Analysis of Saratoga National Historical Park Base Map

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INTRODUCTION

Charles Snell completed the Base Map for Saratoga National Historical Park in 1950, with the object of depicting the character of the battlefield park area as it looked on both September 15 and October 8, 1777. His "Report on the Ground Cover at Saratoga National Historical Park on October 8, 1777" (1949), indicates that Snell based the map on extensive research in primary and secondary, narrative sources as well as on the maps of Lt. William Cumberland Wilkinson, who accompanied Burgoyne's expedition as assistant engineer.

In the almost forty years since Snell completed the Base Map, additional archival and archaeological evidence has become available. Park personnel have been the primary contributors to this expansion of information on the battlefield park area. In addition, in the mid 1970s, Dean Snow of the State University of New York at Albany did an archaeological study of the site. In 1987 Nancy Gordon completed a report, "The Saratoga Battlefield: A Vegetative History," in which, based on newly available primary sources, she offered some conclusions regarding the nature of the park area's ground cover in 1777. Park management in the future will require an up-to-date historical base map securely grounded in currently available research materials. The purpose of the present report is to determine the degree to which the evidence that has become available since 1950 indicates the need for revisions to the Base Map. This report represents the work of only three weeks, and its conclusions are limited and tentative.

The question of the accuracy of the Base Map is made particularly compelling by the Park Service's current plans to bring the landscape into more exact compliance with the Base Map. In order to facilitate the National Park Service's goal of restoring the landscape to its condition on October 7, 1777, the map must accurately depict the character of Euroamerican settlement in the area prior to the arrival of the American and British armies in fall 1777, as well as the clearing done by both armies prior to October 7. The Base Map must describe the area's topography as well as its 1777 roads, structures, farms, and military fortifications. Refining these aspects of the 1950 Base Map will produce a document suitable to guide the management of Saratoga National Historical Park.

AGRICULTURAL CLEARING AND LOGGING IN THE BATTLEFIELD PARK AREA, SEPTEMBER 1777

The Course of Settlement and the Gordon Report

In researching her 1987 report, "The Saratoga Battlefield: A Vegetative History," Nancy Gordon consulted the following newly available, primary sources: German materials microfilmed by the Library of Congress, the journal of William Strickland published by the New York Historical Society in 1971, and the Schuyler Papers held in various archival collections, particularly that of the New York Public Library. Gordon concluded that, "This new material justifies a re-evaluation of the historic information about the battlefield site." It is therefore imperative to determine whether or not her conclusions indicate the need for revisions to the Base Map.

The German materials Gordon consulted constitute the official records of the Brunswick troops serving under General Burgoyne, the originals of which are in the Brunswick Hauptarchiv, Wolfenbuttel, Germany. Microfilm copies made by the Library of Congress are held in the library at the Saratoga National Historical Park. She cites eleven items from this collection for the dates of September 13 through October 2, 1777. Two of these are references to excellent, general statements regarding the heavily wooded terrain and the significance of the dense vegetation to the outcome of the battle.

Three entries from the German diaries for September 13 - 17, 1777, describe the vegetation in the various areas Burgoyne's army passed through in its advance across the Comme-Kill to Sword's house and south to Freeman's Farm. These entries all refer to dense forest. This is consistent with Col. Wm. C. Wilkinson's map, "Plan of the Encampment and Position of the Army under His Excellency Lt. General Burg--- at Sword's House on Hudson's River near Stillwell on September 17, 1777," engraved by Wm. Faden. These descriptions in the German diaries do not, however, preclude the existence of the small farm plots shown on Wilkinson's map. In any case, most of the areas discussed in the entries for September 13 - 17 diary lie north of battlefield park's boundaries.

In her notes 48-51 Gordon cites entries in the German diaries that are relevant to the park's vegetation in 1777. The army's advance from the north to Freeman's Farm is depicted as being through dense forest and the farm itself as surrounded by dense forest. This observation agrees with the 1947 study, "A Report on the Reforestation Program for Saratoga National Historical Park," by Richard J. Koke, then Historian at Saratoga National Historical Park, in which he wrote that the greater portion of the acres comprising the park were, in 1777, "heavily wooded, except for a few scattered farm clearings." This conclusion also corresponds with the depictions of these areas on Wilkinson's maps, making a high probability of accuracy. Gordon's information on the areas to the north of and surrounding Freeman's Farm should be compared to that on the Base Map of September 19, which does appear to indicate that the terrain around Freeman's Farm was brushy and wooded.

Gordon's information here does not, however, fully explain the character of the vegetation in the immediate vicinity of Freeman's Farm on October 7, 1777. The October 8, 1777, Base Map shows that additional areas to the northeast and southwest of Freeman's Farm had been cleared between September 19 and October 8. It is reasonable to assume that, during the interim between the battles, the British army cleared the firing line, particularly in front of the Balcarres Redoubt. It seems probable, then, that the October 8 Base Map is reasonably accurate for this area on that date.

The Gordon report cites entries (notes 49-51) describing the swampy nature, dense scrub growth, and paths through the Middle Ravine as well as the German use of brush to obstruct the American's passage through the ravine between September 19 and October 8. Although the last entry is dated October 2, the passages she cites are helpful in accessing the nature of the vegetation and the armies impact on the Middle Ravine. Although pertinent to understanding the vegetation during battle, these items do not appear to change the Base Map.

Gordon consulted the Schuyler sources held by the New York Historical Society, the New York Public Library, and the American Antiquarian Society in Worcester, MA, as well as the report by Stephen Strach entitled "The Saratoga Estate of General Philip Schuyler: 1745-1839. An Interpretive and Historical Grounds Survey," (Eastern National Park and Monument Association, 1986.) Notes 22, 28, 34, 35, 37, 39, 40, 41, 42,

43, and 55 document Gordon's use of these materials on early Euroamerican settlement in the area.

She used the Schuyler records in support of her contention that the degree of logging by colonists (notes 39-43) in the area was minimal, with the pines cut first and no more than 33 acres logged per year. Although her formula estimating logging rates in the eighteenth century might be questioned, her argument that cutting was minimal and selective seems reasonable. Nor does this hypothesis appear to disagree with either narrative sources, the Wilkinson maps, the Koke and Snell reports, or the Base Map for September 19, 1777. Gordon's arguments with regard to the impact of the Amerindians upon the park area should be noted as well at this point. Her contentions that they used the site for hunting but did not locate a village there seem well founded. Her arguments regarding the impact of burning by Amerindians on vegetation may be questioned, but it seems likely that the onset of Eurasian diseases in the area came even earlier than she estimates, making the impact of the Amerindians on ground cover even less by 1777 than she contends.

The Schuyler sources become relevant to this question of the agricultural development in the battlefield park area in general on page 17 (footnote 37) of Gordon's report. There she cites the Schuyler Day Book held by the New York Historical Society and the Albany County Registry of Deeds to prove that Freeman's Farm was surrounded by deep forest and to support her conclusion that, "Freeman's farm aside, most of those who had been willing to settle on the Saratoga Patent were still taking up lowland acreage. In short, Freeman's Farm was pretty clearly the only one in that immediate area." She argues that the records of the store at Saratoga indicate that Freeman was the only new customer to trade there and therefore the only new tenant in the area.

Based on her new evidence, Gordon makes the following two statements: first, (p. 21) "All indications are that at the time of the battle, . . . not many farms had been established on the wooded uplands;" second, (p. 24) "with the exception of the fields along the Hudson and the area around Freemen's [sic] Farm, the battlefield was covered either with woods of varying density or with shrub growth, and sometimes with both." In a letter to Superintendent W. Glen Gray dated September 20, 1988, Gordon similarly wrote: "In sum, I think, on the basis of the presently available

information, that, except for the area around Freeman's Farm and on Bemis Heights, you ought to let most of the rest of the battlefield revert to forest.

The Course of Settlement and the Base Map

In addition to Freeman's Farm, there are seven well-identified cultivated areas shown on the October Base Map: the McBride Farm, the Coulter Farm, the Barber wheat field, the Hatfield Farm, the Munger Farm, the potato field, and the small field in front of the British main line. In depicting the McBride, Coulter, and Barber farms, Snell relied primarily upon Wilkinson's map, "The Encampment Position of the Army Under His Excy. Lt. Gl. Burgoyne at Swords and Freeman's Farms on Hudson's River near Stillwater, 1777" -- what Snell called Wilkinson's manuscript map -- and Charles Neilson's "Map of the Battleground on on Bemis Heights 19th Sept. and 7th Oct. 1777," (1844). Because these farms are so clearly indicated on the Wilkinson map and the accuracy of his work appears to have held up well in general, one can only surmise that these three farms were, in fact, in place, if abandoned, by October 1777.

For the Munger and Hatfield farms evidence is less definitive, as the Wilkinson manuscript map becomes vague and ends in their vicinity. Wilkinson's map does indicate, however, that he felt some cultivated areas lay to the south and west of the Barber wheat field. Snell also found the J. Munger Cabin in two secondary references: Charles Neilson's map and the W. L. Stone, "Map of the Battle Ground on Bemis Heights Sept. 19th and Oct. 1777." In a Memorandum dated June 1, 1989, Linda White offers historical and archaeological evidence as to the existence of the Munger, Chatfield, and Coulter Farms. For the A. Chatfield Farm she cites the document MS Sparks, "Gate's Camp at Stillwater," drawn by a soldier who fought on the American side.

There are as well a number of references, which Snell cited in his 1949 report, in written, primary sources indicating the existence of several farms to the west and south of Freeman's Farm. Primary sources also referred to both the potato field near the British army's encampment and the smaller field in front of the British line. As well, the deeds to several of these 1777 farms in the battlefield park area are held in

the Saratoga National Historical Park files. Others can probably be found in the Saratoga County courthouse in Ballston Spa. The majority of the farms in the battlefield park area were located south and west of the Great Ravine and the Middle Ravine. Gordon's contention that Freeman's Farm was the only farm in the immediate area is inconclusive, as these other farms may have been tied into a road network that lead to other trading centers. It is also unclear what she considers the "immediate area."

The Barber Wheat Field

While the existence in 1777 of the seven farms shown on the Base Map seems highly probable, their exact positions are less certain. Several Park Service employees have over the years questioned the location of the Barber wheat field and the 1777 road bisecting that field. In a December 10, 1985, memorandum written to the Saratoga's Park Superintendent, Richard Patterson, who was then an assistant park historian, stated: "The Wilkinson Map indicates the road bisecting the Wheatfield at Stop #5 as being a little less than 300 yards north northeast, and parallel to, the branch of Mill Creek. Our road may be as much as 200 yards too far north and the field correspondingly so. The interval of woods between Stop #5 and the field immediately west of it appears on the Wilkinson map as being about 250 yards wide; we don't come close." Patterson may be correct in noting a discrepancy here between Wilkinson's maps and the Base Map.

On the basis of new field evidence, Bill Ward in a March 14, 1989, memo, also suggested that the present placement of the revolutionary war road on the Base Map is incorrect. Contrary to Patterson, however, Ward indicates that the original road and the field were further to the north than the Base Map would indicate. Ward stated that he believed, "the present walking trail is several hundred yards south of where the actual line of engagement took place. There is strong evidence of a road, and I believe the road shown on Wilkinson's map, very close to the tree line at the northern end of the field." Park employee Linda White has found evidence of a road in the Barber wheat field, north toward the treeline; her evidence agrees with Bill Ward's placement.

Additional archaeological work may prove helpful in locating the outlines of the old road and perhaps of the structure Wilkinson showed in the field. The use of Dean Snow's report to establish some archaeological landmarks may also allow for a determination of the accuracy of the several Wilkinson maps. The establishment of accurate benchmarks will make it possible to calculate the location of additional sites shown on the Wilkinson maps for which field evidence no longer exists. Snell's report indicates that he did not consult the Wilkinson map located in the British Museum and entitled, "Plan of the Position of the Army under the command of Lieut Gen. Burgoyne in which it encamped on yr 20th Sept. 1777 near Stillwater." This map is quite clear in its depiction of the Barber Wheat field and the 1777 road, and these locations differs from those given on the Base Map.

The Chatfield, Munger, and Coulter Farms

Linda White has found what appear to be significant new field evidence on the Chatfield and Munger farms. My understanding of this evidence comes from her Memorandum on the Historic Base Map for Saratoga, dated June 1, 1989, to Superintendent, Paul Okey, Clyde Bell, and Pat Lynch. She also took me on field trip through the park on July 29, 1989. She argues convincingly that the label A. C. Hadwick Farm on the Base Map was misspelled and should be A. Chadwick. She also feels that the Munger and Chadwick Farms are incorrectly located on the Base Map (9C, 9D, 10C, and 10D) and need to be shifted to the rises immediately to the west and the south.

This would place the Chatwick Farm on the knoll just northeast of 47 6100 and 6 1000 degrees on the USGS map--on the rise where the Morgan monument is now situated. White has written sources from 1777 indicating the existence of a log cabin in the area. She has located archaeological evidence of a barn as well as an old lilac bush. She has found a well and a dump from the Chadwick house built in the early nineteenth century and has written evidence that this nineteenth century house was built near the older cabin. She feels that the Chatfield Farm should be located in sectors 9C, 10B, and 10C on the Base Map, on the rise where the Base Map places the Munger Farm. The Munger farm she places on the next rise west of the Chatfield

Farm, outside the park's western boundary. She has found remnants of the foundations from the Munger farm in the present corn field. The new location for the Munger farm can not be given for the Base Map because of the lack of contour markings. unclear

White agrees with the location for both the Chatwick and Munger farms given on a 1926 Contour Map, the maker of which is unknown. White has found that this map gives an accurate description of the contours, road placement, drainages, and foundations she has found in the field. She recommends that this 1926 map and the aerial photographic series done in the 1920s be used in the establishment of field lines, many of which have since been obliterated. That the Chatwick and Munger farms were actually further west and south might warrant re-examination of the alignment of the road that goes through the Chatwick Farm. It is possible as well that the location on the Base Map (9D) of the course of the Middle Fork between these farms and the Barber wheat field needs reexamination.

Linda White has also questioned the accuracy of the Base Map with regard to the Coulter farm. In her June 1, 1989, memorandum to the Superintendent, she noted that the farm as outlined was actually the Gannon farm, which dated from 1926. There are some differences, although not dramatic ones, between the Coulter farm on Wilkinson map and the Base Map. It may be that the Wilkinson map more accurately portrayed the Coulter farm than does the Base Map.

What does Susan think of all this?

CLEARINGS FOR MILITARY PURPOSES, SEPTEMBER 19 THROUGH OCTOBER 7, 1777

The British Encampment and Main Line, and the Freeman's Farm Area

In her report (p. 24) Gordon stated: "What do these battle accounts tell us about the vegetation at Saratoga? First of all, they make clear that, with the exception of

the fields along the Hudson and the area around Freeman's Farm, the battlefield was covered with woods of varying density or with shrub growth and sometimes with both." On September 1, 1988, Superintendent W. Glen Gray wrote to Gordon explaining that the Park Service's objective in vegetation restoration was to recreate the conditions of October 7, 1777, and asking if her statement had taken into account the impact of the two armies cutting during the three weeks they were in the area prior to that date.

Replying to Gray on September 20, 1988, Gordon wrote that, "the effect of the battlefield cutting and destruction should not be exaggerated. The German troops, representing at least one-third of the British force . . . were engaged primarily in cutting brush in the ravine separating their position from the American forces on Bemis Heights." She noted that elsewhere in her report she had estimated that a skilled axe-man could fell only about 10-12 large trees in a day and that it is unlikely many soldiers in the British force would have been skilled axe-men. She contended that since most of the Germans were peasants, they would have been familiar with the cutting of brush. She therefore concluded, "that the troops would be responsible for a lot of brush cutting, but that the acreage actually cleared of trees would be rather limited. Trees that were cut would also have had to be limbed out, otherwise they would have been more of an obstacle cut than standing. With the primitive technology then available land clearing was at best an arduous and difficult process, and much land clearing involved only the removal of brush and saplings, the trees being girdled and allowed to die on the stump."

Makes sense

In drawing these conclusions, Gordon used three types of evidence: the German Diary (note 51) telling of the German's piling brush cut from the slopes of the ravine to obstruct the Americans' paths through the ravine; her formula of 10-12 trees per man per day; and conjectures as to the experiences of German peasants and logging technology in 1777. She does not appear to have located in the German diaries any new, direct evidence bearing on the amount of clearing done between September 19 and October 8 within the British encampment or in front of the British line.

Gordon's report was actually less definitive as to the impact of clearing by the British Army than was her letter to Park Superintendent Gray. On page 23 she wrote: "During the period of inaction that followed the clash of September 19 . . .

both sides attempted to alter the woods in which they were positioned to their advantage. . . . the British and Germans tried, by cutting down the trees separating them from their enemy, to create the type of battle conditions better suited to their capabilities. Trees and bushes were removed in the area between the two forces, particularly the slopes of the ravine."

On pages 28-31 of his 1949 "Report on the Ground Cover at Saratoga National Historical Park on October 8, 1777," Snell discusses the impact of the British army on the area immediately south of Wilbur Basin, on which the British later constructed the left wing of their entrenched camp. He cites American and German primary sources referring to the area in front of the British main line as an "open pine plain," "sparsely covered with trees and brushwood" with a few small, fenced fields. In the German sources Pausch and Riedesel, Snell found evidence that trees were cut. The references are clear and several: "chopping trees;" "barricades and palisades of immense trees, cut down, rose up;" and "ordered 1000 working men . . . to cut out a road through the woods." In Riedesel, September 21, Snell found the following quote: "In front of the lines in the woods, trees were felled to within a distance of 100 paces;" "the trees were cut down and rows and layers of trees and earth made;" the "enemy objected to our hewing paths through the forest to our outposts"; we "cut down several thousand trees."

Snell's conclusion was that the area from the British encampment south to the ravines was originally less heavily forested than surrounding areas, being largely a pine forest with two cultivated fields. He also concluded that between September 19 and October 8 the area was further opened up, the trees having been used for fortification and to make a field of fire 100 yards long in front of the line. In his 1947 report, Koke argued that an area of about 500 feet should be kept clear in front of the British lines. Koke also noted that the cleared area within the British camp should include not only farm fields as of September 19 but areas cleared for action and encampment between that date and October 7.

Wilkinson's manuscript map, upon which Koke and Snell relied heavily, confirms written sources that indicate that, prior to September 1, the plateau was covered with a sparsely wooded, mixed pine and hardwood forest. Wilkinson also shows the area north of the road and between the road and the fortification--in other words where the British army encamped--as being clear of trees. He also

indicates some clearing in front of the British main line, presumably the result of logging by the army.

The 1950 Base Map for September 19, 1777, shows the area south of the location where the British would build their line of fortification as forested. On the Base Map for October 8, 1777, the plateau in front of the fortification is shown with stumps interspersed with some other form of vegetation, perhaps brush or trees that had been left. As my copy is in black and white, I do not know if the ground cover for this area was colored coded on the original map, as the the legend seems to indicate. Because of the problems interpreting the color coding and vegetation markings, I an uncertain whether Snell intended the Base Map to indicate that the entire area between the line and ravine had been cleared between September 19 and October 8. If that is what was meant, it is not consistent with either Snell's 1949 report or Koke's earlier recommendations; neither the evidence they cited nor their conclusions indicate that kind of large-scale clearing. Moreover, on page 32 Snell says his findings from narrative, primary sources agreed with Wilkinson's manuscript map, which showed limited cutting.

In conclusion, there is no reason to accept Gordon's hypothesis that the soldiers did not cut trees. Her evidence is conjectural and does not stand up against the primary sources in which contemporaries refer to chopping trees, even large ones. Moreover, conjecture must take into account consideration of military as well as farming practices at the time. At the very least one must consider the disparity of manpower. One primary source indicated the deployment of 1000 men to fell trees.

It seems reasonable to assume, therefore, that the area in which the British army encamped south of the Great Ravine was well cleared by October 7. The soldiers have probably thinned as well the vegetation between the 1777 road and the encampment. The area between the encampment and the main line had also probably been cleared. The British cleared as well a field of fire in front of the entire length of the line. Since the soldiers reported cutting trees and not simply brush and Gordon has no evidence beyond conjecture to the contrary, it is reasonable to assume that this swath was probably quite well cleared, although an occasion large tree may have been spared. Such an operation would have been in line with military practices of the day as it would have placed the fortification in the open and allowed for a clear field of fire. The exact width of this field of fire is less certain. Koke estimated it to

have been 500 feet, which seems conservative in view of the fact that we have the statement in Riedesel's official journal that 100 paces had been cleared by September 23. It seems probable that by October 7 the clearing was as large as 600 paces or 500 yards. Additional archaeological study of the area may offer more evidence on the exact width of the clearing.

Beyond this line of fire, the area between the British line and the ravine was probably still wooded on October 8, 1777, except for small clearings around the advanced pickets. One contemporary source noted that the Americans objected when the British tried to log paths out to the forward outposts; cutting trees close to the ravine, which was covered with dense forest and brush and through which the Americans had paths, would have placed the fellers in a very vulnerable position. According to the contemporary, narrative sources and Wilkinson's manuscript map, the rest of the area south to the ravine was a sparse, mixed pine and hardwood forest. Gordon's assertion that logging in this region prior to the battle was probably minimal and selective is convincing, and accords with contemporary narrative sources, Wilkinson's manuscript map, and the Base Map for September 19.

If the Base Map for October 8, 1777, is interpreted as indicating the entire area south of the British lines was cleared, the map is probably inaccurate. On the other hand, Gordon's conclusion that the Germans and British cleared only brush but did not cut many trees is unconvincing.

Clearing in Front of American Encampment

Although far less is known of the vicinity of the American camp in 1777 than that around the British camp, it is highly probable that some clearing was done by the American army between September 19 and October 8, 1777. Primarily sources include comments by soldiers to the effect that both armies did clear trees and brush during this interim, and military practices of the day included the clearing of a line of fire. The Base Map does not indicate, however, a change in the tree line between September 19 and October 8.

In a note dated December 29, 1950, and written on a copy of the Base Map (Basement of Visitors Center, Pocket #4, folder #4, Plan file #A) Snell wrote as follows: "When I came to the problem of indicated the tree line in front of the American camp on September 19, 1777, however, I found aside from the fact that the area was undoubtedly more forested there was no logic to be followed in this case and just where and how much the American troops managed to clear by September 19 was largely a matter of conjecture. Thus confronted with the fact that the tree line of October 8 is only an estimate, although probably a reasonable one, I found it would be making a completed unsupported guess on the tree line of September 19. Hence I left the two the same." This statement indicates that Snell regarded the October 8 Base Map as having included an estimate of the clearing done by the Americans in the preceding three week.

HISTORIC SITES: REDOUBTS, ROADS, AND OTHER STRUCTURES

In constructing the Base Map in 1950, Charles Snell had access to little archaeological evidence with which to facilitate the identification of specific historic sites, such as fortifications, farms, structures, and roads. Instead, he relied upon extensive research in contemporary and secondary narrative sources and the maps made by Wilkinson. It is therefore imperative that consideration be given to the accuracy of the Base Map in light of archaeological findings since 1950.

In a report entitled, "Historical Outline for Revision of Historic Base Map, Drawing NHP - SAF - 2011 (Revision of 1951 Historical Outline) Saratoga National Historical Park," (1960), John F. Luzader, then Park Historian, recommended an alteration in the alignment of the Quaker Springs Road at its intersection with the road to Saratoga Lake (Base Map grid 15D, 14D, and 13E). He also recommended that the alignment of the Quaker Springs Road (8-9D) be changed where it crossed the head of Middle Ravine. He suggested these revisions primarily to bring the alignment into agreement with the terrain and topography.

Luzader further suggested that the location of the John Neilson House on the Base Map be changed as a result of archaeological investigations. He argued that the location of the John Neilson Barn is logical and should be left unchanged but that the term "Fort Neilson" should be discontinued because of a lack of evidence that the term was applied to the barn in 1777. He recommends further archaeological study to locate the site of the log cabin west of the Neilson farm lot. He recommended as well that in the absence of primary evidence for its existence, the "Powder Magazine" site be removed from the Base Map (14E and 14F).

In his report Luzader further outlined revisions in the location of certain fortifications. He suggested that, in the absence of direct documentation, conjecture dictated revisions in certain features of the American entrenchments, particularly at the apex of the American line on the crest of Bemis Heights. He further recommended that the identification of the Great Redoubt be altered to include a much larger area.

Another study of particular relevance to the Base Map was done by Dean R. Snow of the Department of Anthropology, State University of New York at Albany, entitled "Archaeological Atlas of the Saratoga Battlefield," (1977). The atlas is based on work done, according to the terms of contracts between the National Park Service and the State University of New York at Albany, in the summers of 1972 and 1973 by faculty and students from that university. Snow employed the Park Service's Base Map, even adopting the archaeological grid system employed by Snell. Snow also used, however, low level air photos and his archaeological findings. The results were detailed in the atlas as well as in four reports to the National Park Service.

Snow's work appears to indicate the need for some fine tuning of historic sites shown on the Base Map. Comparisons must, however, be made with extreme care. Snell and Snow employed the same grid system but the scales vary. More importantly, Snow oriented his grid differently, so that using his findings to check the accuracy of the Base Map is extremely difficult. Without a great deal of work reconciling Snell's and Snow's maps, only distances between known locations and the shape of archaeological sites can be compared. A cursory study of Snow's atlas and the Base Map shows possible inconsistencies. They are not, however, dramatic differences and

may in fact represent an acceptable degree of error. I selected the following four areas for comparison:

(1.) Balcarres Redoubt

The Base Map (scale of 1" to 800') shows the redoubt (6F and 7F) to have been approximately 1,400' in length; whereas Snow's atlas (scale of 1:7500 or 1" to 625') shows the redoubt (p. 15 - 7F) to have been only approximately 1,090' in length.

(2.) The Great Redoubts

The Base Map shows 700' between the tops of the Great Redoubts. Snow's map [p. 28] indicates 780' (1" = 625') between the tops of the redoubts. This is a reasonable range of error and may indicate sufficient accuracy for the purposes of the Base Map.

(3.) Breymann's Redoubt

Snow shows Breymann's Redoubt in sector 4E [pp. 15-16]. The configurations of the redoubt are in detail not the same as those shown on the Base Map. Snow shows a significant break in the northwest sector of the redoubt. Snow's depiction more closely corresponds with that on Wilkinson's manuscript maps than it does with that on the Base Map.

(4.) Intersection of the Road from Woodward Farm to Neilson House

My analysis here is based upon the understanding that the nature of this intersection has changed, and therefore legitimately differs, but that the location of the road itself at the point of the intersection has not. The Snell map indicates (15D) that the 1777 road at the T intersection was approximately 500' from the present park boundary. Snow's map [14D, p. 11] shows the present road, where the T had been, 375' from the park boundary. The USGS map also shows the road 375' from the boundary.

TOPOGRAPHY AND GRID SYSTEM OF BASE MAP

In depicting the topography of the park area, Snell relied in part upon the maps made in September and October, 1777, by Lt. Wm. C. Wilkinson of the 62nd Regiment when he accompanied Burogyne's expedition as assistant engineer. Wilkinson served as draftsman to Lt. William Triss, who was the commanding engineer of the expedition and had received formal cartographic training in London. It appears likely that in making his maps, Wilkinson surveyed the park area. There are four Wilkinson maps, each of which is described in the bibliography at the end of this report. Snell relied almost exclusively on the first of these--the so-called manuscript map--"The Encampment Position of the Army Under His Excy. Lt. Gl. Burgoyne at Swords and Freeman's Farms on Hudson's River near Stillwater, 1777." The topography on this map appears to be remarkable accurate, but the contours are marked with shadings only.

In the Base Map's legend, Snell makes reference to the Schuylerville and Cohoes quadrangles then in use by the U. S. Geological Survey. (The U. S. Geological Survey now uses the four quadrangles: Schuylerville, Mechanicville, Schaghticoke, and Quaker Springs.) It is not clear, however, that Snell consulted the 1947 USGS series in constructing the Base Map. His notes mention consulting a National Park Service contour map made in the early 1940s. He noted he had access to aerial photographs of the park area.

Three sites were selected as a preliminary check on the accuracy of the Base Map against the 1947 USGS series map: the Middle Fork of Mill Creek, the Wilbur Road, and the Coulter Farm. Because of differences in scale and grids, these sites could be checked only by comparing them with other known features.

(1) Middle Fork of Mill Creek

The Base Map shows the Middle Fork of Mill Creek forking well to the east of Munger's farm and about 1,400 feet from the park boundary. The USGS map has the Middle Fork of Mill Creek dividing slightly west of the ridge on which the Base Map's places the Munger farm and about 400 feet from the boundary. The fork on the Base Map is close to the road and far from the boundary, whereas it is close to the boundary and far from the road on the USGS map.

(2) Wilbur Road and Coulter Farm

The USGS map shows the Wilbur Road about 600' from the northern park boundary. The Base Map shows the Wilbur Road, in 5K and 6K, located 900' from the northern boundary. If my assumption is correct that locations of the 1777 road and the present road are the same at this point, the Base Map may be distorted here. On the other hand, this discrepancy is not dramatic and a margin of error of 300' may be acceptable. The USGS may also locate the Coulter Farm closer to the park boundary than does the Base Map.

Relying upon Wilkinson's map as well as relatively modern topographic information, Snell was able to represent the park's topography with a high degree of accuracy. The contour lines on Base Map may only require fine tuning, particularly in the southwestern portions of the park. New topographic information and mapping facilities are available to facilitate this process.

There are efforts under way at Saratoga park to establish a functional, independent Geographic Information System or GIS station, which will produce both hard copy and computer data base geographical analysis. This project, under the direction of Jim Schaberl and Patrick Lynch, is scheduled for completion within a year, perhaps as early as February 1990. The GIS contours will be based on new aerial photographs. The information from these news aerial studies as well as those done in the mid 1970s should be used to check the accuracy of the Base Map and revise it as necessary.

The GIS will use the USGS and UTM grid systems. In constructing the Base Map, Snell used a then-standard archaeological grid measured in inches and feet. Although the GIS can reconcile different grids and scales, consideration might be given to abandoning the archaeological grid system employed in the Base Map in

favor of either the USGS grid or the UTM grid. Latitude and longitude marking on the revised Base Map would facilitate comparisons with other maps.

NEED FOR FUTHER STUDY

The archives of the approximately 3,000 German troops, particularly the Brunswick troops, who served with the British under General Burgoyne are a valuable source on the Battle of Saratoga. These German diaries contain detailed descriptions of the battle, including information on the land and vegetation of the site. Unavailable to Charles Snell when he constructed the Base Map, these archives are currently accessible on fifty-two reels of Library of Congress microfilm, copies of which have been purchased by the Saratoga National Historical Park. Since 1981 Helga Doblin, a retired professor at Skidmore College, assisted by Skidmore professor of American Studies Mary C. Lynn, has been translating these records, particularly those left by the troops sent by the Duke Karl of Braunschweig. She has, however, translated only a small percentage the fifty-two reels.

Since such a small percentage of the entire collection has been translated, it is possible that information relative to the land and vegetation of the battlefield may some day be uncovered in these diaries. The Park Service should encourage the opening of these archives. Translation is, however, a time-consuming process and unlikely to result in significant progress in the foreseeable future. The question remains, then, to what extent the translated materials offer material that would indicate the need to revise the Base Maps. Nancy Gordon employed these documents in discussing the vegetation in the battlefield park area, but her report does not appear to alter significantly existing understandings of the nature of the physical environment in 1777.

The Lidgerwood Collection at Morristown, New Jersey, contains the Hessian Documents from the American Revolution for 1776-1783. Lion G. Miles and James L.

Kocham completed a key to this collection, entitled "Guide to Hessian Documents for the American Revolution, 1776-1783" (G. K. Hall & Co, 1989). The Saratoga National Historical Park recently obtained a copies of the guide and of the collection on microfiche. It does not appear that either Snell or Gordon used these papers. It is a very large body of material and without a significant investment of time it is not clear that it would yield evidence that would dramatically alter existing perceptions of the battlefield park area.

Because of their high degree of accuracy and importance as a historical document, the four maps made by Burgoyne's assistant engineer, Lt. William Cumberland Wilkinson of the 62nd Regiment, should be exploited as fully as possible. The first is entitled "The Encampment Position of the Army Under His Excy. Lt. Gl. Burgoyne at Swords and Freeman's Farms on Hudson's River near Stillwater, 1777." Snell referred to this document as manuscript map or Wilkinson Map #1 and regarded it as the most accurate. The original, in color, is in the Library of Congress. A black and white copy is held at the Saratoga National Historic Park. On page one of his "Report on the Ground Cover at Saratoga National Historical Park on October 8, 1777," Snell mentioned that this map had "two additional overlays showing the 1st, 2nd, 3rd and 4th positions of the British forces on September 19, 1777." In his 1947 "Report on the Reforestation Program for Saratoga National Historical Park," Koke, referred to these overlays as showing the vegetation cover in 1777. I could not find the overlays in the battlefield park collection. In light of the importance of this map, they should be located.

The second Wilkinson map, entitled the "Plan of the Encampment and Position of the Army under His Excelly. Lt. General Burgoyne at Swords House on Hudson's River near Stillwater on September 17th, with the Positions of that part of the Army engaged on the 19th. Sept. 1777." The third Wilkinson map is titled, "Plan of the Encampment and Position of the Army under His Excelly. Lt. General Burgoyne at Braemus Heights on Hudson's River near Stillwater on the 20th. Sept. with the Position of the Detachment in the Action of the 7th of Octr. & the Position of the Army on the 8th. Octr. 1777." Both of these maps were engraved by Wm. Faden and published at London on February 1, 1780. Snell wrote that Faden drew them from the map now in the Library of Congress, adding information on the American position and fortifications. Snell wrote that the maps engraved by Faden were less accurate, particularly topographically, than Wilkinson's manuscript map. They are, however,

one of the few sources available on the American position. It might be useful to have more information about these maps, in order to access their accuracy as to the American position.

The fourth W. C. Wilkinson map is: "Plan of the Position of the Army under the Command of Lt. Col. Burgone near Stillwater in which it Encamped on the 20 September 1777." Labelled "Presented by Frazer, K.G.B." It is held by the British Library, R.U.S. 1 Collection. (48.3 x 73.1 centimeters; scale 1:7,200.) According to the British Library, the map shows evidence of formal cartographic training and may have been done in collaboration with Lt. Twiss who studied in Tower of London's Drawing Room for two years. Wilkinson served as draftsman to Lt. William Twiss, Corps of Engineers, who was appointed commanding engineer of the expedition and conducted siege operations against Fort Ticonderoga. As with the map held by the Library of Congress, this one does not present the American position and appears to have been an early map. It is a primary source unknown to Snell. I recommend that the Park Service obtain a full-scale copy from the British Library and additional evidence on its history.

Park Historian Paul Okey has recently obtained twelve written indentures that pertain to the lands of the park. The indentures were located by Eliot Morgan, a park volunteer. There is evidently a large collection extant of these indentures. Paul Okey has suggested that when all these indentures are available, a schematic map could be made from them that would give information relevant to the Base Map regarding property ownership.

Park Service personnel could profitably locate and assemble all of the deeds to the farms in existence in the park area on the eve of the battles. These deeds would dispel any questions raised by the Gordon report as to the extent of agricultural clearing. The deeds would also insure that the clearings, fields, and structures are accurately located and identified as to family name.

Field work is probably the most potentially rewarding area for future research. There are a number of sites that park are likely to yield additional evidences of 1777 roads, fortifications, and farm structures. Such sites can be used to plot the accuracy of the Wilkinson maps and to supplement contemporary, narrative sources. Among the most promising sites for archaeological study are the John Neilson Barn, the

Barber Wheat Field, and the Chatfield Farm. Park personnel may be best equipped to carry out this field work. The alignments of the various American fortifications has proved to be the most problematic to reconstruct because of the dirth of historic and cartographic evidence. This sector of the park may, therefore, prove highly suitable for a comprehensive archaeological study.

CONCLUSIONS

Because it was based on extensive research in narrative sources and the Wilkinson map held in the Library of Congress, the Base Map has withstood the test of time well. Little new evidence appears to have come to light that dramatically changes the picture of the area depicted by Snell's 1949 report and the Base Map. It is clear, however, that some revisions will be necessary, especially to the western portions of the map. What follows are some tentative conclusions as to the direction these revisions should take.

In her 1978 report Nancy Gordon concluded that the battlefield park area was in September and October, 1777, heavily forested or brushy or both and that this ground cover was particularly thick in the ravines. She suggests that hardwood forest prevailed except for the area south of the British line which was a sparser, mixed hardwood and pine forest. It seems highly probable that these general observations as to the ground cover are accurate. In addition to the evidence she offers, these conclusions are supported by the sources quoted in Snell's 1949 report, the report by Richard Koke, and the Wilkinson maps. The present Base Map does not include a great deal of information on the nature of the ground cover, either the regard to density or species types. It may prove desirable to expand upon this information in revising the map. Snow shows more fencing than does the Base Map. First-hand descriptions from soldiers quoted by Snell indicate that fences surrounded most of the fields.

If Gordon's description of the density of the ground cover in general seems to have a high degree of probable accuracy, her statements to the effect that Freeman's

Farm was the only farm clearing in the area in 1777 are seriously misleading. Both the Wilkinson maps and the narrative sources Snell consulted indicate the presence of additional farms. Physical evidence in the field and deeds located by park personnel in recent years further confirm the probability that the seven farms shown on the Base Map existed. It is possible, however, that some of the fields are inaccurately labelled and located. There have been questions raised in particular with reference to the Coulter farm, the Barber wheat field, the Hatfield farm, and the Munger farm. Further archaeological work and additional research into deeds and indentures would clear up some of these questions. It would be reasonable to conclude, therefore, that except for the six or seven farm clearings--the Munger farm being in question--shown on the Base Map, the park area was covered with dense forest or brush or both on October 7, 1777.

The Base Map and the Gordon report differ significantly on the issue of how much ground cover was removed in the interim between September 19 and October 7. Gordon suggests that, "the effect of battlefield cutting and destruction should not be exaggerated" and that "the troops would be responsible for a lot of brush cutting, but that the acreage actually cleared on trees would be rather limited." In contrast, the Base Map for October 8 seems to indicate that a large number of trees were removed throughout the entire area south of the British main line. It should be noted, however, that, if correct, this interpretation of the map does not agree either with Snell's 1949 report or the Wilkinson maps upon which Snell relied. Neither Gordon's position that the British army removed only brush nor the idea that the soldiers cleared the entire area seem logical conclusions.

Existing evidence seems to indicate that the British army cleared the area of their encampment as well as the area out toward their main line. The vegetation between the encampment and the 1777 road was probably also thinned. They also cleared a field of fire along the entire length of the line. It is reasonable to assume that the soldiers cut trees and not simply brush and that these areas were probably quite well cleared. Such an operation would have placed the encampment and the fortifications in the open and allowed a clear field of fire. The exact width of this field of fire is difficult to establish. Certainly it was no less than the 100 paces cleared by September 21. By October 7, the cleared field of fire may have been as wide as 500 yards. Beyond this clearing, the area was probably well wooded on October 7, 1777, except for small clearings around the advanced pickets. Additional research in

contemporary military practices as well as a search for new archaeological evidence may help to clarify this picture.

The topographic contours on the Base Map may not be entirely accurate. Spot checks comparing the map with the USGS map do not reveal significant inaccuracies, but these checks do indicate there may be some distortions in the topography, especially in the southwestern sector of the park. The new Geographic Information System will, however, include the latest topographic information available on the park, and this information should be employed in revising the Base Map. Consideration might also be given to giving the Base Map a grid system and scale that can be readily interpolated into the GIS.

The revised Base Map must also provide accurate sitings and landmarks to be used during the implementation of active restoration. Evidence from work, detailed earlier in this report, by park personnel and Dean Snow needs to be considered in checking the accuracy of the fortifications, 1777 roads, and structures. Additional archaeological research would prove highly productive as well.

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