SARA,055 C.2. CLB/B#2/00288 374/135135 PROPERTY OF LIBRARY ん DIVISION OF CULTURAL RESOURCES, NARO

THE SARATOGA BATTLEFIELD: A VEGETATIVE HISTORY

• •

-2

.....

Nancy M. Gordon 15 March 1987

CHRONOLOGY

- 1600s: area inhabited by Mahicans

1614: Dutch traders established Fort Nassau on Castle Island, opposite Albany

- 1617: Fort Nassau abandoned
- 1624: Mohawks defeat Mahicans
- 1628: Mahicans withdraw to east side of Hudson River
- 1664: English take New Netherlands from the Dutch
- 1684: Saratoga Patent
- 1685: Saratoga flats divided up into seven lots
- 1686: First abortive proposal to settle Christian Indians at Saratoga
- 1708: Confirmation of Saratoga Patent
- 1709: First European settlement at "Saraghtoge"
- 1745: Indian massacre of European inhabitants at "Saraghtoge"

1749: Peter Kalm travels up the Hudson

1750: Division of Saratoga Patent into lots

1754: Second abortive proposal to settle Christian Indians at "Saraghtoge"

1760-65: Construction of the large sawmill on Fish Creek

- 1765: Opening of the store at Saratoga
- 1767: Subdivision by Bleecker of some of the Saratoga lots

1768: John Freeman cited as being "on Lott N^o 16"

1769: Trip of Richard Smith up the Hudson and Mohawk rivers

- 1774: Sale of plots on Lots #37 and 40
- 1776: Sale of all of sawmill output to Continental Army

1776: Charles Carroll visits Saratoga

1777: Battle of Saratoga

- 1780: Marquis de Chastellux visits Saratoga Battlefield
- 1794: William Strickland visits Saratoga Battlefield

TLAFN°22. Theodore Co. Hailes Make - (copy) 1919. Partition & Division Saratoga Loty 1750. He it remembered that on the first day of June 1750, persuant to an agreement of the (Several representatives of the Ratenties of the " - called by the name of Saraloga-Ratent, and according to the notice given in the New York Rublic Printy, met at the house of E.dward Williams Vintner in the Cily of albany, in order to make a division of said tract of Land as surveyed and laid out by John Butse Bleecker, Surveyor of Lands, and John Glen of The City of albany appearing in behalf of the Heirs and representatives of Jan Ganze Bleecker D4, Killian De Rimer * * för the representativer of Cornely Van Byck, Gerrarduy Grocybeck for the representatives of Perick Wessels Ten Broeck, John Van Rensselaer, for representind Coll. Pieter Schuyler's Share and a half of a share of the same Landy, Bobert Livingston Coll. Lieber Schuyler's Share and a nair of a snare of the same Lanay, Jobben Livingston in one of the Shares of the same land as representing Jobbert Livingston, and Edward Colling as representing the other half shares of the said Jobbert Livingston, and William John De Reyster for the share of Coll. John Schuyler De, and having persued and carefully examined the said draft and being satisfied with the 's 's ap laid out, and the lot being assorted to the satisfaction of all parties present, persuant to the said agreement of the Said representatives as being at the second day of October , at the time and place aforesaid according to notice aforesaid ~ amicable division of the same in the presence of lieton Winne Vi Jacob Ten Eych, and the Loly apported accordingly, were drawn by two boys, William Williams, son to said Edward Williams, and Thumay Williams, son at John Williams, in the presence of the subscribing withenter - Corneling V. Horne; Gerrit V. Horne and Margaret Vitch; by Ed. Colling The Representativer of Jan Gange Bleecker, by Juhn Glen-The Bepresentatives of Cornelis Van Dyck by Killyan Devedder~ Tor the Representative, of John Schuy, Dt by John De Feyten at the request of Cornelin Schuy ... For the Bepresentatives of Dirch Wessels, Da, by George G. Groupbeet at the request of Margaret Ten Brocch ~ For the Representatives of Pieter Schuyler by John Van Roenzelaer at the request of Mardaret Livingston ~ Robert Livingston Sen" 74 MIEMORAMPUM, that on the 26th day of June, in the year of Our Lord 1762, personally appeared before me, David Joney Esq. o'ne of Hiy Majesty's Judges of the Supreme Court of Judicature of the Province of New York, the within said John B. Bleecher and Jacob Coemack Ten Eyck, both of the City af albany, who, being duly sworn, severally depose and say, and, for the said John B. Bleecker saith, that the within Survey is and performed by him, their deponent, and is just and true, and the said John C. Ten E yek saith that he way prepent when the lots within mentioned were drawn in the progence of the representatives of the partites, and the * * of Jucub C. Ten Eyck within * * subscribed withesses therete is of his deponents own hand Loty N= 3,11,17, 40,458, 328.26 For the Representatives of Rieter Schuyler -7.8,19,37,48,29 & R3 " · & Rubr Livingslon Jr -2, 10, 16, 21, 44, 33 8, 41 " John Schuyler~ 5, 13, 21, 39, 46, 358, 22 " Pinch Weysely~ x,9,20,42,43,348,28 ,, 4,12,18,36,49,318,25 .. " Bobert Livingston Sen=~ 1 . Jan Gange Bleecker , 6, 14, 15, 38, 47, 308,24. " Cornelin Van Dyck -/ Pieler Winne, Witneyzes (Jacob Ten Eyck Recorded and examined the above Map & Survey July 25= 1762.

37 ' 63 C 28 ц К 1750 Subdivision of 4. 10 43 THIT 397 61 Saratoga Patent from 27. a map in the Albany ŝ 5 ~ F County Clerk's office N ن ہے ۔ ×. A نې دي 634.60 25, • :-397 J.J.F. Ł 63. 4.60 3 4 t (à cid p. 1 23. 755. 76. L. 35 63.0.60. 2 1 22 89-1 36. , M M 5.P 2 ۰. 3.ªE MA. 20. 20. 37 4 R.L. in in by 5 W. OF LS W 81 T.S. T.T. ່ໜ່ 8 ω E871 M. 58 H 16# 11.8. . 8°S M. SI . ZB W S.86 20 2 D'AN' BIS W. 08N 5; 1:5 -9 diey 0677 M.LL.N <u>4</u>0. 3.5. . is N 33.30 2 4074 W -SL'N P. 5 .. 4! 4 Ċ,Ÿ à .. Ś لجاني 3 D.W. 6277 :M -01:N A-2. 2 ÷ 정. 11.6 M.69.K . r' S. HATT 697 . 62 + · M . 89 . N . _ 0. - 984 M.OE. 29.N 084 M. SI . S9 K 1.7 --- σ·----" BL+ M .+9 N ويتسترج جرمو ð. 11 × 11 1. K. F. \sim : N. 63- W. 4720 CH. cy p. M. Tr S. N ن .: - 52+-9.01 - 1574 M . ++9 K * · · · •• 3.0.25 _ _ _ . M . 77.9 N 4 09/1 .. 3 854 M. 0E . HO N 1.5. പ് 1 -. . ·M. 59 N 4100 JUNUS 854 dfall A9.64 -68 م^ە مەلىپىرە يە

Introduction

The year 1935 opened a new chapter in the history of the National Park Service. In that year Congress, through the Historic Sites Act, added to the responsibilities of the Service by making it the keeper of the nation's historic monuments. As part of that responsibility the Service was ordered to "make necessary investigations and researches in the United States relating to particular sites, buildings, or objects to obtain true and accurate historical and archaeological facts and information," dealing with the historic monuments in its charge.

In the years since 1935 a large list of historic monuments have become part of the National Park system. The Saratoga battlefield was one of the earliest of these, being added to the Service's national historic sites on June 1, 1938. Prior to that time the bettlefield had been a New York state historic park.²

The intervention of World War II held up the full absorption of the Saratoga battlefield into the National Park system. In the years immediately following the war, however, the staff of the Park began to carry out the Service's mission to "...make necessary investigations...to obtain true and accurate historical and archaeological facts..." In 1947, in connection with a plan for the reforestation of much of the park, Richard J. Koke, Park Historian, submitted "A Report on the Reforestation Program for Saratoga National Historical Park." Koke's report was based on information contained in a limited number of historic sources; a much more extensive survey was carried out by Charles W. Snell, Park Historian in 1949. Snell's report covered all the available published sources, in 1949.

Since then, however, new historic sources have become accessible to historians, notably the large collection of German materials microfilmed on order of the Library of Congress and available in the Battlefield's library. The journal of William Strickland, donated by one of his descendants to the New York Historical Society, was published by that Society in 1971. A more intensive investigation by recent scholars of the Schuyler Papers in the New York Public Library, as well as some Schuyler materials in other archival collections, has added to the knowledge provided by the German materials and the Strickland journal.

This new material justifies a re-evaluation of the historic information about the battlefield site. The report that follows is an attempt to review what we now know about the site, and should be used in conjunction with Stephen Strach's study, "The Saratoga Estate of General Philip Schuyler, 1745-1839: an Interpretive and Historic Grounds Survey," produced in 1986 for the Eastern National Park and Monument Association.

I. The Precolonial Background

There my slousted

The land in the entire Northeastern portion of the United States, with the possible exception of a small segment of southern Pennsylvania, is the product, first and foremost, of the successive glaciers passing over it during the Pleistocene era. The area around Saratoga, known as the Appalachian peneplain to some, the Hudson-Champlain Lowland to others, consists of one of a series of eroded valleys running basically northsouth, separated by rounded hills composed of glacial drift. There was once a large lake, extending north-south from Glens Falls to Kingston, which is responsible for numerous lacustrine deposits, and which is most likely the source of the sandy plains running north of Albany and only slightly to the west of the battlefield.

Since the end of glaciation, a dominant force in the creation of the area around Saratoga has been the river. It possesses along its banks significant areas known to the early European colonists as "intervals" or "intervales;" we would call them flood plains. The soil in these flood plains is far more fertile than the glacial till on the bordering hills, and clay is a larger component in it than in the sandy gravels that cover the uplands. The flood plain on the west side of the river is intersected by numerous small streams that have cut their way down through the glacial drift and in many instances have formed marshy gullies or ravines, several of which played an important role in the fateful battle of 1777.

As the climate moderated with the retreat of the last great glacier, the vegetation that appeared marched in synchrony with the glacier. First to appear were tundra-like shrubs and mosses that in due time gave way to trees characteristic of the modern boreal forest. But as the warming process continued, the spruces and firs moved northwards, and their place was taken by a mixture of pines and hardwoods: the former being either white pine (Pinus strobus) or pitch pine (Pinus rigida), the latter first typical northern hardwoods such as birch (Betula spp.), Beech (Fagus grandifolia), and maple (Acer spp.), subsequently a more southerly mixture of oaks (Quercus spp.) and hickories (Carva spp.). To some extent the area remains what some have called a transition zone, in which vegetation of a more northerly character is found on northern and eastern exposures, while more southerly species take over in the warmer and drier locations facing south and west. Thus we may find some typically northern collections such as the beech and hophornbeam (Ostrya virginiana) adjoining the Visitors' Center where the microclimate is appropriate for them, whereas elsewhere oaks, elms (Ulmus spp.), cottonwoods (Populus spp.) and hickories predominate. Of the conifers, however, the local species are either pitch pine or white pine, though one would expect to find a few examples of eastern redcedar (Juniperus virginiana) as well (and this may in fact be what Peter Kalm saw, and identified as northern white cedar (Thuja occidentalis).

We have no way of knowing what species of trees grew on the battlefield before the Europeans arrived, because no written transcription of the language and traditions of the native Indian tribes was ever made. We must rely on the observations of Europeans who saw it before the colonists had been able to make any significant changes in it. Our most important description is that by the Swede Peter Kalm, who traveled up the Hudson to Lake Champlain in 1749. His commentary is of great value, because he was a botanist able to identify what he saw with reasonable accuracy.

Kalm notes that the elm was plentiful (and he found both American elm and slippery elm), and was not infrequently used for the manufacture of boats, the inside being hollowed out of a single log. He reports seeing "lime-trees" by which he undoubtedly meant linden trees or basswoods (<u>Tilia</u>





NB: Compass directions entered on this map differ from those on the 1750 map. These compass directions have been determined by a general line of the river betwee: Schuylersville and Mechanicville relative to magnetic north. The divergence of the figures is probably due to change in the magnetic declination since 1750. <u>americana</u>), alders (<u>Alnus</u> spp.), "dog trees" (probably dogwoods - <u>Cornus</u> spp.), "red willows" (which may be black willows - <u>Salix nigra</u>), and "chesnut-trees" (<u>Castanea dentata</u>), of which he elsewhere says that they grow scattered throughout the forest. He notes that many trees were covered with wild grape vines (<u>Vitis</u> spp.), and many of the hills on both sides of the Hudson had large clumps of "American Elder," which he identified as <u>Sambucus occidentalis</u>. Since it was in flower at the time of his journey, which was in June, it was undoubtedly <u>Sambucus canadensis</u>,

For a more detailed description of the oaks we need to turn to an earlier observer, Adriaen van der Donck, writing about a century before Kalm. According to van der Donck (hoping to attract settlers), the land "...produces different kinds of wood, large and small, suitable for building houses and ships, consisting of oaks of various kinds, as postoak, white smooth bark, white rought bark, gray bark, black bark, and another kind which they call, from its softness, butter oak, the poorest of all, and not very valuable " It is not difficult to translate these oaks into modern species designations, such as post oak (Quercus stellata), white oak (Quercus alba), swamp white oak (Quercus bicolor), red oak (Quercus rubra), black oak (Quercus velutina) and scrub oak (Quercus ilicifolia). Van der Donck also cites several varieties of nut trees, notably butternut (Juglans cinerea) and walnut (Juglans nigra), as well as chestnut, "growing in the woods," he says, "without order." He also reports having seen what he calls water beech, a name used by the European settlers for the sycamore (Platanus occidentalis), though Kalm says that he ceased to see any of this species after he had gone north of the confluence of the Mohawk and the Hudson. Van der Donck also found in the woods such things as "ax-handle wood," probably white ash (Fraxinus americana), two species of canoe wood (the two elms notes by Kalm, most likely), hirch, wild cedar, alder, willow, thorn (Crataegus spp.) and elderberry.

Of great importance to us, however, is the mention by both Kalm and van der Donck, of the pines, which they, like so many European travelers, referred to as "firs." Van der Donck mentions both "fir," by which he undoubtedly meant white pine, and "fire-wood," by which he may have meant pitch pine. Kalm reports that when he and his party had travelled half-way from the falls at Cohoes to Saratoga, the country contained "large tracts...covered with woods of fir trees. Now and then we found some parts turned into corn-fields and meadows; however the greater part was covered with woods." A later traveller, William Strickland, noted that "from Ballstown springs [sic] to Schuylers Mills is a continued pine plain...."8 According to Richard Smith, who travelled up the Hudson as far as the junction with the Mohawk in 1769, "the Timber in these Parts besides the Two sorts of Pine consists of Black & White, Oak, White and brown Aspen large and small, Bilberry [blueberry - vaccinium], Maple red Oak Hazel Bushes [Corvius spp.], Ash and Gum [Nyssa silvatica] together with Butternut and shellbark, Hiccory in plenty, Elm and others." In other words, just about what we might expect of woods in the Oak-Hickory central hardwoods region, but with significant stands of pine in the sandy "pine plains" north of Albany.

It is important to note, however, that along the banks of the river there were some natural meadows. There are mentioned by van der Donck, who describes them as "very fine flats and mowing lands, together with large meadows," and he subsequently notes that "...the mowing lands, flats and meadows, have few or no trees...." Charles Carroll of Carrollton, who passed up the Hudson in 1776, noted that, "the bottoms adjoining the river Hudson are fine lands," and they are specifically mentioned in the deeds dealing with the Saratoga Patent.

Thus nature would have supplied the area around the battlefield with woods containing a mixture of deciduous species, mostly hardwoods on the moister sites with predominantly clay loam soils, and pines, both pitch and white, on the more improverished, sandier locations. As William Strickland put it, "the soil of the valley is universally of that white, silty and somewhat clayey appearance before described, without any mixture of stones, or calcareous matter; where it has the most tendency to clay, it is the most fertile, and produces oak; where most sandy, pines, and in its natural state is very steril [sic]; in general the bottom and part of the way up the hills are fertile..." The exception to this general description lies in the natural meadows along the river, which, perhaps due to regular flooding, seldom had many trees in them.

How far was this assemblage of tree species the product of primary succession, and to what extent had it been modified by human disturbance, and so is more properly described as a secondary succession? We can probably never answer this question conclusively, for to do so we would need far more detailed and botanically accurate descriptions of the trees and shrubs growing on the battlefield in 1777 than we are ever likely to find. We do know that, in 1794, there were isolated stands of primeval forest, for they are described, in unmistakable fashion, by William Strickland:

"In a few places original woods of small extent remain producing trees of wonderful magnitude, and standing so thick on the ground that though there is no underwood and they have no branches for many feet in height, they admit not of view in any direction above a few hundred yards, frequently not one hundred; sound is equally destroyed, the report of a gun cannot be heard farther. The gloom and silence of these woods, whose branches forming a vaulted canopy, deprive the traveller of a view of the Skies, and admit not the rays of the Sun to strike the ground, but leave him only a faint and dubious light by which in a narrow path to pick out his way, the damp chill that strikes him on entering them; the quantity and thickness of the windfalls in many places lying on the ground, the vast roots of the growing trees, which frequently strike out of, and rise above the surface of the ground and then bend to and penetrate it again, in short the whole scenery cannot be described in words that can convey an adequate description nor can it be conceived by those, who have not witnessed it...."

But Strickland is careful to indicate that such stands are infrequent; and the descriptions of other travelers together with frequent references to substantial amounts of underbrush contained in the battlefield accounts make it clear that such stands had largely disappeared from the battlefield area by 1777. We need, therefore, to consider how, and when, the primeval forest in the form described by Strickland (and by Kalm, for the area north of Saratoga) had been modified by human intervention.

The first issue to be resolved is, how far was the vegetation at

Saratoga modified by any possible Indian inhabitants? Indeed, can we determine if there were, in fact, Indian inhabitants?

The evidence from such Indian artifacts as have been uncarthed at, for example, Bemis Heights, is inconclusive. The discovery of a few artifacts may be the remnants of earlier Indian occupation, or they may be simply a later white settler's treasure trove as the archaeologist who uncovered them has suggested. Where large quantitites of Indian artifacts have been uncarthed, as along the banks of Fish Creek by state archaeologists Ritchie and Funk, the assertion can be made with confidence that the area was indeed the site of prior Indian villages. Most of the artifacts derive from the Late Woodland phase, and are characteristic of Algonkian culture. It is this evidence, essentially, that leads Ritchie and Funk, and the latest writer dealing with this area, T.J. Brasser, to group this portion of the Hudson valley with that below Albany, which unquestionably formed the tribal lands of the Mahicans.¹³

In addition to the large collection of Indian artifacts unearthed on the banks of Fish Creek, Ritchie and Funk discovered some artifacts on the flats along the river, and two caches were found on the bluffs overlooking it. No one seems to have surveyed archaeologically the entire area between Fish Creek and Anthony's Creek. Thus, all we can say with certainty is that there were Indian villages within 10 miles of the battlefield, but as yet there is no significant amount of evidence that they actually lived at the site of the battle.

Population statistics argue against the notion of an Indian village on the battlefield. According to Brasser, and he bases his figures on some early Dutch sources, the entire Mahican tribal group amounted to some 1600 braves in 1610, which would presuppose a total population of 4,000 to 4,500 map, this population was spread out up and down the valley of the Hudson from Lake Champlain to around Kingston, a distance of more than 100 miles. If there were, as Brasser indicates, around 200 individuals to a village, the entire Mahican population could have been contained in 22-23 villages, or a village every 4.5 miles, or, if we reckon with occupation on both sides of the hudson, every 9 miles along its banks. It seems reasonably certain that the villages would be located where a ready supply of drinking water was available, and that would mean alongside a brook, if not beside the river. In short, the most likely locations for Indian villages in the vicinity of Saratoga, besides Fish Creek, are along the banks of the Batten Kill, on the opposite, or east, bank of the Hudson, and along the banks of the next sizeable stream flowing into the Hudson from the west, Anthony's Kill. On the east side, the next favorable site would be the point at which the Hoosic River flows into the Hudson, and indeed there were Indian settlements there, at Schaghticoke.

To be sure, Brasser suggests that the Mahicans tended to locate their villages on bluffs overlooking the rivers running through their territories. Quite close to Fish Creek, on its northern bank, the land rises some 100' in a space of under 500' back from the bank. Most of the artifacts were found on the south bank of the Creek, but it would not be unreasonable to find the village's trash heap located below its living area. Artifacts were also found along the banks of the Batten Kill, which enters the Hudson almost directly opposite Fish Creek. And although, as

Brasser points out, the villages had to be moved every 8-12 years, because of the exhaustion of the soil in the gardens adjoining the villages, and because the supply of readily available firewood ran out, the pattern of artifacts suggests that the villages may merely have been moved a bit up the creek.

In all probability, then, the battlefield site, located as it is roughly midway between a known and a likely site for an Indian village on the west side of the Hudson, represented hunting lands, but not a village site.

If we then ask whether the use of the land as hunting land would have led to any action by the Indians to modify the vegetation, we can give no conclusive answer. What argues for modification of the vegetation is the reported practice of the Indians for New England, and the Mahican cultural practices were very similar to those of the New England Indians, of burning the woods in the spring and fall to reduce the undergrowth and drive the game. The classic source for this practice is William Wood's new England's Prospect, of 1634, in which he says: "'And whereas it is generally conceived, that the woods grow so thicke, that there is no more cleare ground than is hewed out by labor of man; it is nothing so; in many places, divers Acres being cleare, so that one may ride a hunting in most places of the land, if he will venture himself for being lost; there is no underwood saving in swamps, and low grounds that are wet....for it being the custome of the Indians to burne the wood in November, when the grasse is withered, and leaves dryed, it consumes all the underwood, and rubbish, which otherwise would over grow the Country, making it unpassable, and spoile their much affected hunting; so that by this means in those places where the Indians inhabit, there is scarce a bush or bramble, or any cumbersome underwood to bee seene in the more champion ground.""

Even more explicit is Adriaen van der Donck's description, written in the early 1650's, and after some years spent in dealing with the Indians resident in New Netherlands: "The Indians have a yearly custom (which some of our Christians have also adopted) of burning the woods, plains and meadows in the fall of the year, when the leaves have fallen, and when the grass and vegetable substances are dry. Those places which are then passed over are fired in the spring in April. This practice is named by us and the Indians, 'bush-burning,' which is done for several reasons. First, to render hunting easier, as the bush and vegetable growth renders the walking difficult for the hunter, and the crackling of the dry substances betrays him and frightens away the game. Secondly, to thin out and clear the woods of all dead substances and grass, which grow better the ensuing spring. Thirdly, to circumscribe and enclose the game within the lines of the fire, when it is more easily taken, and also, because the game is more easily tracked over the burned parts of the woods."

Until recently, most writers accepted the notion that wide stretches of the northeastern woods were subjected to annual burning by the Indians resident before the appearance of the Europeans. In the last few years, however, this view has been challenged by Emily W.B. Russell in an article in <u>Ecology</u>, published in 1983. After surveying the written accounts, Russell concludes that, "there is no strong evidence that Indians purposely burned large areas of the forested northeastern United States frequently." Russell bases her conclusions on the fact that the "open woodland" that

early European observers attributed to "bush-burning" could, in fact, have been produced by natural causes; that it is unlikely the Europeans who wrote such descriptions were actual eye-witnesses of the procedure; and that the Europeans had an ulterior motive - to attract additional colonists - that would lead them to portray the forest in such a way as to make it more tempting to potential European settlers.

Russell is undoubtedly correct in rejecting the notion that vast stretches of the northeastern woods had been subjected annually to such treatment, though not for the reasons she gives. The Indian population was simply too small, and too thin on the ground, to have carried out such actions on an annual basis over large areas. One recent estimate places the density of Indian population at 1.3 persons per square kilometer, or 3.4 per square mile. If we recall that each village had about 200 individuals in it, then each village would be responsible for some 60 square miles. Since of the inhabitants of the village no more than 50 are likely to be adult males, and some of them would be elder statesmen, perhaps as many as 40 would be available to conduct such burning operations. It is manifestly impossible for a crew of that size to burn, on <u>an annual basis</u>, 60 square miles.

But that the practice occurred there can be no doubt. There are too many such descriptions extant; they must have a foundation in fact. There is no evidence, either internal or external, that these authors were connected with one another, and van der Donck's account, written in Dutch, remained unknown to the English-speaking world until the 19th century. Van der Donck, moreover, served on several occasions as translator in dealings between the Indians and the Dutch, because in his eight years' residence in New Netherlands (mostly in the vicinity of Albany) he had learned enough of the Indians' tongue to understand and be understood by them. It must not be forgotten that for the first 80 years of the colonial period in America, the Europeans and the Indians lived side by side. Even if van der Donck did not himself witness "bush-burning," he would have had ample opportunity to learn of it from the Indians themselves, from missionaries such as father Jogues, or from the numerous fur traders in close contact with the Indians. In short, what might have been (or might not have been) is not history; what several observers describe is. Evidence is the basis of history.

It is, moreover, entirely logical for the Indians to have followed such a practice. The Indians were keen observers of the natural environment, and fire was about the only "technology" available to them for changing its character. They would surely have noted that young forests, with substantial browse, or areas where openings had been created (as in areas burned by lightning strikes) so that "edge" vegetation existed, were particularly attractive to the deer. I think it exceedingly likely, therefore, that through group action they could have chosen to modify the environment to create better deer grazing, by burning selected areas perhaps on a rotating basis, so as to encourage the kind of vegetation that would make the game more readily available to them. Acceptance of the notion of occasional burning by the Indians makes it easier to account for the widespread presence of white pine along the Hudson (as observed by Kalm during his passage up the river in a cance), for fire, by eliminating the accumulated duff, does facilitate pine regeneration, and can even be helpful helpful, if it is not repeated often, in the regeneration of oak. Indeed,

these two species need some assistance - such as that provided by periodic fires - if they are to remain an important component of the forest. As we shall see, they were the two primary "commercial" species in the last third of the 18th century, so it is fair to assume that burning in the 16th and 17th centuries helped to establish the stands that were harvested in the 18th.

If we can legitimately postulate that the woods on the Saratoga battlefield were being used by the Indians who unquestionably lived nearby, in the period before the arrival of the Europeans, what can we say of their use of the area after the Europeans began to influence developments? Events of the 17th century are the focus of our interest because most factors bearing on the composition and structure of a forest act only over a period of many years. If we are dealing with a case of secondary succession, then this is surely the case; and even if we are dealing with a "primeval" forest, modified tree by tree through mortality or windthrow, still these modifications would only be fully effective many years later. What happened, then, to these woods that we have designated hunting territory of the resident Mahicans, in the years after 1600?

One of the most important influences had nothing to do with the Europeans; that was the endemic warfare between the Mahicans and their encroaching, and warlike, neighbors, the Mohawks. This conflict reached a critical point in the 1620's, when, to be sure, the "European" era had already begun, but the numbers of Europeans were still too few to have any significant impact. In 1624, or thereabouts, the Mohawks administered a decisive defeat to the Mahicans, a defeat that led to the withdrawal, after 1628, of all Mahican villages on the WEST side of the Hudson. Mahican villages continued to exist on the east side of the river, but Mahicans ventured onto the west side only to hunt, and that doubtless with significantly less frequency than heretofore, lest their hunting parties be challenged by roving Mohawk bands. Thus an area that in all probability had been a major hunting ground for the Mahicans in the preceding century, ceased to be that in the early years of the 17th century. Such vegetative manipulation as had been carried out on the forest on the west side of the Hudson would have declined substantially if it was not altogether abandoned after 1628.

A factor which played, through the Indians, an important role in the effect of man on the Saratoga environment is, however, attributable to the Europeans. That factor is the introduction of diseases which had never previously existed on the North American continent and against which, therefore, the Indians had no built-up immunity. The most devastating of these was small pox, a disease not infrequently fatal even in populations where centuries of exposure had developed some endemic immunity. Lacking domesticated animals, more particularly cattle, the Indians did not even have the advantage of some individuals in the population who had acquired immunity through infection with the cowpox virus. The result was the decimation of many Indian populations, including the Mahican.

By the end of the seventeenth century, only 90 Mahican warriors were left among the tribal remnants living along the Hudson, which suggests that the Mahican population did not likely exceed 300. All of these lived east of the Hudson. Besides these remnants of the Mahicans, there were about 350 Indians of mixed tribal backgrounds living at Schaghticoke, on the east side of the river just south of Saratoga. Thus the Indians who might have had an impact on the environment at Saratoga had been reduced to about 15% of their former numbers in the course of just one century.

What was the likely impact of these developments on the forest at Saratoga? certainly the abandonment of Indian villages along Fish Creek, for, despite their victory, the Mohawks did not move into the area; their villages remained located along the Mohawk River, and nearly all of them south of the river. The Mohawks assumed some measure of nominal authority over the lands along the west bank of the Hudson, however, though they do not appear to have made much active use of them, for they readily deeded them in 1684 to the seven purchasers of the Saratoga Patent, something they were unprepared to do with lands they were actively using.²²

We have, then, an area effectively abandoned by the Indians at least by 1684, if not 50 years earlier, and we might have supposed - as clearly happened in New England - that it would have been rapidly populated by Europeans. Such, however, was not the case, and the reasons for it were varied.

To be sure, at the site of the old Indian village, at the confluence of Fish creek and the Hudson, a small settlement was established in the early years of the 18th century. The necessary precondition to this development was the issuance of a patent to seven prosperous residents of Albany by Governor Dongan in 1684, after the seven had purchased the area from the Mohawks. Under the terms of the patent, the "Arrable or Intervall Land" was immediately divided into seven parts, but the remainder continued to be held in joint ownership. This patent was confirmed by Queen Anne in 1708. Immediately fallowing the confirmation Johannes Schuyler, who had bought the one-seventh share of one of the original patentees, one Johannes Wendell, whose widow he had married in 1695, initiated a small settlement at what was then known as "Saraghtoge", and it followed the practice elsewhere in English North America, that is, it was located where a previous Indian settlement had been. By the 1740's, there were at least two mills at the site, for they are specifically referred to in Johannes Schyuler's will made in the early 1740's, and, apparently, a small number of settlers living there, generally believed to amount to some 30 families. In addition, there were scattered farms along the banks of the river, almost certainly one at Dovegat by that time, for it is referred to in the deed dealing with the 1750 subdivision of the Saratoga Patent into lots.

Moreover, by 1749 there was a road, which Peter Kalm describes as "a good road," running along the western side of the river north of Albany. The eastern shore of the river remained, according to Kalm, "...uncultivated, woody, and hilly; but the western [shore] is flat, cultivated, and chiefly turned into corn-fields...." But there farms were almost certainly located on the "arrable or Intervall Land," primarily that which had been divided into seven parts among the original patentees in 1685. Reference to the map of 1762, in the Albany County Clerk's office (or more accurately, a 1919 copy of the 1762 map) reveals a section on both sides of the river that was not part of the subdivision into lots carried out in 1750, and drawn by lot among the representatives of the patentees on 1 June 1750. This was assuredly the "arrable or intervall land" divided into seven parts among the original patentees in 1685. This land, lying both north and south of the mouth of the Fish Kill along the Hudson River,

extends south of the Fish Kill as far as Dovogat, and inland from there due west 81 chains. The remainder of the land bordering the Hudson on the western side (and on the eastern shore as well) was subdivided into lots in the 1750 subdivision. That is, the lots running "into the woods" some six miles, more or less, from the river, extend down to the river from Dovogat south to Anthony's Kill.²⁴

Aside, however, from these riverside farms, the rest of the Saratoga Patent, comprising an area roughly (by the terms of the original patent) twelve miles by twenty-two miles but in fact, as laid out on modern maps, 14.3 by 11.5 miles, 164.45 square miles, or 105,248A, remained essentially uninhabited from the time when the Mahicans ceased to use it, even as a hunting ground, certainly from the mid-1600's on, until it was settled by colonists after 1750. We can be reasonably certain of this uninhabited state on the basis of three pieces of evidence. One has already been mentioned: the fact, documented by deeds in the Albany County Clerk's office, that aside from the "arrable" the patent was only divided into lots and parcelled out among the heirs of the original patentees in 1750. Aside from the heirs of Johannes Schuyler, none of the other original patentees (treating Johannes Schuyler as the equivalent of an original patentee) showed any interest in actually settling on the Saratoga patent. Therefore, only by the sale or lease of land could any significant settlement take place, and that in turn depended on the parcelling of the patent into lots assigned individually.

Two other incidents also make clear that the area was uninhabited. In 1686 an idea was proposed to the then governor of the province, Governor Dongan, that some of the Indians (mostly Iroquois, and chiefly Mohawks) who had been converted to Christianity by French missionaries and had been persuaded to resettle in Canada adjoining one or another of the Catholic missions there, should be encouraged to return to their old home and, specifically, that a settlement might be set up for them at Saratoga. The -Mohawks on the Mohawk River evinced considerable interest in this notion, but Governor Dongan never pursued it, and nothing ever came of the proposal. The significance of this abortive scheme is, however, that it could not have been proposed had there been either Indians or colonists living at Saratoga at the time. A similar proposal was advanced in 1754, and was opposed, quite evidently successfully, by a Philip Schuyler, presumably the later General, and a Cornelius Cuyler, almost certainly the uncle of the General. Once again, no such proposal could have been made had there been any significant population of either colonists or Indians at Saratoga.

Indeed, even at Saratoga itself the human hold was somewhat precarious. Saratoga was the northernmost boundary of European settlement under the control of the English; as such it was a frontier outpost. This circumstance made it extremely vulnerable in the almost endemic warfare between the English on the one side and the French and their Indian allies on the other. In the course of what was known in Europe as the War of the Austrian Succession, which lasted from 1742 to 1748, a lightning strike by French and Indians swept down the Lake Champlain corridor in 1745 and almost totally wiped out the little settlement at Saratoga, burning the saw mills and killing or capturing the colonists. Though peace was restored in 1748, it was a precarious peace, and there was evidently no rush among the colonists to return to the area, for Kalm reported it largely uninhabited in 1749.27

Thus, before almost all of the Saratoga Patent was partitioned into lots and opened up to settlers, a partitioning that took place only in 1750, we can say with reasonable certainty that no human beings actually lived on the site of the battle. But since we know with certainty that a number of Mahican villages existed prior to 1628 in relatively close proximity to the battlefield - on Fish Creek, on the Batten Kill, and at Schaghticoke - we can be reasonably certain that the land was exploited for its natural products. In the process, did anything happen to the vegetation? That we cannot say with certainty; there is, however, a high degree of probability that the land on which the battle later occurred was subjected at some point in time to burning, by the Indians, for purposes of manipulating the vegetation. We can say, with a much greater degree of certainty, that the Indians ceased to use the land for hunting, at least in the last quarter of the 17th century and the first half of the 18th, and perhaps even earlier; so that it is fair to say that the forest covering the battlefield area was able to grow unimpinged by man, for at least a century before more intensive settlement by colonists of European alte pine starte muel han gram i abrealmes oprimition clearing,

II. The period of European Settlement

To determine the impact of white settlement on the Saratoga battlefield, we first need to have some significant dates, chronological parameters as it were. These can be established in some measure by getting a clear picture of the chronological sequence of legal actions affecting the Saratoga Patent. The original patent was that issued by Governor Dongan acting as agent of the Duke of York and dated 4 November 1684. The bounds are described in the letters patent:

Beginning at the South side of the Mouth of a certaine Creek on the West Side of Hudsons river commonly called by the Indians Tionoondehowe and by the Christians Anthony's Kill which is the uppermost bounds of the Land formerly purchased by Goosen Gerritse and Phillip Pieterse Schuyler and from thence extending Westerly into the woods by the said Creek on the South Side thereof as it runs Six english Miles, and if the said Creeck do not Stretch soe far into the woods then from the end thereof West by a straight line untill it shall be six Miles distant from Hudson river upon a measured Straight line and from thence Northerly by a line Paralell to the course of Hudsons river untill it comes opposite to and bear West from the North side of another Creeks Mouth on the East side of Hudsons river called Dionoondehowe which upon Hudsons river is computed to be distant from the Mouth of Tionoondehowe aforesaid about twenty two English miles be it more or less and from the last termination by a straight line to be drawn East to the North side of the Mouth of the said creek Dionoondehowe and from thence continued East six Miles into the woods on the East side of Hudsons river, and from thence by a line Southerly paralell to the course of the said Hudsons river and six miles distant from the same soe far Southerly untill it come opposite to and bear East six Miles distant from the North side of the Mouth of Shaackook Kill which is the bounds of Schaackook Patent late belonging to Henry Van Renslaer, together with all and singular the woods, underwoods, trees, timber, Feedings, Meadows, Marshes, Swamps, pooles, ponds, waters, watercourses, rivers, rivoletts, Runns and Streams

of water fishing, fowling, hunting, hawking, Mines and Mineralls, standing, growing, lyeing or being or to be had used or enjoyed within the bounds & limitts aforesaid and all other profitts, benefitts, advantages, Hereditaments and appurtenances w^t soever...(except and always reserved out of this our present Grant all Gold and Silver Mines....)²⁰

At the outset, the new proprietors divided the land suitable for immediate settlement, the "arrable" land on either side of the Hudson at the north end of the tract, into seven lots. That settlment did not immediately follow was due to a number of factors, some of them quite extranceous to America, but still impacting the situation here.

First and foremost in all probability was the fact that English politics were destined shortly to enter a period of turmoil, calling into question the authority under which the original patent was granted. Governor Dongan, who had issued the original grant acting as agent for the ultimate proprietor of the colony, the Duke of York, was, by virtue of his close association with the Duke (and perhaps also because of his religious affiliation) in a somewhat precarious position. To be sure, the Duke became King in 1685, but a mere three years later he was to lose his throne and Dongan would also be gone from the scene. New York ceased to be York's personal patrimony and became a crown colony. With the shifting forces of English politics, the ripe moment for confirmation from the monarch, now the residual owner and source of all patents, did not come until the later years of Queen Anne's reign. Thus it was that the patentees did not receive confirmation unitl 9 October 1708. This confirmation was made essential since one of the original patentees, Johannes Wendell, had died in the interval and his interest had been sold to Johannes Schuyler while another original patentee, David Schuyler, had sold his share to Peter Schuyler and Robert Livingston since the granting of the original patent.²⁹

With this confirmation went formal assignment of the seven lots located in the "arrable" at the north end of the patent. Peter Schuyler received Lot #1, and one-half of Lot #6; the remaining half of Lot #6, together with Lot #5, went to Robert Livingston; Dirrick Wessells acquired Lot #3, and John Johnson Bleecker Lot #2; Lot #4 was assigned to Johannes Schuyler, the assignee of Johannes Wendell, while Lot #7 fell to Cornelius Van Dyck. In addition, the share of the joint proprietors in the remaining land was spelled out: of the 14 equal parts into which it was to be divided, Peter Schuyler and Rober Livingston would each receive 3, while each of the remaining proprietors would receive 2. The quitrent for this largesse was established at 20 bushels of wheat to be paid annually to the collector of customs in New York.³⁰

This document, confirming the earlier patent and spelling out exactly how the seven patentees or their assignees were to share in the grant, provided the necessary basis for exploitation of the area by the colonists. The first settlements, at the confluence of the Fish Creek and the Hudson, followed immediately, and, as was typical in such settlements, almost the first installation to materialize was a sawmill. For this, Fish Creek was a natural; as the outlet of Saratoga Lake it could provide a continuous year-round flow of water of substantial proportions; and the topography, in a valley that alternately widens and narrows, was absolutely ideal for the exploitation of the water power resource. The creek, moreover, was a large enough stream to serve as transport for the logs that were brought with

such a massive input of human labor, given the available technology, to the mill. The establishment of this mill began what was later to become a major local economic resource, the lumber trade first to Albany and shortly thereafter to New York City and, somewhat later, the West Indies.

Despite these promising beginnings, the small settlment at Fish Creek was, as soon became clear, not on a growth curve, for, as has been previously noted, nearly 40 years later it boasted no more than some 30 families living in the vicinity. Since these were the desirable, the easily exploited lands, it is a necessary corollary that the upland tracts remained in the state they had been since the Indians had ceased to use them. A number of factors serve to account for the slowness of development.

First and foremost, it should not be forgotten that Saratoga was, and remained until 1763, a frontier post. To be sure, many miles separated it from the foreign land of Canada, but most of those miles were blessed with a natural waterway, one that the Indians had found highly useful long before the European landed on the scene. It was simply not that difficult to travel from the St. Lawrence down the Richelieu to Lake Champlain, down Champlain and then through Lake George to Ticonderoga, make the small portage to the headwaters of the Hudson, and continue down to Albany. Since water transport was the transport of choice in that era, this had been a major Indian trade route, and they and their French allies made full use of it in the colonial era. That a high degree of risk was associated with settlement at Saratoga is shown by the elimination of nearly all the inhabitants, either through capture or death, in 1745.

The 18th century was a period of almost continual conflict between France and England, a conflict that was played out both in Europe and on the North American continent. Both sides sought Indian allies - the English expended substantial efforts to win and secure the allegiance of the Iroquois - and these became the principal agents for executing imperial aggrandizement in North America. That the little settlement existed at all at Saratoga is doubtless due to the interval of European peace between 1715 and 1742; but between 1701 and 1715, between 1742 and 1748, and again between 1754 and 1763, the frontier was continuously at risk. The decisive change occurred with the transfer of Canada from France to England in 1763, ending the threat of assault on the frontier sections of the colonies of New York and New England.

Aside, however, from the risk to life and limb, the policies of the New York colonial government were such as to deter settlement. The government in England, with no clear perception of the entirely different conditions prevailing in its American colonies, attempted to transfer to the colonies regulations designed to protect the woodland from indiscriminate cutting. The effect was to inhibit settlement on wooded lands, which of course constituted the overwhelming part of the Saratoga Patent. Indeed, the formal regulations provided for forfeiture of the patent if the patentee did not see to it that at least three acres for every 50 granted was in cultivation within three years, while at the same time the settlers were forbidden to burn the woods in order to clear the land. In 1727 the royal instructions to Governor Montgomery ordered him, "...to take care, that in all New patents for Lands there be inserted a clause to restrain the grantee from burning the woods to clear the Land, Under the penalty of

forfeiting their patents," and the Governor was further instructed to press for the passage of a law to that effect in the New York Assembly. The exasperation of local landholders at such ignorance of local conditions is clearly perceptible in this report of a council meetng held at Fort George:

This board are of the Opinion wood land cannot be cleared without burning up the woods and brush to render it fit for tillage & that his Majestie did not Intend to prohibit Such burning of the woods or falling of trees as are necessary and conducive to the Clearing of Land or for the use of the Owner and that the Grantee is not subject to a forfeiture for Such burning of woods and falling of trees they are all so of Opinion that no burning of woods are Intended to be prohibited but such as will or are likely to destroy Pine trees fit to make masts or barrs and that in Grants made of lands in which there are no Such pine trees there is no need of using any Clause to that Effect....

In the end, benign neglect must have solved the problem, for the colonial government was run by men whose interests ran counter to any such policy.³¹

Of even greater significance was the question of the form of land ownership. Most of the holders of land under direct patent from the crown preferred to lease the land, rather than to sell it. This was Schuyler's practice; as he told Charles Carroll of Carrollton, a large landholder himself in his home colony of Maryland, since each change of lessee involved a substantial payment to the lessor, "...this was much the most advantageous way of leasing lands,... [for] in the course of a few years, from the frequent transmutation of tenants, the alienation fines would exceed the purchase of the fee-simple." The other side of the coin was that tenants who expected their tenure to be short had no interest in making improvements. Colonists contrasted the leasehold that was available to them in New York with the freehold they could have in New England, and New York proved much less successful in attracting potential settlers from Europe as a consequence. Cadwallader Colden, at one time Surveyor-General of New York, complained about the practice. "The hopes," he said, "of having land of their own & becoming independent of Landlords is what chiefly induces people into America.

Nevertheless, settlement did proceed, if very slowly. Clearly, the bottom lands were settled first; there were settlers at Stillwater by 1750, a mixture of Dutch and English, to judge by their last names. The first church, a congregational church, was established in 1763; and while a church might not have been as important in New York as it was in new settlements in colonial New England, it was important enough to indicate the date of any significant number of people in the settlement.³³

Yet another indicator of a major increase in settlement was the establishment of a store by Schuyler, at Saratoga, evidently in 1765. Records of this store have survived, and from the pattern of sales and purchases, a picture of the development of the local population can be obtained. In the first year or two, most of the purchases, nearly all made on credit, are either basic staples or agricultural supplies. Before the end of the decade, however, a wide variety of things was being sold, including manufactured commodities from Europe, and many of the transactions were in cash. Too, cutomers were selling to the store as well as buying from it, and this would scarcely have been possible in the first year or two of settlement. 34

Further evidence that settlement was increasing, and that it was now extending into the woodland back from the river, is contained in a map in the Albany County Clerk's office. This map shows a somewhat different arrangement of the lots on the east side of the Hudson than the distribution in the plan of 1750; more important, however, it shows that several of the large lots (containing on average about 1500 acres) on the west side of the river had been subdivided, presumably to facilitate either lease or sale. This map, which shows "the subdivision of Margaret Livingston's and Bayard's Lots by John E. Bleecker," is dated 1767 and helps us to pinpoint the time at which settlement began on the uplands. Part of the woodland of the Saratoga battlefield, essentially "untouched by human hands" for a century or more, was about to feel the effect of the settler's axe.³⁵

How much change would such individuals produce in the woods, and how quickly? Most studies seem to show that, on average, new settlers cleared land at the rate of 1.5 acres per year. If an individual had nothing else to do - that is, if he had no family and had some other living accommodation in the area - he might be able to clear as much as 10 acres the first year; but many had also to build a home for their families and to plant at least some of the newly cleared land as quickly as possible to have food for the family and feed for the livestock. In all probability these new farms, in the 10 years or so between their original leasing and the battle, had up to 15 acres cleared; and most descriptions of Freeman's Farm suggest that, indeed, the clearing contained anywhere from 8-15 acres. One should be careful to differentiate the upland farm from the farm along the river; numbers of these are mentioned in the battle accounts, and these the had mostly been in existence longer, and many may have been composed at least in part of natural meadows with few if any trees on them.

How far had settlement progressed between the late 1760's and 1777, on that portion of the upland comprised within the Battlefield Park? Not, I think, very far. In all the battlefield accounts, Freeman's Farm is singled out as a "clearing," surrounded by woods. In the accounts of the store at Saratoga, one John Freeman is specifically identified in an entry for 8 April 1768, as "on Lott Nº 16." Few other patrons of the store are identified as to location, and all the others that are lived in such places as Stillwater or Half-Moon. Thus John Freeman must have been a new customer and a new tenant, living far enough away from the store not to be locally known. The entry almost certainly dates the approximate beginning of Freeman's tenancy. If there were other tenants (or landowners) living in the area of Freeman's Farm, one would expect that they would be > identified in similar locational form. In fact, portions of Lots 37 and 40 were sold off in 1774; but these lots comprised significant bottom lands along the river, though on the east side. This tends to reinforce the 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 37 Freeman's Farm was pretty clearly the only one in that immediate area.

Why there? Well, perhaps because the area had been partially logged off anyway shortly before. According to the recollections of one Samuel Woodruff, who particpated in the battle of Saratoga, Freeman's Farm"... was then covered by a thin growth of pitch-pine wood without underbrush, excepting one lot of about six or eight acres, which had been cleared and fenced."" would entail considerably less effort than clearing an area where the forest growth had a century or so to develop, or had at least remained untouched over that space of time. The absence of underbrush could have been accounted for if, in creating his clearing, Freeman had burned the resulting slash, as was customary, and the fire had spread to the adjoining pitch-pine stands. It is equally possible that Freeman had deliberately burned off the brush in the adjoining pitch-pine stand, since it was a "thin" stand anyway, with the object of creating a pasture out of it. Ease of clearing was a major consideration of new settlers, for obvious reasons, and it seems altogether likely that it operated in this case.³⁸

Indeed, there may well, at Saratoga, have existed a symbiotic relationship between lumbering and settlement. Lumber had been a major local product ever since the very first pioneers located at Saratoga in the early years of the century. Those who came after the first wave may have been attracted by lands where the timber had already been cut off. By the 1770's, Schuyler had not one but two mills on the Fish Kill, and probably another on the east side of the Hudson, on the Batten Kill. The upstream mill on the Fish Kill was the largest, it being equipped with a gang saw with 12-15 blades - various observers cite differing numbers of blades, but all numbers fall within that range.

How far had lumbering gone in depleting the local woods resource? Two observers suggest that it had substantially done that: in 1749, Kalm reported that, in the vicinity of Saratoga, "the wood around about was generally cut down," and William Strickland, going through nearly half a century later, noted that, "Schuyler's mills are sawing mills, but having consumed most of the timber within reach, they are likely soon to cease to work."

Are we to believe this? For the immediate vicinity of the mills, doubtless; but further away, it seems improbable, for several reasons. A11 saw mills of that era, and Schuyler's mills were no exception, were up-down mills. I have observed two such reconstructed mills in operation, and it takes 15-20 minutes to saw through, once, an 8-foot log. For reasons that are not clear, but the documentary evidence is substantial, it was the custom, then, to cut both planks and boards in 14-foot lengths. To cut through a single 14-foot log would therefore require approximately one-half hour. Two such logs could be cut in an hour, twenty in a ten-hour day. If we assume a six-day week; there are 310 working days in a year, always assuming that the saw mills were working year round. But the Schuyler correspondence contains several letters indicating that, for one reason or another, the mills were not always working - the weather, a lack of laborers, and most likely preoccupation with other activities. If we assume for practical purposes that there were 250 working days in a year, the larger mill could process 5000 logs a year; we lack information on the smaller mill, or on that on the Batten Kill, but in all probability they could not handle as large a quantity - let us attribute to the two combined the capacity of the larger mill. The upper mill attracted the notice of visitors because of its exceptionally large size.

If we consider that the three mills together were capable of sawing 10,000 logs per year, how many trees does this represent? The larger trees I find the arguments in these pages to be rother halond.

would have produced 3-4 14' logs, the smaller, at least two; let us say for purposes of the argument that the average was three. The mill capacity, then, could handle the job of sawing some 3333 trees each year. While fully stocked stands vary somewhat according to species (we can legitimately assume full stocking since we have shown that the woods were not manipulated by man for at least a century) 100 trees per acre of sawlog size is a reasonable figure. If the logging operations had been clearcutting operations - and given the technology it is unlikely that they were - the lumbering operations of Schuyler would have clearcut 33 acres per year. Since it is pretty clear that the saw mill was built during the early 1760's, by 1777 we're talking about the possible clearcutting of some 500 acres in the fifteen years or so it had been in operation prior to the battle. since most of the 49 lots in the Saratoga Patent contained around 1500 acres, the mills would have been able to saw timber from less than one of these in the available time.

How does this stack up with what we know of the logging operations? Logging was done almost exclusively in the winter time for several reasons. The winter time was the best time to get the logs out, by skidding them on ice or sledding them on the snow. Cutting in the winter time would avoid insect infestation of the cut logs, especially if they were stored in water until they were processed. Throughout the 19th century, logging continued to be done almost entirely in the winter months. The correspondence in the Schuyler papers that refers to logging operations is all dated in winter months. Logging was done by negro slaves, it appears in a crew of three. Even a skilled axman could not fell more than 10-12 large trees in a day, trees large enough to be good saw-timber. At 60 trees per week for a logging season of 12 weeks, a crew could fell and skid some 720 trees per year. Schuyler would have needed 4-5 crews of loggers just to supply the capacity of his saw mills, and we have direct historical evidence of only one such crew.

To be sure, some of the mill capacity was used to saw logs for Schuyler's tenants; at one point, in reporting that the mills were not operating at all because the mill superintendent lacked funds to pay the work force, John Graham in a letter to Schuyler in December of 1775 notes that there are between two and four hundred logs belonging to others waiting to be sawed, along with Schuyler's own logs. The records of the store indicate that a significant portion of mill time was devoted to sawing logs for the tenants and others in the neighborhood. In short, combining Schuyler's own logging crews' capacity with that of the tenants, an estimate of timber sawn at some 3333 trees per annum seems very reasonable.

But did the logging crews of Schuyler, and the tenants, clearcut? In cases where they were clearing land for cultivation, assuredly; but in cases where they were cutting just to harvest the timber, probably not. They were clearly only interested in certain species, and higher quality trees even though references to timber traded do not very often refer to tree species. Pine timber, and this clearly included both white pine and pitch pine, was a major variety; next in importance to it was oak, and in some cases white oak and specified. Chestnut was occasionally processed for posts. Basically, however, the lumbering business concentrated on pine and oak. because of the great technological difficulties of moving large quantitites of logs except by water - ox sledding was the basic land

technique - trees that were not well worth the effort would not be cut. Thus, in areas where the growth was solidly pine, as on the pine plains to the west of Saratoga, the land could indeed have been largely denuded of forest cover. It is perhaps worth noting that this is the area through which William Strickland passed when travelling from Ballston Spa to Saratoga in 1795, and which let him to predict that the mills of Schuyler would soon run out of raw material.

Is there any way in which we can check these hypothetical calculations, that led us to conclude that Schuyler's mills would have been capable of processing no more timber than the total growth on some 33 acres per year? Fortunately there is, using some historical evidence. The Schuyler Papers contain a bill submitted by Schuyler to Stephen Moylan, Quartermaster General (of the Continental Army), and covering the period April 16-Sept. 19, 1776. During this period Schuyler supplied the Continental Army with 5222 planks and 12560 boards. Some of the planks were specifically listed as 1 1/2-inch planks; I assume the others will have been 2" planks. The planks are thus divided between 1.5" and 2", and I assume all are 10" wide. Nearly all the boards are described as 1" thick; I assume they are all 12" wide. With these assumptions we can calculate the total number of board feet sold the Continental Army in this billing, namely 284,574. A hundredyear-old stand of, say white pine (and the bill specifies white pine in some instances) growing at a profitable rate for commercial forest of half a cord per acre per year would have on it 25,000 board feet per acre. The 284.5 mbf supplied the Continental Army as recorded in this bill represents, therefore, the wood from 11.38 acres. In addition, the Schuyler Papers contain a letter from James Van Rensselaer, to Schuyler, dated 22 September 1776, saying that he, Van Rensselaer, understands that Schuyler has some 20,000 boards and planks at his mill at that time, and the army will take all of them. If these 20,000 are divided into boards and planks in the same ratio as those already supplied the Continental Army as detailed in Schuyler's bill to the Quartermaster General, they would consist of 5880 planks and 14120 boards. Assumng the planks are all 2 x 10s and the boards all 1 x 12s, these 20,000 boards and planks constitute 334.3 mbf, or, at 25,000 board feet to the acre, the cut from 13.37 acres. Adding this to the 11.38 acres comprised in Schuyler's bill to the Quartermaster General, we have the Continental Army taking from Schuyler the cut from 24.75 acres, a figure which is wholly consistent with our estimate that the likely annual production of the sawmills was the cut from 33 acres.

In addition, however, we must calculate roughly how much timber was cut and burned to create tillage, and how much was cut for firewood. Strach estimates that 200-300 people lived in an around Saratoga by 1763, a negligible increase over the 30 families (at 6 persons to a family typical for that era) supposed to have been there at the time of the 1745 massacre. Strach believes that in a scant four years, this had grown to 1200, but a four-fold increase in four years does not seem credible, especially given the general unpopularity of the leasehold tenure. Perhaps a better estimate can be arrived at by looking at the records of the Saratoga tore between 1765 and 1769 216 different names appear on the list of customers. Of these, however, two were from Albany, three from Half-moon, two from Schaticoke, and one from Fort Edward. That leaves 208 locals, who may reasonably be equated with households. But the rate of growth was clearly quite rapid in this period; so it would not be unreasonable to assume that

Survey met

splice ?

the number of households would have doubled by 1777, giving us a total number of households of 416. If all of these were primarily farmers (and some were clearly not: the customer list identifies one as a cooper, another as a schoolmaster) we would have 416 farms being cleared. For the sake of round numbers (and to accommodate craftsmen and other non-farmers) let us fix the number of farms by 1777 at 400. Some of these would have been occupied for up to 15 years, a few of the original riverside ones much longer, but others would be much newer, say five; let's average the age of the farms at ten years. If each farmer had been clearing 1.5 acres per year, each farm would have 15 acres cleared by 1777, and if there are 400 farms by 1777, 6000 acres would have been cleared, or the equivalent of four entire lots in the 1750 distribution. However, the settlers went first for the "interval" lands along the river; and the original seven lots, not included in the division of 1750 because they had already been subdivided, comprised a bit over 6000 acres, so it is safe to say that not much clearing had taken place on the upland farms by 1777 - as. indeed, we have already concluded.

We still, however, have to consider if much of the forest would have been removed to supply our 400 households with fuelwood. This was an age before iron stoves, so the method of heating was by inefficient open fireplaces. Some fairly realistic figures for a season's heating with stoves were developed in Massachusetts in the 1830's, and these suggested that it took 14 cords to heat a house. If we double this for heating with fireplaces it would not be unrealistic, and for simplification's sake we will round up to 30 cords per household per year. Since we've allotted these 416 households an average duration prior to 1777 of ten years, each household is going to need 3000 cords over those 10 years, or, for all 416 households, 124,800 cords - let's round that off at 125,000. Even though the diary of Abner Sanger, a farmer living in Keene, New Hampshire at that time, shows that a lot of pine was burned as fuelwood in those years, it seems safest to assume that in the majority of cases, hardwoods were cut for fuelwood. Using Schnur's estimate for the volume of wood on an average site of a stand of 100-year-old upland oak, we have a figure of 20,000 board feet, or 52.71 cords. It would have required the timber on 2371 acres to heat our 416 households for ten years. It seems more likely, however - and Abner Sanger's diary reinforces this subjective impression that the settlers cut their fuelwood here and there in the woods, where it was relatively easy to get out. Serendipity was also exploited; Sanger cut up dead trees for fuelwood, and at Saratoga it would have been surprising if the settlers had not taken advantage of the tops left from trees logged. Such spotty cutting would have encouraged the growth of underbrush. As the battlefield accounts make clear, underbrush was a serious obstacle to military operations.

What conclusions can we draw from these arithmetical calculations? That despite the active operations of the sawmills on Fish Creek, the available technology severely constrained the amount of timber that could be processed from the area around Saratoga. To be sure, besides the timber cut and processed we cannot overlook the timber simply destroyed to clear for tillage, or timber used for fuelwood. But here the constraints are in the number of settlers actually taking up residence on the site. All indications are that <u>at the time of the battle</u>, while the bottom lands were being pretty heavily farmed, not many farms had been established on the wooded uplands. Such a conclusion is consistent with Lt. Wilkinson's map,

which shows the area between the river and the Albany road as entirely farm fields, but which, by contrast, shows the area to the west of the road as almost entirely under tree cover.

III. Battlefield Observations

Perhaps the most detailed description of the battle, in a day-by-day format, is to be found in the Dairy of the German Forces in America. While the account makes no distinction as to species of tree encountered, it contains some observations that are useful to us in determining the character of the vegetation.

The Diary becomes fully relevant on September 13, when it points out that "the heights of Saratoga are forested, also covered with thick, short shrubs..." By the 15th of September, advancing slowly - on this date the British army covered some three and a half miles - the forces of Burgoyne had occupied a position in which the left wing controlled the plains along the Hudson, while the right wing was anchored in "a swampy forest." The center of this position was at Dovogat House. Immediately in front of the forces of Burgoyne was a small stream called the Comme-Kill, which flows into the Hudson at this point; however, as a result of the irregular course of the stream, the right wing of the British forces was almost back-to-back with the left.⁴⁵

In the advance on September 16, the army crossed the Comme-Kill, mostly over a ruined bridge, presumably deliberately destroyed by the Americans, as they had a policy of creating every possible obstruction to the regular advance of the British. Conditions at this point forced Burgoyne to divide his army into two parts; one advanced in good order along the main Albany road, but the other was obliged to find its way over a path through the woods ultimately winding up at the house of someone named Dawes. The party on the road halted when it reached the house belonging to Moor. The two wings were, the diary notes, separated by dense forest - it was this condition which entailed dividing the army into two parts.

On the 17th, however, the two parts of the army were joined together again, after they had advanced to the vicinity of Sword's house, which was the center of Burgoyne's encampment. However, Burgoyne felt obliged to send a significant portion of his forces up the hills abutting the road; in that location they advanced with some difficulty, because of the woods covering the hills. In fact, the British found the woods through which their forces were obliged to march (the Germans were stationed along the river, so they had the advantage of the advancing through cleared fields) such an obstacle that communication with the portion of the army on the plain adjoining the river could only be maintained by a system of gun-shot signals. Near Sword's house there were some low hills, and behind it - in the direction opposite to the river - was "deep woods." There was, it appears, a track that left the road at the point where it crossed the ravine south of Sword's house, and wound its way up the ravine to the hills overlooking it. Riedesel, the German commander, consequently stationed troops at a position that overlooked this track, in order to control it.

On the 19th, as the British forces continued their advance toward Stillwater, where, as they were aware, the American camp was located, they

had to advance through terrain covered with trees and shrubs. Only the left wing, consisting primarily of the German forces and the artillery, was able to advance along the road paralleling the river. As is well known, the Americans and the British clashed at Freeman's Farm, and, when Riedesel received the order from Burgoyne to march to the aid of the hard-pressed British, Riedesel made his way through the woods and up the hill until he came out on a cleared eminence overlooking the field of battle. Around this cleared area, however, the German troops reported dense forest.

The American forces were strung out on a line between a clump of trees and a deep, swampy ravine whose sides were covered with shrubs. The Americans had added to the natural advantages of this position by building an abbatis, a typical battlefield defensive construction of the 18th century, consisting of downed trees piled up haphazardly, some of them with their ends pointing toward the approaching enemy.

When Riedesel and his troops arrived at the point where the British forces were being pressed by the Americans, he decided the best way to relieve the pressure was to attack the Americans in the flank. He therefore ordered Regiment Riedesel and two companies of Regiment v. Rhetz to cross the ravine and attack the right wing of the American forces. This maneuver was successful despite the difficult terain, and the Americans were forced to draw back toward their camp on Bemis Heights. When the sun set the British and German forces were masters of Freeman's Farm, and the German troops camped in the wood bordering the great ravine, protected from American attack by the dense growth of shrubs in the ravine.

During the period of inaction that followed the clash of September 19 while Burgoyne waited for Clinton to come up from New York - both sides attempted to alter the woods in which they were positioned to their advantage. The Americans enlarged and strengthened the abbatis in front of their lines, while 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 October 2, Riedesel sent out a patrol into the ravine, to gain intelligence about the American forces. The patrol was unable to complete its mission, however, because the shrub cover was so dense at a point where several side ravines join the main one that progress was simply impossible. The patrol did, however, discover a network of paths that the Americans had been using through the ravine to enable small parties to reconnoitre. The Germans in fact utilized the opportunity to obstruct these paths - taking a page out of the American book - with piled up brush cut from the slopes of the ravine.

On 7 October, forced by dwindling supplies to take action, the British attemped a "reconnaissance in force," under circumstances that forced the right wing to operate in a woods. Once again the Americans capitalized on conditions that particularly suited the guerrilla style of fighting favored by irregulars, and, inspired by Arnold, pushed the British back. The British retreated toward Saratoga, and, after several days of indecision, chose to offer a conditional surrender. An alternative, considered by Burgoyne's council of war, was to turn all the British and German troops loose to make their way, as best they could, back to Canada. Riedesel argued against this proposal, as did others, on the grounds that the German troops"...are simply not conditioned to operate in woods that wholly lack defined roads." 52

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 Freemen's Farm, the battlefield was covered either with woods of varying density or with shrub growth, and sometimes with both. The ravines were, at their bottoms, so swampy that in all probability nothing but wet-site shrubs such as red osier dogwood, lyonia, bayberry would grow there. That the slopes of the ravines had nothing but shrubs on them may indicate that trees had recently been cleared from them, though there are situations in which shrub cover can be so dense that trees do not have an opportunity to get started. This seems the most likely explanation for the condition of the ravines.

The quantity of shrub growth in the woods at many locations does suggest that the canopy was not closed, for shrubs are rare under a tight overstory.

We know that the forested area was criss-crossed by paths that may well have had their origin in logging roads. It is reasonably clear that the logging that was being done was selective, that is, only certain species were being taken; and in a forest of mixed deciduous species such as we would expect to find on that soil in that location, selective logging could open up the canopy sufficiently to encourage the growth of shrubs on the forest floor.

The trees, except in the immediate vicinity of Freeman's Farm, would appear to have been assorted hardwood species. If selective logging had been going on, it would have removed the good quality oaks, the pines where they existed scattered through the hardwoods, the chestnuts and perhaps a few of the hickories. The poor quality oaks, the red maples, the elms, butternuts and basswoods would have been left behind. Around Freeman's Farm we know that there were many pines, and Chastellux, visiting the site several years later, speaking of the fighting there, said, "this action was very brisk, to which the fir [pine] trees which are torn by musket and cannon shot, will long bear testimony."⁵³

IV. Saratoga after the Battle

Similar observations were made by William Strickland, who visisted the battlefield some 14 years after Chastellux. "...Some few of the trees near where the principal action took place," he noted, "are still to be seen which were mutilated with the canon [sic] shot, and many places are pointed out in their trunks, where shot are bedded, deep within them; but many more have been cut down. The sides of the hills which line the banks of the Hudson are in general cover [sic] with wood to their feet, except the three described by Anbury [sic], whose book I had with me and whose drawing is very correct, but these are still covered with stumps, and some of the dead trees which he shows in his view of the place are still remaining; back from the summit of these hills the country is a level plain, covered with wood to the breadth of from half a mile to a mile and a half, beyond which the woods having been in part cut down the country is tolerably open, and along this open country the British and American army passed, and on it

took place the fatal action on the 7th of October."54

These woods that had "...been in part cut down..." may well have been largely intact at the time of the battle, indeed, the battle descriptions suggest that they were. But in the meantime settlement of the area had proceeded apace, and where Freeman's Farm had been a fairly isolated opening in the woods, there must now have been a great many. By 1795, the year that Strickland made his journey, Lot #13 had twelve tenants on it. Since Lot #13 comprised 1500 acres, each tenant accounted for approximately 125 acres. Some of them, no doubt, were taking advantage of the clearing of the woods that the battle had brought about in some places; others would have proceeded right away to remove at least a portion of the trees. If the other lots were as fully occupied as Lot #13, the Saratoga battlefield was well on the way to becoming the farmland it remained for at least a 19th century, Schuyler's son abandoned the leasehold, and sold many of the farms in fee simple to the tenants occupying them.⁵⁵

The conversion of Saratoga from wild land just emerging from frontier status to settled and cultivated farmland was a process which, though briefly interrupted by the battle, resumed as soon as the revolution was over. Saratoga became an incorporated town in March of 1788, a tribute to its rapid growth since the land had first been surveyed and subdivided in the 1750's and 1760's. In 1789 the part of Saratoga on the other side of the Hudson became the separate town of Easton, and pieces of Saratoga were carved off to make portions of towns to the westward in the 1790's. Saratoga Springs became a separate political entity in 1819.

The Schuylers rebuilt the house burned by the British and continued to operate the estate into the 19th century, beyond the death of General Schuyler. They still possessed a prime water power site and the mills continued to exist, though they were later converted to other uses than sawing lumber. The rich bottomlands became especially prized in the years after the revolution - the population of Albany tripled between 1790 and 1810 and that population needed to be fed - and the trade in farm produce, especially during the years of high agricultural prices between 1790 and 1815, made this a prosperous time for the possessors of prime agricultural land. In the years after the battle Saratoga became what it was to be for more than a century, a farming community.

V. Conslusion

How important is it for us to know about the vegetation at Saratoga? Does it matter whether the land was open or wooded? Anburey, who was present at the battle and published his memoirs shortly after the end of the Revolution, wrote that, "the nature of the country is peculiarly unfavorable in respect to military operations, it being difficult to reconnoitre the enemy, and to obtain any intelligence to be relied on; the roads, the situation of the enemy, the grounds for procuring forage, of which the army is in great want, and all parties are in quest of, are often attended with the utmost danger, and require great bodies to cover them." These general difficulties, which impeded operations European-style throughout much of the Revoluation, were heightened by the particular local situation. "...There are not less than a dozen strong passes," wrote Anburey, "setting aside the passage of the Mohawk; where, if strengthened with abbatis, which the Americans are expert at making, as they never encamped a single night without throwing up works of this sort in a few hours, five hundred of their militia would stop, for a time, ten times their number of the bravest troops in the world who had not artillery to assist them."⁵⁰

These general problems of the terrain became critical in the battle at Saratoga. "The officers who have been killed and wounded in the late action [on 19 September]," wrote Anburey, "are much greater in proportion than that of the soldiers, which must be attributed to the great execution of the [American] rifle-men, who directed their fire against them in particular; in every interval of smoke, they were sure to take off some, as the rifle-men had posted themselves in high trees." Would the results of the action have been different if the "high trees" had not been there for the sharpshooters to use? We cannot of course know; but the opinion of one even more directly involved, General von Riedesel, commander of the German troops, affords an answer:

Since on every occasion when the Brunswick troops have been engaged they have conducted themselves with the greatest valor, still it is clear that we lose a great many valiant soldiers unnecessarily; if [on the other hand] our soldiers would avoid open ground, and instead seek protection behind trees or other cover, and then run from one tree to another, every soldier would have his own defense; this is the one means by which we could attack the enemy in the woods without great loss, and win through. Moreover, if every soldier would only shoot when he can aim at his enemy from behind the protection of a tree or other cover, it would be better; otherwise he will use up all his ammunition within half an hour, without accomplishing anything. By contrast, if the enemy were positioned in an open plain, then we could use our old tactics, and advance in close formation without firing and with fixed bayonets; for it is clear that in the open our enemy is the most contemptible enemy imaginable, and will not offer any resistance to an advancing battalion in closed formation.⁵⁹

Prerhaps General Gates was wiser than the fiery spirits around him; for by insuring that the battle would be fought in the woods, which his volunteer force knew how to use to best advantage, he secured a victory for the American colonists that was critical in determining the outcome of the entire war. It just may be that the American woods of Saratoga won the war for the colonists.

NOTES

- 1. U.S. Congress. Historic Sites Act, 1935 (ch. 593), Sec. 2.
- 2. U.S. Congress. An Act for the Creation of the Saratoga Natonal Historical Park (ch. 316), 1938.
- 3. Funk, R. E. <u>Recent Contributions to Hudson Valley Prehistory</u>. Albany New York State Museum, Memoir #22, 1976. pp. 5-6.
- 4. French, J. H. <u>Gazetteer of the State of New York</u>. First ed., 1860; this re-issue, Port Washington, Ira J. Friedman, 1969. pp. 584, 593. Funk, op. cit., p. 6.
- 5. Westfeld, Marinus, et. al. "Natural Forest Vegetation Zones of New England." Journal of Forestry, 54 (1956): 332-338. Funk, op. cit., p. 6. Byers, Douglas S. "The Environment of the Northeast." In: Johnson, Frederick, ed. <u>Man in Northeastern America</u>. Andover (MA), Peabody Foundation for Archaeology, 1946. pp. 17, 29.
- 6. Kalm, Peter. <u>Travels into North America, Containing its Natural History, and a Circumstantial Account of its Plantations and Agriculture in General</u>.... John Reinhold Forster, tr. 2nd ed., London, T. Lowndes, 1772. II, pp. 110, 118, 121-122, 131.
- van der Donck, Adriaen. <u>Vertoogh van Nieu Nederland</u>. Henry C. Murphy, tr. New York, 1854 [no publisher listed]. pp. 14-15.
- 8. <u>Ibid.</u>, pp. 5-6. Kalm, <u>op.cit.</u>, II, p. 120. Strickland, William. <u>Journal of a Tour of the United States of America</u>, <u>1794-1795</u>. New York, New York Historical Society, 1971. pp. 145-46.
- 9. Smith, Richard. <u>A Tour of Four Great Rivers</u>. Francis W. Halsey, ed. New York, Scribner's, 1906. p. 21.
- Kalm, <u>op.cit.</u> II, p. 120. van der Donck, Adriaen, <u>op. cit.</u>, pp. 13-14. Albany County Registry of Deeds, Book 6, pp. 308-310. Carroll, Charles, of Carrollton. "Journal." In: Van Zandt, Roland. <u>Chronicles of the Hudson: Three Centuries of Travelers' Accounts.</u> New Brunswick, Rutgers, 1971. p. 83.
- 11. Strickland, op. cit., p. 156.
- 12. <u>Ibid.</u>, pp. 145-146.

۰.

13. David Starbuck, Department of Science and Technology Studies, Rensselaer Polytechnic Insitute, personal communication; Dean Snow, Department of Anthropogy, SUNY at Albany, personal communication. Brasser, T.J. "Mahican," in: Sturtevant, William C. <u>Handbook of North</u> <u>American Indians</u>. Washington, DC, Smithsonian Inst., 1978. Vol. 15: Northeast. p. 198.

- 14. Funk, <u>op. cit.</u>, p. 27. Brasser, "Mahican," in Sturtevant, <u>op. cit.</u>, p. 200.
- 15. Ibid., pp. 198-199. Funk, op. cit., viii.
- 16. Byers, "Environment of the Northeast," in Johnson, <u>op. cit.</u>, pp. 18-19. Quoted from the 1734 edition of Wood, p. 16.
- 17. Van der Donck, Adriaen. <u>A Description of the New Netherlands</u>. Jeremiah Johnson, tr., Thomas F. O'Donnell, Ed. Syracuse, Syracuse Univ. Press, 1968. pp. 20-21. This translation is based on a much enlarged edition of Van der Donck's description of New Netherlands. The passage dealing with firing the woods is not in the <u>Vertoogh</u> translated by Murphy.
- Russell, Emily W. B. "Indian-Set Fires in the Forests of the Northeastern United States." Ecology, 64, I (1983): 78-88. p. 86. Byers, "The Environment of the Northeast," in Johnson, <u>op. cit.</u>, p. 23. Little, Silas. "Effects of Fire on Temperate Forests: Northeastern United States." In: Kozlowksi, T.T. & C.E. Ahlgren. Fire and Ecosystems. New York, Academic, 1974. p. 225.
- 19. Little, "Effects of Fire on Temperate Forests: Northeastern United States," in: Kozlowski, op. cit., pp. 232, 233.
- Brasser, "Mahican," in: Sturtevant, <u>op. cits.</u>, pp. 202-203. Grassmann, Thomas. <u>The Mohawk Indians and their Valley</u>. Albany, J.S. Lischynsky, 1969. p. 39.
- Brasser, "Mahican," in: Sturtevant, <u>op. cit.</u>, pp. 204, 206.
 O'Callaghan, E.B. <u>The Documentary History of the State of New York</u>. Albany, Charles van Benthuysen, 1851. Appendix to Vol. I, p. 690.
- 22. See Schuyler Papers, NYPL, Box 16, Governor Dongan's Attest to the Saratoga Patent, 4 November 1684. Grassmann, <u>op. cit.</u>, p. 46.
- 23. French, <u>op. cit.</u>, pp. 585n, 591n. Brasser, "Mahican," in: Sturtevant, <u>op. cit.</u> p. 203. Gerlach, Don W. <u>Philip Schuyler and the</u> <u>American Revolution in New York</u>. Lincoln (NE), Univ. of Nebraska Press, 1964. p. 317. Albany County Registry of Deeds, Book 6, pp. 308-310.
- 24. <u>Ibid.</u>, pp. 308-310. Kalm, <u>op. cit.</u>, pp. 108-109.
- 25. Albany county Registry of Deeds, Book 6, pp. 308-310.
- 26. O'Callaghan, E.B., ed. <u>Calendar of the Historical Manuscripts in the Office of the Secretary of State, Albany, New York</u>. Albany, Weed, Parsons, 1866. p. 621. Trelease, Allen W. <u>Indian Affairs in Colonial New York: the Seventeenth Century</u>. Ithaca, Cornell, 1960. p. 276.
- 27. French, op. cit., p. 591n.
- 28. Albany County Registry of Deeds, Book 6, pp. 308-310. Schuyler Papers, NYPL, Box 16.

- 29. Gerlach, <u>op. cit.</u>, Appendix, Schuyler Family Landholdings. Schuyler Papers, NYPL, Box 16.
- 30. <u>Ibid.</u>

• -

- 31. Colden, Cadwallader. "The Colden Papers, 1711-1729." New York Historical Society <u>Collections</u>, 1917. pp. 135-136, 137, 229.
- 32. Colden, Cadwallader. "The Colden Papers, 1730-1742, II. New York Historical Society <u>Collections</u>, 1917, II, p. 32. Colden, Cadwallader. "The State of the Lands in the Province of New York, in 1732. In: O'Callaghan, E.B. <u>The Documentary History of the State of New York</u>. Albany, Charles van Benthuysen, 1851. I, 384. Carroll, "Journal," in Van Zandt, <u>op. cit.</u>, p. 84. Ellis, David M. <u>Landlords and Farmers in</u> <u>the Hudson-Mohawk Region</u>, <u>1790-1850</u>. New York, Octagon, 1967. pp. 41-42.
- 33. French, op. cit., pp. 593, 593n.
- 34. The records of the store for 1765-1770, entitled "Schuyler Day Book," are in the holdings of the New York Historical Society.
- 35. This map is reproduced in Strach, Stephen G. The Saratoga Estate of General Philip Schuyler, 1745-1839: An Interpretive and Historic Grounds Survey. Eastern National Park and Monument Association, 1986 (Mss.).
- 36. Ellis, <u>op. cit.</u>, p. 75. Stone, William L. <u>Visits to the Saratoga</u> <u>Battle-Grounds</u>, <u>1780-1880</u>. Albany, 1898. Quoted in: Snell, Charles W. A Report on the ground Cover at Saratoga National Historical Park October 8, 1777. Submitted July 25, 1949. In: File No. 834.
- 37. Schuyler Day Book, New York Historical Society. Albany county Registry of Deeds, Book 9, pp. 71, 78.
- 38. Ellis, op. cit., pp. 73-74.
- 39. Golden, C"The Colden Papers, 1730-1742, II." NYHS, Collections, 1917, II, p. 33. Kalm, op. cit., II, p. 100. Carroll, "Journal," in Van Zandt, op. cit., p. 84. Schuyler Papers, NYPL, Box 24, Letter: Ph. Lansingh to Schuyler, 2 January 1772; Box 23, Lansingh to Schuyler, 27 December 1771. These letters are quoted in Strach, op. cit., Appendix, "Mills-Saw," no pagination. Strickland, op. cit., p. 147. Kalm, op. cit., II, p. 123.
- Schuyler Papers, NYPL, Box 23, Lansingh to Schuyler, 27 Dec. 1771; Box 26, Letter, John Graham to Schuyler, 19 Dec. 1775.
- 41. Ibid.; Schuyler Papers, NYPL, Lansingh to Schuyler, 27 Dec. 1771.
- 42. Schuyler Day Book, NYHS, <u>passim</u>; Schuyler Papers, NYPL, Box 24, Lansigingh to Schuyler, 2 Jan. 1772; Schuyler Letter Book, Am. Antiqu. Soc., Entry for 10 July 1777; Schuyler Papers, NYPL, Lansingh to Schuyler, 27 Dec. 1771; Box 30, James Van Rensselaer to Schuyler, 22

Sept. 1776.

- 43. Schuyler Papers, NYPL, Box 33, Bill, Schuyler to Stephen Moylan, Quartermaster General; Box 30, James Van Rensselaer to Schuyler, 22 Sept. 1776.
- Schnur, G. Luther. <u>Yield, Stand and Volume Tables for even-aged</u> <u>Upland Oak Forests</u> Washington, DC USDA FS, TEch. Bull. 560, Apr. 1937. p. 8. Sanger, Abner. <u>Very Poor and of a lo Make: the Journal</u> <u>of Abner Sanger</u>. Lois K. Stabler, ed. Portsmouth (NH), Peter Randall, 1986, <u>passim</u>. Colman, Henry. <u>Fourth Report of the</u> <u>Agriculture of Massachusetts</u>. Boston, Dutton and Wentworth, 1841. Russell, Peter A. "Forest into Farmland: Upper Canadian Clearing Rates, 1822-1839." <u>Agricultural History</u>, 57 (1983): 326-339.
- 45. Riedesel II, 46, Vols. I, II, Part III: Tagebuch der braunschweigischen Truppen in Amerika unter dem Befehle des Generalmajors v. Riedesel. Entry for Sept. 13; Entry for Sept. 15.
- 46. Ibid., Entry for Sept. 16.
- 47. <u>Ibid.</u>, Entry for Sept. 17. Anburey, Thomas. <u>Travels through the</u> <u>Interior Parts of America</u>. Orig. ed: London, Wm. Lane, 1789. Repr., NY, Arno. 1969. I, pp. 364-66.
- 48. Anon., "Fragment eines Tagebuchs uber die Braunschweigischen Truppen in Amerikanischen Feldzuge, 1777." Hauptarchiv, Braunschweig. Filmed for the L of C collection.
- 49. Riedesel, op. cit., entry for Sept. 19.
- 50. Ibid.
- 51. <u>Ibid.</u>, entry for Sept. 20, 22; entry for Oct. 2. Anburey, <u>op. cit.</u>, I, pp. 431-32.
- 52. Bancroft Collection, NYPL, Hessian Papers, Riedesel to Duke of Brunswick, Albany, 21 Oct. 1777.
- 53. Chastellux, Marquis de. <u>Travels in North America</u>. H.C. Rice, Jr., tr. Chapel Hill, N. Carolina Press, 1963, I, pp. 212-13.
- 54. Strickland, op. cit., p. 151.
- 55. Schuyler Papers, NYPL, Box 12, Leatherbound rent book of Abraham Ten Broeck. Ellis, op. cit., pp. 40, 47-48.
- 56. French, op. cit., p. 591.
- 57. Ellis, op. cit., pp. 80-81.
- 58. Anburey, op. cit., I, 383, 429; II, 424-25.
- 59. Riedesel, II 50, Vol. II, and 51, II. General Order, dated 26 August 1777.

BIBLIOGRAPHY

- I. Personal Testimony.
 - 1. Snow, Dean. Professor of Anthropology, SUNY at Albany. Professor Snow has carried out some intensive investigations of Indian relics in the Hudson Valley.
 - 2. Starbuck, David. Professor, Department of Science and Technology Studies, Rensselaer Polytechnic Insitute. Professor Starbuck has carried out archaeological excavations at Bemis Heights.
- II. Manuscript Materials.
 - 1. Albany County Registry of Deeds in the Albany County Clerk's Office.
 - 2. Anon., Fragment eines Tagebuchs uber die Braunschweigischen Truppen in Amerikanischen Feldzuge, 1777. This is part of the collection of Brunswick documents dealing with the German troops serving with the British forces during the American Revolution, and is included in the Library of Congress microfilms of those materials.
 - 3. Bancroft Collections, New York Public Library, Hessian Papers. This collection includes letters of General von Riedesel, commander of the German troops serving with Burgoyne.
 - 4. Riedesel. This is the general heading used for the official records of the Brunswick troops serving under General Burgoyne. The originals are in the Brunswick Hauptarchiv, Wolfenbuttel, Germany. This material was filmed by the Library of Congress.
 - 5. Schuyler, General Philip. Day Book. This document, which records the transactions at the store established by Schuyler in Saratoga, is in the holdings of the New York Historical Society.
 - 6. Schuyler, General Philip. Letter Book, 1777. Notations of the letters written by Schuyler during 1777. This book is in the holdings of the American Antiquarian Society, Worcester, MA.
 - 7. Schuyler Papers, New York Public Library. The Schuyler Papers in the Manuscripts Division of the New York Public Library are the largest collection Schuyler materials.
 - 8. Strach, Stephen G. The Saratoga Estate of General Philip Schuvler: 1745-1839. An Interpretive and Historic Grounds Survey. Eastern National Park and Monument Association. 1986.

III. Printed Sources.

1. Anburey, Thomas. Travels through the Interior Parts of America.

Orig. ed, London, Wm. Lane, 1789. Repr., New York, Arno Press, 1969.

- Brasser, T.J. "Mahican." In: Sturtevant, William C. <u>Handbook of</u> <u>North American Indians</u>. Washington, DC, Smithsonian Inst., 1978. Vol. 15: Northeast.
- 3. Byers, Douglas S. "The Environment of the Northeast". In: Johnson, Frederick, ed. <u>Man in Northeastern America</u>. Andover (MA), Peabody Foundation for Archaeology, 1946.
- 4. Carroll, Charles, of Carrollton. "Journal." In: Van Zandt, Roland, ed. <u>Chronicles of the Hudson: Three Centuries of</u> <u>Travelers' Accounts</u>. New Brunswick, Rutgers, 1971.
- 5. Chastellux, Maquis de. <u>Travels in North America</u>. H.C. Rice, Jr., tr. Chapel Hill, N. Carolina Press, 1963.
- 6. Colden, Cadwallader. <u>The Colden Papers</u>. New York Historical Society <u>Collections</u>, 1917.
- 7. Colman, Henry. Fourth Report of the Agriculture of Massachusetts. Boston, Dutton and Wentworth, 1841.
- 8. Ellis, David M. Landlords and Farmers in the Hudson-Mohawk Region, <u>1790-1850</u>. New York, Octagon, 1967.
- 9. French, J.H. <u>Gazetteer of the State of New York</u>. First ed., 1860; re-issued, Port Washington, Ira J. Friedman. 1969.
- 10. Funk, R.E. <u>Recent Contributions to Hudson Valley Prehistory</u>. Albany, New York State Museum, Memoir #22, 1976.
- 11. Gerlach, Don W. Philip Schuyler and the American Revolution in New York. Lincoln (NE), University of Nebraska, 1964.
- 12. Grassmann, Thomas. <u>The Mohawk Indians and their Valley</u>. Albany, J.S. Lyschynsky, 1969.
- 13. Kalm, Peter. <u>Travels into North America: Containing its Natural</u> <u>History, and a Circumstantial Account of its Plantations and</u> <u>Agriculture in General</u>.... John Reinhold Forster, tr. London, T. Lowndes, 1772.
- 14. Little, Silas. "Effects of Fire on Temperate Forests: Northeastern United States." In: Kozlowski, T.T. and C.E. Ahlgren. <u>Fire and Ecosystems</u>. New York, Academic, 1974.
- 15. O'Callaghan, E.B., ed. <u>Calendar of the Historical Manuscripts in</u> <u>the Office of the Secretary of State, Albany, New York</u>. Albany, Weed, Parsons, 1866.
- 16. O'Callaghan, E.B. <u>The Documentary History of the state of New</u> York. Albany, Charles van Benthuysen, 1851.

- 17. Russell, Emily W.B. "Indian-Set Fires in the Forests of the Northeastern United States." <u>Ecology</u>, 64, I (1983): 78-88.
- 18. Russell, Peter A. "Forest into Farmland: Upper Canadian Clearing Rates, 1822-1839." <u>Agricultural History</u>, 57 (1983): 326-339.
- 19. Schnur, G. Luther. <u>Yield, Stand and Volume Tables for Even-aged</u> <u>Upland Oak Forest</u>. Washington, DC, USDA FS, Tech. Bull. 560, April 1937.
- 20. Smith, Richard. <u>A Tour of Four Great Rivers</u>. Francis W. Halsey, ed. New York, Scribner's, 1906.
- 21. Stabler, Lois K., ed. Very Poor and of a Lo Make: the Journal of Abner Sanger. Portsmouth (NH), Peter Randall, 1986.
- 22. Stone, William L. <u>Visits to the Saratoga Battle-Grounds, 1780-1880</u>. Albany, 1898.
- 23. Strickland, William. <u>Journal of a Tour of the United States of</u> <u>America, 1794-1795</u>. New York, New York Historical Society, 1971.
- 24. Trelease, Allen W. Indian Affairs in Colonial New York: the Seventeenth Century. Ithaca, Cornell, 1960.
- 25. van der Donck, Adriaen. <u>A Description of the New Netherlands</u>. Jeremiah Johnson, tr., Thomas F. O'Donnell, ed. Syracuse, Syracuse University Press, 1968.
- 26. van der Donck, Adriaen. <u>Vertoogh van Nieu Nederland</u>. Henry c. Murphy, tr. New York, 1854.
- 27. Westfield, Marinus, et. al. "Natural Forest Vegetation Zones of New England." Journal of Forestry, 54 (1956): 332-338.



Faculty of Arts and Sciences • Department of Geological Sciences Newark • New Jersey 07102

> 18 June, 1987 26 Ridgewood Ave., Box 430 Mt. Tabor, NJ 07878

Dr. Mary K. Foley US Dept. Interior National Park Service North Atlantic Region 15 State Street Boston, MA 02109-3572

Dear Mary:

Thanks for sending me the study of Saratoga Battlefields to review. It is an interesting use of historical documents to reconstruct a past landscape. My impression from reading it is that Dr. Gordon may very well have hit on the most likely landscape. We can certainly never be sure about one small area, but this is a reasonable effort. I find the accounts of the battle to be the most convincing part of the argument, with the other documentation much less certain. I will pretty much skip over her discussion of my work - though I do wonder if she read the Ecology article very carefully. This discussion does, however, bring up a major question about the use of historical sources. She criticizes me for critically analyzing some of the documents, saying that the evidence makes the history. This is rather naive, and surprising from a historian, and her more professional attitude shows up when she herself more or less discounts historical documents which do not agree with her perceptions of the historical landscape on page 18. Historians must analyze, criticize and otherwise interpret the documents.

Her argument about the possible rates of clearing are labored, and though they ostensibly sound very reasonable, it is amazing to find in historical contexts that what was accomplished was much greater than seems logical based on such reasoning. Without the documentation of the battle itself I would find it difficult to judge between the two interpretations of the landscape - one denuded of trees or one in which only the lowlands and very little of the uplands were cleared.

My real concern with this work is what I see as an insufficient appreciation of the natural environment, or discussion of it. Nowhere does she discuss the bedrock or the specific glacial debris on the In this area which I gather is at least near the "Albany Pine site. Bush" the local environment is critical. That area is guite unique, and the historical development of it unknown. Pitch pine and white pine are rather different species, in many respects, and if she is suggesting that at least part of the battlefield was in pines, it is critical to consider the probable species. Pitch pine is most common on areas of poor, droughty soil, probably subjected to frequent fires. White pine, on the other hand, is very sensitive to fire, and is most common in the Northeast on abandoned old fields. Over time it is succeeded by hardwoods. It is also common, and often very large, in very poorly drained sites.

I am not sure just what the management implications of this are. You will obviously never really know for sure just how much cleared farmland was in the area at the time of the battle. I am also not sure that you will have much idea just what the composition of the forest was. One can just hope that leaving the fields to revert to forest might lead to the establishment of the original type of forest. But that, of course, leaves the question of the effects of the Indians, and desertion of their fields. I do not think that the fire history can tell you much, or that there is any good reason to use fire as a force to maintain some hypothetical forest type. I have trouble believing that someone who is a "fire ecologist" can be quite neutral about the role of fire in the forest, but that may be just expressing my prejudices. It does seem unlikely that Indian-set fires have been responsible for maintaining the northeastern oak forest for the 8000 or so years that oaks have dominated their part of the landscape.

On the other hand, I think that it is most likely from what I read in this report that the lowlands in the region were much more thoroughly cleared that the uplands, and that there were forested uplands, and perhaps ravines and swamps. Steep hillslopes and swamps may have a good growth of trees and a thick growth of shrubs, the steep areas because the light can penetrate through the trunks because of the angle of the slope and swamps because the forest stand is often not as closed as in better drained sites, though that is quite variable depending on the type of swamp forest. I would also suggest trying to find what pollen analysis has been done in the fairly local region to establish precolonial forest types. Broad generalizations based on pollen analysis for the Northeast are not very useful for a local area.

I hope that these thoughts are of some use. I have made comments (probably cryptic) on the report itself, especially on problems I see

with her lack of knowledge of basic ecology and botany. I assume that it is to try to deal with such deficiencies that she is working now with Bill Patterson, which I find to be very laudable. There is a small but growing cadre of people now who are trying to get advanced training in both history and ecology, and I hope that she is in the vanguard of a growing population of historical ecologists.

I have been working recently at Hopewell Furnace Nat'l Historic Site in Pennsylvania. Mapped the vegetation last year, and plan to design a permanent plot system this summer. At least there it is unlikely that there will be any strong move to reestablish the historic scene in the forests. Cutting for charcoal does not produce a very picturesque landscape! But the residual effects of the cutting are still apparent in the forest in terms of structure and composition, and make a very interesting comparison with adjacent sites that were farmed, and we did discover several areas which are now forested but must have been farmed in the past, based on the species composition of the present forest.

Sincerely yours.

Emily

Emily W. B. Russell