep of highways and bridges (Connecticut 1830:49-50). All male residents, from 16 to 60 years of age, were to provide at least two days of free labor a year working on the highways, providing their own equipment and materials (Connecticut 1830:49-50). Roads differed in the quality of the construction and repairs as a result of this corvée system. In southwest Connecticut roads were considered

extremely poor, possibly because many residents preferred to pay fines rather than work. When they did work, it was often a fairly relaxed effort accompanied by good fellowship and libatious refreshments (Parks 1967:9-10).

The Post Road In Greenwich

In the southwestern corner of Connecticut, adjacent to the New York border, lies the Town of Greenwich. Passing through this community is what is now called U.S. Route One, known locally at various times as the Westchester Path, the Main Country Road, the Connecticut Turnpike, the Old Post Road, the Boston Post Road and, more recently, Putnam Avenue. Portions of this present route probably existed as an Indian path, only a few feet wide. Its overall direction was generally straight, looping around large boulders, steep hills, swamps, water courses and rock outcroppings (Mitchell 1933:4). Stretching from each river or stream ford, closest to Long Island Sound, to the next water course, the path paralleled the coast for many miles. In Greenwich, European settlement began along the southeastern shore in 1640. In the 1670's, town farmers seeking additional arable land, looked to the unsettled area several miles to the west known as Horseneck. The ensuing westward movement followed what was to become U.S. Route One, then called the Westchester Path. Almost from the earliest settlement this roadway was the most important local land artery.

The Greenwich Town Meeting of December, 1679, appointed a committee of seven men to lay out homelots at Horseneck and to ". . . lay out and make a better way along the Path" (Greenwich, Town of 1640-1754:38). In 1686 two men from the growing settlement of Horseneck were named as road surveyors (Greenwich, Town of 1640-1754:54). Horseneck contained a tavern in 1696 and a meeting house by 1705 (Greenwich, Town of 1640-1754:104, 147-148). In 1706, the Town Meeting specifically called for the laying out of the Main Country Road on the Westchester Path (Greenwich, Town of 1640-1754:156). The stretch of road referred to was from the Mianus River on the east to the Byram River, on the west and coincided with the boundaries of the year-old Second Congregational Parish. In this case, the need to reach the meeting house seems to have initiated road improvements. The March 1719/1720 Town Meeting gave authority to the select men to layout the Main Country Road, and directed each owner to fence in his land along the road, and, specifically to pull down any pents blocking the road (Greenwich, Town of 1640-1754:185). Increased traffic and a growing demand for an uninterrupted passage through Town necessitated an alternative to the use of pents. At this juncture, the Main Country Road ceased to be a mosaic of right-of-ways and became a public highway.

Traveler's Accounts

Eighteenth century travelers have left us with many accounts of this section of U.S. Route One and, in particular, of a memorable ridge in the east end of Horseneck. Here the Main Country Road incorporated a switchback that was necessary to provide a stable surface for nonpedestrian traffic to traverse a sixty foot high ridge referred to during the colonial period as the Great Hill (Figure 1) (McLean 1967).

In 1704, Sarah Knight, while on a five-month trip from Boston to New York and back, spoke of a "prodigious high hill" in Horseneck which she walked up, leading her horse. On her return trip, she mentions "descending the mountainous passage that almost broke my heart in ascending before" (Godine 1972:25, 33). James Birket, while passing through Town in 1750, commented on the "most intolerable road" and added from "Horseneck we made three miles of the most miserable to Birom River" (Birket 1916:38,39).

In 1764, Benjamin Franklin initiated a day-and-night postal service between Boston and New York which utilized this route through southwest Connecticut (Rose 1976:1). From this service, the roadway derived its almost universal name of the Boston Post Road, or simply, the Post Road. Eight years later a stagecoach line was established between these

two cities, which entailed a two-week trip each way; and, although the service was abandoned during the Revolution, it was revived in the 1780's (Rose 1976:1).

The War And Its Effects

Throughout the Revolutionary War, traveling by ship on Long Island Sound was dangerous because the British largely controlled these waters; consequently, use of the coastal roads increased. The upkeep of the overland routes was important for the rebel cause as troops and materials constantly moved over them. At one time Greenwich militia, much to their distress, were ordered to spend their time repairing the local portion of the Post Road (Webb 1882:311). A famous Revolutionary exploit occurred on the Great Hill when General Israel Putnam was visiting Horseneck. Surprised by a large contingent of British soldiers he narrowly escaped capture when he bypassed the switchback and plunged down the steep hillside. This action amazed his contemporaries and was celebrated widely (Figure 2). Thereafter the Great Hill became popularly known as Put's Hill (Mead 1911: 162-168).

Due to the heavy traffic and lack of repairs during the Revolution the Post Road, after 1783, was undoubtedly even in a poorer condition than it had been prior to the War. In the winter of 1785-6, Robert Hunter Jr. passed through town and wrote of the "steep precipice that Gen. Putnam . . " and added "I would not attempt it for the world" (Tingling and Wright 1943:159). Speaking of his driver; the imaginative Brissot de Warville in 1788 wrote:

> I cannot conceive he avoided twenty times dashing the carriage to pieces and how his horses could retain themselves in descending the staircase of rocks . . . one of these is Horseneck, a chain of rocks so precipitous that if a horse should slip, the carriage must fall 2 or 300 feet into a valley (Handlin 1948:81).

About the same time another traveler, John Cutler, more accurately reported:

> The road ascends a precipice by different windings, which appears to me to be nearly 60 feet high and almost perpendicular. As you approach it, it appears inaccessible but nature has found crevies in certain directions, which seem to have been designed for a road and by labor it has been made tolerably good (Cutler and Cutler 1888:224).

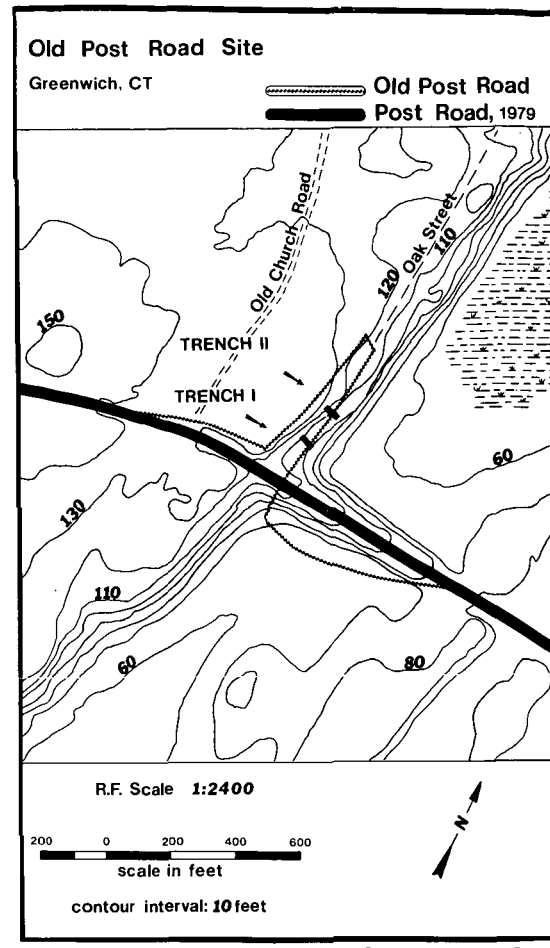

Figure 1. The Put's Hill section of U. S. Route One. Illustrated above is (1) the Old Post Road (including the pre-1807 switchback) and (2) the present Post Road (1979) (Close 1918:136b; Ristow 1961: 124). The present U. S. Route One (Post Road, 1979) and the topographical features are taken from the Greenwich Conservation Commission Aerial Topographical Map #17. Old Church Road was built to replace Oak Street in 1899 (Greenwich, Borough of 1854-1931 III:34).

An increasing population, the aggregation of portions of this population, the development of local industries, improved carriage technology and availability, and the severance from England combined to dramatically change the transportation requisites in New England as the eighteenth century came to an

end. The Revolution had proven to the new nation the necessity of an operative overland road network; and, concomitantly, the War had enlarged the American social horizon beyond a neighborhood perspective (Cleveland 1909:10). The combined effect of these catalytic factors was an intensification of road construction and improved construction technology. However, the outbreak of the Napoleonic Wars in 1793, and the subsequent abolishment of the foreign colonial monopolies, enabled America to become a free-trade center and exploit world commerce through a maritime system (Cleveland 1909:16). The resulting expansion of the coastal trading centers was coupled with an expansion of inland routes and overland connector links.

In Taaffe, Morrill and Gould's analysis of the sequence of transportation development, Phase 3 is represented by the growth of feeder routes and the beginnings of lateral interconnection. During this Phase the main seacoast terminals established during Phases 1 and 2, continue to expand, and intermediate centers linking the coastal and interior terminals develop (Taaffee, *et al* 1963:511). The historic transportation development sequence of the post-colonial country appears to fit the Taaffe, Morrill and Gould model.

Improved Roadways

In an effort to meet the public demand for an improved transportation system, the Greenwich link of the Post Road was incorporated into a county turnpike company in 1792, the third turnpike company in America (Wood 1919:376). The company was designed so that revenues extracted from turnpike travelers, at regularly spaced turnpikes, would subsidize improvements on this notorious switchback (United States Department of Transportation 1976:8). However, the financial and administrative burden was still too heavy for the county, and in 1806 the Connecticut Turnpike Company was formed to rebuild and maintain the Post Road from the Town of Fairfield to the New York border, incorporating the Greenwich link (Greenwich, Town of 1782-1847:20-24). Portions of the Turnpike that were not efficient were modified, to the extent that the current technology allowed, i.e. curves were eliminated and bridges erected (Wood 1919:376). The new company made major changes to the alignment of the road along Put's Hill when it blasted through the rocky ridge crest and built a causeway from the ridge east, to the vally below, bypassing the switchback. Until the coupling of blasting powder technology with transportation economics, negative deviations, such as the Put's Hill switchback, had provided the only method of circumventing natural barriers (Haggett 1971:66).

Additional advances in construction technology and the influence of construction specialists accelerated the improvements on turnpike systems. J. P. M. Trésaquet's detailed specifications for road construction, which included a ten-inch base of hammered, broken stone for an eighteen foot wide carriageway, became a model for America's earliest turnpikes (United States Department of Transportation 1976:12-13). Albert Gallatin, U. S. Secretary of the Treasury in 1807, outlined similar construction principles in his report to Congress, including: 1) the reduction of hills to a maximum slope of 6.12 per cent; 2) the use of stones in the roadbed of similar quality and size and not more than three inches in diameter; and 3) the use of a 12 inch pounded stone or 18 inch gravel base (Anonymous 1930:11). McAdam's broadly circulated construction specifications, that required only a six to ten inch base of broken, two inch sized stones, were first used in America during the 1920s.

Although the switchback was no longer part of a turnpike system after 1806, it was still a vital road that was maintained by the town. Oak Street, the circa 1716 northern extension of the switchback continued to connect the Post Road with farms to the north (Greenwich, Town of 1640-1754:178). Greenwich records indicate that ditches/gutters were authorized along the turnpike sections adjacent to Put's Hill in 1879 (Greenwich, Borough of 1954-1931 IA:55-56).

A growing and mobile population continued to use the New England road system but technology was beginning to provide alternatives. In the 1830s, steamboats made travel

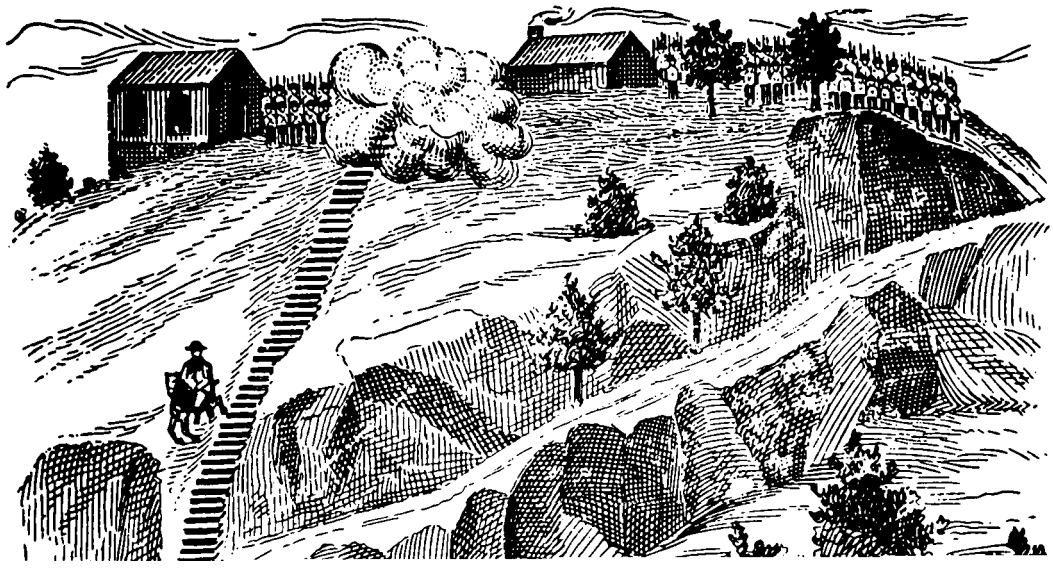

Figure 2. This sketch is purportedly based upon the recollections of Gen. Israel Putnam and depicts his 1779 flight down the hillside. The roadbed is shown in the lower right of the illustration. The steep pedestrian field stone stairway was, in actuality, much cruder than this representation indicates (Mead 1911:162b, 166).

by water faster and more reliable, while in 1849 the railroad passed through Greenwich just south of the Post Road. The Connecticut Turnpike Company went out of business in 1854, but improvements continued on the road, with trolleys, paving, professional work crews and many expansions (Wood 1919:377). Its use for long distance vehicular travel lessened in 1938 when the Merritt Parkway was built for cars, and, almost completely in 1955 when the new Connecticut Turnpike was built to provide a high speed artery for commercial and pleasure vehicles.

The final Phase of the Taaffe, Morrill and Gould model is characterized by "the steady rise in the importance of road traffic, which first complements the railroad, then competes with it, and finally overwhelms it" (Taaffe, *et al* 1963:514). This developmental sequence repeats the process of linkage and concentration between and within the most important centers established in the three prior Phases. The best paved roads, the heaviest rail schedules, etc. will follow these "main street" links between the major centers according to the model (Haggett, *et al* 1971:96). A positive relationship between the predicted developmental sequence and New England's post 1850 transportation pattern is suggested from a southwest Connecticut perspective.

A Switchback Remembered

From 1806 until 1897 the switchback was an undeveloped side road. In 1897 the owner of the switchback property asked the Borough of Greenwich to exchange the land containing the old roadbed (Oak Street) along the cliff's edge for a new roadway (Old Church Road) to the west of the old roadbed (Greenwich, Borough of 1854-1931 3:34). After much local opposition to sacrificing the historic ridge the Borough agreed to the exchange (*Greenwich Graphic* 1898). To lessen the widespread hostility to this agreement, a proviso to the exchange granted to the town a quarter acre park on the crest of the hill near the site of Putnam's escape (Mead 1911:301-303). Soon afterwards the crest was raised with a retaining wall and a large brick residence was built on the edge of the bluff where the roadway had formerly run. This mansion was dismantled in the 1930s. Evidence of the southernmost loop of the abandoned switchback that extended south of the Post Road, called Putnam Avenue after the late 1800s, was des-

troyed during a 1950s residential development. This seventeenth and eighteenth century switchback was little used throughout the nineteenth century (Minor 1898). A portion remained largely forgotten, but seemingly undisturbed, during the twentieth century.

In 1978, when plans to develop the old Post Road ridge site were publicly announced, civic pride in the Hill's historic significance was vocalized and mobilized into a preservation effort. This public action, which paralled the local pride in Put's Hill that had incured a town park in the 1890s, successfully halted the initial development plans. The recognition that destruction of the site was highly probable resulted in plans to conduct archaeological fieldwork at the historic site. This unpaved roadway was considered to be one of the few, if not the only, extant, largely unmodified, sections of the colonial Post Road.

ARCHAEOLOGICAL APPROACH

An archaeological investigation of the site was initiated in 1979 to ascertain the integrity of the switchback remnants and to gain an understanding of the road construction techniques employed in colonial Connecticut to circumvent a natural barrier. It was also hoped that an appreciation of a portion of New England's transportation system could be related to the regional development of that system. The archaeological research design included test hypotheses formulated with the aid of eighteenth and nineteenth century construction specifications and, due to the paucity of archaeological reports on early American, non-turnpike roadways, intuitive reasoning (Huey, *et al* 1977; Michael, *et al* 1976; Riley 1976). If, in fact, the colonial roadway, on a subsurface level, was extant, we could expect to locate: 1) cultural detritus, concentrated in the gutters; 2) evidence of a crown; 3) evidence of ruts; 4) the width of the road, which might be a datable feature as roadway width specifications have been dated; 5) both the roadbed surface and the roadbed's sub-surface structure; 6) evidence of gutters; and, 7) evidence of repair efforts.

Fieldwork

The ridge area available for archaeological investigation was restricted by the *circa* 1900 construction and extensive landscaping on the ridge crest as well as the 1950s housing development. Therefore, only the eastern portion of the documented switchback, north of U. S. Route One, was investigated. The fieldwork was designed to ascertain the roadway's integrity with minimum excavation. Two trenches, aligned perpendicular to the ridge base, were excavated by trowel and all soil was screened by two centimeter levels. The datum point was established at a USGS marker to the south-southwest. A narrow terrace traversing the hillside, apparent in the field survey, roughly coincided with historic sketches of the pre-1900 roadway; placement of the trenches was based on this feature.

Trench 1, the southern testing unit, was placed north of U. S. Route One, 38 feet east of the ridge face and 26.5 feet below the post 1900 ridge top (Figure 1). This trench was excavated to bedrock at 17.3 inches on the east end and at 19.5 inches at the west end. A horizontal and vertical scatter of artifacts was noted, including a scratch blue sherd, salt glazed gray bodied stoneware and twentieth century beer bottle fragments. The spatial patterning of the pebbles, cobbles, boulders and cultural artifacts indicated downslope deposition and disturbed stratigraphy (Butzer 1971:163). Investigations of the ridge face revealed eroding pits with contents that were manufactured between *circa* 1750 and *circa* 1970. These trash pits, in conjunction with construction episodes on the causeway, contributed to inconclusive evidence of a roadbed at this locus.

Trench II, 21.6 feet below the post 1900 ridge top, was located contiguous to the ridge face, north-northwest of Trench I (Figure 1). This second test unit measured 16.1 feet by 3.3 feet, the width of the terrace at this locus, and sloped at ground level west to east with a drop of 20.1 inches, a grade of 10.4 per cent. The north-south ground level incline of the terrace between the two trenches measured a slop of 6.75 per cent, higher than the maximum

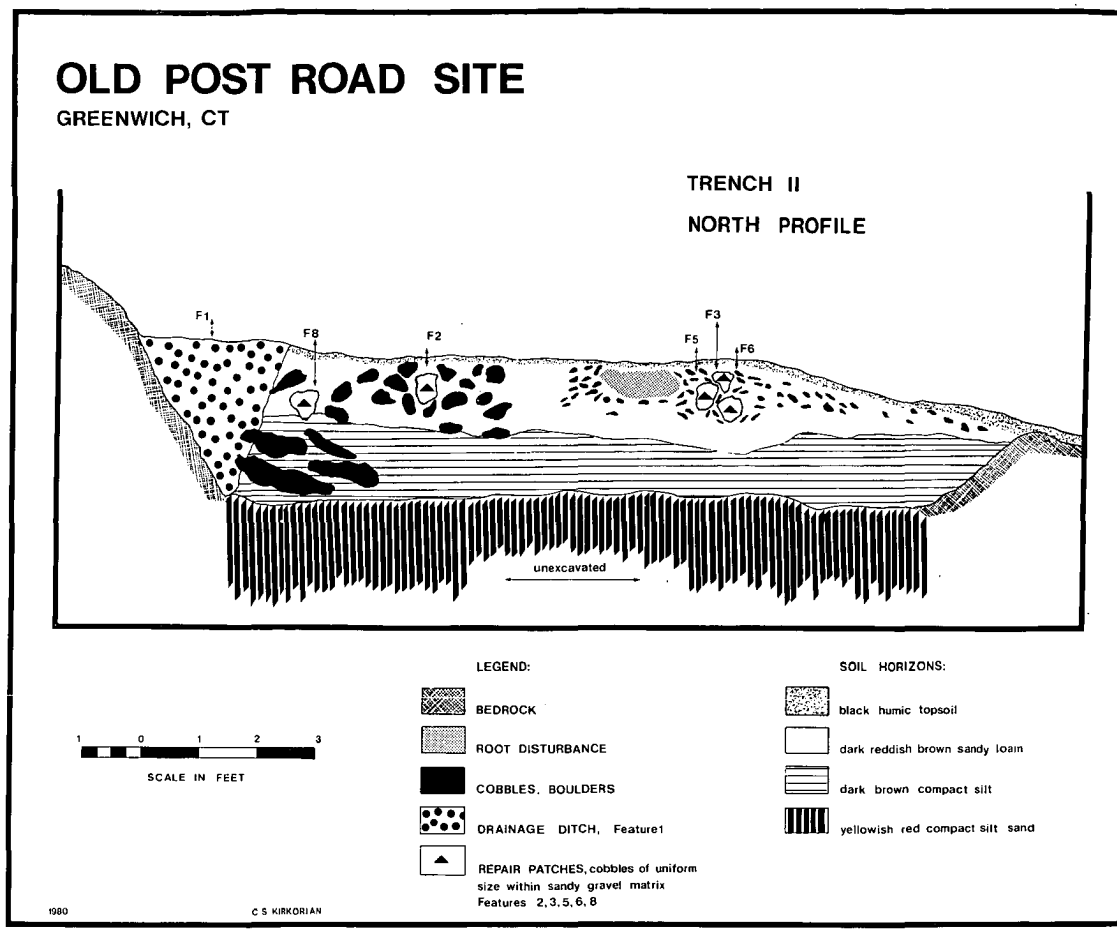

Figure 3. Trench II. North Profile.

slope in Gallatin's 1807 recommendation for "modernized" roads.

No artifacts were recorded beneath the shallow sod zone of Trench II. However, below the sod zone a horizontal massing of cobbles on the east end and of boulders on the west end suggested an artificial/human manipulation (Butzer 1971:163). The concentration of the stones by size, the unnatural juxtaposition of the variety of the stones and the horizontal bedding of the cobbles and boulders are factors symptomatic of road surface preparation, but are also indicative of a preparation that did not provide the advantages of a cobblestone road, that is, a uniform surface of contiguous, water worn, similarly aligned stones. The switchback surface preparation, as revealed in Trench II, did not conform to either Trésaguet's construction specifications or McAdam's principles which were popular after 1820; but the surface does reflect an appreciation, by either the town or the county turnpike maintenance personnel, of the construction techniques advocated by Gallatin, Traésaguet and McAdam. The roadbed's base, which provided a secure footing for the road along the steep side of the ridge, must have required considerable work during its construction and use; but, tools were not available to explore its mass and determine how it was formed and to what degree it rested on rock outcroppings.

Evidence of a crown was inticipated since research had indicated that as early as 1794 small New England communities were placing crowns on old roads as part of a general repair program (Belknap 1794:18). Also, it was anticipated that the 1792 to 1806 turnpike

company control of the switchback would have left traces of a crown. However, no evidence of a crown was noted.

A pit (Figure 1) of black, rubble filled soil abutted the ridge and extended 2.6 feet into the trench to a depth of 2.7 feet, following the contour of the bedrock (Figure 3). The pit was most probably a section of a crude drainage ditch that extended along the ridge base of the eastern portion of the switchback. Slate roof tile fragments, windowpane glass, nails, wood and brick spalls comprised the artifacts from the ditch and represent an assemblage of *circa* 1900 con struction materials. When the mansion was erected on the ridge crest and the town re-directed the north-south traffic, the abandoned switchback's drainage ditch was undoubtedly filled with architectural remnants and constructional debris as part of a landscaping effort.

Nine features were recorded in the roadbed. Eight of these features shared common attributes of loosely packed sandy soil; cobbles of uniform size; and, soil color distinct from the surrounding matrix. The size of the features varied as the total number of cobbles per feature ranged from 8 to 40. Although the angularity of the cobbles in certain features indicates purposeful rock crushing activity, there has been no determination as to whether these features represent hand/hammer work or post 1858 rock crushing machine products (Anonymous 1930:11). Most probably these cobble filled features represent road repair efforts to offset the effects of hillside gravity and wheel and water damage (Gillespie 1848:337, 331). The juxtaposition of these repair patches appears to form two clusters aligned perpendicular to the ridge. This orientation corresponds to the common ox cart axle width, five feet (Anonymous 1835). Evidence of both repair efforts and ruts had been anticipated; it is felt that these eight features represent repair efforts and activities that would have created discernible ruts in other soil/slope circumstances.

Bulk Density Testing

As the cobbles and boulders were removed from the trench, it was noted that a packed clay layer, 3-6mm in thickness, adhered to the underside of the stones. This evidence of packing, due to extended and heavy traffic, was supported by bulk density testing of the excavation area. Bulk density testing was conducted at the site to substantiate the roadway's existence and to test the potential of this soil analysis method for other archaeological situations. Bulk density is not an invariant quantity for a given soil; it varies with the structural condition of the soil, particularly that related to packing (Blake 1965:375). A brass, double-sleeve cylinder coring device was pressed into seven loci at a standard depth of 12 inches below the surface. A known volume as it existed *in situ* was extracted from each testing locus by the core device and then dried to 105°C to adjust for moisture variability. Standard bulk density is the oven-dried mass divided by the field volume of the sample. However, adjusted bulk densities (i.e., adjusted bulk density = weight of fines/volume of fines) were recorded after screening the samples through a 2mm mesh, #10 sieve, and adjusting for the specific gravity of the mineral particles. Five of the seven tests were conducted within the suspected roadway; and, two control tests were taken: (1) a sample from the filled drainage ditch; and, (2) a sample from a nondisturbed portion of the ridge. These adjusted bulk density weights (ranging from 1.35 $g.cm^{-3}$ to .8994 $g.cm^{-3}$) are the highest at the trench site, within the ox cart width perimeters, and diminish with the distance of the testing points north and south of these known perimeters. The lowest recordings were from the two control samples and an area 2'9" south of the trench and parallel to the ox cart wheel interspace. The results of the bulk density testing support the contention that the easternmost section of the old Post Road switchback is intact, and indicate that bulk density testing has an enormous potential for delineating archaeological sites while avoiding unnecessary and uneconomical excavations.

CONCLUSIONS

Results of the archaeological fieldwork yielded no evidence of two anticipated fac-

tors, cultural detritus and crowns. However, substantial evidence of a gutter/ditch and repair work was uncovered. Although the width of the road was delineated, it is felt the physical constraints of the terrace dictated the maximum width of the roadbed during any period of use rather than any prevailing construction concept. There was no recognizable rut configuration but the alignment of the cobble filled patches suggests a concentrated effort to repair rut-like damage to the road surface. This switchback traversed a steep hill on a narrow terrace that afforded space for only one inside ditch/gutter. Perhaps extensive crowning was unnecessary on this switchback because of the hillside incline, the interior ditch and the terrace grade. A massive, packed layer of introduced cobbles and boulders is indicative of a prepared roadbed but we were unable to delineate any surface and subsurface structural variation as had been anticipated.

The historical research and the bulk density testing results lend support to the belief that a portion of the old Post Road is extant in Greenwich, Connecticut. This artery was vital to the development of a coastal hamlet and a town and served as a main transportation link between the centers of Boston and New York. The degree to which Taaffe, Morrill and Gould's model is applicable to colonial New England is not approached; however, the need for an appreciation of the import of transportation links and their development is recognized.

ACKNOWLEDGEMENTS

We gratefully acknowledge the invaluable assistance of Denise Tratolatis both in the field and for support throughout the project. The bulk density testing was conducted under the guidance of Dr. Harvey Luce and Mary Lou Peloetier, School of Agriculture, University of Connecticut, Stoors, CT. Bill Hollis and Ann Ross were kind enough to photographically record the site. Robert Weiner, Geography Department, University of Connecticut, Storrs, CT, was responsible for the graphic reproductions. Funding for this project was provided in part by the Public Archaeology Survey Team, University of Connecticut, Storrs, CT and the Archaeological Associates of Greenwich, Greenwich, CT. And finally, without the cooperation of the Greenwich YMCA, owners of the site in 1979, this work would not have been possible.

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Authors

CECELIA S. KIRKORIAN
Historical Perspectives
43 Zaccheus Mead Lane
Greenwich, Connecticut 06830

JOSEPH ZERANSKY
Greenwich Conservation Commission
Greenwich Town Hall
Greenwich, Connecticut 06830