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Forest, Forge, and Farm: an Historical Geography of the Musconetcong Valley, New Jersey.

Peter Oscar Wacker
Louisiana State University and Agricultural & Mechanical College

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FOREST, FORGE, AND FARM: AN HISTORICAL
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FOREST, FORGE, AND FARM: AN HISTORICAL GEOGRAPHY OF
THE MUSCONETCONG VALLEY, NEW JERSEY

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Geography and Anthropology

by

Peter Oscar Wacker
B.A., Montclair State College, 1959
M.A., Louisiana State University, 1961
August, 1966
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A chorologic study of the changing cultural landscapes of the Musconetcong Valley, New Jersey, was undertaken. The Valley is typical, both culturally and physically, of the Highlands, which is that portion of the Reading Prong of the New England Upland lying within the state of New Jersey.

Human occupation of the Musconetcong Valley has endured for perhaps ten thousand years, beginning with Paleo-Indians. Aboriginal occupancy of the region served mainly to establish initial road and farm locations for the settlers of European origin and also to begin the deforestation which had affected most of the limestone valley by the end of the eighteenth century. Both Indian and European generally avoided locations north of the Wisconsin terminal moraine.

By the end of the eighteenth century, settlers of northwestern European cultural traditions had established the "initial occupancy" of the region, which in large part can still be seen. Existing features in the region, such as settlement types, property lines, road alignments, and building types all hark back to eighteenth-century precedent.

Structures, especially house and farm building types, indicate that two major streams of diffusion were responsible for the late eighteenth-century cultural landscape. The dominant stream involved the Delaware Valley as a routeway, and included the "I" house, which
was largely of English origin, and the bank barn and springhouse, largely of Pennsylvania-German provenance. New England influences and settlers penetrated from the east, and can be delineated by the distribution of East Jersey cottages and English barns. The only major Dutch contribution has been the barrack, which joined both the Delaware Valley and New England assemblages. Today, however, only relict barracks still survive.

Industrial establishments, beginning with charcoal iron enterprises, entered the Valley before the middle of the eighteenth century. Important industries were oriented toward the power provided by the river. Charcoal ironworks were responsible for a great deal of deforestation, and by the end of the eighteenth century largely gave way to agriculture south of the terminal moraine. Both iron interests and agriculturists largely clear-cut the woodlands, encouraging sprout hardwoods such as the chestnut to become dominant on sites which remained forested.

Several agglomerated settlements arose by the end of the eighteenth century and have maintained themselves to the present. Their locations have been influenced by the availability of water-power, rich limestone soils, and readiness of access to overland transportation.
INTRODUCTION

Forest, Forge, and Farm: An Historical Geography of the Musconetcong Valley, New Jersey, is concerned chiefly with an investigation into the cultural landscapes which have existed in the Musconetcong watershed from the period of first human occupancy to the end of the period of pioneer occupancy by people of northwestern European origin. This is a study in historical geography in the sense of the school of thought emanating from Carl O. Sauer and his students: "Historical geography may be considered as the series of changes which the cultural landscapes have undergone and therefore involves the reconstruction of past cultural landscapes."¹

A unique opportunity exists in New Jersey, especially in the southern Highlands of the state, to investigate the processes whereby distinct ethnic groups and varied economic interests have transformed the largely forested landscape of aboriginal days to the largely deforested agricultural landscape of today. The Musconetcong Valley was chosen for a chorologic study of these processes in depth for several reasons: (1) Physical geography - The Musconetcong is structurally typical of Highland valleys. It has wide areas of fertile limestone soils, but at the same time is crossed by the Wisconsin terminal moraine. Areas northeast and southwest of the moraine have always shown a contrast in land use. (2) Aboriginal occupancy - Fluted

¹For notes to Introduction see page 276.
projectile points collected in the Musconetcong watershed, indicate occupancy by Paleo-Indians. The sites occupied by aborigines in the historical period are at least as well known in the Musconetcong Valley as they are elsewhere in the Highlands. Aboriginal impact on the flora and fauna of the region is fairly well known. (3)

Occupation by varied ethnic stocks of northwestern European origin - The Musconetcong Valley lay astride the major routes of penetration into the southern Highlands in the eighteenth century. These routes were used by pioneers of English, New England, Dutch, Scotch-Irish, and German stock, all bringing with them quite varied material culture traits. Acculturation of these groups is quite well illustrated by the changes which ensued in the cultural landscape. This is especially clear in terms of the structures which had been erected in the Valley by the end of the eighteenth century. (4)

Economic activities - Pioneer subsistence agriculture, commercial grain farming, the charcoal iron industry, and various local service industries all added their imprint to the cultural landscape in pioneer days. (5)

Settlement - The Musconetcong Valley is typical of most parts of the Middle Colonies in that its settlement was for the most part of a dispersed nature. (6) Esthetic considerations - Despite its proximity to the sprawling ugliness of Megalopolis, the Musconetcong Valley is one of the most beautiful major valleys in the Highlands. In the early nineteenth century it could be described as "sublime, and among those prospects to be laid up in memory's store - house, as one of her richest treasures." Much of this character remains in the twentieth century and makes field work all the more pleasant.
Originally, it had been intended that the investigation would include land use during the nineteenth and early twentieth centuries as well. Intensive research, however, has indicated that the major cultural components of the landscape existed by the end of the eighteenth century, and it was decided to end the study chronologically at about that point. We might term this the end of the pioneer period and the end of the "initial occupancy" of the area. By the end of the eighteenth century, the more marginal agriculturists, and many of the younger people, were leaving the area to seek better, cheaper land elsewhere. Also, the last major influx of a distinct ethnic group had occurred by the end of the century. Contact with the outside world was improved by the coming of turnpikes in the first two decades of the nineteenth century, and folk building practices were replaced, at least in semi-urban centers, by houses "of all descriptions." Well before the end of the eighteenth century the charcoal iron industry, which had played such a great role in the economy of the region, had declined to unimportance, and service industries continued to function at the waterpower sites which had been developed during the middle of the century. Thus, the initial occupancy of the region was for the most part a function of the eighteenth century.
CHAPTER I

PHYSICAL GEOGRAPHY

Location and General Description

The Musconetcong River rises at Lake Hopatcong in the northern portion of the state of New Jersey, and flows southwest to join the Delaware River at Riegelsville, New Jersey (Fig. 1). The sources of the stream are to be found in the springs and brooks which feed Lake Hopatcong. One of the latter, Weldon Brook, which rises west of Bowling Green Mountain, is held to be the ultimate source of the river. This would make the total length of the Musconetcong from its source to its mouth approximately forty-four miles.

The Musconetcong Drainage System

The drainage system of the Musconetcong is a relatively long and narrow one, equalling a total of 157.6 square miles. It is narrowest near the mouth of the stream, being but a half mile or less in width, then rapidly increases upstream to a width of two miles. At Hackettstown, which is approximately twenty-six miles from the mouth, the watershed reaches a width of about four miles. Six miles above Hackettstown it narrows to three miles near the village of Waterloo. A little more than a mile northeast of Waterloo the major

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1 For notes to Chapter I see page 276.
Fig. 1. Compiled from various sources.
affluent of the river, Lubber's Run, joins the main trunk. The combined watershed of the two streams widens to six miles and extends to a little more than twelve miles northeast of Waterloo.

Terrain

The Musconetcong begins its flow as a modest brook approximately 1,260 feet above mean sea level in a region of rugged topography northeast of Lake Hopatcong. Many summits in the immediate vicinity exceed 1,300 feet, and one, Bowling Green Mountain, rises to 1,391 feet. Local relief north of Lake Hopatcong often exceeds 400 feet. The lake, 2,443 acres in area, nestles among mountains which have summits exceeding 1,100 feet, and itself lies at 914.57 feet above mean sea level.

Issuing forth from Lake Hopatcong, the Musconetcong flows a little more than a mile southwest to man-made Lake Musconetcong, then reverses itself for almost two miles to flow northwest to meet Lubber's Run. The steep profile of the stream and the rugged terrain through which it flows in this short distance may be ascertained from the fact that the Musconetcong falls approximately 55 feet per mile from Lake Hopatcong down to the valley of Lubber's Run.

The enlarged river resulting from the junction with Lubber's Run flows more gently, and occupies the southeast side of a rather straight northeast-southwest-trending valley which stretches for approximately thirty-three miles to a junction with the Delaware. Lubber's Run occupies the northern extension of this straight valley. The terrain of the valley floor is quite rugged north of Hackettstown and level to rolling south of that point. The valley floor is
approximately one mile wide two miles southwest of Waterloo, narrows to less than one-eighth of a mile at Saxton Falls, and expands southwest of Hackettstown, occupying widths of one to two miles with the exception of a gorge southwest of Bloomsbury. The fall from the mouth of Lubber's Run to Hackettstown is sixteen feet per mile, from Hackettstown to Bloomsbury, twelve feet per mile, and from Bloomsbury to the mouth of the river at Riegelsville, sixteen feet per mile.  

Flanking the relatively gentle valley floor are several mountains or hills which rise four to five hundred feet above the valley and also trend in a northeast-southwest direction. Southwest of the river are located, from southwest to northeast (1) Musconetcong Mountain, and (2) Schooley's Mountain. Northwest of the Valley are located, again from southwest to northeast: (1) Silver Hill, (2) Pohatcong Mountain, (3) Upper Pohatcong Mountain, and (4) Allamuchy Mountain. A gap between Musconetcong Mountain and Schooley's Mountain at Hampton offers easy access to the Musconetcong Valley from the south, while gaps between Silver Hill and Pohatcong Mountain near Bloomsbury and between Pohatcong Mountain and Upper Pohatcong Mountain near Washington allow easy access to the Pohatcong Valley, which parallels that of the Musconetcong.

The Highlands

The entire Musconetcong drainage system lies within, and is typical of the distinct natural region known in New Jersey and southeastern New York as "the Highlands" (Fig. 2). The Highlands is so called because of the distinct break in topography where it
Fig. 2. Adapted from Kemble Widmer, The Geology and Geography of New Jersey (Princeton: D. Van Nostrand Company, Inc., 1964).

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meets the lower Ridge and Valley physiographic province to the northwest and the Piedmont province to the southeast. Fenneman has classified the rugged plateau-like surface of the Highlands as comprising the Reading Prong of the New England Upland, and traces it from the Taconic Mountains in Connecticut to its terminus at Reading, Pennsylvania.7

The Highlands has a distinct northeast-southwest trend and varies from ten to twenty-five miles in width in New Jersey. In area it represents nine-hundred square miles within New Jersey, or one-eighth of the entire state.8 The Musconectong drains approximately one-sixth of the area of the Highlands.

The northeast-southwest trend which characterizes the Highlands also characterizes the alignment of most of the upland and valley surfaces within the region. The upland surfaces generally stand several hundreds of feet above valley floors and often have accordant summits averaging one-thousand feet above mean sea level. Peneplanation has been suggested as the cause of this accordance by many writers, and Schooley's Mountain is often cited as the type location of a peneplain.9

Geology of the Highlands

Geologically, most of the Highlands consists of Precambrian gneisses occurring as upland surfaces, and infolded and infaulted limestones and slaty-shales of Cambrian to Ordovician ages occupying the valley floors. The slaty-shales, being somewhat more resistant to erosion, often stand as rolling upland surfaces a hundred feet or more above the relatively flat limestones.10 Most areas within the
Highlands have felt the results of Pleistocene glaciation, and the upland and valley surfaces are replete with the effects of the erosional and depositional activities of the Pleistocene ice.

Geology of the Musconetcong Watershed.—Formerly, the rocks underlying upland surfaces in the Highlands, and in the Musconetcong drainage system, were classified with the terms "Losee Gneiss," "Byram Gneiss," and "Pochuck Gneiss." Recent work indicates that these "are wastebasket terms which include rock types with very diverse origins." Unfortunately, no geological maps more recent than those depicting the older classification have been published. Thus, it is safest to say simply that upland surfaces have been formed from Precambrian gneisses (Fig. 3).

The Musconetcong has been described as "the type of Highland streams." As do most of the other rivers in the Highlands, it flows in a southwesterly direction, follows a synclinal belt of Cambro-Ordovician limestones and shales, and is structurally controlled for most of its length. This structural control is, at least in part, that of a graben, which occupies the valley floor from at least three miles north of Hackettstown to the low divide between the Musconetcong and Pohatcong valleys near Washington, New Jersey.

Exceptions to the sedimentary origin of the rocks of the valley floor occur (1) southwest of Bloomsbury, where the river wends its way in a narrow gorge through gneiss, and (2) north of Waterloo, where the straight structural valley is underlain with gneiss.

Pleistocene Geology.—Evidence in the form of stratified drift located south of the Wisconsin terminal moraine indicates that much of the Highlands was affected by Pleistocene glaciation older than
Fig. 3. Adapted from J. Volney Lewis et al., Geologic Map of New Jersey, State of New Jersey, Department of Conservation and Economic Development, Division of Planning and Development, Atlas Sheet No. 40, 1950.
that of the Wisconsin stage. Salisbury identified these deposits as "extra-morainic drift," and located many of them in and around the Musconetcong Valley. The drift occurs in distinct beds on Musconetcong Mountain, as till in various locations on Schooley's Mountain, as scattered boulders on Pohatcong Mountain, and as scattered boulders and beds of drift of small extent at various points on Upper Pohatcong Mountain. The older drift of the valley floor is not as extensive as that found in the Pohatcong Valley to the north but occurs widely in patches from Hackettstown to Bloomsbury. The older drift is now dated as Kansan and Illinoian in age.

The more recent activities of the Pleistocene epoch, those of the Wisconsin glacial stage, have also widely affected the Musconetcong Valley. Less than a mile northeast of Hackettstown the Wisconsin terminal moraine crosses the Valley. This moraine has been identified as being the result of the oldest of Wisconsin advances, that of the Iowan sub-age. Succeeding Wisconsin advances apparently did not reach far south into the New Jersey Highlands.

Although the terminal moraine cannot be said to be an especially prominent topographic feature throughout the Highlands, "the contrast between the flat, level surface of the Musconetcong Valley and the hummocky, tumultuous character of the moraine to the north is striking." The moraine blankets the Valley northeast to Saxton Falls, then stretches eastward south of Netcong, and forms the southern shore of Lake Hopatcong. The surface expression of the moraine in the Musconetcong watershed is a typical knob and kettle topography with a local relief of from twenty-five to forty feet.
North of the terminal moraine the entire Musconetcong drainage system is blanketed with either till resulting from the deposition of the retreating ice, or stratified drift resulting from deposition in running or standing water. The till is often gneissic, with boulders of large size much in evidence. Stratified drift in the Valley is not extensive. West of Stanhope are prominent kames, and at the junction with Lubber's Run stratified gravels form a plain-like surface. For the most part, however, the stratified gravels have an undulatory surface.

South of the terminal moraine a valley train of stratified gravels extends down valley to beyond Beattystown, and from there in narrow, interrupted belts all the way to the Delaware. Due to the effects of later erosion, the gravels in no case form a well marked terrace.

In addition to mantling the Tertiary landscape with drift and till, the Pleistocene epoch accounted for great changes in drainage in the Musconetcong watershed. Lubber's Run is most likely the agent responsible for much of the excavation of the present straight valley, and the Musconetcong northeast of its junction with Lubber's Run is "very likely a post-glacial tributary...." Lake Hopatcong occupies a basin which owes its origin largely to excavation by the advancing ice, and formed due to the blocking of its pre-Pleistocene drainage by glacial deposits. This is not to say, however, that the plethora of ponds and lakes in the portion of the Musconetcong drainage system north of the terminal moraine is entirely of Pleistocene age. Lake Hopatcong itself is partially the result of the artificial
impoundment of the Musconetcong at its outlet.\textsuperscript{29} Eighteenth and early nineteenth-century maps reveal the absence of many of today's waterbodies\textsuperscript{30} (Appendices I and II). The numerous basins which allowed artificial impoundment were probably at least in part of Pleistocene origin and in post-Pleistocene times were probably poorly drained, swampy sites, as many of the early surveys indicate.\textsuperscript{31} The many poorly drained upland sites still in evidence in the area are also due in large part to Pleistocene derangement.

\textbf{Climate}

Although there are no weather stations within the Musconetcong drainage system, three exist in locations near enough to give an accurate picture of general climatic conditions in the area. These stations are located at Flemington, Newton, and Phillipsburg, New Jersey. Flemington is a Piedmont station, located fifteen miles southeast of the Musconetcong. Newton and Phillipsburg are both Highland stations, respectively eight and five miles northwest of the river.

Twenty-five-year records\textsuperscript{32} indicate that the Musconetcong drainage system lies toward the northern limit of the Cfa or Humid Subtropical Climate of the Koppen-Geiger system,\textsuperscript{33} or the Daf or Humid Microthermal Climate of the Trewartha system\textsuperscript{34} (Table I). Winters are cold, with the three coldest months - December, January, and February - having mean monthly temperatures near or below freezing, and summers are hot, with the three warmest months - June, July, and August - having mean monthly temperatures near or above 70\textdegree F. Yearly mean temperatures average a little over 50\textdegree F. Precipitation is well distributed
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<td>28.1</td>
</tr>
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<td>Precipitation</td>
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<tr>
<td><strong>Phillipsburg</strong></td>
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<tr>
<td>Precipitation</td>
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<td>3.00</td>
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throughout the year, with a definite warm season maximum of four to five or more inches per month. Total annual precipitation exceeds forty-five inches.

**Stream Flow**

Despite the warm season maximum in monthly precipitation, both nineteenth- and twentieth-century data indicate that the average monthly and daily stream flow reach their minima during the months of May, June, July, August, and September. This discrepancy between stream flow and precipitation can be best explained by the much greater rate of evapotranspiration in the drainage system during the warm months.

**Soils**

Much confusion is involved in the study of soils maps of northern New Jersey. The entire drainage system of the Musconetcong has been mapped, and portions are included on the Sussex Area Sheet of 1911, the Belvidere Area Sheet of 1917, and the Bernardsville Sheet of 1919, and, most recently, twenty-eight sheets published by the Soil Conservation Service in 1953 cover the soil series and land-use-capability classes of Warren County, New Jersey. Unfortunately, the identification of, and the criteria used in the identification of soil series, vary widely from map to map, as do the areas occupied by the soil series. For example - in placing the Bernardsville Sheet on the southern boundary of the Sussex Area Sheet it becomes readily apparent that what has been mapped as "Rough stony land" on the Sussex Area Sheet is described, with different
boundaries, as the "stony phase" of "Gloucester loam" on the
Bernardsville Sheet, this despite the fact that "Gloucester stony
loam" has been located elsewhere on the Sussex Area Sheet. The
stony phase of the Gloucester loam which appears in some portions of
Warren County included in the Belvidere Area Sheet becomes the
"Chatfield and Oquaga extremely rocky loams" on Sheet No. 12 of the
Soil Conservation soil map of Warren County. Such confusion is
found throughout the areas not included by recent soil maps.
Unfortunately, only Warren County has been remapped with the more recent
criteria for identifying soil series, so that meaningful soils maps
covering the greater part of the Musconetcong drainage system simply
do not exist.

It is, however, possible to generalize about the soils of the
region. They can generally be described as gray-brown podzolics which
have been intensively leached and which have developed under a
primarily deciduous forest cover.

Land Types

A further generalization of the soils of the region involves
their association with various "land types." This has been done for
Warren County, and by extrapolation can be applied to the entire
Musconetcong drainage system (Fig. 4). The concept of land types
refers to areas which are relatively homogeneous from the standpoint
of geological formation, Pleistocene history, and topographic
expression. Nine major land types have been described for Warren
County. Of these, six can be recognized in the Musconetcong
drainage system. These are: (1) Limestone Valleys of Later Drift,
Fig. 4. Adapted from J. C. F. Tedrow et al., Warren County Soils: Their Nature, Conservation, and Use (New Brunswick, New Jersey: New Jersey Agricultural Experiment Station, 1953).

Limestone Valleys of Later Drift

This land type classification may be applied to the Musconetcong Valley north of the terminal moraine (Fig. 5). Although the limestone underlying the valley surface is replaced by gneiss northeast of Waterloo, the soil situation is similar. Glacial scouring and deposition have altered the original topography and soil series to the extent that there are few areas in which soils are well developed. Valley flats are composed, for the most part, of poorly drained clays, and glacial debris composed of gravels and boulders has hindered post-Pleistocene soil development elsewhere.

Gneiss Highlands of Later Drift

Upland surfaces north of the terminal moraine have also felt the effects of Pleistocene glaciation. The topography is rough, broken, and mountainous. Most of the area is characterized by stony or gravelly loams on steep slopes and often there are bare or erratic mantled summits. Agriculture is possibly only in the limited areas of rolling topography where less stony soils exist.

The Moraine

The Wisconsin terminal moraine mantles the Valley for approximately half a mile. Its texture varies from heavy silts to extremely porous sands and gravels. Limestone usually predominates among the rock materials. Some agriculture is possible where topography permits.
Fig. 5. Limestone valley of later drift. Waterloo, New Jersey. View northward, Waterloo Lake in foreground, gneiss highlands of later drift in background.

Fig. 6. Limestone valley of earlier drift. Near Bloomsbury, New Jersey. View northward, gneiss highlands of earlier drift in background.
Limestone Valleys of Earlier Drift

The Musconetcong Valley south of the terminal moraine, except for the areas of slaty-shale uplands, and where the river cuts a gorge through gneiss highlands southwest of Bloomsbury, can be classified as a limestone valley of earlier drift (Fig. 6).

These limestone valleys were not affected by Wisconsin glaciation and are characterized by gently undulating topography and soils which are "among the most productive in the northeastern United States." Soil materials consist mostly of deeply weathered limestone drift which is three to eight feet deep to bedrock. The soil structure is excellent and largely accounts for the agricultural value of the soils. The lime has usually been leached to a considerable depth and the under-drainage is generally good. A typical soil profile contains a twelve-inch layer of very friable, granulated brown silt loam, which is underlain by a sixteen-inch layer of reddish-yellow granular silt loam.

Minor Land Types

Two minor land types occurring in the limestone valley south of the terminal moraine are: (1) Glacial Outwash, and (2) Flood Plains. The glacial outwash is limited in extent. Where it occurs, chiefly from Hackettstown to Beattystown, it is characterized by sandy and gravelly materials which tend to be well drained and form good agricultural soils.

Flood plains occur in extremely narrow, discontinuous pockets immediately adjacent to the river. Seasonal inundation often precludes their use for purposes other than pasture or woodland.
Gneiss Highlands of Earlier Drift

All of the upland surfaces bordering the Musconetcong Valley south of the terminal moraine can be classified as gneiss highlands of earlier drift. These gneiss uplands are often stony, with steep slopes and shallow soil. The slopes are usually well to excessively drained, but many of the more-level upland areas experience impeded drainage. Soils are formed mainly of acid gneiss and are strongly acid throughout the profile under undisturbed conditions. Deep, well-drained sites develop gray-brown podsols characterized by an eight-inch surface layer of loose, friable, well-aggregated gray-brown loam. Loose, friable, and weakly aggregated yellowish-brown loam is found in the upper subsoil, and at a depth of fifteen inches the soil becomes a loose and friable strong, brown, gritty loam. The land is generally productive where drainage and topography permit.53

Slaty-Shale Uplands of Earlier Drift

The slaty-shale uplands of earlier drift in the Musconetcong Valley occur southwest of Hackettstown and west of Hampton (Fig. 7). Soils developing on these gently rolling hills are mildly acid, brown or shaly silt loams which grade into bedrock at depths of two feet or less. Drainage is good to excessive, except for a few local areas, and crops often suffer from a lack of moisture in these soils.54

Soils and Agriculture

From the foregoing discussion it can be seen that the soils most useful for agricultural purposes lie south of the terminal moraine. Further, the soils of the limestone valley floor are very well
Fig. 7. Slaty-shale uplands of earlier drift. Near Asbury, New Jersey. View northward, limestone valley of earlier drift and gneiss highlands of earlier drift in background.
adapted for agricultural use, being classified with the very best in the northeastern United States.

**Flora**

The Highlands lies within the oak-chestnut region of the plant geographer. This classification is based upon the composition of the forests as they were in the late nineteenth and early twentieth centuries: essentially an association of the sprout hardwoods such as the various species of oaks (*Quercus* spp.) and the American chestnut (*Castanea dentata*). Since that time the chestnut has largely vanished from the scene due to the introduction of a blight, and has, for the most part, been replaced by oaks.

The composition of the original forests is open to some dispute, but surveyors' records and early accounts indicate the presence of deciduous forests composed largely of oak and chestnut. The same species, except for the chestnut, are still found in the area today, although their percentages may have changed due to clear-cutting, selective logging, and other human influences (Table II).

Surveyors' records and early accounts also stress the open nature of much of the deciduous woodlands of the state. These open woodlands, and associated meadows, both probably in large part created by the aboriginal population, supported native grasses in abundance. These annual grasses, chiefly wild rye (*Elymus* spp.) and broom straw (*Andropogon* spp.), were largely eliminated by over-grazing on the part of the livestock of the pioneers.

Forest, meadow, and swamp also contained an abundance of fruits, berries, and tubers which were widely utilized by the Indians, and
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<th>LAND TYPES</th>
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<th>MINOR STAND</th>
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<td><em>Carya ovata</em> (shagbark hickory)</td>
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<td><em>Betula lenta</em> (sweet birch)</td>
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<td></td>
<td><em>Acer rubrum</em> (red maple)</td>
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<td></td>
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<td><em>(tulip poplar)</em></td>
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<td><em>Betula lutea</em> (yellow birch)</td>
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<td><em>Carya spp.</em> (hickories)</td>
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<td>Carya spp. (hickories)</td>
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<td>Slaty-Shale Uplands—</td>
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to some extent by European pioneers. These vegetable resources will be discussed in the section on "Gathering" in Chapter II.

Fauna

The fauna of the region was little different than that found elsewhere at the time of first European contact in northeastern North America. Most species still have representatives in the area today, although their total numbers and their percentage of the total fauna have greatly changed due to man's upsetting the ecological equilibrium by forest clearance, elimination of predators, and the like. Species which have been eliminated at least partially through the agency of Europeans include: (1) the American gray wolf (*Canis lupus*), (2) the panther (*Felis concolor*), (3) the beaver (*Castor canadensis*), (4) the wild turkey (*Meleagris gallopavo*), and (5) the wild (passenger) pigeon (*Ectopistes migratorius*). Several other species may have been eliminated in prehistoric times by the aborigines.61
CHAPTER II

ABORIGINAL OCCUPANCE

Ca. 8,000 B.C.—Ca. A.D. 1750

Paleo-Indian

The term applied to the earliest human inhabitants of the western hemisphere is Paleo-Indian.¹ Although no camp or kill sites attributable to these hunters has been found in the Musconetcong drainage system, or in the Highlands, their presence in early days is now certain due to scattered surface finds of their characteristic fluted projectile points. These projectile points, of Clovis type, have been found in both the environs of the Musconetcong Valley, and throughout the drainage basin of the Delaware River.²

It is most difficult to date the time of arrival of these early men with any precision. Cross,³ relying on data supplied by Griffin,⁴ dates the Paleo-Indian period in the state of New Jersey as beginning ca. 8,000 B.C., and lasting until ca. 3,000 B.C. Ritchie,⁵ relying on data from New York State, prefers a date of ca. 3,500-5,000 B.C. for the advent of man in the northeastern United States. The only radio-carbon date in the state which can be applied to the problem of early man's arrival is that of the remains of a mastodon discovered near Highland Lakes in the very northern portion

¹For notes to Chapter II see page 280.
of the New Jersey Highlands (Fig. 8). This has been dated as having died $10,890 \pm 200$ years before present time, indicating that a suitable climate and fauna existed for hunters at that time. Other earlier finds of large Pleistocene mammals in New Jersey indicate the wealth of the fauna found south of the Wisconsin ice at this time.  

Movement into the Highlands

The origin of the Paleo-Indian cultural tradition lay outside the eastern United States, perhaps on the High Plains, east of the Rocky Mountains. With the desiccation of this area during the waning days of the Pleistocene, the big-game animals, and man, may have been encouraged to migrate toward the more salubrious East. The further retreat of the Wisconsin ice encouraged the big-game animals to move further north, and man followed his food supply. The probable routes of penetration followed the major river valleys, where most of the fluted points in the East have been found to date. Major valleys, such as those of the Ohio and Tennessee rivers, offered ready access into Virginia, and the Susquehanna and Delaware valleys provided easy routes into the northeastern states. Paleo-Indians also followed tributary streams in search of their quarry. The Musconetcong was one of these.

Location of Paleo-Indian Sites

The location of Paleo-Indian sites in the eastern portion of the United States, and the finds of projectile points attributed to Paleo-Indian occupation, are most often in elevated locations in the
NEW JERSEY AND ADJOINING STATES
CONJECTURED ROUTES OF MAJOR INDIAN TRAILS
Along with selected place locations

Fig. 8. Compiled from various sources.
valleys of, or near major waterways. These sites must have offered vantage points from which to observe the river valleys, which were favorable environments for game such as the mastodon, musk ox, caribou, and other species which existed in New Jersey during the waning days of the Pleistocene.

Effect on the Landscape

Although little is known of Paleo-Indian and his culture, there is a good possibility that he altered his environment by burning. The game animals of the day were difficult to kill with the simple weapons at hand, and fire may well have been used to drive the game to a strategic point. The Paleo-Indians, composed as they were of small numbers of widely scattered bands, and being extremely mobile, could have altered a very wide area indeed, perhaps encouraging grasses at the expense of forest vegetation. It is instructive to note that the basal portion of the pollen profile of the Tuckerton tidal marsh, now beneath water, shows evidence of extensive burning on dry land before the rise of the post-Pleistocene seas.

The Abbott Farm Site

More is known of the prehistoric folk who succeeded the Paleo-Indian bands than is known about the latter. The nearest thoroughly excavated site to the New Jersey Highlands is that of the Abbott Farm, which lies on the Delaware River just south of Trenton, New Jersey, and approximately thirty-five miles south of the Musconetcong River. This is one of the best known archaeological sites in the eastern portion of North America, and before its recent
thorough excavation was long a cause célèbre among archaeologists. Since this site is well known, and no sites in or near the Highlands have yet yielded as much evidence of the men who succeeded the Paleo-Indians, it will be used to reconstruct the cultures succeeding that of the Paleo-Indians and preceding that of the historic Indians.

The Archaic Period

The period of time from ca. 3,000 B.C. to A.D. 100 has been termed the Archaic Culture Period at the Abbott site. Cultural influences emanating from the west and south found their way into the area at this time.

The economy of Archaic man depended on simple hunting, fishing, and gathering. The chief weapon in use was the spear, which was tipped with variously shaped stone points. Spears were both launched by a spear thrower, an innovation apparently from the west, and thrust by hand. The game sought was of a smaller size than that of the Paleo-Indian period of occupancy, since the larger game had either followed the ice farther north, or had become extinct. Bear (Ursus americanus), deer (Odocoileus virginianus), fox (Urocyon cinereoargenteus), muskrat (Ondatra zibethica), various birds and the like abounded, however, and furnished a major part of the diet. Fishing was also of some importance. Spearing and netting were practiced and there is some evidence for the use of lines. Edible nuts, roots, and herbs were plentiful, and were probably utilized much as they were by later peoples. The occurrence of stone pestles on the site indicates that such foods could have been processed by being ground or pounded.

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The ample food supply allowed a relatively sedentary existence. Nevertheless, a certain amount of trading took place. Many tools found at the Abbott Site have an origin at least as far north as Lockatong Creek, a little more than ten miles south of the Musconetcong Valley, or in Bucks County, Pennsylvania. Thus, culture contacts could easily have taken place between the Abbott Farm Site and Highland sites as yet unknown.  

The Early Woodland Period

After ca. A.D. 100, there was a gradual transition from the Archaic Culture Period to the Early Woodland Culture Period. Physically, the racial stock probably remained the same as it had been in the previous period. Farther west this stock has been described as being of relatively small stature, slight in bone structure, and possessing delicate features.

Hunting, fishing, and gathering continued as the major economic activities of the population, with the introduction of the bow and arrow causing the abandonment of the spear thrower.

Another major difference between the Archaic and Early Woodland periods was the use of steatite for ornaments and bowls. This implies that lengthy trips, or trading relationships with peoples located at some distance took place. The nearest natural source of steatite was at Phillipsburg, New Jersey, approximately fifty miles by water from the Abbott site and some six or seven miles by water north of the Musconetcong. Again, cultural contacts of some kind may well have taken place.
A major change in occurance during the Early Woodland Period occurred toward its close when the population sporadically or seasonally moved from the bluff where they had been residing down to the flood plain of the Delaware.\textsuperscript{18}

The Middle Woodland Period

During the Middle Woodland Period, which lasted from ca. A.D. 350 to ca. A.D. 900, several new traits were added to the culture of the inhabitants of the Abbott site. Shellfish gathered on the Atlantic coast made an appearance and, more important, toward the end of the period, tobacco was probably cultivated. Many cylindrical vessels, large sunken vessels and storage pits, and an abundance of pottery, which had appeared sporadically during the Early Woodland Period, point to a more sedentary population, and, indirectly, to the advent of agriculture. The shells regularly procured from the Atlantic coast for tempering pottery indicated extensive contact with the seacoast and trading relations continued with the north and extended further in that direction.\textsuperscript{19}

One writer\textsuperscript{20} suggests that the Indians known in historic times made their way into the area prior to late Middle Woodland times. Quite possibly the Abbott site may have been an early nucleus from which a dispersion of these people took place.

The Late Woodland Period

By the time of the advent of the Late Woodland Period, after ca. A.D. 900, agriculture came to play a greater role in the economy. Hunting, fishing, and gathering, however, continued as the major foci

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of the subsistence economy. Shellfish continued to be gathered along the coast, and more contact with Pennsylvania and northern New Jersey took place.21

**Historic Indians**

There is abundant evidence with which to reconstruct the culture of the aborigines dwelling in the Highlands in early historic times. These were the Lenape, a term which meant "people" in their Eastern-Central Algonkin tongue.22 The Lenape were divided into a large number of small, dispersed, and independent groups inhabiting a continuous area extending from Delaware Bay northward through Manhattan Island, and up the west side of the Hudson River to the Catskills in southeastern New York. In the early years of the eighteenth century, under the pressure of European advances to the interior, the Lenape concentrated near the Delaware River and became politically consolidated. The term applied to these Indians collectively, especially by English speakers, was "Delaware," an outgrowth of their location in the late sixteenth and early seventeenth centuries.23

**The Munsi**

The aborigines inhabiting the portion of New Jersey north of Musconetcong Mountain during the eighteenth century were of the Munsi (or Munsee, Monsey, Minsi, Monthey, Minisink) traditional division of the Delaware.24 The term Munsi meant "people of the stony country," or, perhaps, "mountaineers," an apt term, since they occupied most of the Highlands.25 The Munsi were a distinct cultural group, speaking a dialect which differed considerably from that of the other Delawares.
Munsi linguistic affinities were with the Mahicans, Pequots, and other peoples to the northeast. Historical records indicate that at least a portion of the Indians living in the Highlands, especially in the vicinity of Lake Hopatcong, had come from New England as a result of the wars between the Indians and Europeans in that area.

Numbers

The Indians of Delaware affinities were never great in total numbers. One estimate places approximately eight thousand Indians in southern New York, eastern Pennsylvania, and all of New Jersey in A.D. 1600. There are no accurate data to enable an estimate of the population of the New Jersey Highlands at that date, but the Indians living on the shores of what is now Lake Hopatcong were said to be two or three hundred in number during the eighteenth century by a nineteenth-century observer. This is perhaps too high a number, although the lake was a favored dwelling place. The population for the entire Musconetcong drainage system was perhaps as high as two or three hundred, but it is difficult to say it with certainty.

Settlement

The settlement patterns of the historic Munsi were of two main types: (1) semipermanent agricultural villages, and (2) dispersed temporary residences of the fall and winter hunting season. In location, these settlement types had much in common. Both were situated very near a source of potable water - either a spring, lake, or stream - but were high enough above the source of water to avoid flooding. In addition, if possible, a southern exposure was chosen.
so that the site would be sunny for most of the day and would be protected from cold north winds. In the case of the semipermanent village, where hoe gardening was the important activity, the sites were mostly in or near bottoms with easily cultivated sandy, friable soil.30

The Semipermanent Agricultural Village

The semipermanent agricultural villages, with some exceptions in the very northern part of New Jersey, were not palisaded.31 Dwellings were known as wigwams, a common Algonkin term, and were placed "two or three rods apart,"32 and grouped randomly around a ceremonial structure known as the "Big House."33 As a rule, each family occupied a separate wigwam. These were of three main types: (1) circular floor plan with a dome-shaped roof, (2) rectangular floor plan with an arched roof, and (3) rectangular floor plan with a gabled roof. The first two were constructed in much the same way. Saplings were driven into the earth two or three feet apart, outlining the floor plan. They were then bent together to form the roof and were tied with bast fiber. This framework was made more secure by saplings which were tied crosswise over the upright poles. The more temporary structures were simply covered with woven mats, while the more permanent dwellings were shingled with chestnut, elm, cedar, or other bark. Shingles were tied to the frame and daubed with clay or mud. The gabled house was constructed similarly, except that a ridge pole and side poles set in crotched logs determined the shape of the roof and the rafters were supported by short, crotched wall posts. A smoke hole was left in the center of the roof and was covered with
a piece of skin. One or two doorways, approximately three feet in height, allowed ingress and egress. This framework was covered with mats, pieces of bark, or skins.34

The wigwams with rectangular floor plans were related to the Iroquois long house and were probably used largely by the Munsi, whose culture was most affected by contacts with the north,35 while the dome-roofed type may have been used also by the dispersed Munsi hunters and fishers. In 1698 Thomas wrote of the Delaware Indians that "in Travel they lodge in the Woods about a great Fire, with the Mantle of Duffils they wear wrapt about them, and a few Boughs stuck round them."36

The gable-roofed structure was described by William Penn in 1683: "Their Houses are Mats, or Barks of Trees, set on Poles, in the fashion of an English Barn, but out of the power of the Winds, for they are hardly higher than a man...."37 Thomas, in 1698, described Indian dwellings in a similar fashion: "Their Houses are Matts, or Barks of Trees set on Poles, Barn-like, not higher than a Man...."38 These structures apparently remained as the major form of dwelling for the Munsi well into the eighteenth century, as Smith, in 1765, speaks of them being "built with poles laid on forked sticks in the ground, with bark, flags or bushes on the top and sides, with an opening to the south, their fire in the middle...."39

The circular house had a diameter of from eight to nine feet, while the long house averaged ten by twenty feet in its floor plan. Roofs were from six to eight feet high in both types.40

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An important structure in every village was the sweathouse, the use of which was considered a panacea by the Indians. The sweathouse consisted of a small oven, large enough for three or four men, which was built on the side of a running brook. This oven was made of the branches of trees, covered with split bark and earth, and lined with clay. Steam was provided by heating stones in a fire, placing them in the sweathouse, and pouring water on them. After sufficient perspiration had come forth, the participants plunged into the nearby stream.

Dispersed Settlement

Dispersed settlement was the rule, especially during the hunting season. This was indicated by Smith writing of the Indians who remained in the state in 1765: "Their houses...were sometimes together in towns but mostly moveable, and occasionally fixed near a spring or other water, according to the conveniencies for hunting, fishing, or other business of that sort...."\(^4\) In addition to the dome-shaped hut most often used by solitary families, rock shelters were also used as dwellings for short periods of time. These consisted of rock overhangs or caves which offered protection from the elements, and had ready access to water and to animal and plant foods.\(^5\)

Aboriginal Occupance in the Musconetcong Drainage System

Sites of aboriginal occupancy are not particularly numerous in the Musconetcong Valley (Fig. 9). All the sites identified or inferred to date appear to be of the impermanent type, with the exception of two locations.\(^6\) These are the two semipermanent village
Fig. 9. Compiled from various sources.
sites of Pelouesse and Pechquakock or Araughcun, located respectively on the right bank of the Musconetcong near Hampton, and in the environs of Halsey Island, Lake Hopatcong. The site of Pelouesse, identified as "an old Indian plantation" by John Reading in 1715, has been surveyed by the New Jersey Indian Site Survey. It was found to occupy approximately six hundred and fifty by nine hundred feet. Many artifacts and some pottery were surface collected from the sandy gravel soil of the site, which lay ten feet above the level of the river. Pechquakock, as it was known in the seventeenth century, or Araughcun, in the eighteenth century, is largely now beneath the present surface of Lake Hopatcong. The raising of the waters of the lake occurred in the latter portion of the eighteenth century and the early portion of the nineteenth century, when successively higher dams were placed at the outlet of the lake. The result was the joining together of the two smaller lakes that had existed previously. The village, or series of villages, which occupied the site of a beach stretching from Prospect Point to Halsey Island and beyond, was apparently the largest concentration of population in the Musconetcong drainage basin. Even in the nineteenth century, low-water periods in the lake revealed the hearths of fifty or more wigwams which had stood there in historic times. This site, unfortunately, has never been systematically surveyed or excavated. John Reading visited Lake "Huppakong" on the first of June, 1716, but mentions only that his party "took up our lodging in an Indian wigwam." Lake Hopatcong in the eighteenth century was an ideal place for Indian habitation since it
was "well stored with fish and a very pleasant place." Also, it offered easy access to a broad area of easily worked fertile soil south of Hurdtown and was surrounded by heavily forested hills which were inhabited by large numbers of game. Tradition locates an important Indian village west of Waterloo, but neither Reading nor Lawrence mentions such a village in their surveyor's notes and no official survey has ever mapped an Indian site in that area.

In addition to the two definite semipermanent village sites discussed above, almost sixty sites of impermanent occupancy have been located by the various official archaeological surveys of the area. None of these has been properly surveyed or excavated and none is in an undisturbed condition. It is of interest to note that of all these sites mapped to date, but six are northeast of the terminal moraine, and but twelve are more than a few feet from the banks of the Musconetcong or a major affluent of the river. Most sites are located in the limestone valley of earlier drift. An absence of sites occurs on the slaty shale uplands of earlier drift, and generally on the gneiss highlands. The clustering of sites along the banks of the stream southwest of Hacketstown, near Beattystown, near Penwell, southwest of Squire's Point, between Hampton and Asbury, and northeast of Bloomsbury, suggests that these areas have been favored camp sites through time, perhaps on occasion even sites of semipermanent villages. The distribution of the impermanent sites would seem to indicate that access to water and fertile soils would be primary locational factors.
Economy

The relative importance of hunting, fishing, and gardening in the economy of the Lenape has long been in dispute. Pehr Kalm, drawing on the information given him by early Swedish settlers, said that the Indians "lived chiefly by hunting" before the coming of Europeans. Samuel Smith, a little more than a decade later, in 1765, stated that "the woods and rivers afforded them the chief of their provisions..." Even in the last decade of the eighteenth century, after the Delawares had moved to Ohio, it was said that agriculture "is more attended to by the Iroquois than the Delawares, but by both merely to satisfy their most pressing wants... the winter happens to be severe, and the snow prevents them from hunting, a general famine ensues, by which many die." Later writers, however, are by no means unanimous on this point, and a recent study cites numerous data to support the position that among the inland Lenape hoe gardening was of primary importance and was only rivaled seasonally by hunting and fishing. Driver and Massey map the aboriginal subsistence economy of New Jersey as being dominated by the cultivation of maize (Zea mays).

Hoe Gardening

The garden plots of the Indians were generally located in bottom lands, where the soils were fertile and easily worked with the primitive instruments at hand, which consisted mainly of hoes fashioned from the scapulas of deer, or tortoise shells fastened to thick sticks. The gardens were often deliberately kept "at some distance from their dwellings, that they may not be tempted to waste so much
Indian plantations were relatively small. Kalm stated that a typical Indian field encompassed no more ground "than a farmer in our country takes to plant cabbage for his family. At least, a farmer's cabbage and turnip ground, taken together, is always as extensive, if not more so, than all the corn fields and kitchen gardens of an Indian family." In the early nineteenth century, a Moravian missionary estimated that each family grew but two or three acres of maize.

Indian plantations were cleared by means of girdling trees, thus causing them to defoliate, and allow the sun's rays to penetrate to the forest floor. Brush was removed by hand. Clearance was the responsibility of the men, cultivation of the women.

After a number of years of tillage, ten perhaps being a maximum, the old fields were allowed to return to forest or brush, and new plots were cleared. "But when the strength of the soil is exhausted, they remove their plantations for they know nothing of the use of manure and have land enough."

Although several different crops were grown by the Lenape before white contact, maize or Indian corn was always the most important food crop. The varieties of maize grown included the most common flint corn, dent corn, popcorn, and a soft white variety known as "squaw corn." The method of cultivation was as follows: "They make heaps like molehills, each about two and a half feet from the others, which they sow or plant in April with maize, in each heap five or six grains; in the middle of May, when the maize is the height of a finger or more, they plant in each heap three or four
Turkish beans...⁶⁹ Beans were second in importance among the food crops. Many varieties of the common kidney bean (Phaseolus vulgaris) were grown, and also the lima bean (P. lunatus).⁷⁰

Other food plants grown by the Indians of New Jersey before white contact included the pumpkin (Cucurbita pepo), the bottle gourd (Lagenaria siceraria), the Jerusalem artichoke (Helianthus tuberosus), and the sunflower (H. annuus).⁷¹ There is also a possibility that the potato-bean (Glycine apios) was cultivated before white contact, as it was grown by the Delawares on the Muskingum River in Ohio in 1794.⁷² Tobacco (Nicotiana rustica), a non-food stimulant and ceremonial plant, which had first appeared in Middle Woodland times, continued to be grown widely.⁷³

Storage of food crops took place in "round holes, dug in the earth at some distance from the houses, lined and covered with dry leaves and grass."⁷⁴ Kalm described the pits as being less than six feet in depth and being lined with bark and grass.⁷⁵

Gathering

Plant foods were also obtained by gathering. One of the most popular of these was the potato-bean (Glycine apios), which may have also been cultivated. One of the outstanding students of the Lenape indicated the importance of this tuber by stating that "the ground on Indian village sites and the immediate vicinity has been disturbed for a depth of ten to eighteen inches by the natives in digging the tubers of the potato-bean."⁷⁶ The Indian name for the plant was hopniss and Pehr Kalm described it as growing in fertile soil, having
a root resembling a potato, and being eaten also by the whites, especially in lieu of potatoes.  

Other tubers were also of importance. Kalm mentioned especially katniss (Sagittaria longirotra), now known as the swamp potato, and an aroid, taw-ho or tawhim (Arum virginicum), which also grew in swampy areas. Katniss grew in low, muddy ground, and was much relished by whites and Indians alike, who boiled or roasted it. Taw-ho often grew to the thickness of a man's thigh, but contained an acrid principle when raw, which was eliminated by baking the tubers in an earth oven. The abundance of both katniss and taw-ho declined rapidly after white contact, due to the fondness of hogs for these tubers.  

Other wild tubers which were utilized by the Indians included those of the jack-in-the-pulpit (Arisaema attorubus), the wild morning glory (Ipomoea pandurata), American licorice (Falcatia comosa), wild ginger (Asarum canadense), pepper root (Dentaria diphylla), ginseng (Aralia quinquefolia), sweet flag (Acornus calamus), cattail flag (Typha latifolia) and many others. 

Water plants also elicited the attention of the aborigines. The American lotus (Nelumbo lutea) was valued for both its submerged stems and its seeds, while the seeds and root of the yellow pond lilly (Nymphaea advena) were eaten. 

Of the trees, especially the nut bearers were valued. Most preferred by the Lenape was the American chestnut (Castanea dentata), called by them woapin. Other valued nut bearers included the black walnut (Juglans nigra), the butternut (J. cinerea), the hickories (Carya spp.), certain species of oaks (Quercus spp.),
and the hazelnut (*Corylus americana*). Most villages were surrounded by thickets of the latter.82

Other trees, such as the hemlock (*Tsuga canadensis*) and slippery elm (*Ulmus fulva*), were valued for their cambium, which yielded a flour when processed; and the spiny growth of the sassafras (*Sassafras varifolium*) was crushed and cooked with meat. The sugar maple (*Acer saccharum*) was of importance, and the production of maple sugar was an important spring activity.83

Women and children also gathered persimmons (*Diospyros virginiana*), grapes (*Vitis spp.*), crabapples (*Malus coronaria*), plums (*Prunus americana*), cranberries (*Vaccinium macrocarpon*), blackberries (*Rubus spp.*), and strawberries (*Fragaria virginiana*), from the forests and old fields surrounding their villages.84

During the summer months, parties often travelled to favored coastal locations and collected shellfish. These were dried, smoked, and carried back to the interior for use as seasoning in cooking. The shells were used for tempering pottery and for making ornaments.85 Freshwater molluscs were gathered for similar use in Highland lakes, ponds, and streams and included *Polygyra albolabris* Say, *Polygyra hirsuta* Say, *Anguispira alternata* Say, *Mesomphix cupreus* Rafinesque, and *Elliptio complanatus* Solander.86

**Hunting**

Of almost as great importance to the subsistence of the Lenape as agriculture was hunting. Hunting provided not only food but pelts and hides as well, which could be fabricated into clothing. Virtually all local mammals were hunted, but deer (*Odocoileus virginianus*),
bear (*Ursus americanus*), and elk (*Cervus canadensis*) were especially prized. The best preserved and largest number of animal bones which have been associated with an historic Indian site in the Highlands was excavated at the Fairy Hole rock shelter, at the northeastern end of Jenny Jump Mountain, approximately six miles north of the Musconetcong Valley. The bones were largely of the smaller mammals, which may be partially explained by the fact that some of the larger bones had been removed by earlier investigators, and also by the fact that the larger bones may have been thrown down the slope in front of the cave, where small rodents would have a better chance to destroy them. The bones found during the course of the excavation of the shelter and identified at the Academy of Natural Sciences of Philadelphia included:

<table>
<thead>
<tr>
<th>Species</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procyon lotor</td>
<td>(Raccoon)—many fragments</td>
</tr>
<tr>
<td>Mephitis nigra</td>
<td>(Skunk)—many fragments</td>
</tr>
<tr>
<td>Marmotta monax</td>
<td>(Ground Hog)—few fragments</td>
</tr>
<tr>
<td>Castor canadensis</td>
<td>(Beaver)—teeth</td>
</tr>
<tr>
<td>Sylvilagus floridanus</td>
<td>(Cottontail)—few fragments</td>
</tr>
<tr>
<td>Ondatra zibethica</td>
<td>(Musk Rat)—many fragments</td>
</tr>
<tr>
<td>Sciurus carolinensis</td>
<td>(Gray Squirrel)—many fragments</td>
</tr>
<tr>
<td>Eptesicus fuscus</td>
<td>(Brown Rat)—two skulls</td>
</tr>
<tr>
<td>Casteroides</td>
<td>(Giant Beaver, extinct)—tooth</td>
</tr>
<tr>
<td>Erthizon dorsatum</td>
<td>(Porcupine)—few fragments</td>
</tr>
<tr>
<td>Scalops aquaticus</td>
<td>(Mole)—bone</td>
</tr>
<tr>
<td>Blarina brevicauda</td>
<td>(Short-tailed Shrew)—two skulls</td>
</tr>
<tr>
<td>Tamias striatus</td>
<td>(Chipmunk)—few jaws</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Species</th>
<th>Description</th>
<th>Fossils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peromyscus</td>
<td>(Mouse)-many fragments</td>
<td></td>
</tr>
<tr>
<td>Microtus</td>
<td>(Meadow Mouse)-many fragments</td>
<td></td>
</tr>
<tr>
<td>Neotoma pennsylvanica</td>
<td>(Cave Rat)-many fragments</td>
<td></td>
</tr>
<tr>
<td>Lepus</td>
<td>(Hare)-bone</td>
<td></td>
</tr>
<tr>
<td>Canis</td>
<td>(Two species) (Wolf and Dog)-jaws</td>
<td></td>
</tr>
<tr>
<td>Urocyon</td>
<td>(Gray Fox)-few fragments</td>
<td></td>
</tr>
<tr>
<td>Lynx</td>
<td>(Bobcat)-few fragments</td>
<td></td>
</tr>
<tr>
<td>Odocoileus</td>
<td>(Deer)-many fragments</td>
<td></td>
</tr>
<tr>
<td>Cervus</td>
<td>(Elk)-few fragments</td>
<td></td>
</tr>
</tbody>
</table>

It can be seen, then, that the aboriginal diet was quite varied insofar as mammals were concerned.

The hunting of large game was both a communal and an individual enterprise, the latter form prevailing mainly in the winter. The typical communal hunt for deer in the middle of the seventeenth century has been described as follows:

When now the sachem wants to arrange his hunt, then he commands his people to position themselves close together in a circle of 1/2, 1 or 2 miles, according to the number of people at his command... each one roots up the grass about 3 or 4 ells, so that the fire will not be able to run back, each one then beginning to set fire to the grass, which is mightily ignited, so that the fire travels away, in towards the center of the circle, which the Indians follow with great noise, and all the animals which are found within the circle, flee from the fire and the cries of the Indians...now the Indians have surrounded the center with a small circle, so that they mutually cannot do each other any harm, then they break loose with guns and bows on the animals.

Another writer described a similar hunt among the Delawares who had removed to Ohio in the last decade of the eighteenth century. In the northern part of New Jersey lines of huntsmen were used to drive
deer to and off cliffs. Birds were also avidly hunted. Even young boys were taught to shoot them on the wing with a bow and arrow.

Fishing

Fishing was "one of the most favorite diversions of the Indians next to hunting...." This was carried on in several ways, either individually or in groups. Weirs, nets, bows and arrows, spears, harpoons, clubs, and hooks and lines were among the implements used.

Individuals always carried hooks and harpoons along on hunting expeditions. Hooks were of bone, the line of wild hemp or milkweed, the bait used an earthworm or a grasshopper. On May 30, 1715, John Reading's surveying party met "an Indian called Nepuck and his sons a fishing," in the Musconetcong. They did their fishing with bows and arrows.

Group fishing activities were of several types. On July ninth of the same year that Reading's party met Nepuck, they witnessed Indians in canoes on the Delaware fishing for eels. For this purpose the Indians employed lighted torches to attract the eels at night, and struck them with clubs when they approached the canoes. Another widely used device was the fish weir. This consisted of a V-shaped dam placed across a stream, with the point of the structure facing downstream. The fish would be driven upstream from a point well below the weir by means of a party of Indians dragging either a brush net made by lashing branches together, or a knotted net of wild hemp weighted with stone sinkers. The fish would be clubbed or speared upon attaining shallow water on the flanks of the weir.
Relations With Europeans

Relations between European settlers and the Indians of New Jersey were relatively good. In the province of West Jersey especially, the aborigines "manifested an open hospitable disposition to the English, and were in the general, far from any design to their prejudice."\(^{100}\) In large part this was due to the Quaker influence in the area.\(^{101}\)

Unfortunately, the Indians were adversely affected by European diseases and alcoholic beverages, and declined greatly in numbers in the seventeenth century.\(^{102}\) An additional factor adversely affecting the Munsis was warfare with the Dutch in the middle of the seventeenth century.\(^{103}\) By 1685 the aborigines of the southwestern portion of the state were "but few in Number,"\(^{104}\) and in the northern part of the state were "sparse at the beginning of the eighteenth century."\(^{105}\)

In 1758, by means of a treaty with the Munsis signed at Easton, Pennsylvania, all Indian claims to the northern part of New Jersey were relinquished.\(^{106}\) For the most part, however, the aboriginal inhabitants of present Morris, Hunterdon, Sussex, and Warren counties had left by the middle of the eighteenth century.\(^{107}\) John Reading, for example, regularly encountered Indians in his travels through the Highlands in 1715,\(^{108}\) but in 1743 John Lawrence encountered only "an Indian Wigwam"\(^{109}\) approximately one mile north of Waterloo, and mentioned no inhabitants. A few Indians remained behind after their fellows had left for the West and mixed with Europeans, or carried on a precarious living on marginal land.\(^{110}\) Two Indian families maintained themselves until the fifth decade of the nineteenth century on Schooley's Mountain in Morris County.\(^{111}\)
Acculturation of the Aborigines

Contact with Europeans affected Lenape culture in several ways. Politically, there was more unity after conflicts with Europeans.\textsuperscript{112} Economically, a dependence on European trade goods often replaced traditional enterprises. Europeans provided a ready market, especially for skins and pelts, that had not existed before. Later observers noted that the numbers of many game animals, especially deer, increased noticeably immediately after the departure of the Indians from the Highlands.\textsuperscript{113}

The Lenape also adopted certain of the domesticated plants and animals introduced by Europeans. As early as 1631 the Swedes planted orchards on the lower Delaware and Pehr Kalm indicates that by the early eighteenth century the Indians had a great love for apples and peaches found in Swedish settlements.\textsuperscript{114} In the nineteenth century it was claimed by one observer that apple, plum, and cherry trees planted by the aborigines could still be seen in Sussex County.\textsuperscript{115} Possibly, as a result of stimulus diffusion, at least some of the Lenape turned toward the planting of native trees. Schoepf, writing of eastern Pennsylvania in 1783, noted that the Delawares planted "wild red plums \textit{Prunus americana} ... and that they were\textsuperscript{7} very fond of this insipid fruit, which grows wild in the wood, and plant the seeds wherever they stay for any time. And so these plums, not much bigger or better than sloes, are called Indian Plums."\textsuperscript{116}

The only domestic animal possessed by the Lenape before contact with Europeans was the dog. The value of European domesticates was soon seen, however, and in the mid-eighteenth century "some Indians...
bought hogs of the Swedes and raised them. They taught them to follow them like dogs, and whenever they moved from one place to another their pigs always went with them. Later in the eighteenth century horses were raised "which feed in the woods without a keeper," and cows, chickens, and cats were also kept.

Aboriginal Influences Upon Europeans

Aboriginal influences upon Europeans were manifold. Indian crops were adopted by the early settlers and initial settlement often took place in Indian old fields, where the task of clearance had been accomplished by the aborigines. Early surveyors sought out these clearings and were often opposed, as was John Reading in 1715, for doing so. "We came to one of our Indian plantations where the owner of the same opposed our surveying and would not let us proceed in the same."

Europeans often, at least at first, adopted Indian methods to attain certain ends, often with marked success. In 1680, Mahlon Stacy wrote a letter to his brother indicating that he and several other Englishmen had trapped large numbers of fish in the Delaware "after the Indian fashion...." The fact that Indian fish weirs continued to exist long after their original builders had left the state and that fish drives reminiscent of aboriginal practices were carried out by settlers in Bucks County, Pennsylvania, in the nineteenth century, may also indicate aboriginal influences.

Transportation

With the exception of certain plant domesticates, it is perhaps in the field of transportation that Indian influences were longest.
felt. The Lenape were a water-conditioned people who often travelled by means of the dense network of natural waterways. Canoes were of two types - dugout and bark. The dugout was fashioned of tulip-poplar (Liriodendron tulipifera), white cedar (Chamaecyparis thyoides), or sycamore (Platanus occidentalis), and was hollowed out by means of adzes and fire. Bark canoes were made of elm (Ulmus americana), black oak (Quercus velutina), or hickory (Carya spp.) bark. European settlers adopted especially the dugouts for travelling the inland waters of the state, and were to be seen using them on such rivers as the Raritan as late as 1800.

Indian Footpaths

Perhaps the most lasting influence of the aborigines on the European settlers of New Jersey, as well as on the landscape of the state, has been the extensive network of Indian footpaths, since these "Indian trails finally became, in most instances, the crooked highways up hills and down dales for use of the wagon traffic of the white man." Indeed, "in nearly every instance the Indian paths were followed in the location of the roads that are to-day the great thoroughfares of the State." In addition, Indian routeways often determined lengthy portions of county boundaries, and of township boundaries as well. Thus, the maps of New Jersey are still replete with the effects of aboriginal occupance, which for all practical purposes ended over two centuries ago.

Major Indian footpaths served to link the interior camp and village sites with the shellfisheries of the Atlantic coast. Large shell middens still attest to the seasonal movement on the part of
many groups to the seaboard during the spring and summer months. Major trails also served to link interior village sites with one another.

Minor trails branched off the major paths and led to favorite hunting and fishing grounds, camp sites, garden plots, and rock shelters. There were so many of these lesser trails, in use and fallen into disuse, that a great deal of confusion has always attended efforts to unravel their exact locations and destinations.

The Indian paths were usually sinuous in their courses, being designed to follow the lines of least resistance to travel on foot rather than to facilitate travel in a straight line. In general, considerations in selecting the line of travel included dry land in relatively low terrain, the absence of rocks and stones in the pathway, and easily ascended grades. The Minisink trail, for example, was located for a great part of its length on the Wisconsin terminal moraine. Another consideration was the crossing of streams. The Indian preferred locations with shallow, uniform depths and firm bottoms.

Major Indian routeways were well-beaten paths that could be easily located. They were perhaps two or three feet wide and were kept clear by the regular travel of Indians throughout the year. An idea may be gained of the ease of access to the interior of the state afforded by these paths in examining the journal of John Reading, one of the early surveyors of northern New Jersey. Reading and his party travelled widely in sections of the Highlands in 1715 and 1716 on horseback, and rarely had any difficulty of access to any area in which they had an interest.
On the other hand, since the Indian always walked in single file "and so disturbed as little as possible the foliage along their footpaths," many of the minor, seldom-used paths were difficult to locate. Smith, writing of the New Jersey Indian population in 1765, mentioned that "to know their walks agains, in unfrequented woods, they heaped stones or marked trees." John Reading, in 1715, experienced difficulty in finding a path to the village of "Penungachongh," and required the services of a local Indian to put him in the proper trail. In another instance his party moved along a path but "it being very blind we could not keep it...."

The withdrawal of the Indians from the state before the entrance of whites in numbers into certain areas, probably served to obscure many formerly well-frequented trails. Richard Smith, in 1769, described a path, once used by the Delaware Indians, which led from the Susquehanna to the Delaware in the vicinity of Deposit, New York, as being "a blind Indian Path," and complained of it as being "in many parts blocked up by old trees and Brush...." There were only a few impoverished Indians left in the locality at the time.

A summary of the locations of many of the major Indian paths in the northern portion of New Jersey has been compiled by Lane. In addition to these, several other important aboriginal routeways served the northwestern portion of the state (Fig. 8). These included the Malayelick Path, the South Branch of the Raritan River Trail, the Allamatunk Trail, northern branches of the Minisink Trail, and the Old Mine Road from Kingston, New York. Several minor trails served to connect the major routeways. Not a few of these eased access to the Musconetcong Valley.
Toponymy

Much of the toponymy of the Highlands is aboriginal in origin. The suffix ong, written and pronounced as unk or onk in the eighteenth century, is especially evident in toponyms of Indian origin in the region. In the Munsi dialect this apparently meant either "in, in the, on, out of;" or "place where there is." In the case of northern New Jersey the latter meaning is probably the more accurate one.

Unfortunately, the Munsi dialect is imperfectly known, and various meanings are assigned to the Indian terms. "Musconetcong" is itself a Munsi term, the meaning of which is not clear. Interpretations have included "a rapid running stream," "clear running stream," "stream running along the base of a mountain," and "place where bass fish are caught with fish spears." Musconetcong, or as it was often spelled in the eighteenth century "Musconetkonk," refers most likely to a locality instead of a stream. The Munsi had no terms for individual streams per se prior to the arrival of Europeans. When asked for the names of streams by the early surveyors and settlers, the Indians generally replied with a term referring to an important event which had taken place nearby or to an economic activity which was regularly pursued in the area. The contention that a vicinity instead of a stream was referred to by the term Musconetcong is borne out by the fact that pioneer European communities used the term in this sense, and the fact that the highest upland area in the vicinity came to be known as Musconetcong Mountain.
Another important Indian term, of which the corrupted form, "Hopatcong," is still in use, refers to the largest body of water in the Musconetcong drainage system. The early eighteenth-century orthography appears to have been "Huppakong,"\textsuperscript{159} or "Hapakonoesson."\textsuperscript{160} There are several suggested meanings of this term, the most popular of which alludes to the supposed former shape of the lake: "a pipe to smoke out of."\textsuperscript{161} Other possible interpretations include "place of very deep water," and "stone water."\textsuperscript{162}

Two other aboriginal toponyms in use in the Musconetcong Valley include Netcong and Pohatcong. Netcong may mean "place of a stream,"\textsuperscript{163} and Pohatcong may mean "place of a stream outlet between a split in the hills."\textsuperscript{164}

**Aboriginal Effects on Flora and Fauna**

Aboriginal effects on the flora of New Jersey were long in evidence. The use of fire by the Indians on a large scale, for a variety of reasons, served to greatly modify the natural vegetation. Fires were set in order to drive game,\textsuperscript{165} to prevent young trees from gaining a foothold in open areas,\textsuperscript{166} to encourage the growth of grasses instead of brush on the forest floor,\textsuperscript{167} to clear high grass in open areas so as to remove the cover sought by pursued game,\textsuperscript{168} and to encourage a new crop of succulent grasses after the previous crop had withered.\textsuperscript{169}

The effects of widespread burning were much in evidence at the time of first European settlement in many localities. This was a fortunate circumstance for many settlers, who at first had great dependence on livestock. In 1685, Budd wrote of southwestern New Jersey:\textsuperscript{170}
The Trees grow but thin in most places, and very little under-Wood. In the Woods growth plentifully a course sort of Grass, which is so proving that it soon makes the Cattel and Horses fat in the Summer....

Other early settlers and travellers also found park-like landscapes in other areas of former aboriginal occupancy. In 1684, Gawen Lawrie, in writing of the vicinity of Amboy in the east central part of the state, mentioned that the trees "grow generally not thick, but in some places ten, in some fifteen, in some thirty upon an acre, this I find generally, but in some particular places there is one hundred upon an acre; but that is very rare...." In the middle of the eighteenth century, in the southwestern part of the state, Pehr Kalm found that he could "ride on horseback without inconvenience in the woods, and even with a cart in most places...." In the middle of the eighteenth century, in the southwestern part of the state, Pehr Kalm found that he could "ride on horseback without inconvenience in the woods, and even with a cart in most places...." In the middle of the eighteenth century, in the southwestern part of the state, Pehr Kalm found that he could "ride on horseback without inconvenience in the woods, and even with a cart in most places...."

In addition to grass for the stock, the open forest floors were also rich in mast for the ubiquitous hogs of the pioneers. In 1765, Smith noted that "the Indians, before the European settlements, used every year regularly to burn the woods,...this practice kept the woods clean, so that pigeons regularly got acorns, which then not being devoured by hogs, were plenty almost every where...."

Burning also served to expand grasslands. If near water and relatively small in extent, perhaps being at least in part the remnant of an old field, grasslands were termed "meadows" by the early settlers and were much prized, being avidly sought by the early surveyors. Many poorly drained meadows lapsed back into forest after seasonal Indian burning ceased.

There is a story related that in a certain law suit in which a large tract of "meadow," then swamp
was in dispute, a witness, an old lady of three score and ten, testified that when she was a child the whole tract was treeless, except one small tree, naming the kind and its location. Curiosity, mingled no doubt with a desire to impeach the old lady's testimony, led some persons to search for the tree, which they found, so accurate was her description, and, on cutting it down and counting its rings of yearly growth, they found it confirmed the old lady's story.

When wide areas were denuded of trees, eighteenth-century surveyors termed them "plains," or "barrens." In 1715 John Reading, approaching the vicinity of Hackettstown, related that "about two miles short of Muskonetkong we entered a very large plain but barren, we went across the same which is better than a mile over...." The next day Reading's party explored both banks of the stream southwest of Hackettstown and found "the aforesaid Plains on the upper side of the same [Musconetcong] about six miles by computation." The area covered by this grassland corresponds very closely to the droughty slaty-shale uplands southwest of Hackettstown, where aboriginal burning could be expected to have been especially effective (Fig. 9).

A larger area of grasslands and degraded forest vegetation existed south of the river on the gneiss uplands southeast of Bloomsbury, in the middle of Alexandria Township. This grassland was termed the "Barrens" by early settlers and was more than fifty square miles in extent. Even in the late eighteenth century, a little to the south of this area, it was said that one could see all the way from Oak Grove to Quakertown, a distance of over two miles, because of the dearth of trees. Local tradition assigns the responsibility for the lack of forest cover in the area to Indian burning. After such burning ceased, the area, although still termed the "Barrens" grew up in a forest composed almost exclusively of chestnut.
The lack of trees in many areas was considered a favorable rather than an unfavorable circumstance for early settlement, since clearance was generally viewed as an onerous task, especially by English settlers. In 1684, a report on the upper Raritan Valley included the intelligence that "so far as we went, was very rich land, and yet that above it is said to be richer; a great deal of it is naturally clear of wood, and what is not so, is easily cleared, the trees being but small and at a good distance from one another...." The early English settlers of Quakertown, approximately ten miles southeast of the Musconetcong, chose the vicinity "on account of the richness of the soil, the beauty of its situation, and the absence of forests, the last, as is usually the case in new countries being considered a great advantage to the settler." (Italics mine.)

Aboriginal burning also probably affected the species composition of the forests. Trees such as the oaks, hickories, and chestnut were more fire resistant than maple, yellow birch, and hemlock. Considering the value of the nut bearers to both aborigine and European pioneer, this was a most favorable result of burning. To the later charcoal-iron interests, however, such was not the case. They complained of the lack of dense forests and of the poor quality of the charcoal made from the fire-damaged, immature trees.

Another, more subtle influence of the Indians on the area, was their effect on the native fauna. Although the Indians are often cited as natural conservationists, in some cases they may have caused certain species, which existed in a fragile equilibrium, to become extinct. The presence of the tooth of the giant beaver, and bones
of the porcupine and elk at the Fairy Hole rock shelter indicate that at least the latter two were widely hunted in the state. Giant beaver remains have been found in other nearby caves in Pennsylvania and New York associated with post-Pleistocene deposits.\textsuperscript{185} The tooth associated with the artifacts of historic Indians at the Fairy Hole rock shelter may indicate that they had a hand in causing its extinction. In historic times elk were rare even in eastern Pennsylvania and were unknown in New Jersey, while the porcupine has been exterminated in historic times.\textsuperscript{186}
CHAPTER III

PIONEER AGRICULTURAL SETTLEMENT

CA. 1720-1790

Availability of Land

The initial settlement of northwestern New Jersey by pioneers of European descent was concerned mainly with subsistence agriculture and thus depended on the availability of land, in one form or another, for such pursuit. As natural increase and the increasing tide of European immigrants forced settlers to look outside the areas of older European occupance, a growing tide of pioneers entered the northwestern portion of New Jersey, including the Musconetcong drainage system. In northwestern New Jersey, land for agricultural settlement was obtained in three ways: (1) outright purchase, a situation rare for the average pioneer in the days of earliest settlement; (2) tenancy, which involved the paying of rent to, or share-cropping with, a landowner or proprietor; and (3) squatting, or occupance without payment of rent. The latter form of tenure was often possible due to the lack of knowledge of distant landowners that the practice was taking place, and the unsettled conditions, especially insofar as law enforcement was concerned, on the frontier.¹

¹For notes to Chapter III see page 291.
Surveying of Lands

Agricultural settlement generally followed in the wake of the surveying parties, which were active in the Highlands during the first years of the eighteenth century. Only on occasion did squatters precede even the surveyors into favored areas. Surveyors were hired by, or, in the case of John Reading and his son, were themselves proprietors. The proprietors held shares in the companies which owned the lands of, and encouraged settlement in, East and West Jersey. East Jersey included, for the most part, the portion of the Musconetcong drainage system northeast of Waterloo, West Jersey the Valley southwest of Waterloo (Appendix I). The proprietors of each division of the colony periodically declared dividends, which were in the form of warrants for unlocated lands. These warrants could then be taken up by the proprietors themselves and the lands surveyed and held, or later sold. Often, however, the warrants were sold to speculators, or, on occasion to actual settlers, although the latter practice was rare in early days.

Preferred Sites for Settlement

The early surveyors moved into the wilderness by way of the network of Indian paths already described, or by way of the major river valleys, which, as we have seen, were easily penetrated. The first lands to be surveyed were selected carefully with several criteria in mind. In value, water-power sites and outcroppings of ore, especially of iron, surpassed agricultural land, and were thus first surveyed. The most valuable of agricultural lands were the cleared areas lying near a source of water, and near the network of
Indian paths.\(^5\)

It is a circumstance which has not failed to impress itself upon those familiar with the records of the proprietors of East Jersey that among the first lands to be taken up or purchased especially in the northern part of the county /Morris/ were the lots containing waterfalls, and where veins of ore cropped out on the surface, afterward pieces of natural meadow, and last of all the surrounding hills.

The same could be said for West Jersey.\(^6\) John Reading, the son of a West Jersey proprietor, was mainly interested in surveying "natural" meadows and Indian plantations.\(^7\) These generally lay contiguous to Indian paths and so were of relatively easy access in addition to having pasture available for the pioneer agriculturist's stock during the critical first few winters.\(^8\)

On occasion, the surveying of advantageous parcels of property brought great competition on the part of early purchasers. John Bowlby, in 1740, bought a great tract of land from the West Jersey proprietors. When surveyed, it was found to include 5,088 acres, and ran from present Asbury to Hampton, New Jersey.\(^9\)

When John Bowlby was running the boundaries of his land, Col. Daniel Coxe was also laying out a tract to the east of him. There seems to have been some strife between them as to who should get his survey entered upon record first, and at the same time get as much of the creek /Musconetcong/ as possible.

Coxe became alarmed, mounted his horse and rode towards Burlington as fast as he could, while Bowlby ran his lines so far as to take up the whole stream, keeping Coxe out of every foot of it. He then mounted a horse and followed Coxe, who rode one horse to death, and borrowed another, and thus reached Burlington first. But Bowlby "kept him out of the creek" and that was all he desired, for now he had a mill site, and the most valuable portion of the land.
System of Survey

The early deeds and returns of surveys extant show that the metes-and-bounds system of survey was in general use\textsuperscript{10} (Appendix III). This system made use of natural features as bounds rather than any systematic earth grid. Trees, streams, Indian paths, and an occasional cairn built by the surveyors served to demarcate the different tracts of the early landholders. This casual, inaccurate method of survey, depending as it did on impermanent features, often led to difficulties when later, more accurate surveys were made. In 1771 Garret Rapalje, an important capitalist of the day, sold thirteen and six-tenths acres of his land at the outlet of Lake Hopatcong, which, it had been found, had been included "within the bounds of a former survey," to James Parker, President of the Council of Proprietors for the Eastern Division of New Jersey for six pence, "in Order to Obtain a Certificate for Locating so much Land Elsewhere."\textsuperscript{11} In 1762, William Coxe, one of the great landholders of Hunterdon County (Appendix IV), wrote to his agent and surveyor, John Emley, that the bounds of his lands "were never done with care," and asked him to be cautious in selecting chainbearers, and especially not to select relatives of purchasers for the task.\textsuperscript{12} Boundary difficulties, apparently, were almost universal in later days.\textsuperscript{13}

Squatting

The metes-and-bounds system allowed the early surveyors to work quickly, if not well, and they were generally far in the van of actual settlement. In much of Warren County, for example, the best
lands had already been located by 1730.\textsuperscript{14} Unfortunately, many of the proprietors, and most of the speculators who bought large tracts of other proprietors, held on to their lands in anticipation of rising values. In Sussex County "the best locations were generally entered before any immigrants had arrived...and they had to cultivate the soil when they did come as tenants or trespassers."\textsuperscript{15} This could be said of much of northern New Jersey. Such a situation was naturally resented by the pioneer agriculturist, whose resources were slight and who could not hope to buy a small parcel of land at a reasonable price. Many pioneers in New Jersey, especially the Scotch-Irish, had much the same attitude as their fellows in Pennsylvania, who told James Logan, the secretary of the province, when he tried to oust them from lands owned by the Penns, that 'it was against the laws of God and nature, that so much land should lie idle while so many Christians wanted it to labor on and to raise their bread.'\textsuperscript{16}

Allen and Turner, capitalists of Philadelphia, had a great deal of trouble with squatters on their lands in northern Hunterdon County in 1749. Harassment on the part of the aforementioned Allen and Turner backfired when the adamant pioneers went so far as to destroy much of an iron furnace which had been erected by the Philadelphia partnership.\textsuperscript{17} In Sussex County, a few years later, lands were taxed not according to ownership, but according to the improvements made by the settlers actually living thereon. This was done in order to collect taxes from the settlers present, who often did not hold titles to the land upon which they were located.\textsuperscript{18}
Tenancy

The widespread practice of squatting and the large number of settlers engaged in the practice, caused many landowners and speculators to be cautious in their treatment of the impecunious pioneers. After conditions had stabilized, and legal pressure could be judiciously applied, most of the squatters later agreed to become tenants. This occurred mostly after the middle of the eighteenth century. Settlers refusing to sign leases were either ejected or finally left the area of their own volition. Tenancy became the common form of tenure in most of northern Hunterdon County in the middle decades of the eighteenth century.

In Sussex County, also, tenancy was quite widespread and one author even indicated that the rapid settlement of that county was due to the landholders being anxious to improve their lands and thus offering tenants extremely generous terms. This, however, did not work out quite as well as expected, and finally "instead of holding on, in the hope of ultimately getting large prices, the owners sold out to as good advantage as they could, ere the virgin soil of their respective tracts should become completely exhausted; and every portion of our county soon felt the beneficial influence of the change."20

High Taxes Render Lands Available

In addition to the landowners' fears that tenants would ultimately ruin the land and decrease its value, the subdivisions of the large tracts often occurred due to the high taxes imposed by county governments. Some owners were forced to sell unused lands at
a low price in later days. Such was the case for John Bowlby of Hampton.21

John Bowlby sold many hundreds of acres of land for 2s, 6d. per acre, because he did not wish to pay the tax on it....Parties now living at the Junction /Hampton/ can remember hearing their grandfathers tell about the time when they could have bought land from Bowlby for 50 cts. per acre. It must be remembered that in those days taxes were high in proportion to the value of the land; and while land was plentiful, money was scarce.

**Land Availability in the Musconetcong Valley**

Unfortunately, there are few data extant on the relative importance of the types of land tenure involved in early days in northwestern New Jersey and on the availability of lands for pioneer agriculturists. The best source for this information and for the general course of agricultural settlement and improvement of the land lies in the eighteenth-century newspaper advertisements, as reprinted in the New Jersey Archives.22

In general, the early advertisements, beginning in the 1730's, reflect the purchase and disposal of large tracts, often of a thousand or more acres, by land speculators. Later advertisements show that tenancy was an important form of tenure, and remained important until after the Revolution. During the 1760's many smaller, unimproved properties of less than three hundred acres became available. In many cases, however, land was difficult to sell, especially to those used to tenancy. As late as 1774, William McAdam reported to Samuel Barker, owner of a 7,308 acre estate in Alexandria Township (Appendix IV) that his land "would be very
difficult to sell...at any rate for Cash as it is rare that such chaps [Tenants] offer hit...."23

The economic dislocations caused by the Revolution generally served to discourage tenancy. Even wealthy patriots met with heavy losses. One of these, William Alexander, lost thousands of acres of tenanted farmland in the Musconetcong Valley alone in 1779 and 1780.24 The seizure of Tories' property by county governments also rendered much formerly tenanted land available to small freeholders.25

As late as the last decade of the eighteenth century, some locations in the fertile limestone portions of the Musconetcong Valley lay unused due to their being held by large landholders, but most plots had been sold to individual settlers by that time.26

Origins of the Early Settlers of Northern New Jersey

In regard to the origins of the settlers of northern New Jersey, the remarks of John Rutherfurd in 1786 are generally pertinent. In his words:27

...Morris County is partly New England descent, and a few from West Jersey....Part of Morris, ...were from the north of Ireland, but all the most valuable lands /In Somerset County/ are possesst by the low Dutch, also the large township of Reading in Hunterdon. Sussex is settled and is a mixture from all the other Counties.

Of West Jersey it could be said that:

...the chief Proprioters were Quakers, who made fine settlements in the Counties of Burlington, Gloster /sic/, Salem, Cumberland, Cape May, Hunterdon and half of Sussex and the many Settlers among them were of different Persuasions, yet the Quakers held the chief Property and Management....
And finally:

...dispersed in both Divisions are many laborious, ingenious and parsimonious Germans, who came here late and poor, but are daily acquiring Estates, especially in the large Counties of Hunterdon and Sussex.

It can generally be asserted that the pioneer population of much of northern New Jersey was quite a polyglot one. Indeed, the local historians have been most eager to accentuate the polygenetic nature of their subjects.28

...no county [Hunterdon] in the State had so mixed a population, composed, as it was of Huguenots, Hollanders, Germans, Scotch, Irish, English, and native Americans.

In general, the Musconetcong Valley as a whole reflects the same mixture of ethnic stocks to a greater or lesser degree. Unfortunately, it is often difficult to ascertain exactly ethnic affiliations and dates of settlement for individual localities. It could be said, at the time the first local histories were being written, that "few, if any, of the early settlers survive, and their representatives... have not preserved the traditions of their ancestors. It is, therefore, almost impossible for the historian to obtain a sufficient number of facts to make a record of the early settlement interesting or valuable."29 It will be necessary, then, to draw upon many sources, and, by inference, trace early population movements.

Routes of Penetration

A common misconception, in dealing with the early settlement of the southern Highlands is that:30

It is well-known history that northwestern New Jersey was settled by two distinct streams of emigration: one from Ulster County, New York, consisting of
Huguenot and Hollander stock, and another from Philadelphia, consisting of Quakers, Germans and Scotch-Irish and Irish.

In fact, the situation was far more complex. Pioneer settlement in the Highlands was influenced, and eased, by the existence of a relatively dense network of Indian paths. These provided ready access to the major river valleys of the Highlands not only from Philadelphia and southern New York, but also from Trenton, New Brunswick, Elizabeth, and Newark, in New Jersey.

Major routeways of the first settlers included the Old York Road leading north from Philadelphia, the Malayelick Path leading north from Trenton and crossing the Old York Road at Ringoes, the trails leading west and north along the South Branch of the Raritan from New Brunswick, the Allamatunk Path leading northwest from New Brunswick, and the various paths called the "Minisink Trail" leading northwest from the settlements of Elizabeth, Newark, and Bergen.

An additional factor easing initial European access to the interior was the open nature of the woodlands, especially in the major river valleys, so that forested areas in early days were not so serious a barrier to settlement as they later became. In this connection, we might mention that in some localities tradition asserts that early settlers had to "cut their way" in order to attain their lands. This might have referred to the obliteration of Indian paths by forest growth after they had fallen into disuse and also to the thickening of the forest understory due to the discontinuance of aboriginal burning.
Earliest Settlement in the Musconetcong Valley

All available information indicates that the southwestern portion of the Musconetcong Valley was settled before the middle or northeastern portions were. There is a possibility that the earliest pioneers had arrived by the beginning of the eighteenth century. Snell\textsuperscript{33} cites the records of an early surveyor, Daniel Leeds, in this connection. According to Snell, Leeds recorded encountering a blacksmith, "William Titfoot," settled in the vicinity of present Riegelsville, New Jersey in 1710. Snell felt that this proved prior agricultural settlement. However, Snell also mentioned that Leeds referred to the river in the locality as Maghaghtmeck Creek.\textsuperscript{34} This is suspiciously like the term used contemporaneously for the Neversink River in the vicinity of Port Jervis, New York: Maghagkemek in 1689\textsuperscript{35}, Maggaghkamieck in 1694\textsuperscript{36} and Mahekkomack in 1719.\textsuperscript{37} Also, a blacksmith by the name of William Tietsort or Titsoord located in that vicinity as early as 1689 and did not remove until 1713\textsuperscript{38}. Thus, it is quite possible that Snell was mistaken in locating settlers in the Musconetcong Valley at such an early date. The will of Andrew Heath, of Hopewell Township, which was filed in 1717, included a listing of "600 acres, on the Muskanickcunk Branch of Delaware River, farm, bo't of Thomas Truss."\textsuperscript{39} (Italics mine). The listing of the property as a farm may indicate that agricultural settlement had occurred as early as the second decade of the eighteenth century.
English Pioneers

The settlers who first arrived in the southwestern portion of the Musconetcong Valley were most likely of English stock (Fig. 10). Dutch settlers were located to the north, near Port Jervis, but they were few in number and had not penetrated very far southward in the early eighteenth century. To the south, however, there lay a great reservoir of Englishmen and their descendants. The Hunterdon County Tax Roll of 1722, which includes the names of almost all the settlers of the present area of Hunterdon, Morris, and Sussex counties, illustrates this point by an almost entire absence of non-English names.

Since Trenton, in 1726, consisted of 'hardly more than one house,' we must look elsewhere for the major source of these early English settlers. This source can be found in the old Quaker settlements of Philadelphia and southwestern New Jersey. Indeed, English Quakers had already begun to explore the Highlands by way of the Delaware river as early as 1685.

Dispersed settlement was the rule as the English Quakers pushed north. John Reading, for example, a former resident of Burlington, located his homestead far from any neighbor in the vicinity of the present city of Lambertville in 1703 or soon thereafter. Others had joined him in this locality by 1707.

Reading had probably used the Malayelick Path as his means of access to this new home, but others could well have come north from Philadelphia via the Old York Road. Quakertown, lying ten miles south of the Musconetcong Valley, was settled by Englishmen having
Fig. 10. Compiled from various sources.
an early relationship with the Burlington Quarterly Meeting. Settlement in this vicinity may have occurred before 1700\textsuperscript{47} or perhaps "about 1725"\textsuperscript{48} but surely had taken place by 1733.\textsuperscript{49}

Lack of consensus by the authorities concerned with the actual date of settlement reflects the general paucity of early historical data. At any rate, Quakertown also could be most easily reached via the Malayelick Path.

Another English Quaker, of whom we have more definite information, was John Axford, who settled in the vicinity of the present Oxford, New Jersey, approximately five miles north of the Musconetcong, ca. 1730. Axford was formerly a resident of the vicinity of Trenton.\textsuperscript{50} It may be noted that Axford's land could be reached from Trenton most easily by the eastern branch of the Malayelick Path.

Other Englishmen in West Jersey were associated with the Church of England. Episcopalians were located in Hopewell Township as early as 1703\textsuperscript{51} and built a log church at Ringoes in 1725.\textsuperscript{52} Both of these localities were serviced by the Old York Road and the Malayelick Path.

Evidence of the early origins of English settlements in the southwestern portion of the Musconetcong Valley and vicinity is also found in the statement of the Rev. William Frazer, a missionary associated with the Society for the Propagation of the Gospel. In 1768 he wrote of his parishioners in the vicinity of present Changewater, New Jersey, that:\textsuperscript{53}

> There are a great many families who call themselves Church of England people from no other principle as I can find than because it was the Religion of their Fathers.... I have once preached about 16 miles distant from the place I generally attend at Muskenetcunk where I was told there
had been Churchmen (as they called themselves) arrived to the age of 40 who never in their lives had been to hear a church minister....

Frazer's statement indicates that many Englishmen had settled so far in the van of the establishment of organized religion that they had raised families with no formal religious knowledge.

Further evidence of the English origins of the earliest settlers of the lower Musconetcong Valley may be found in the names of Sir Robert Barker's tenants in Alexandria Township in 1756 and thereafter, in the names listed in the account books of the Greenwich and Chelsea forges in this locality in the 1780's, and in the John Cooley papers dealing with Alexandria Township in the 1790's.

New England Pioneers

Another stream of English settlers, although much weaker numerically than those associated with the Delaware Valley, entered New Jersey via the Raritan Valley and quickly pushed to the interior, utilizing the Raritan, its tributaries, and associated Indian paths to reach their lands. Many of these people ultimately settled in West Jersey.

Earliest settlement on the Raritan and vicinity was in 1667, involving Presbyterians and Episcopalians from Massachusetts and Connecticut settling in Woodbridge; and Baptists from Maine and New Hampshire settling Piscataway Township.

The subsequent movements of these settlers and their descendants are not well known. There is a good possibility that some of them
moved north along the Allamatunk Trail into the vicinity of present Oldwick at an early date. It is certain that Englishmen preceded Germans into this vicinity. The plot upon which the Zion Lutheran Church was built in 1749 had been owned by Ralph Smith who is described as a "Yankee" and was a member of the Lamington Presbyterian Church.59

It is certain that English settlers remained numerous in the area as late as 1753, since Henry Muhlenberg preached a sermon in English to a large crowd of Dutch and English after his regular German service in that year.60

Englishmen also preceded the Germans into Long (German) Valley at an early date.61 Schooley's Mountain may have been settled by the English as early as 1726.62

New Englanders and their descendants also worked their way inland along the branches of the Minisink Trail leading northwestward from Newark and Elizabethtown (Elizabeth). By 1710 a few families had settled in the vicinity of "Whippenung" (Whippany). They established a Presbyterian Church not long after.63

Other New Englanders, in the course of time, became interested in this locality and the surveyor John Reading records meeting "with some New England men who came to treat about purchasing of lands," at Whippany in 1715.64

Emigrants from the Long Island communities of New England descent began locating in the area peripheral to the Minisink Trail, approaching Lake Hopatcong from the southeast as early as 1737. Additional emigrants from Long Island joined them in the 1740's and thereafter.65
A scattered English population probably was already located in the environs of Lake Hopatcong and the northern portion of the Musconetcong Valley as early as the 1740's. In 1743, John Lawrence, in running the partition line between East and West Jersey mentioned leaving his work of the day six miles north of the Musconetcong and going "to a house belonging to Richard Green." In a survey of land adjoining the "Great Pond" (Lake Hopatcong) in 1759, Daniell Cooper used the "Dwelling House that was formerly Stown [sic] Bishops" as a bound. A list of "Names of Settlers Living on Lake Hopatcong Shore Prior to Year 1800," included names that are all of English derivation except for two that are Dutch. The prevalence of English stock in the area is further supported by the list of freeholders of Morris County which included "township of Roxberr[yo] [sic]" names. These are all Anglo-Saxon in appearance. Even after the establishment of the iron industry in the area, there remained a general prevalence of English names.

**Dutch Pioneers**

The Dutch and their religious brethren, the Huguenots, also appeared in northern New Jersey at an early date. Chief means of access to our area of interest lay in movement northward and westward from the Raritan Valley, movement westward along the branches of the Minisink Trail from Bergen and associated settlements on the Hudson, and a movement down the Delaware from Kingston, New York, via the Old Mine Road.

In numbers and influence, the Dutch settlers moving along the Raritan, its tributaries, and associated Indian paths were most
important. Their origin lay in the older Dutch settlements on Long
Island, Manhattan, and Staten Island, and at Bergen on the Hudson. 71

As early as 1683 Pierre Ballou settled southeast of present Bound
Brook at what later became Fieldville. 72 Dutch Huguenots had reached
the North Branch of the Raritan in 1685 and a Dutch church was
established in Somerville in 1699. 73

The era of Dutch migration lasted until about 1735. Hundreds
of families came by sloop to the present site of New Brunswick and
then ascended the river to Raritan Landing by flatboats of
shallower draft. 74 Shortly after 1700 the Dutch became preponderant
in the vicinity of what is now New Brunswick, which had hitherto
consisted of only a ferry site. A congregation was organized in 1717
and by 1735 counted 110 families as members. 75 The influence of the
Dutch was strong enough to affect the English settlers of
Piscataway, and by 1735, north of a line from Raritan Landing to New
Market, there were twenty-one Dutch and Huguenot families and only
seven English families. The latter attended Dutch churches and
soon used Dutch as their language. 76

Land hunger served to drive the Dutch further and further to
the interior. The Scotch proprietors of East Jersey thought of them
as "their best customers." Many settled the region between
Pleasant Run and the South Branch from 1710 to 1720, 77 and the
vicinity of White House had been reached by 1724. 78 Estimates place
the numbers of Dutch and Huguenots in Somerset County in 1740 as
ninety percent of the 4,505 inhabitants. 79
The rapidly advancing Dutch swept northward and westward and
accounted for many of the earliest pioneers of present Hunterdon
County.\textsuperscript{80} Bethlehem Township, which includes a portion of the
southwestern Musconetcong Valley from Hampton to Bloomsbury,
traditionally was first settled by Hollanders.\textsuperscript{81} As this township
may have been organized as early as 1724, Dutch settlement may have
occurred at that time.\textsuperscript{82}

The branch of the Minisink Trail serving the old Dutch settlements
in Bergen County also afforded access to the New Jersey Highlands.
By 1700, four or five Dutch families, which had originated on Long
Island, Manhattan, and at Bergen, had penetrated the Pompton Valley
near the present town of Pompton.\textsuperscript{83} Another area of Dutch settlement,
apparently, was in the vicinity of present Mountain View, where John
Reading visited George Ryerson in 1715.\textsuperscript{84} By 1718 Dutch settlers
were penetrating the valleys of the Pequannock and Wanaque rivers.\textsuperscript{85}

It is apparent, however, that Dutch settlers never entered the
vicinity of Lake Hopatcong in great numbers from this or any other
source. The early family names in the area are all English, as
established above, and even in the late eighteenth century only a
few Dutch names appear in store accounts,\textsuperscript{86} and the bearers of these
could well have been living at a distance. According to the list of
"Names of Settlers Living on Lake /Hopatcong/ Shore Prior to year
1800,"\textsuperscript{87} only two of the nineteen families in the area were of Dutch
descent.

In addition to the Dutch moving up the various Indian paths
and stream courses connecting with the Raritan Valley, and the Dutch
moving into the Highlands via the Minisink Trail, other Dutch families
had penetrated the northwestern portion of the state via the Neversink Valley from Kingston, New York. This route is locally known as the Old Mine Road.\textsuperscript{88} Snell\textsuperscript{89} places the Dutch in scattered settlements from the Delaware Water Gap northward to Ulster County, New York, prior to the year 1700. This, however, is far too early a date for settlements in the Delaware Valley south of the vicinity of Montague, New Jersey. The best evidence for this is mustered by John Reading's journal. In traversing the area from Manunka Chunk to the Water Gap in 1715, he found only Indian settlements.\textsuperscript{90} In 1719, when he and his party travelled northward to help survey the boundary between New York and New Jersey, they first met with a settler, Solomon Davis, in what must have been a location north of the present Montague, New Jersey. Dutch settlements were located approximately six miles north of Davis' land.\textsuperscript{91} In 1725, Nicholas Dupui, a Huguenot, settled in the vicinity of Shawnee, Pennsylvania, which is just north of the Water Gap. His means of access was by way of the Old Mine Road.\textsuperscript{92} More Dutch and Huguenot families must have been lured into the region at this time, since by the year 1737 four Dutch Reformed Churches had been organized to serve residents on both sides of the Delaware from present Port Jervis to the Delaware Water Gap. A parsonage for the minister serving these congregations was built in Sandyston Township, New Jersey in 1741. This probably marked the approximate geographical center of these settlements at that date.\textsuperscript{93}

John Lawrence, surveying the East and West Jersey boundary line in 1743, emerged at the Delaware south of present Bevans, New Jersey.
He mentions Dutch families as residing in the vicinity both on the New Jersey and Pennsylvania sides of the river.²⁴

There is little evidence to substantiate the movement of sizeable members of Dutch from these northwestern settlements into the Musconetcong Valley. Several Dutch names are recorded as having been among the earliest settlers of Mansfield Township,²⁵ but they could just as easily have been a result of the general movement of Dutch families northward from the Raritan Valley. About 1760, however, there is record of a Dutch family which originated in New York state settling in Greenwich Township.²⁶ They may well have been a result of the Dutch movement southward.

Scotch-Irish Pioneers

Large numbers of Ulster Scots, or as they are generally known in the United States, Scotch-Irish, began to arrive at Philadelphia between the years 1710 and 1720 and thereafter.²⁷ Although the general movement of these pioneers was west and south from southeastern Pennsylvania, many may be traced northward into Bucks and Northampton counties in Pennsylvania, and into present Hunterdon and Warren counties, New Jersey (Fig. 11). The general absence of New England stock in West Jersey and eastern Pennsylvania eases the identification of Presbyterian churches as being associated with Scotch-Irish population movements. Indeed, in the case of Warren County "they were the founders of all the early Presbyterian churches in the county."²⁸

In East Jersey, tracing Scotch-Irish movements is much more difficult, due to the affinity of New Englanders for Presbyterianism and due to the early Scotch settlers at Perth Amboy and vicinity who
Fig. 11. Compiled from various sources.
also established Presbyterian congregations. There does definitely seem to have been a movement of Scotch-Irish up the Raritan Valley, but their origins and numerical strength are unknown.

In the case of the movement northward from Philadelphia, there is better evidence. The movement was rapid, as is indicated by the fact that Scotch-Irish Presbyterian congregations had been organized at Tinicum and at Durham, Bucks County, by 1739. Also, the minutes of the Presbytery of New Brunswick in 1739 contain "a supplication for supplies of preaching in Mr. Barber's neighborhood near Musconekunk." This, apparently, was a congregation made up of Scotch and Scotch-Irish settlers. Their church was located a short distance west of present Bloomsbury on the Musconetcong or near Asbury, and was built of logs, probably ca. 1740. Hanna indicates this church as being operative in 1738. The same preacher served other nearby Scotch-Irish congregations at Durham, Pennsylvania, and at Greenwich, New Jersey, in 1740. Still another Presbyterian church serving the spiritual needs of the Scotch-Irish may have been located at Mansfield Woodhouse (Washington, New Jersey) as early as 1730.

Local historians, recognizing the influence of the early Scotch-Irish settlements, have stated that the vicinity of Phillipsburg was a strong center of Scotch-Irish Presbyterians after 1735 and that the "larger and for a time controlling element of Greenwich Township was Scotch-Irish."

That many of these Scotch-Irish may have arrived in New Jersey by way of the Old York Road from Philadelphia, and then followed trails
northward into West Jersey is indicated by the Reverend William Frazer's complaining in 1768 that "the Dissenters have now got such a footing here [Amwell Township] especially Presbyterians," and that they had three places of worship within ten miles of his Episcopal church.

A further Scotch-Irish increment occurred somewhat later than the original settlement due to the turbulent conditions on the Pennsylvania frontier:

The French and Indian war had an important effect on the character of the population of Warren and Northampton /Pennsylvania/ counties. The population of Northampton up to that time was prevailing Irish.... When the Indians drove out nearly all the inhabitants from the county above Easton, these fled mostly to Warren County, and many stayed here permanently.

Other Scotch-Irish continued to trickle in in later years. The Kennedy family, for example, came from the north of Ireland to Bucks County after 1730. In 1771 they moved to Greenwich Township, New Jersey, from Tinicum, Bucks County, Pennsylvania. Other Scotch-Irish settlers were still arriving in Greenwich Township from the same locality as late as 1793.

The lesser numbers of Scotch-Irish who penetrated the interior of northern New Jersey via the Raritan Valley may have travelled via the Old York Road from Philadelphia to New Brunswick or may have actually debarked at New Brunswick. They were preceded in the Raritan region by Scotch, English, Dutch, and German settlers, and this probably accounted for their small numbers.

We do know that Scotch-Irish settlement did take place, since the Lutherans at Pluckemin were 'bereft of their glebe through the
artifices of English and Irish people who had settled around them. This occurred in 1743 or 1744 and we can thus date the Scotch-Irish as being there at the time.

Unfortunately, it is extremely difficult to determine whether the early Presbyterian congregations of the region serviced by routeways northward from New Brunswick were chiefly of New England, Scotch, or Scotch-Irish derivation. At any rate, we may postulate that since Scotch-Irish were definitely in the area, they may have formed at least a portion of the congregations established. Presbyterian congregations were formed at New Brunswick in 1726; Lebanon, Peapack, and White House in 1740; and in Fairmount, or Fox Hill, before 1746.

The initial settlement of Hackettstown in the Musconetcong Valley is generally attributed to Scotch-Irish, New England, and Scotch stock. A Presbyterian congregation was established at an early date and a frame church built in 1764. This may well indicate that the Scotch-Irish joined with their fellow Presbyterians in moving northward along the Allamatunk Trail and its branches.

**German Pioneers**

German settlement in northern New Jersey is generally fixed at a much later date than that of other ethnic stocks such as the English, Scotch, Dutch, or Scotch-Irish. The statement that the Germans "came...late and poor," is true for most parts of the state. An exception to this rule is found in the valley of the Raritan, where scattered German settlers were to be found quite early in the eighteenth century.
There is evidence to indicate that Germans may have joined the Raritan Dutch in their movement to the interior as early as 1713. These were almost certainly disgruntled remnants of the 1710 Palatine emigration to the Hudson in New York.

These early Germans, and many Dutch as well, were Lutherans. Justus Falckner, a Lutheran minister from New York City, ministered to the needs of the Lutherans on the Raritan and to other congregations as well, one on the Hackensack and the other at Piscataway. In all, the three Dutch and German congregations numbered a total of one hundred communicants in 1715.

Between 1715 and 1720 these Dutch and German Lutherans had formed a congregation 'in the Mountains near the River Raritan,' the members of which were the widely dispersed residents of northern Somerset County.

Between 1725 and 1730 another congregation was formed by the Lutheran inhabitants of western Hunterdon County. This indicates the rapidity of dispersal of these early Dutch and German settlers. The latter congregation had the appellation 'Rockaway Lutheran Society.'

The approximate centers of the dispersed Lutherans of the day may be indicated by the sites of the churches which they established. The "congregation in the Mountains" built a church near present-day Pluckemin; the Rockaway Lutherans built their own church in the hamlet of Potterstown in 1731. The former was large enough to call its own minister in 1731-34, and included the "Hanover district" which referred to all of Morris County at that date and probably specifically to the scattered Lutherans of Black River north of
Pottersville. Since Dutch and German speech were both used in the temporal and spiritual dealings of these congregations as late as 1735, both ethnic stocks must have been well represented.

After 1735, apparently, there came an in-migration of Germans to this general area. Most likely, Philadelphia, instead of New York City as in former days, supplied the new settlers. It is instructive to note that the early Lutheran congregations on the Raritan and its tributaries had close relations with New York City during their formative period, suggesting that a movement of Germans from that city by sea to the Raritan was involved in their origin. Their minister, Falckner, for example, who served in the second decade of the eighteenth century, was a German from New York City. Until 1743 all advice on spiritual and temporal matters was sought in New York. Thereafter, however, these congregations turned toward the German Lutherans of eastern Pennsylvania for guidance.

This change of orientation on the part of the Raritan Lutherans probably reflects a change in the source of Lutheran migration. An oft-recorded legend in New Jersey recounts the movement overland ca. 1717, of Palatine Germans whose ship had been blown off its course for New York and had landed in Philadelphia instead. These people, supposedly, wished to join their brethren in New York and set out to do so overland through New Jersey, but became so enamored of the area in the vicinity of Long (German) Valley that they settled there. This, of course, is far too early a date perhaps by thirty years or more for the settlement of Germans in the area, and a movement
overland at this time to hostile New York would have been highly unlikely, to say the least.133

The legend, however, may well be based in fact. The Old York Road is mentioned in an early source as the actual route of the migrants.134 This certainly would have been the most logical overland route of that day. It is instructive to note that German settlers are recorded at Ringoes in 1721, and they surely must have come in via the Old York Road.135 Also, in tracing the movements of Johannes Moelich, a member of the Zion Meeting House in New Germantown (Oldwick) in 1749, we find that he remained in the vicinity of Philadelphia for ten years after debarking there and then settled on a farm between the present White House and North Branch Station, New Jersey, before 1750.136 It is most logical to assume that he reached his property via the Old York Road. Moelich became a member of the congregation of German Lutherans at New Germantown in 1749. New Germantown traditionally owes its settlement to an overland movement from Germantown, Pennsylvania.137 Again, the Old York Road is the most logical means of entry. In 1759, when Henry Muhlenberg came from Pennsylvania to preach to the Raritan Lutherans, he definitely travelled via the Old York Road.138

When the Zion Lutheran church was built at New Germantown in 1749, the trustees were all German and included Moelich.139 Germans were certainly in the majority in the area by 1753, as the Reverend Muhlenberg preached in English, after the German service, to Dutch and English in the vicinity.140 The German influx is also reflected in the names of communicants of the United Societies of Zion and St.
Paul's in Pluckemin in 1767. Of 111 names there is not one that is English, Irish, or Scotch, and only eight or ten are Dutch.\textsuperscript{111}

Other German Lutherans were moving along the South Branch of the Raritan River and Allamatunk trails at the same time, and by 1749, another congregation, that of Fox Hill, had formed. It included residents of Fox Hill, Long (German) Valley, Spruce Run, and Schooley's Mountain.\textsuperscript{142}

The numbers of Germans moving into the Raritan Valley at this time may be judged by Pehr Kalm's statement in regard to New Brunswick in 1749, that "the German inhabitants have two churches, one of stone and the other of wood."\textsuperscript{143}

The descendants of these people, if not the early Germans themselves, often filtered northward over Schooley's Mountain and took up land in the valley of the Musconetcong.\textsuperscript{144} Some Germans settled in the environs of the Valley after residence in New Brunswick.\textsuperscript{145}

In western New Jersey, unlike the Raritan Valley, the initial German settlers came from Philadelphia. In speaking of Warren County, New Jersey, the arrival of German settlers is often dated as beginning about 1740 and ending at about the time of the Revolution.\textsuperscript{146} Large numbers of Germans, however, were entering the port of Philadelphia in the second decade of the eighteenth century,\textsuperscript{147} and some of them began to appear in the vicinity of Ringoes as early as 1721.\textsuperscript{148} This would indicate a movement into New Jersey via the Old York Road at a rather early date. By 1755 Germans had penetrated the far northwestern portion of the state as is shown by an article in the New York Mercury for that year: "A List of the People killed,
and Houses burnt, by the Indians at the Minisinks...Several Palatines, and their Families, supposed to be about...20...."1149 There were sufficient German settlers to erect a church at Mt. Pleasant before 1760 and to build a church at Phillipsburg by 1762.150 German settlers in the vicinity of the Musconetcong Valley are recorded as early as 1738 "in the vicinity of Riegelsville"151 and "shortly after 1750" in Phillipsburg.152 Lists of the tenants on Sir Robert Barker's land in Alexandria Township begin to contain German names as early as 1765, with direct proof of the German origin of at least one of the families (Fine) in 1767.153 In 1774 an agent of Sir Robert Barker mentioned that the settlers on Barker's Pohatcong tract "are of German extraction and very Industrious."154 Several of the names included in the account book of Greenwich Forge in the 1780's and in the Chelsea Forge journals for the same time period are also most likely of German origin.155

Rapidity of Pioneer Settlement

As lands became available in northwestern New Jersey in general, and in the Musconetcong Valley in particular, many additional settlers flocked in to establish farms. Comparative county population figures give some idea of the rapid increases in numbers. In 1737, Hunterdon County, which then included present Morris, Sussex, and Warren counties, boasted 5,507 inhabitants. In 1745, Hunterdon had a population of 9,151, while Morris County, which had been separated from Hunterdon in 1738, had 4,436 of its own. In 1784, Hunterdon had 18,363 inhabitants, Morris 13,416, and Sussex (including present Warren), which had been separated from Morris in 1753, had 14,187.156
The rapidity of settlement in northern New Jersey was so great, especially after 1765, that the Board of Justices and Freeholders of Sussex County was forced to apply to the Provincial Legislature for funds to supply sufficient wheat to the new settlers. Settlement had been so rapid as to outrun the local food supply. Before 1765, the situation in Sussex County had been far different. At that time it was "a frontier...not much improved, having but few inhabitants...." In similar fashion, Morris County also experienced rapid development, and between 1740 and 1775 "the whole county had been opened up by the actual settlers....Only the roughest hills and the large lakes or little 'gores' of land overlooked by the surveyor were left to the proprietors." This is not to say, however, that all localities were developed and settled equally. Unfortunately, there are no complete data on the relative density of population in northwestern New Jersey during the eighteenth century. It is indicative, however, that when taxes were assessed during the Revolutionary War in Sussex County (present Warren and Sussex), Greenwich Township, which bordered the Musconetcong to the north and extended to the Delaware, was third in total valuation of the ten townships existing in the county at that time, showing that it was a relatively well developed township. At virtually the same time, Thomas Anburey, who travelled through Hackettstown and vicinity in 1778, lamented the fact that he had seen only the "back settlements." Before the advent of the nineteenth century, only nineteen families were enumerated as living on or near the shores of Lake Hopatcong.
Subsequent Population Movements

After the initial occupancy of the Musconetcong Valley, many subsequent population movements took place. We have already noted a continuous movement of Scotch-Irish settlers from Bucks and Northampton counties, Pennsylvania, into the region. An additional movement, probably much larger in total numbers, involved Germans from Pennsylvania. Many came in the 1780's and 1790's as land became available, especially from nearby Bucks and Northampton counties. This migration was still taking place in the first two decades of the nineteenth century. That Germans from Pennsylvania were good customers for lands available in the Musconetcong Valley can be seen in many of the letters written by James Parker to his agent John Cooley in the last decade of the eighteenth century.

I now inclose you forty advertisements for the Sale of the Lands in Greenwich and Alexandria townships which I would have you set up chiefly in Pennsylvania and at the different places of crossing the Delaware -- and I think you had best go out yourself into Pennsylvania as far as you can. I have sent you forty with my name signed to them which I think will be best to put up in Pennsylvania. (Italics mine.)

Joshua Gilpin, in writing of the people living in the vicinity of Easton, Pennsylvania, approximately eight miles north of the mouth of the Musconetcong, in 1802, described a situation probably very much like the one obtaining in the Musconetcong Valley and much of northwestern New Jersey when he said:

I never knew before the total want of a Language for in this respect we might quite as well have been in the middle of Germany. J. Nevins being vexed at one of the houses we called at with their speaking only a foreign tongue instead of the American giving travellers no information got to talking Spanish to them.
Other later migrations involved German families from Schooley's Mountain settling in the vicinity of Hackettstown in the early nineteenth century and families of probable New England descent continuing to enter the same area in the late eighteenth and early nineteenth centuries.

**Natural Increase and Emigration**

Natural increase also served to swell the Valley's population after initial settlement had taken place. In 1794, Theophile Cazenove placed the average number of children per farm family in the area as being from five to eight. Some families were even larger. One is recorded as having included fourteen children. As early as the last decade of the eighteenth century, members of the younger generation began leaving the area for the less densely settled agricultural frontier of Ohio and central New York, thus ending the pioneer period in northwestern New Jersey. Those farming the more marginal and worn-out farmlands joined the exodus.

As could be expected, by the beginning of the nineteenth century, the population of the Musconetcong Valley was quite mixed as to cultural traditions and ethnic stock. In general, the western portion of the Valley was composed of people of German, Scotch-Irish, English, and Dutch origin, probably in that order. The middle portion of the Valley, centering around Hackettstown, was composed of New England, Scotch-Irish, German and Dutch stock, and the vicinity of Lake Hopatcong by New Englanders and a few Dutch families.
Toponymy

The naming of physiographic features in and near the Musconetcong Valley reflects the English origin of most of the earliest settlers. Uplands are labeled "hills" and "mountains," both terms of English origin. The two portions of Lake Hopatcong, which existed prior to impoundment in the nineteenth century, were known as the "Great Pond," and the "Little Pond." The term pond is of English origin, and is especially used in New England, from where many of the first settlers of the area north of the terminal moraine had come.

The Musconetcong itself is often termed a river or a creek in early advertisements. Both terms are of English origin. A problem presents itself, however, in the name applied to the chief affluent of the Musconetcong, Lubber's Run. One writer has proposed that it "derived its name from some early settler whose name was Lubbert, a name quite common in the early records of the Dutch." The Dutch, however, arrived later in the area than did New Englanders, and Lubbert is not a family name known in the area. In 1769 the term Lubbers Run was in use, as is shown on the Faden map (Appendix I). Perhaps this was in error, but Lubbers seems to have been the spelling used since that time. Also of interest is the fact that the term "run" as used to designate small streams, has been attributed to Scotch or Scotch-Irish influence. The term is comparatively rare in New Jersey, and the settlers of the region involved were not of Scotch-Irish derivation. However, in eighteenth- and early nineteenth-century surveyors' notes which deal with the area at hand, the term run is often applied to very small streams, despite the diverse ethnic origins of the surveyors.
CHAPTER IV

PIioneer AGRICULTURE

CA. 1720 - CA. 1800

Initial Agricultural Occupance

With the exception of a few scattered hunters and trappers who may have preceded pioneer agriculturists into some portions of the Musconetcong drainage system, the first settlers were in most cases subsistence farmers. It has been stated, and often repeated, that in much of the New Jersey Highlands "the pioneers...were rather manufacturers than agriculturists," and that "the forge was uniformly the precursor of the farm....."\(^1\) Although this may be true for many Highlands localities, it certainly is not true for most of the limestone-floored valley of the Musconetcong. The earliest iron-working establishment founded in the Musconetcong Valley was that at Changewater, built ca. 1741.\(^2\) It has been established in the previous chapter that agricultural land use in the southwestern portion of the Valley probably preceded the erection of the forge at Changewater by two decades. The traditional and inferred dates of agricultural settlement elsewhere in the Valley are contemporaneous with, or slightly earlier than, the known dates of the erection of ironworks.

\(^1\)For notes to Chapter IV see page 299.
One of the best examples of the contemporaneity between the establishment of ironworks and of pioneer farms, is that to be found in the vicinity of original Lake Hopatcong, which consisted of two smaller lakes in the eighteenth century. The area is rugged and the soils much poorer for agriculture than those found southwest of the Wisconsin terminal moraine. A forge was erected ca. 1760 at the outlet of the lake, yet in 1759 a survey of a parcel of land adjoining the larger (southern) of the two lakes included the "Dwelling House that was formerly Stown Bishop" as a bound. There is no evidence to indicate that Bishop was an agriculturist. Tradition has it that the area was first settled by hunters and trappers, and Bishop may have been one of these. There is, however, definite proof of agricultural settlement before 1762. In that year, the executors of George Eyre's estate offered for sale...

...a valuable Tract of Land, lying in the Township of Roxbury, in Morris County, West New Jersey, at the Head of Muskennecunk River, adjoining a certain Pond, called the Little Pond [the northern Lake] containing about 943 Acres, the greatest part of which is extraordinarily well timbered, and about 90 Acres of this Tract is cleared, and under good Fence, with a good Log House on it....

Thus, even in this rocky, glaciated area, agricultural occupancy was at least contemporaneous with ironworking.

Clearance

The most arduous task facing the majority of pioneer agriculturists other than that of housing their families, which will be treated in the following chapter, was that of the clearance and improvement of the land. Many of the earliest settlers chose to settle properties
where "meadows" due mainly to Indian burning were located.\textsuperscript{7} Others settled in Indian old fields.\textsuperscript{8} In both cases, the necessity for immediate forest clearance was obviated, and this at the time of earliest settlement, as will be seen, was a definite advantage.

The later pioneers were not quite so fortunate. Most of the northwestern portion of the state was forested and later settlers had to clear away the trees for their initial subsistence plot. Although the earliest New England and Dutch immigrants in East Jersey preferred to clear-cut their new lands,\textsuperscript{9} later pioneers in the northwestern portion of the state were a bit more casual and followed methods which had possibly been suggested by aboriginal precedent.\textsuperscript{10} If friendly neighbors were available, the pioneers\textsuperscript{11}

\ldots would proceed to the forest with their axes and grubbing hoes and set to work felling the smaller trees and cutting them up for rails and firewood, and girdling the larger ones to prevent the circulation of the sap, thus causing their death, and these after a year or two were to be cut down and converted into fence rails and firewood. With the grubbing hoe the small saplings and under brush were taken out by the roots, cut up, and the brush piled into heaps, and when dry, burned; the ashes of which helped to fertilize the virgin soil.

Although the foregoing passage refers to the practice of German settlers in Sussex County, elsewhere in the state, pioneers of other origins used the same general methods.\textsuperscript{12} Within four or five years after clearance, the stumps that dotted the landscape would have decayed to the point that they could be beaten to pieces and be plowed under.\textsuperscript{13}
Commercial Agriculture

Gradual improvements in transportation allowed a shift from what had primarily been subsistence agriculture to the production of commercial grain crops. In many cases, the local millers acted as middlemen and forwarded grain to market in manufactured or raw form. Since mills were being established in the area as early as 1737, commercial agriculture in the Musconetcong Valley was probably in development before 1750. At any rate, the advertisement of a mill at Hackettstown in 1777, including a pair of stones for "merchant" work, indicates that a considerable trade in flour had developed by that date. The establishment of ironworking enterprises in the Valley as early as the fifth decade of the eighteenth century also served to stimulate commercial agricultural production. In 1763 a proprietor advertised lands in the "Center of the County of Sussex" and stated that "on Account of the great Number of People employ'd at the Iron Works in that Neighbourhood, there is generally as good a Market for Grain, and other Produce as at New-York." Elsewhere in the glaciated Highlands, agriculture was also stimulated by the iron industry.

Agricultural Products

The produce of pioneer farms in the Musconetcong Valley, as well as in all of northwestern New Jersey, varied quite considerably from the period of initial occupation to the period of commercial farming. In general, at first, because of the small amount of cleared land and the poorly developed transportation network, emphasis was on subsistence crops such as buckwheat, rye, and flax, and also on
freely-roaming livestock. Later, with the extension of cleared land and improvements in transportation, the cash cropping of grains such as wheat and rye became the major economic activity of most pioneer agriculturists.

Grain Crops

The first subsistence crop was planted before the stumps had decayed. The newly cleared earth was disturbed by drawing a knotty log over its surface and buckwheat was broadcast and then harrowed in with heavy brush. Sowing took place in July, harvest in September.\(^{19}\) When ripe, the stalks of this first crop were cut with sickles, threshed on ground made hard by horses hooves by driving the horses again over the grain and then winnowed by "a good stiff breeze."\(^{20}\)

Buckwheat had several distinct advantages as an initial crop. It was easily grown, requiring a minimum of effort, equipment, and farming skill, yet yielded extremely well on newly cleared land.\(^ {21}\) Also, buckwheat was a much preferred grain, especially among the English. Kalm found that buckwheat cakes and puddings were in wide use throughout New Jersey in the middle of the eighteenth century.\(^ {22}\) An additional use for the crop lay in its being a valuable feed for the animals kept by the farmer, especially during the winter. Chickens and hogs, apparently, were especially fond of buckwheat, and thrive on the grain.\(^ {23}\)

Buckwheat remained important throughout the eighteenth century. Local stores in the Musconetcong Valley bought and sold it frequently.\(^ {24}\) Buckwheat was not as much a commercial crop as wheat and rye, since trading took place mostly on a local level where buckwheat's
value as a poultry and swine feed could be realized and where buckwheat cakes were appreciated by the settlers.\textsuperscript{25} Buckwheat also furnished excellent pasture for bees, which were quite common throughout the state.\textsuperscript{26} During the 1780's, on occasion, a prudent tenant could pay his rent with the produce of his hives -- honey, mead, and beeswax.\textsuperscript{27}

Although wheat became the most important cash crop later in the eighteenth century, rye was probably more important during the first days of commercial farming in many areas, and even later in the eighteenth century remained a strong competitor of wheat. Some ethnic groups, such as the Swedes in southern New Jersey, and the Germans generally in Pennsylvania, grew rye as a preferred grain, especially for bread flour.\textsuperscript{28} Rye was often the first of the major grains to be grown by settlers of other ethnic affiliations in northern New Jersey due to the fact that it did better than wheat on new ground,\textsuperscript{29} and yielded better than the latter on poor soils.\textsuperscript{30} In many localities, where the first grain crops "all grew to straw,"\textsuperscript{31} rye could be used for thatching. Rye remained a competitor of wheat in later days, as local store accounts testify in the Musconetcong Valley.\textsuperscript{32} Also, for several years after 1786, crop losses due to the Hessian fly encouraged farmers to substitute rye for their usual sowings of wheat.\textsuperscript{33}

In most cases, however, after initial occupation, clearance, and cultivation had taken place, the most important cash crop in the Musconetcong drainage system was wheat, as, indeed, was the case generally in the Middle Colonies during the eighteenth century.\textsuperscript{34} This was due to the fact that wheat was a preferred crop, especially...
among the British and Dutch, and also could be readily sold, in either finished or raw form, at first in the West Indies and southern planter colonies, and later in New England.\(^35\)

The wheat and rye grown in New Jersey in the eighteenth century was almost invariably sown in the fall and harvested in the spring.\(^36\) Moderate snowfalls in winter served to shield the crop from severe temperatures, and winter wheat and rye could be harvested before the occasional killing droughts of the summer season.\(^37\)

In the Musconetcong Valley, wheat must have been the leading crop in acreage during the eighteenth century. The records of local merchants contain far more entries of wheat credited to farmers' accounts than of any other farm product.\(^38\) Also, when James Parker offered Samuel Barker's extensive property in Alexandria Township for sale in 1790, he advertised it as being located "in the Heart of a fine wheat Country...."\(^39\)

Maize, or Indian corn, was of much less importance than the two major grain crops, wheat and rye. This may well have been due to the fact that the initial methods of cultivating it were more laborious than those required for wheat or rye.\(^40\) Kalm, writing in 1748, described the cultivation of maize in southeastern New Jersey: "The corn is planted as usual in squares, in little hills so that there is a space of five feet and six inches between each hill, in both directions."\(^41\) Similar methods were followed by James Parker on his estate in Hunterdon County in 1778,\(^42\) and Schmidt,\(^43\) drawing on other sources, found that much the same practice existed for many years in Hunterdon. Since the seeds of wheat, rye, and other small grains of
European origin could be simply raked in by hand or scratched in with a simple harrow, maize cultivation was more difficult. An additional factor discouraging cultivation of corn during the pioneer phase of settlement in northwestern New Jersey may have been the prevailing belief that the area was too cold for Indian corn to ripen. As late as 1784 maize was grown in Hunterdon County for sale in Sussex County. An advertisement in 1779, of property lying six miles northwest of Hackettstown, includes the statement that the "meadow is good for hemp, rye \textit{sic}, indian corn, &c." Local stores were buying maize on many occasions in the 1780's, perhaps indicating that the crop was being grown locally at the time.

Barley and oats, although of widespread secondary importance during the eighteenth century in the state, apparently were but seldom grown in the Musconetcong Valley, according to early store accounts. One entry of "Oats" has been encountered but no reference to barley has been found. Oats had a great value as a horse feed, and may have been grown for use on the farm without being traded locally, while barley was used primarily for beer and whiskey, and was apparently not produced in quantity during the eighteenth century in the Musconetcong Valley.

**Commercial Crops Other Than Grains**

Flax was one of the initial crops planted in northwestern New Jersey. Its cultivation was almost universal among pioneers, since clothing was a necessity, and wool was difficult to obtain locally both due, no doubt, to a lack of money on the part of the pioneer, and to the depredations of wolves in days of earliest settlement.
Flax also was easy to cultivate and grew extremely well on newly cleared land. An estimated one acre or so would serve to supply the average family with clothing for an entire year. Although flax was most likely a universal crop among pioneer agriculturists, the plots remained small, through time, due to the backbreaking labor necessary in just harvesting and processing enough linen for family use. Flax maintained an important position throughout the eighteenth century despite its limited acreage. The Reverend Uzal Ogden, an early missionary, reported to the Society for the Propagation of the Gospel in Foreign Parts, in 1771, that "Flax-seed" was one of the most important products of Sussex County. "Linen" and "tow" are mentioned occasionally in Musconetcong Valley store accounts, and one entry refers to a charge of "Flax ground" in 1781 perhaps indicating the local production of linseed oil. Linseed oil was quite valuable for its use in paints and much was exported through the port of New York during the eighteenth century. Linen and tow (tow being the coarse fibers of flax before spinning) were produced throughout the state in the eighteenth century to answer the local demand for clothing.

The appearance of orchards also marked a further development in agriculture after subsistence had been attained. The earliest fruit trees planted in almost every case were apple trees. Casper Schaeffer planted an apple orchard within a few years after he settled at Stillwater in the 1740's. Eighteenth-century advertisements for the vicinity of the Musconetcong Valley indicate that apple and other orchards were almost universal, and were established during the
days of earliest settlement. Surviving agreements between tenants residing on the Barker tract in the latter days of the eighteenth century and James Parker reflect the early importance of fruit trees. One tenant in 1793 agreed to "plant out in some convenient place one hundred thrifty apple trees and keep up the number and also suffer not creatures to damage them." In southern Hunterdon County orchards were thought small unless they occupied at least nine or ten acres. The trees were planted in rows about six or seven yards apart, to allow convenient tillage with a plow, and many trees were placed by the side of the road for the refreshment of travellers. Perhaps the same conditions obtained in the Musconetcong Valley during the waning days of the eighteenth century.

The early importance of apples in the farm economy stemmed from the fact that New Jersey cider became famed throughout the colonies at an early date. Kalm, writing in 1749, lavishly praised the liquid. "The best cider in America is said to be made in New Jersey and about New York, hence this cider is preferred to any other. I have scarcely tasted any better cider than that from New Jersey." Cazenove, writing in 1794, mentioned the existence of many apple orchards in northern Morris County. According to him, sixty-five to seventy trees could be planted per acre and would yield two hundred and fifty bushels of apples.

As early as 1773, stills began to be imported from England into Morris County for the production of applejack or "Jersey lightning." One acre planted to apple trees would ultimately yield 125 gallons of spirits, which could be sold for seventy-five cents per gallon in
This was a good return, as the wages of a laborer engaged during the harvest season averaged only seventy-five cents per day. Apples apparently were also valued for eating, as relatively small amounts are occasionally mentioned in early store accounts in the Musconetcong Valley. In the eighteenth century, oven-dried apples were considered a delicacy, and many were exported to the West Indies in this form. It may be that this trade also influenced the establishment of large apple orchards in northern New Jersey.

Other fruits besides apples were undoubtedly grown in the area, as New Jersey was well known for the variety and quality of its fruits during colonial days. Peaches, cherries, and plums were grown throughout the state.

Vegetables

Vegetable gardens made their appearance at an early date. Many advertisements list "paled" gardens as distinct assets to the farmstead. Vegetables produced by these gardens were a welcome addition to the family larder. Kitchen gardening was mainly women's work. An eighteenth-century writer noted that the "Wives and Daughters of the Farmers and poorer Inhabitants...make good Gardens of a variety of good Vegetables which is half the support of their Families...." Although this was said of East Jersey, the more developed portions of the western part of the state revealed a similar picture as reflected in the eighteenth-century land advertisements.

Vegetables mentioned in store accounts during the eighteenth century in the Musconetcong Valley included potatoes, turnips, and
These were common garden crops during this period in most of the state. Although most vegetables did not have particular affiliations with certain ethnic groups, cabbages did. The sauerkraut of the German settler and the Kohl-salat of the Dutchman necessitated large numbers of cabbages in the gardens of these settlers.

Other garden vegetables, most likely present in individual eighteenth-century garden plots, but not available through local merchants, perhaps because they kept poorly, were asparagus, cauliflower, parsnips, carrots, onions, cucumbers, pumpkins, watermelons, muskmelons, squashes, beans, radishes, peas, beets, spinach, parsley, leeks, endive, and other salads.

Livestock

Although the pioneer was, for the most part, a farmer, his chances for successfully growing and marketing a cash crop were exceedingly small. His initial clearing was too small, the demands on his time too great, and the means of transportation available to him in early days too primitive and costly to allow him to carry on agriculture much in advance of the subsistence level. As self-sustaining as pioneer agriculture was, however, certain items, as, for example, salt, firearms, and gunpowder, were needed from the outside. A product was needed, therefore, which would require relatively little labor or investment but which would yield the cash or exchange value necessary to obtain goods not available locally.

The solution to this problem was an early emphasis on livestock. Cattle, horses, and hogs required little care, yielded a relatively
high return, and could be driven or even ridden by way of the primitive Indian paths to market. The importance of livestock in the days of early settlement is reflected in the early tax records, in which a man's holdings in livestock are listed often to the exclusion of any mention of land ownership. The true wealth, especially of the squatter or tenant, lay in his livestock. Great numbers of livestock were to be found in the Musconetcong Valley in early days, as is shown by an advertisement in 1766, which, in listing the advantages of a certain tanyard, mentioned that it was "situate on the great road leading through the county to Hacket's, from whence a great quantity of hides may be had yearly...." Since "Halketstown" appears as a misnomer on a map as early as 1769, "Hacket's" most likely referred to the environs of present Hackettstown.

The importance of livestock also served to magnify the importance of the "meadows" and old fields so sought after by the early surveyors and settlers. The advantages here were relative, however, as the forests, due to their open nature in early days, also furnished abundant native American grasses for livestock. This use of wooded land was so important to the early settlers that they would burn the woods every spring, possibly in remembrance of the aboriginal practice, in order to remove the overburden of several inches of fallen leaves, so that the native grasses would be freed for immediate growth. Kalm spoke unfavorably of this practice in eastern Pennsylvania, where it was so widespread that the state government tried unsuccessfully to get the settlers to abandon the custom. Undoubtedly, the practice of spring burning was widespread
in New Jersey at the same time, since the New York Journal in 1768 stated that:

The cold dry weather we have lately had, has been attended with bad Consequences to many in the Country, by the Loss of Cattle, &c. but the usual Practice of burning of Woods and Meadows in the Spring, has been more so than usual; for we are assured, that near Mount Holly in Burlington County, /New Jersey/ three Dwelling-Houses, and much Fencing have been destroyed by Fire on Wednesday last, besides other great Damages; And in the Event has been detrimental to those who would probably have been out of the Reach of such Fires otherways.

The keeping of livestock in New Jersey in early days was strongly influenced by the traditionally casual practices of the English, who prevailed numerically in most areas. Pehr Kalm, in 1749, noted that the Swedes, who had originally built barns for their cattle, had become completely acculturated to the English practice, which was to let the cattle roam free, with little or no shelter even during the winter. Hogs, and to some extent horses also, were allowed to wander almost at will at the time of first settlement.

It is probable that the early emphasis on livestock encouraged some settlers to acquire lands that were marginal for agricultural purposes, but which, with little labor, could serve to support cattle and hogs. The advertisement of a property near Andover, north and east of the Wisconsin terminal moraine, in 1773, indicates that this may well have been the case.

Besides the meadows above mentioned, it contains a considerable quantity of good swamp, which may be easily cleared and brought into grass; so that upon the whole there are few (if any) lands in that part of the country better calculated for raising stock. The advantages of raising hogs thereon are also very
considerable, on account of the great quantity of oak timber and acorns on it and many thousands of acres of unimproved land, contiguous thereto afford, where they may be fattened with little or no expense to the owner....

In Jefferson Township, where agricultural clearing was minimal due to thin and rocky soils, the first town meeting, on April 9, 1804, fixed a reward of 'two shillings per head on cattle drove into town and not owned by the inhabitants thereof....'\textsuperscript{91} Thus, in areas north of the Wisconsin terminal moraine, where clearing was less extensive and farming more marginal, the existence of loose stock lasted well into the nineteenth century.

The lack of supervision given to livestock at the time of pioneer occupancy created several problems. It was not at all unusual for animals to wander off and perhaps cause damage to another's crops. The early settlers coped with this problem in several ways. First, a property right was established by notching the ears of cattle and hogs in a distinctive manner, and by notching the ears of or branding horses.\textsuperscript{92} The distinctive earmark and brands of the owners would be duly registered in the township's records and any strays originating outside the township were impounded until the owner appeared, who was required to pay all charges arising from any damages caused by his animal, and for the cost of keeping the animal at the township pound.\textsuperscript{93} The records of Bethlehem Township are especially interesting in this connection. An entry on November 20, 1760, is typical. One Bairfoot Brundson apprehended a stray bull and the animal was described as being of a "dun colour, supposed to Be marked in the Near ear with a half Crop and half penny Aged three years...."\textsuperscript{94}
Other earmarks, registered by residents of the township in 1762, were listed as follows:

Mary Clifford's ear-mark is a crop off the off ear and a slit in the near ear. Joseph Beaver's ear-mark is a crop off the near ear. Peter Case's ear-mark is a half-penny under each ear and a slit in the near ear. Robert Biggers' ear-mark is a 'croop sic' of the off ear, and a nick in the croop and a nick in the fore part of the near ear near his head.' James Biggers' ear-mark is a 'croop sic' off the near ear, and a swallow fork in the off ear, and a half-penny in the fore part of the near ear.' John Beaver's ear-mark brought from old book, record there in the year 1753; his mark is a half penny under side each ear, and a slit in each ear top the ear.

Despite the emphasis on grain production, livestock retained an important economic position throughout the latter part of the eighteenth century. Oxen were of special importance once commercial agriculture began. Of a more steady nature and stronger than horses, oxen were less likely to break plows and harness on the imperfectly cleared fields of the first days of commercial crop production. In the Musconetcong Valley and vicinity, oxen were being used at an early date. A contract dating from 1754 mentions the purchase of yoked oxen and a farm cart. After fields had been brought under more thorough cultivation, horses began to replace oxen as draft animals. This was due to the greater speed of the horse, which could be used for relatively rapid transport, as well as for farm work. By 1786 a knowledgeable Jerseyman was able to state that "unfortunately few Oxen are used for Draught except in Morris and Essex Counties, which are a great Advantage to them, and deserves to be imitated."
Despite the waning interest in oxen, cattle remained important in the local economy. Cattle and butter were major products of Sussex County in 1771, reaching the Philadelphia and New York markets in large quantities in that year. Cowhides, calfskins, beef, veal, and butter are mentioned frequently in the accounts of stores in the Musconetcong Valley during the 1780's. As late as 1794, Theophile Cazenove remarked that farmers in the vicinity of the Musconetcong Valley "buy as much land around here as they can, not so much for cultivation as to ... send their cattle and horses to pasture in the uncultivated woods." This may have been due to the presence of numbers of German settlers as "a noticeable feature in a German settlement was a fondness for cattle...."

Cattle in use in New Jersey during the eighteenth century were a mixture of Dutch and the more hardy English stocks. In 1786, Rutherfurd stated that New Jersey cattle were smaller than those of Rhode Island or Connecticut, "and the Cows weigh from four to six hundred Weight the Quarter...."

As has been mentioned, horses began to take over the draught functions of oxen at an early date. Horse breeding received great interest due to the prestige value of owning a good animal. Horses in use on most farms in the eighteenth century were of medium size, suitable for both farm work and riding.

Although not present at the time of first land clearing, due to the presence of wolves, sheep rapidly became an important feature of many farms in the Musconetcong Valley. Mutton was a common item credited to the accounts of farmers in local stores during the 1780's.
New Jersey became famous for its wool a few years before the onset of the Revolution and Hunterdon County alone had approximately twenty thousand head at that time.\textsuperscript{110} It is interesting to note that "wool" or "mutton" is omitted from a list of the leading products of Sussex County in 1771,\textsuperscript{111} perhaps due to the frontier conditions still prevailing at that time. Despite the relatively large numbers of sheep found in the state before the Revolution, one writer lamented the fact that "we keep so few Sheep, owing to our not providing Winter and Spring Food for them, otherwise nothing more profitable."\textsuperscript{112}

Eighteenth-century sheep in New Jersey were the result of crossing Swedish, Dutch, and English stocks, with characteristics of the latter, larger breeds, predominating.\textsuperscript{113}

Of all the livestock kept by farmers in the eighteenth century, swine were probably the most profitable. In 1786 Rutherfurd stated that "I have known a sow to cost four Dollars and within the Year she and her Broods have amounted in Value to eighty-two Dollars, with very ordinary keeping."\textsuperscript{114} Hams are mentioned as one of the important products of Sussex County in 1771,\textsuperscript{115} and local store accounts in the Musconetcong Valley list credits for fresh pork quite frequently.\textsuperscript{116}

Hogs were allowed to run about almost at will in many cases and subsisted on the abundant mast of the forest. When confined, they were fed maize and buckwheat, and allowed to run about the orchard to utilize the fallen fruit.\textsuperscript{117} During the winter hogs fared rather poorly. They were kept in small enclosures, fully exposed to the
cold weather. Occasionally, pig drovers would pass through the back settlements, on their way to market, and purchase hogs from the farmers.\footnote{118}

Eighteenth-century hogs were mostly descendants of English stock, and were slaughtered at an age of from twelve to eighteen months, by which time, if well kept, they weighed at least two hundred pounds. The hogs running about in the forest rapidly assumed the "roachback" or "razorback" form: narrow body, long snout, arched back, and large bones.\footnote{119}

**Domestic Fowls**

Of great importance, but little mentioned in early sources,\footnote{120} were the domestic fowls. Of these, chickens were the most important. Chickens were allowed to run about the farmstead at will, perching in nearby trees or in the orchard at night.\footnote{121} An occasional "poultry house" was built by wealthy farmers in more heavily settled areas,\footnote{122} but farmsteads in northwestern New Jersey apparently did not possess such specialized structures, as references to them are totally lacking. At Stillwater, during the winter season, chickens were commonly kept in coops built on the lower floor of the barn. This practice may have been followed elsewhere, especially where bank barns were in use.

The chickens found in New Jersey during the eighteenth century left much to be desired. Only in the mid-nineteenth century was the stock improved by crossing with imported fowls.\footnote{124}

Another domestic fowl of some importance was the goose. The Greenwich Forge store bought "13 geese" from a farmer in 1780,\footnote{125}
indicating their presence in the environs of the Musconetcong Valley at that time. Geese were useful for both their meat and their feathers, which were used for bedding. At Stillwater they were large and of a gray color, but varied considerably elsewhere. Geese were also allowed to roam freely about the farmstead but were restrained from damaging field crops by three or four sticks, fastened crossways about their necks, which prevented them from creeping through the casual fencing of the day.

In many localities in northwestern New Jersey turkeys were raised. They were of a smaller size than the wild stock found at the time and were a much preferred food among the farmers. Their origin in this region is obscure. Other commonly kept fowls in northwestern New Jersey included ducks, pigeons, and guinea fowls.

European Grasses

Although the pasturing of herbivorous stock in local woodlands persisted well after initial occupancy of the Musconetcong Valley had taken place, the establishment of permanent pastures with European grasses began at an early date. Soon after first settlement, settlers noted the decline of native annual grasses due, no doubt, to over-grazing, especially before the plants produced seeds for the following year. In many areas, perennial English grasses had appeared during the seventeenth century, probably introduced accidentally, and had begun to force out the native grasses. "English grasses" appeared before 1770 in the Musconetcong Valley. These most likely included timothy (Phleum pratense) and red clover (Trifolium pratense).
**Agricultural Practices**

European travellers in the Middle Colonies, as well as elsewhere in North America, were generally unimpressed by the agricultural practices of the average farmer. Pehr Kalm, an especially competent observer who had visited wide areas in western New Jersey and eastern Pennsylvania, mentioned that a lack of sound agricultural practices was not the exclusive trait of any single nationality or ethnic group.  

Here ... one can travel several days and learn almost nothing about land, neither from the English, nor from the Swedes, Germans, Dutch and French; except that from their gross mistakes and carelessness of the future, one finds opportunities every day of making all sorts of observations, and of growing wise by their mistakes. In a word, the grain fields, the meadows, the forests, the cattle, etc. are treated with equal carelessness....

One of the poorest practices insofar as pioneer agriculture was concerned was the rotation of land instead of crops. It was customary to crop the land continuously after clearance without fertilization until it was exhausted, then turn it into pasture for cattle or abandon it, and clear yet another plot.

**Land Use Among Squatters**

Especially ruinous in their agricultural practices were the squatters, who made up a large proportion of the early settlers in the Musconetcong drainage system. Sir Robert Barker, owner of a 7,308-acre estate in northern Alexandria Township, Hunterdon County, bounding on the Delaware and Musconetcong rivers, received a letter from his agent, John Emley, in 1764, complaining of settlement on
118. the tract by squatters. In 1765 another of Barker's agents reported on the lack of improvements on the property. "We found the Houses in a miserable situation and very few Barns that were fit to preserve their grain or shelter their cattle...the fences in very bad repair...." A later report by the same agent indicates the ruinous land use of the forty families of squatters residing on the tract in 1764.

The squatters, from the uncertainty of their tenure had no object in view beside getting whatever they could by constant ploughing where they had any prospect of reaping and by cutting down the Timber to convert it into Charcoal for the two Neighbouring Forges - had they not been restrained the Bulk of the Timber would have been destroyed and the bare hills naturally unfit for cultivation would only have remained at this day....

These practices were probably typical for squatters in that day.

Land Use Among Tenants

Barker, cognizant of the troubles other landholders had had with squatters in the same general area, wrote his agents to persuade the squatters to become tenants. 'My desire is that you may use your best endeavour, by gentle and persuasive means, to get the livers on the estate to come under lease for one year or, at most, three.' His agents, William McAdam and the aforementioned John Emley, then approached the settlers individually and had good success, in most cases, with persuading them to sign leases. These two agents later reported to Barker that they "used every means that might tend to promote peace and Industry among our new tenants, who still retained doubts concerning our Title...." Their efforts, however, were not made without some difficulty.
Resistance to coming under lease was ... supported by the Art and malevolence of that Firebrand, Mary Gamman who was now prosecuting Mr. Thos. Richie for Trespass which he had made on her on our Acct. by turning her out of her House by Force. In this distress we found it necessary to assist to endeavour to get her away for our own Interest which was effected with considerable Expense.

After the squatters had been persuaded to accept leases, and were impressed with the activity of Barker’s agents, there was a general improvement in their land use and the appearance of the farms and farmsteads. A similar problem on a tract owned by Barker a few miles north, in the vicinity of present Phillipsburg, was solved in a similar way. The tenants there were “of German extraction and very Industrious;” and when sure of their tenure repaired their houses and barns and did not cultivate so ruinously as before.

In later years landowners attempted to assure suitable use of their properties on the part of tenants by carefully stipulating what should and should not be done with the property in a lease which was signed by the tenant. In 1790, after James Parker had taken over the ownership of Barker’s large Alexandria tract, a tenant promised the following:

...to cut no green Timber but for the use of the Premises; not to cut any green Timber or Wood for Fire-Wood while there is dry to be had on the Premises; not to plow any Part of the Premises, more than once in four years for winter grain and that he will plow for the present year the field or fields that come next in course at the Rate that he will lay the fences that were division fences between him and the neighbouring Farms on the Division lines as they are now run out and bounded.

Additional conditions imposed in some indentures included plowing winter grain once in three years and keeping a meadow “properly enclosed.” Constant vigilance was required in order to make the
tenants live up to their part of the agreement. Especially difficult to hinder was timber thievery, which was prevalent in most of northern New Jersey. In 1789 James Parker found much of his tract "very bare of Timber."

That difficulties with tenants and poor use of the land on their part was the rule rather than an exception is seen in the fact that landowners sold out in Sussex County before "the virgin soil of their respective tracts should become completely exhausted...."

Land Use Among Freeholders

Farm management among freeholders was not far different than that of the tenants and squatters. In 1794, Cazenove noted that farmers in the Musconetcong Valley, who by this date were mostly freeholders, used "little manure." Although lime was known to be a suitable fertilizer in the eighteenth century and "a good convenience for burning lime to manure the land" was advertised as being on the Squire's Point Forge property in 1773, the practice of burning lime for manure does not seem to have been widespread in the area before the early years of the nineteenth century, after the passing of the pioneer period. It is no wonder, then, that Cazenove wrote of a farmer's land in Long (German) Valley as being "overworked and cannot produce any more." The use of animal manures also was not widely followed.

Crop Rotation

In the last years of the eighteenth century, many farmers began to follow the practice of crop rotation. The systems varied
according to the individual farmer and his location, but in general involved a four-year and four-field system in which a summer grain would be grown the first year, a winter grain the second, grass the third, and in the fourth year the field would lie fallow. James Parker's leases indicate that he required this system on the part of many of his tenants in 1790. Practices in East Jersey at the same time were similar. Planting occurred in the spring and harvest in the fall during the first year. The crops grown in this way included maize, oats, flax, and buckwheat. The field lay fallow during the second year. In the third year a winter grain, wheat or rye, was grown and in the fourth year the field was seeded in grass.

Land Productivity and Value

It is instructive to note the contrasts in land use, productivity, and value between the limestone-floored valley of the Musconetcong southwest of the terminal moraine, and similar land in the German area of Pennsylvania in 1794. In that year the average per acre yield in the Musconetcong Valley was ten bushels of wheat, twenty of maize, or fifteen of buckwheat. In the vicinity of Allentown, Pennsylvania, an area heavily inhabited by Germans, twelve to eighteen bushels of wheat were harvested per acre, forty bushels of maize, and twenty to twenty-eight of buckwheat. A four-year rotation was the rule. Wheat was grown the first year, oats, maize, or buckwheat the second, clover the third, and clover (apparently used as a green manure) the fourth year. Lime was universally used as a manure, and forty bushels per acre were applied.
The more sophisticated land use of the Pennsylvania-German farmer was reflected in land values. A two-hundred-acre farm in the Musconetcong Valley brought a maximum of £800 in 1794. A similar acreage near Allentown would bring at least £2,000 and perhaps as much as £3,000 in the same year.

The difference in land values between the Musconetcong Valley and similar property in eastern Pennsylvania largely reflected the fact that the German agriculturists were especially able, and as freeholders, were very industrious. Joshua Gilpin, writing in 1802 of the area lying about Easton, Pennsylvania, only a few miles north of the mouth of the Musconetcong, indicated the success of German farmers. "Many farmers of our own country, i.e., those of English stock, would lay by nothing where these Germans collect handsome estates...." In many locations in Pennsylvania the Germans arrived late, but prospered where the others had worn out their lands. In 1794, Cazenove noted that "8 miles from here [Bethlehem, Pennsylvania] is the Irish Scotch-Irish settlement, where the Irish came in 1740, while the Moravians settled at Bethlehem; but the Irish became poor and their places have been gradually filled by Germans who are thriving there." As we have already seen, in the later years of the eighteenth century there occurred a gradual influx of Pennsylvania Germans into the worked-out, cheaper lands available in West Jersey.

Farm Acreages

Farm acreages in West Jersey tended to be larger than in the eastern portion of the state. In northeastern New Jersey the size of the earliest grants was normally between one hundred and two

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hundred acres. In West Jersey, grants of two hundred to five hundred acres were not rare. The Hunterdon County tax roll of 1722 indicates that the most typical size at that time was two hundred acres. A list of the tenants and the acreages which they leased on the Barker Alexandria Township property, which antedates 1776, indicates that of twenty-nine individual parcels, eighteen were from two to three hundred acres, two from three to four hundred acres, one slightly over four hundred acres, and only eight were from one to two hundred acres in size. As the property was said to have forty families of squatters resident in 1764, and as Barker desired the property to be used well, the two-hundred-or-more-acre size may have been considered the ideal for that time. In 1794, when Theophile Cazenove travelled across the valley of the Musconetcong in the vicinity of present Penwell, he indicated that the typical farm acreage was two hundred acres.

**Agricultural Implements**

Farming tools in use during most of the eighteenth century in northwestern New Jersey were not as primitive as in many areas of pioneer occupation. The nearness of sources of supply made it possible for most farmers to have an inventory of well-made tools. The well-equipped farmer possessed iron-toothed harrows, plows, plow tackle, scythes, hoes, spades, and forks. Plows had points or shares of iron and moldboards almost entirely of wood. Harrows were triangular, with heavy wooden frames. Cradles were used in harvesting before 1740 in Hunterdon County, and by 1750 in Sussex County. Flails
were used for threshing, or occasionally, as with buckwheat, horses
trod out the grain. Fans composed of willow rods were used to
clean grain before 1750, but after that date the fanning mill came
into use.167

Fencing

The ubiquity of loose stock during the days of first settlement
caused fencing to have an early importance among the pioneers. In
northwestern New Jersey, as was the case elsewhere in the colonies,
fences were erected rather to keep stock out than in.168 The first
fencing utilized in the Musconetcong drainage system was probably
made out of the stumps of trees, as was the case in nearby Bucks
County, Pennsylvania. The uprooted stumps were rolled together,
roots outward. The use of this crude type of fencing lasted only a
short while.169 The fence most in use after substantial clearing
had taken place, and the pioneer turned seriously to the erection of
fencing, was the snake or worm fence. This became an integral part
of rural landscapes throughout the area and lasted well into the
nineteenth century.

Worm fences were built of rails approximately ten feet long.
These rails were piled one on top of another and interlocked with
other rails at either end at an angle of approximately sixty degrees.
Although the rails were cut about ten feet long, the need to zigzag
the panels of the fence so that they would interlock, shortened the
actual linear distance enclosed by a panel to seven or eight feet.
These fences were about four feet high, which generally required eight

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rails. The appellation "worm" or "snake" applied to the fencing came as a result of its distinctive sinuous course over the landscape. 170

An early improvement on the worm fence was the stake and rider fence (Fig. 12). This was used because of the ease with which cattle could push over the rails of an ordinary worm fence. The stake and rider fence solved this problem by setting two stakes into the ground in the form of an "X" over the intersection of the panels of the worm fence, thus steadying them, and placing one or more rails in the crotch of the stakes as "riders." 171 The stake and rider fence was well known in New Jersey before 1780. 172

There were several disadvantages in using the worm fences even with stakes and riders. The sinuous course of this fence removed much land from easy cultivation, and a great amount of timber was needed to erect and maintain it. These, however, were not major problems during the days of first settlement, when the land was used extensively instead of intensively, and large amounts of wood were available.

On the other hand, there were several advantages in using the worm fence. Construction was relatively easy, requiring little in the way of specialized equipment or skills. Also, these rail fences were easily reconstructed after storm damage, were easily movable, and lasted longer than other forms of fencing, which, by extended contact with the earth, soon rotted away and had to be replaced. 173

Worm fences were apparently unknown in both the British Isles and Sweden. 174 The only European precedent for this fence type to date is an example encountered in the Austrian Tirol in 1897. 175
In addition to fencing, there were other means to control livestock so that they would have difficulty disturbing tilled crops. Hobbles, yokes, and heavy drags were used where appropriate. In 1748, Pehr Kalm noted that near Philadelphia\textsuperscript{176}

The fences were in some parts low enough for the cattle to leap over with ease; to prevent this the hogs had a triangular wooden yoke and this custom was, as I have already observed, common all over the English plantations. To the horses neck was fastened a piece of wood, which at the lower end had a tooth or hook which would catch in the fence and stop the horse just as it lifted its fore feet to leap over; but I know not whether this is a safe invention with regard to horses. They were likewise kept in bounds by a piece of wood, one end of which was fastened to one of the forefeet, and the other to one of the hind feet. It forced them to walk pretty slowly, and at the same time made it impossible for them to leap over the fence. To me it seemed that the horses were subject to all sorts of dangerous accidents from this contrivance.

Since many of the early settlers of the Musconetcong drainage system were English, and had come from the southwestern portion of the state, we may infer that these devices were in use there also. Yokes were most certainly used to control stock in the Valley during the mid-eighteenth century,\textsuperscript{177} while dairy cattle and horses were generally hobbled in northern New Jersey at this time, and bulls were restrained by means of heavy logs dragging from their horns.\textsuperscript{178} These methods most likely remained in use as long as unconfined stock remained in northern New Jersey.

Another form of fencing, although not nearly as popular as the worm fence, was built when clearings were extended and wealth accumulated. This was the post and rail fence (Fig. 13), consisting of posts six or seven feet long set into the earth ten or eleven feet
Fig. 13. Post and rail and worm fencing, late nineteenth century. Near Oak Ridge, New Jersey. Source: Salisbury et al., The Glacial Geology of New Jersey.

apart, containing three or four rails, inserted one above another in holes cut into the posts. The construction of such a fence, especially before the invention of the thread auger in 1809, was much more difficult than in the case of the worm fence. In addition, maintenance problems were greater with the post and rail fence since posts had to be straightened every spring due to the heaving of the earth during the winter season. For these reasons, post and rail fences were probably not to be found in newly cleared areas. Later, when one wished to impress neighbors or travellers with the neatness of one's farm, a post and rail fence might be built along the public road, and the more utilitarian worm or snake fence used elsewhere.

Post and rail fencing existed in New Netherland before 1650, and had come into use in the Musconetcong Valley by the end of the eighteenth century. John Emley, in 1792, recorded paying for the making of "50 posts" and "150 flat rails," to be used on the Barker Tract in Hunterdon and Sussex counties. Apparently these were to be used for fencing.

Another kind of fencing, which probably followed the use of wood, especially in areas north of the Wisconsin terminal moraine where the soil was quite rocky, was the stone wall fence (Fig. 14). As many early advertisements of lands newly cleared north and east of the terminal moraine mention that fencing was in use, we can infer that this referred to the worm or snake fence as stone wall fences could not be erected so quickly. The use of stone for fencing is not the obvious effect of the presence of a large amount of glacial boulders in the vicinity, as Zelinsky has ably demonstrated. That

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the pioneers of the Highlands did build stone fences there can be no doubt. Such fences were in wide use in the later nineteenth century before the building of macadamized roads. Macadam pavement required a crushed stone foundation which was in many cases furnished by the old stone walls.  

In many cases nineteenth- and early twentieth-century fences in the Highlands were constructed of both stone and rails (Fig. 14). The stones acted as a foundation for the rails, which were placed on top and often staked and ridered. It may be that in some instances stone fencing originated through the placing of boulders found in the fields along the line of the rail fences, and the resulting stone walls finally became high enough to replace the rails.

**Pioneer Agriculture and the Iron Industry**

The charcoal iron industry was associated with and influenced pioneer agriculture in several ways. Since it existed side by side with agriculture in many areas, it provided a nearby market for the produce of the farmers, who dealt with the company store or with individual ironworkers. The gristmills and sawmills associated with most ironworking establishments provided needed services for the agriculturists. Also, many farmers were employed seasonally by the iron interests as woodchoppers, colliers, or teamsters.  

The iron industry also often turned to farming; using the land available after the cutting of portions of the forest to provide wood for charcoal production had taken place. The creation of meadows was a primary consideration, since the working livestock had to be
provided with fodder. Later, grain and other crops were planted, and stock might be kept for food or milk, in addition to their use as work animals. The combination of iron and agricultural interests was not peculiar to the New Jersey Highlands; "Iron Plantations" played a large role in the development of Pennsylvania's charcoal iron industry.\textsuperscript{187}

Farming Activities of Iron Interests in the Musconetcong Valley

In the Musconetcong drainage basin, as early as 1761, an iron interest located at present Bloomsbury included "a good plantation already cleared, and a considerable quantity of meadow \textit{sic} cleared, and in good fence."\textsuperscript{188} In 1763, another nearby ironworking establishment also had "some meadow cleared,"\textsuperscript{189} probably also for the working stock. Further improvements were fast in coming. A forge located at present Waterloo in 1770 included "a good Farm, with about 50 Acres of Winter Grain in the ground, and 25 Acres of Meadow in English Grass."\textsuperscript{190} Four years later, at Changewater, a forge had "a great quantity of very good meadow already made,"\textsuperscript{191} and also had a barn located on the property. In 1777 a forge located at the outlet of Lake Hopatcong was advertised as "a Valuable Plantation and Iron Works (Italics mine),"\textsuperscript{192} but in the next year the owner admitted that the property included only eighty acres of "choice meadow."\textsuperscript{193}

The farming interests of the iron industries of the Musconetcong drainage system are best illustrated in the papers collected by B. F. Fackenthal on Greenwich Forge,\textsuperscript{194} which was located within five miles of the mouth of the Musconetcong. In 1779, an "Inventory of
sundries delivered at Greenwich Forge by Samuel Williams for the
use of Richard Backhouse and Company," contained the following
items: "Plow with Irons Cleveus &c.; a gray horse; sorrel horse; a
four year old bay horse; a wagon; a cow; a bull." Three years later
Williams sold Backhouse "eight horses, two cows and a calf, two sows
and seven shotes; a quantity of hay and straw; two plows and one
harrow;" and "about 30 Acres of Wheat and Rye in the Ground...."

The books of the Greenwich Forge store for the same period show
credits for such activities as "three Days Mowing," and for
"Splitting 500 Rails." The forge owners evidently intended to be
good farm managers. Still another forge property in 1780 was
advertised as being "under good fence."

Deforestation and the general depression of the iron industry
after the Revolution also encouraged agriculture. Especially in the
Musconetcong and other fertile limestone valleys southwest of the
Wisconsin terminal moraine, many large tracts associated with
forges "when stripped of their timber, were subdivided among
agricultural successors...." As early as 1774, the Squire's
Point Forge was advertised as a "plantation divided into four
farms." The failure of this forge released approximately eighteen
hundred acres for use as farmland.

In some cases, the ironworkers themselves turned to farming when
the forges declined. On February 24, 1790, James Parker recorded in
his diary that "two forge men at Greenwich Forge send word by Fine
that they would wish to buy the Lott Conrad Conell lives on...."

In 1790, John Smith, who had been a boss collier at the Andover
Iron Works, leased the tract near the old forge at Waterloo, which was "a barren waste" at the time due to deforestation, and carried on farming operations with his three brothers for a number of years.  

**Deforestation**

The major effect of pioneer agricultural occupation on the landscape was deforestation. Actual clearing was accomplished in league with the woodcutters and colliers of the iron interests, but the persistence of cleared fields was due to agricultural occupation.

Since the southwestern portion of the Musconetcong Valley was first occupied by both the pioneer farmers and the iron interests, it can be assumed that this area was well cleared by the end of the eighteenth century. Theophile Cazenove, who travelled across the Valley in the vicinity of Penwell in 1794, noted that between Black River (Chester) and Penwell "you see very few farms and everything is woods and uncultivated land, except the valley between the two ranges of mountains /the Musconetcong Valley/... there the land is pretty good as far as Easton."  

Despite the general agricultural land use in the area, Cazenove noted that his host, probably Andrew Miller, a tavern keeper, had bought his property five years earlier "where it was all woods." Also, two nearby properties totalling fifteen hundred acres were still woodland in 1794.

To the southwest of this point, however, there was more-intensive land use, and woodlots were often somewhat removed from the farms, which had been entirely cleared. In the 1780's and 1790's the wills of residents of Alexandria, Bethlehem, and Greenwich townships begin to contain specific bequests of "wood lots." A popular location...
for wood lots in later years was the "Barrens" in Alexandria Township, which had begun to become a woodland after aboriginal burning ceased. These woods were composed almost entirely of chestnut, which was the most valued wood for general farm use. In 1805 Job Thatcher of Alexandria Township left his daughter "2 small lots in the Barrans." Other farmers had their woodlots on land too rugged to cultivate. Although much of this land was cut off by the iron interests, the forest soon regrew from stump sprouts. In 1794 Cazenove noted that in the vicinity of Penwell one third of the typical farm was "on the mountain." This was probably the land set aside for woods, while the soil of the limestone valley was intensively tilled, and almost entirely deforested.

North and east of the terminal moraine the difficulty of agricultural endeavors kept most areas not cut over by the iron interests in woodland. Marginal agricultural activities served to keep some areas cut over by the iron interests free of forest for several years but, as in the case of the Smiths at Andover, these activities soon failed and the forest reasserted itself.
CHAPTER V

THE PIONEER FARMSTEAD

Houses

Occupation of the Musconetcong Valley by pioneers of European
descent was first expressed in their habitations. These were erected
near a ready source of water, preferably a spring, a brook, or the
river itself.1

In house construction, the use of hewn or round logs seems to
have been universal among the earliest settlers. An early resident
of the area recalled that during his childhood in the waning years
of the eighteenth century, "there was nothing but log houses"2 in
the vicinity of Hampton. This statement is substantiated by the
numerous references to log structures in the area in the latter part
of the eighteenth century contained in contemporary advertisements
(Fig. 15), and also in such references in county histories3 written
during the nineteenth century.

This is not to say, however, that frame and even stone
structures did not exist as well, after the earliest settlement
had taken place and finished lumber became available. This can be
seen in the case of the colony of Quakers from Kingwood Township in

1For notes to Chapter V see page 309.
Hunterdon County, who settled near Allamuchy in 1764 "and took along to the new location all the frames and lumber for their first dwellings."

Log Houses

Log structures, however, remained important in most locations long after water- and even steam-driven sawmills had begun to provide finished lumber relatively cheaply. A traveller en route from Newton to Johnsonburg in 1817 noted the ubiquity of log dwellings: "The Houses in general are quite mean. More than one half of them are built of logs...." Indeed, log structures remained to lend a definite character to the landscapes of the Highlands well into the last years of the nineteenth century. In some areas log houses were still being inhabited as late as 1911.

Log structures were introduced into New Jersey and surrounding states through the agency of Swedish and Finnish settlers on the Delaware in the early seventeenth century, and also by German and Swiss colonists in southeastern Pennsylvania in the late seventeenth and early eighteenth centuries. Settlers of other ethnic stocks adopted the trait of building with logs and spread log construction from its primary hearths in southeastern Pennsylvania and southwestern New Jersey to the frontiers of settlement elsewhere. In this connection, it is interesting to note which traits of log construction reached the Musconetcong Valley, over forty miles from the hearths of their introduction.

The Works Progress Administration's survey of early log houses in New Jersey is the most complete record of the log houses in the
The houses surveyed were almost entirely in the southwestern portion of New Jersey as only scattered data were available for other portions of the state, where the ravages of time, fires, and cannibalization had removed log structures. The survey recognized three basic types of log structures in southwestern New Jersey:

1. This type is constructed of round logs of oak or cedar notched together at the corners, the interstices closed with moss, chips and clay. The round-log cabins consist of one room with a small fireplace at one end. Door openings were made by pinning a hewn frame to the outside face of the log wall with hard wood pins, one to one and a half inches in diameter and six or more inches long. In the small window openings the jamb frames are pinned to the ends of the logs with the hewn log over and below the opening serving directly as head and sill.

2. The second type is the hewn plank cabin of cedar or oak with dovetailed corners and with the same type of chinking between logs as employed in the cabins constructed of round logs...
   The construction of the oak plank houses is similar to that of the round log with the exception that the logs at all openings are pinned together by short dowels about one inch in diameter and long enough to penetrate one log and half of the one below it. The jambs of door and window frames are pinned to the ends of the logs at those openings. There is a second floor loft, the floor of which is laid over rough hewn beams which penetrate the outside walls and extend as much as three feet beyond them. The foot of the roof rafter which has a slope of about 45 degrees rests on the ends of these beams. The logs forming the walls are roughly dressed to a face on both sides. They are from four to six inches thick and from eight to fourteen inches high. The usual inside arrangement was a stone fireplace at one end or corner and a ladder alongside of it to gain access to the loft. In most examples, the uppermost three or four logs are corbelled out in a continuous cove to bring the face of the top or wall plate three to six inches beyond the face of the walls.
The third and most interesting type is the hewn cedar plank cabin with dovetailed corners and V joints extending the entire length of the logs or planks and requiring little or no chinking....

The cedar plank houses are similar to those of oak construction, except that the planks do not exceed three inches in thickness and vary from five to sixteen inches in width. The very close V joint running the full length of the building is characteristic....One of the most interesting and progressive steps in this general type of construction is... an... almost... complete second story....

Broadly speaking, on the basis of general morphology, the three log house types identified by the survey, can be grouped into two broad categories. These would be: (1) The round or unfinished log dwelling without a loft; (2) the hewn-log house of one and a half stories, the joists of which penetrate and extend beyond the outside walls.

The descriptions of log dwellings in northern New Jersey indicate that these two broad classifications may also be used there. In general, but not exclusively, the one-story, simpler structure seems to be associated with English or Scotch-Irish settlement, and the more sophisticated one and a half story house with German settlement.

One-Story Log Houses

The search for the antecedents of this house type is most difficult due to the general lack of data. It would seem, however, that the one-story, crude dwelling is probably largely of Swedish origin. Pehr Kalm, in describing the original homes of the Swedish colonists on the Delaware, stated that "the whole house consisted of one little room" and also that "the board ceilings in the first
colonial houses had been covered with earth to prevent the heat from escaping through the top."\textsuperscript{12} This, of course, indicated that the Swedes made little or no use of a loft or attic.

Log building techniques, as well as this type of house, seem to have been adopted early by pioneer settlers of other ethnic stocks who passed through the Swedish area. Kalm, in 1749, noted that "the houses of the Swedes were all of wood with clay smeared between the logs, like those now built by the Irish /Scotch-Irish/\textsuperscript{7}."\textsuperscript{13} This building tradition was largely concerned with \textsuperscript{14}

...round logs from which the bark was peeled. The horizontal joints were caulked with various substances such as clay or moss. At the corners of such buildings the logs were saddle-notched with rounded cuts, and the ends of the logs projected from the face of the building to give strength to the notch.

The movement north of the English and Scotch-Irish through eastern Pennsylvania and western New Jersey extended the distribution of this house type. The early log structures of Stockton, in southwestern Hunterdon County, were of this type. A very old dwelling there destroyed in 1837 has been described as having been 'a log house about 20 feet square one story high...covered with shingles. It had a door in front with a window front and back.'\textsuperscript{15} In the vicinity stood three similar log structures. Nearby, another had a partial second story, indicating a mixture of types within the area. On all of these houses the logs were notched at the ends and laid up like a crib, with their ends protruding six to eight inches beyond the notches.\textsuperscript{16} This kind of construction is found widely in Sweden.\textsuperscript{17}
In nearby Bucks County, Pennsylvania, the earliest log structures are similar in description.\textsuperscript{16}

White oak sapling trees about ten inches in diameter, cut in lengths of 22 or 24 feet, notched at the ends, were laid up a little higher than a man's head, as the walls of the house; the roof was made on rafters hewed from smaller trees, pitched from the center each way, and covered with rived lath and shingles and the gable ends from the square with rived weatherboards running up and down.

These houses were of the one-story order, and occasionally one was built more elaborately with two rooms on the floor, which lengthwise required longer logs... The windows were few and small, and until glass 7 x 9 were available, the greased paper or thin linen filled the bill for window lights. In this second edition of houses /a cruder log structure was the initial dwelling/ there was a great improvement in doors, for instead of a blanket or canvas to close the Foramen magnum, a wooden door hung on wooden hinges, the boards of which were carefully rived out of choice timber with a froe.

It may be noted that Bucks County was initially settled by the Scotch-Irish moving northward from southeastern Pennsylvania. The Morgan family, residents of Durham, Bucks County, and products of a migration from Darby, Pennsylvania (south of Philadelphia), were dwelling in a log structure when their son Daniel, the famous hero of the American Revolution, was born. The building was described by a collector for the University of Pennsylvania.\textsuperscript{19}

As near as I could ascertain the building was twenty feet by twenty-eight, of logs, chimney running up outside, fireplace and large. John Dillon, who died in 1890, was the last child born in the Morgan house. After the death of James Morgan, ironmaster, the parents of Mr. Dillon occupied the house from 1782 to 1806; according to Mr. Dillon's evidence, the house soon after becoming leaky and thus unfit for habitation.

The house was then dismantled, some logs utilized for fencing, and the foundations finally taken up in 1863.\textsuperscript{20}
In 1863 the foundation stones and the hearth-stones were removed...the hearthstone, when in situ, had small holes cut into it for the legs of the olden-times andirons, to prevent them from slipping when heavy logs of wood were rolled into the chimney corner into the fire.

One-And-One-Half-Story Log Houses

A one-and-one-half-story, dovetailed, hewn log house, with a projecting roof, seems to have been in early use among German settlers. In 1738, Caspar Wistar, a product of direct migration from Germany through the port of Philadelphia, erected a log dwelling approximately one mile distant from the present town of Alloway in Salem County, southwestern New Jersey. A later account of the structure described it as "built of logs neatly squared and dovetailed at the corners," and as possessing "joists...which at one time extended several feet beyond the first story to support the projecting roof, so common to the homes of the early German settlers." This account, unfortunately, does not mention the location of the fireplace or chimney. The Reall log house (Fig. 16), located near Friesburg, approximately four miles southeast of the Wistar log structure, possesses all of the features of the latter and definitely has a central chimney. Unfortunately, the date of construction and the name of the builder are unknown, but the house is distinctly Germanic in type. Many of the houses of similar morphology in the area (types 2 and 3 of the W.P.A. survey) have corner fireplaces. This certainly is not a German trait. Kalm, writing in 1750 of the earliest Swedish log structures in the same region, stated that...
Fig. 16. Real log house, early twentieth-century view. Note the one-and-one-half story height, the neatly squared and dovetailed logs, the protruding joists which carry the roof well beyond the front wall of the house, and the central chimney. Near Friesburg, New Jersey. Source: Joseph S. Sickler, The Old Houses of Salem County (2d ed.; Salem, New Jersey: Sunbeam Publishing Company, 1949).
...the fireplaces made at the time were built in a corner of the dwelling room...they are now called Swedish fireplaces here, and are said to be quite rare. The most common ones now are English, which are as large as our kitchen hearth, though the bottom of them is not higher than the floor of the room.

Waterman and Shurtleff also concur on the fact that a corner fireplace is definitely a Swedish trait. There is no evidence to indicate that this feature penetrated northwestern New Jersey, although there is mention of it in single-story log structures in Bucks County, Pennsylvania. Use of this type of fireplace in one-and-one-half-story log houses, which are probably not of Swedish derivation, does, however, indicate that there was a synthesis of building traditions at an early date in southwestern New Jersey. Further, type 3 of the W.P.A. survey reflects the distinctly Swedish technique known as the "long groove." Thus, it is impossible to call these log house types purely German or purely Swedish.

Let us turn to data which mark the occurrence of the one-and-one-half-story house in northern New Jersey.

The early German settlers of Cokesbury, about seven miles southeast of Changewater, are thought to be an offshoot of the New Germantwon (Oldwick) settlement, which, as we have seen, was most likely in part, at least, derived from an overland migration from eastern Pennsylvania by way of the Old York Road. The Cokesbury pioneers built log structures, according to tradition, "with hewn logs, split shingle roof and plank floor, the plank cut out with a crosscut saw." These houses differed little from each other in general form.
Single-story houses, big cellar, chimney in the middle, wide fireplace in the kitchen and store room at the other end....On the upper floors a portion of the grain was kept....An indispensable appendage to the German's house was the piazza /overhanging roof-integral porch/ in which the saddles, bridles, and sometimes plough and wagon harness were hung up.

We have here all of the features of the one-and-one-half-story houses described in southwestern New Jersey, except for the central chimney. Although a half story is not mentioned, the absence of remarks as to sleeping quarters may be taken to imply that a loft was probably included above for that purpose. Also, "upper floors" may well refer to an attic or garret. In this connection, it is well to note the statement of an historian most familiar with the early Germans of this area about a structure at New Germantown during the 1750's, which was

...probably not better than the common run of dwellings of that day. It must have been built of smoothly hewn logs, and was perhaps clapboarded on its front and sides....I conjecture that it was of one story only, with a low garret arranged for sleeping rooms.

Johannes Moelich, a German from Philadelphia, settled at Peapack, northern Somerset County, around 1749. Before building a stone house he erected a temporary log structure. One of his descendants, drawing on family tradition, and a general knowledge of the history of the region, described the raising of this temporary structure as follows

The ends of the logs are squared and so cut as to be let in or dovetailed together....the walls go up apace; by afternoon skids are necessary upon which to roll the heavy logs to their places....When entirely completed it was nothing more than a square enclosure, with one story and a cockloft above....
In this example of a temporary dwelling, an overhang and the hewing of the logs are not mentioned, but the logs are dovetailed and a "cockloft" is included.

Indeed, an attic or garret seems to have been in wide use among German settlers. Peter Stryker, a Jerseyan travelling in the vicinity of Wilkesbarre, Pennsylvania, in 1816, mentions staying overnight at the house of John Mills, whom he describes as a German. "I lodged unfavourably between two feather beds in an open garret of a log-house!"34

The distinctive German log house, with its central chimney, one-and-one-half stories, and overhanging roof, is well illustrated by the Heydrick-Yeakle log house which stood at Mermaid Lane and Germantown Avenue in Germantown, Pennsylvania, until it was demolished in 1909.35 As most Germans entered New Jersey through the port of Philadelphia, this house type may have diffused with them.

Advertisements of Log Structures in the Eighteenth Century

The most complete data available on log structures erected throughout the state during the eighteenth century are contained in the advertisements of property reprinted in the New Jersey Archives. The distribution of these log structures has been plotted (Fig. 15). Excepting the large numbers of log buildings which were associated with the ironworks of the day and which may have no cultural significance, it can be seen that the greatest cluster of log structures is in the southwestern portion of the state, well within the sphere of Swedish influence. There is also a generally continuous distribution of log structures up the Delaware Valley and into the
Unfortunately, the advertisements reflect a span of only forty years (1742-1782), and give no hint as to the real age of the structures listed. Also, the first listing of a log structure in the Highlands does not occur until 1750, thirty years or more after the first settlers had entered the region. These dates are much too late to indicate whether the hearth of German log culture in southeastern Pennsylvania or the Swedish hearth of log culture in southwestern New Jersey was largely responsible for the techniques of log construction and the types of log structures erected in the Highlands. The striking distribution of log structures in the state certainly does indicate, however, that log structures did penetrate the state from the south and perhaps from the west as well, but not from the north or east. The well-settled eastern portions of the state generally seem to have rejected log structures through time. It might be noted that log structures seem to have been associated with minimal clearance and a general lack of improvements on the property which contained them.

Additional evidence for the origin of log building techniques in New Jersey may be seen in the names associated with the advertisements of log houses. These are almost entirely of Anglo-Saxon origin, suggesting a movement north from the old English settlements in the southwestern portion of the state.
Log Houses in Northwestern New Jersey

Both the one story and story-and-one-half log house were in existence in early days in northwestern New Jersey. The story-and-one-half house was considered to be a better dwelling and was preferred by settlers after initial occupancy of the area had taken place. John Bowlby's log house, built after 1740 near Hampton, in the Musconetcong Valley, "was once considered the grandest house in the settlement. It consisted of logs hewn on two sides and notched at the ends; was one and a half stories high and had two large rooms below stairs, while the other houses had only one." One source mentions Bowlby as a German pioneer, although the orthography of the name seems English.

Log houses in existence during the nineteenth century in the area seem to have been of the one-and-one-half story type. A log house which was still inhabited in 1911 at Hardwick, in northern Warren County, approximately twelve miles northwest of Hackettstown, of which a photograph exists (Fig. 17), looks much like the German form of log house. It was one-and-one-half stories in height, and had joists which could have supported an overhanging roof. The exact position of the chimney is unsure, but it was at the gable end, not in a central position.

A log house (Fig. 18) built by John Byerly in 1799 or by Thomas Roberts in 1803, in the section of Doylestown, Pennsylvania, once known as "Germany," may represent the German log house as it was constructed by other ethnic groups. It is very similar to the descriptions of
Fig. 17. Log house occupied as late as 1911 near Hardwick, New Jersey. Note the one-and-one-half story height, the partially adzed logs, the appearance of joists in the front wall of the house, and the gable end (interior?) chimney. Source: George W. Cummins, History of Warren County (New York: Lewis Historical Publishing Company, 1911).
Fig. 18. Byerly log house. Note the story-and-one-half height, the joists which plainly appear in the front wall, the gable end, interior chimney, and the distinctive Pennsylvania German notching technique (V notch). Mercer Museum, Doylestown, Pennsylvania.
German log houses in New Jersey, and may well, at one time, have had an overhanging roof. The joists are certainly in a proper position for such an appendage. The chimney, however, is built inside, at the gable end. The corner-timbering (V notch) is definitely a German trait.\(^1\)

Frame or Stone Construction

After the pioneer agriculturists had completed the initial phases of developing their farms, many turned to the improvement of their habitations, and substituted structures of frame or stone for those of logs. This was especially true of those settlers who came after initial occupancy had taken place and of those whose ties to Old World traditions had not been erased by several generations of life on the frontier. Settlers in Hackettstown, for example, who were of New England derivation, built frame structures at an early date.\(^2\) Other earlier settlers, after inhabiting log dwellings for several years, also turned to the construction of more elaborate and prestigious frame or stone structures.

Folk House Types

As in the case of log dwellings, the later stone and frame structures reflect a blending of architectural traditions in the New World, and the process of acculturation. Unfortunately, data on the folk house types extant in the region today are largely lacking, except for the pioneer efforts of Thomas Jefferson Wertenbaker,\(^3\) some cataloging by the Historic American Buildings Survey,\(^4\) and a recent landmark address given by Fred B. Kniffen.\(^5\) Also,
eighteenth-century advertisements generally give few hints as to the
types of houses listed for sale. Thus, it was decided to map the
present distribution of house types which were known to be present
in the general area during the eighteenth century. This was done
by car traverse of every road in the Musconetcong Valley which was
in existence before the early nineteenth century. Distinctive farm
buildings were recorded in a similar fashion.

The "I" House

Throughout the greater portion of the Musconetcong Valley today,
the "I" house prevails (Fig. 19). In northwestern New Jersey this
house type is characterized by its rectangular form, generally with
the gable end or shorter axis oriented away from the road, its two-
and-a-half story height, its simple, generally porchless exterior
devoid of pent roof or ornate door hood, its doubly pitched, moderately
sloping roof which is devoid of dormers, its interior gable-end
chimneys, and the presence of a full cellar. The house is one room
deep (Fig. 20). Additions to these houses are often built in like
form, sometimes as an ell, but more often in a straight line extension
to one side. The material used in construction of the addition often
is at variance with the original.

The "I" house is held by Kniffen to have evolved from an old
English unit consisting of one room and an end chimney. Houses very
similar to the "I" type may be seen today on many of the secondary
roads of East Anglia. It is instructive to note, however, that not
a few of the "I" houses erected in the last years of the seventeenth
Fig. 19

MUSCONETCONG VALLEY
DISTRIBUTION OF "1" HOUSES-1965

- = FIVE HOUSES
(2) - TWENTY DOTS
Fig. 20. "I" houses. Port Colden, New Jersey. These were most likely built after the first two decades of the nineteenth century.
century and the first years of the eighteenth century in southwestern New Jersey possess corner fireplaces. This is a distinct Swedish characteristic. Since the fireplace is such a basic part of these houses, it would seem that at least in southwestern New Jersey the "I" house is not purely of English provenance.

By the end of the seventeenth century the "I" house had become established all the way from Chesapeake Bay to the lower Delaware. Although the type largely diffused to the south and west, it also advanced northward up the Delaware Valley with the tide of settlement. Culturally, the "I" house became the accepted abode in western New Jersey, of all who could afford it, early in the eighteenth century. In southwestern New Jersey, the desire for this type was so pronounced that existing gambrelled roofs were altered to gable roofs so as to conform with the preferred roof line.

In many cases, the houses of the owners and managers of the local ironworks may have served as models for the farmhouses of agriculturists when the latter turned from the log structures of their pioneer days to more sophisticated dwellings of frame and stone. The managers and owners of ironworks in western New Jersey were largely of Philadelphia or Pennsylvania origin, and many of them were accustomed to living in frame or stone "I" houses. Sawmills were established early at most forges in order to supply the lumber needed for such houses, as well as for the iron enterprise itself. Abram Evans, of Philadelphia, offered the Chelsea Forge, at what later became Finesville, on the Musconetcong, for sale in 1763. On the premises was "a good Stone House, two Stories high, with two Rooms
Another advertisement of Chelsea Forge in 1780 listed one of the dwellings on the property as being of "stone, two stories high, with fire-places at each end." This was probably the same house and most likely also contained a full cellar and garret - in short a perfect "I" house. Thus, at a time before most agriculturists turned from log to frame or stone construction, the "I" house existed as a model, and with it was associated the prestige of the moneyed iron interests.

The distribution of the "I" house in the Musconetcong Valley well reflects the Delaware Valley stream of diffusion of the type. For the most part, the houses are clustered in the limestone portions of the watershed, where better soils prevail. This is especially true of the "I" houses associated with farmsteads. Few "I" houses are found north of the terminal moraine. Large numbers of "I" houses are found lining the older streets of many of the agglomerated settlements such as Bloomsbury, Hampton, and Hackettstown. These are probably in large part of nineteenth-century origin, but reflect a preference, on the part of the population, for such houses. It is especially interesting to note that Hackettstown, which is well within the New England sphere of influence in the Valley, has such large numbers of "I" houses.

The Two-And-One-Half-Story "English" House

Second in numbers in the Musconetcong Valley, but with less than one-half the total of "I" houses, is the two room deep "English" house (Fig. 21). The "English" house is very similar in description to the "I" type, except for its generally being near or over thirty
Fig. 21. "English" house. Near Hackettstown, New Jersey.
feet in depth, while the "I" house is seldom deeper than twenty-two or twenty-three feet. The "I" house and the "English" house are probably ultimately related types.53

The "English" house appears to have diffused northward via the Delaware Valley early in the eighteenth century54 and also westward along with later waves of migration from New England which entered eastern New Jersey in the first half of the eighteenth century carrying along a similar house type based on Georgian lines.55

The present distribution of the "English" house in the Musconetcong Valley (Fig. 22) gives little indication as to its route or routes of entry. Variations of the basic type probably entered by way of both the Delaware Valley and routes from the east such as the Minisink Trail. Variations from the distribution of the "I" house include the fact that the "English" house is not particularly oriented to the better soils as is the "I" house, and the fact that a significant number of them is located north of the Wisconsin terminal moraine. Also, the "English" house is, in terms of relative numbers, far more of an urban house than is the "I" type.

The East Jersey Cottage

The East Jersey cottage (Fig. 23) has been described by Wertenbaker: "The typical house was perhaps forty-five feet by eighteen, one story high with loft, with few or no dormers,...the chimneys usually, though not always, at either end and invariably placed in, not on the outside of the wall, the roof often sloping down behind to cover a narrow annex to the rear."56 Wertenbaker held that this house type had evolved from a cottage found widely on Long
Fig. 22.

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Fig. 23. East Jersey cottage. Beattystown, New Jersey.
Island and in Connecticut. The primary cultural influence causing
the evolution from what had been a two room deep house with a central
chimney to a one room deep house with a gable-end location for the
chimney was most likely Flemish. Flemings were especially numerous
in northern Morris and Essex counties and generally on the north bank
of the Raritan in Middlesex County. These were all sources of the
settlers of the New England cultural antecedents who penetrated the
Musconetcong Valley.

The present distribution of East Jersey cottages in the
Musconetcong Valley (Fig. 24) as well as their occurrence now and
then along the older roads from the east penetrating the Valley, tend
to confirm this. The East Jersey cottage is especially numerous
as a farmhouse in the portions of the Valley influenced by both the
Dutch and New Englanders. The generally scattered distribution of
East Jersey cottages south of Stephensburgh (except for Bloomsbury)
can best be explained by a diffusion of the type from the Raritan
Valley, perhaps by means of the South Branch of the Raritan River
Trail. A similar one-room-deep cottage has also been recorded for
southwestern New Jersey in the early eighteenth century. This,
however, had a gambrelled roof, which is unknown in the northwestern
portion of the state.

The Deep East Jersey Cottage

Closely related to the East Jersey cottage is a structure which
we might term the "Deep East Jersey Cottage" (Fig. 25). This house
type is closer to New England precedent than is the East Jersey
cottage except for the general gable-end location of the chimney
Fig. 25. Deep East Jersey cottage. Near Hackettstown, New Jersey. Note (original?) central chimney.
and the frequent use of stone as a building material. These, again, are probably Flemish influences. 60

The Deep East Jersey cottage can be followed from its sources in northern Essex and Morris counties with greater ease and continuity than can its shallower relative. In the Musconetcong Valley (Fig. 26) the type is confined to the area of New England settlement and is a diagnostic feature of such cultural influence.

Auxiliary Structures

The need for structures auxiliary to the main farm building soon manifested itself as additional land was cleared and the pioneer families grew in wealth and numbers. Specialized structures were needed for baking, storage, odd jobs, and the housing of farm animals. These additional structures arose as soon as need or inclination permitted. Logs, stone, frame and brick were used as building materials, depending on purpose, local availability, and cultural preference.

Outside Kitchens

One of the first additions to the original farmstead was the separate kitchen. These were often erected before the dwelling was improved by switching from log to frame or stone construction, as can be seen by James Ellison's advertisement in 1767 of one hundred and fifty acres in Gloucester County including "a square Log House and Kitchen, with a good stone chimney in each...." 61

The outside kitchen seems to have been almost universal in much of western New Jersey and had lasted as an important feature of the
Fig. 26

MUSCONETCONG VALLEY

DISTRIBUTION OF DEEP EAST JERSEY COTTAGES-1965

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farmstead until well into the latter portion of the nineteenth century in the northwestern portion of the state.\textsuperscript{62} A property offered for sale in Hackettstown in 1777 included a "frame kitchen."\textsuperscript{63} Apparently, the outside kitchen was also known at an early date in the eastern portion of the state as a house with "a Kitchin adjoyning"\textsuperscript{64} was advertised for sale in Elizabethtown in 1737. Outside kitchens are frequently associated with Dutch barns in eighteenth-century advertisements.\textsuperscript{65} The dimensions of these early structures may have been similar to one in Princeton in 1775, which was listed as being "22 feet long and 16 wide,"\textsuperscript{66} or to one at Middlebush during the Revolution, which was twenty-four feet square.\textsuperscript{67}

The present term applied to outside kitchens is "outdoor cookhouse," and older residents of the Musconetcong drainage system remember their mothers' using them all day long. The remains of a typical cookhouse on the Fine Homestead at Finesville built after 1811 (Fig. 27) has a foundation of brick with a length of thirteen feet eleven inches and a width of eleven feet ten inches. The cookhouse itself had frame construction, gable roof, door on each long end, and a built-on porch on one side where the family's clothes were washed.\textsuperscript{68} The large fireplace, still standing, has outside dimensions of eight feet two inches in width and four feet ten inches in depth. Inside dimensions are five feet four inches in width, two feet ten inches in depth at the bottom, two feet five inches at the top, and a height of four feet nine inches. The chimney is approximately fourteen feet high. Another cookhouse, near Asbury, also a frame structure, is twelve feet three inches square on the outside. The
Fig. 27. Remains of typical outdoor cookhouse, Fine homestead, Finesville, New Jersey. Note the stone "I" house.
distribution of existing cookhouses in the Musconetcong Valley today (Fig. 2b) closely corresponds with the areas of Dutch and German settlement in the western portion of the Valley.

Springhouses

A later and not quite as universal an addition to the farmstead was the springhouse. These are to be widely seen in northwestern New Jersey and nearby eastern Pennsylvania and are often still in use. They are apparently always built of stone and have small windows one on each side, with outside stationary blinds or shutters made of wood. They differ mainly in size, sometimes the roof is a stone arch covered with sod, and sometimes it is made of wood covered with shingles. They are built over a spring or springs.

The earliest known occurrence of a springhouse in the Musconetcong Valley was in 1774, at Greenwich Forge, but they date back to at least 1727 in nearby Bucks County, Pennsylvania, and probably entered northwestern New Jersey also at an early date.

In 1749 Pehr Kalm recorded springhouses as being common north of Philadelphia. Pennsylvania abounds in springs. The people near such springs, besides making the usual use of the spring water, also conduct it into a little stone building, near the house where they can confine it. In summer, they place their milk, bottles of wine and other liquors in the water, where they keep cool and fresh.

Kalm's discussion of these structures elsewhere indicates their general absence among Swedish and Dutch settlers in early days. The Pennsylvania Germans, however, were well acquainted with their use and springhouses were built by them at an early date. In the

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Musconetcong Valley the distribution of springhouses (Fig. 29) most closely correlates with that of the "I" house, suggesting that both of these structures are parts of a complex which diffused into northwestern New Jersey by way of the Delaware Valley.

**Miscellaneous Structures**

Miscellaneous structures, most often of frame, but sometimes of stone construction, joined the house, outside kitchen, springhouse, and barn at a later date, depending on the prosperity and need of the farmer. These later structures might include a shop "for weaving, mending tools, and doing odd jobs," a "Smoak House," and an individual "Wash House" built on a stream where the water for the laundry could be most easily obtained. The shop was often joined to the farmhouse, while the other buildings were separate, but nearby. Occasionally, an auxiliary building would combine several functions, as in the case of a structure in Reading Township, Hunterdon County, in 1755, which housed "a large Store-House and Shop with an Under-ground Kitchen and Oven...."

The use of extra buildings probably became more widespread later in the history of settlement, after the farm was entirely won from the forest and the barn was no longer sufficient in size to accommodate the miscellaneous additional functions of farms once the pioneer period has passed.

**Barns**

As has been seen, the sheltering of farm stock was not a major concern among most pioneer agriculturists. Also, since the produce
of the initial farm clearing was small, it could easily be stored in the farmhouse itself. \textsuperscript{81}

With the improvement of the farm, the clearing of additional land and the increase of stock, came the need for additional farm buildings. In some cases, multipurpose structures were erected. In most cases, however, the barn served to house the stock, store the grain, and protect the farm implements.

Undoubtedly, the first barns were primitive affairs. Most likely, the original log dwelling often served to house cattle after a better house had been built. \textsuperscript{82} Schmidt, after intensive research into the pioneer agricultural settlement of Hunterdon County, came to the conclusion that the first barns of the settlers were "usually of logs and built somewhat like their cabins." \textsuperscript{83} The Morgan log dwelling, built at Durham, Pennsylvania, only a short distance from the mouth of the Musconetcong, in 1732, had a stable associated with it. In later years the foundation of the latter structure was described as being "a small affair, sixteen by twenty, and loosely laid, also of logs." \textsuperscript{84}

Log barns were occasionally mentioned in advertisements of property in northwestern New Jersey during the eighteenth century (Fig. 15), but were probably more prevalent than their listing indicates. The tax records of Bucks and Northampton counties, Pennsylvania, which border northwestern New Jersey, indicate that in 1798 well over sixty percent of the barns in those counties were entirely of log construction, and many more contained logs as at least a portion of their structures. \textsuperscript{85} The typical log barn in Pennsylvania at this
time was "a rectangular building, without a foundation or only a simple stone one, and it was one or one-and-one-half stories high." Most of these structures were between thirty and forty feet long, but a good number also ranged from forty to fifty feet in length. At least some of the log barns in the Musconetcong Valley must have been of this size in early days, as William Frazer reported holding religious services in such structures as early as 1768.

Although log barns were an important feature of the pioneer farmstead, frame structures appeared at an early date. Indeed, in many cases the erection of a frame barn preceded the erection of a frame or stone farmhouse. In 1751, William Gammon, an inhabitant of Bethlehem Township, was dwelling in a log house while his cattle were housed in a frame barn. During the latter portion of the eighteenth century the association of log farmhouses and frame barns was quite common elsewhere in the Highlands. As late as 1817, an observer from Connecticut, travelling from Newton to Johnsonburgh, noted that "more than one half of the houses are built of logs, yet they have large Barns universally thatched with straw...." Apparently, these barns were of frame construction.

Unfortunately, there are few references to the types of barns which were to be found in northwestern New Jersey after building in frame became common. That distinct types did exist, however, is evident from occasional references to English barns and frequent references to Dutch barns in contemporary newspaper advertisements.
English Barns

English barns are only occasionally mentioned in eighteenth-century advertisements. A "tolerable good English barn"\(^\text{92}\) was offered for sale in 1780 at Flanders, by Mary Mills. This was most likely the rectangular, gable-roofed structure, with high doors on its longest side, which was common in New England,\(^\text{93}\) from whence many of the settlers of Morris County had come. English barns thus probably entered the northeastern part of the Musconetcong Valley along with the New England settlers of that area. New Englanders had been forced, through harsh continental winters, to offer protection to their cattle. Pioneers directly from the British Isles, who settled the southwestern portion of New Jersey, followed a more casual practice of wintering their stock outdoors. By the middle of the eighteenth century they had influenced the descendants of Swedish settlers, who at first had built barns to house their cattle, to do the same.\(^\text{94}\) Thus, the barns of English type now found in the Musconetcong Valley (Fig. 30) probably did not come along with the earliest tide of English migration into the Valley.

Dutch Barns

Dutch and German settlers, coming from regions in which winter temperatures were more severe, and in which the care of farm stock was more seriously pursued, were not acculturated to the casual ways of the English, and, even in milder southwestern New Jersey, in Kalm's words, "preserved the custom of their country, and generally kept their cattle in barns during the winter."\(^\text{95}\)
The Dutch barns erected by early settlers of Dutch and German origins were described by Kalm, who saw many of them in travelling between Trenton and New Brunswick in 1748.  

The barns had a peculiar kind of construction in this locality, of which I shall give a concise description. The main building was very large almost the size of a small church; the roof was high, covered with wooden shingles, sloping on both sides, but not steep. The walls which supported it were not much higher than a full grown man; but on the other hand the breadth of the building was all the greater. In the middle was the threshing floor and above it, or in the loft or garret, they put the unthreshed grain, the straw, or anything else, according to the season. On one side were stables for the horses, and on the other for the cows. The young stock had also their particular stables or stalls, and in both ends of the building were large doors, so that one could drive in with a cart and horses through one of them, and go out at the other. Here under one roof therefore were the threshing floor, the barn, the stables, and hay loft, and the coach house, etc. This kind of building is used chiefly by the Dutch and Germans, for it is to be observed that the country between Trenton and New York is not inhabited by many Englishmen, but mostly by Germans or Dutch, the latter of which are especially numerous.

Thomas Anburey, a British prisoner of war, in travelling through western New Jersey and Lancaster County, Pennsylvania in 1778 described Dutch barns in a similar fashion. Advertisements, and an account book listing the damages done by the British Army during the Revolutionary War, indicate that the typical Dutch barn was square, or almost so, ranging from forty to fifty feet on a side.

The origin of the Dutch barn is held to be in the Lower Saxon peasant house which centers in the basin of the lower Elbe River. These houses are quite common today in this region and generally in rural portions of the northern Netherlands.
Dutch barns must have entered the Musconetcong Valley with the early Dutch settlers of the area and possibly with Germans as well. In 1769 "a good new large Dutch barn" was located within three miles of Squire's Point Forge on the Musconetcong, so that surely such structures were known in the area by this time.

According to eighteenth-century newspaper advertisements, the hearth of Dutch barns in New Jersey was the Raritan Valley (Fig. 31). Dutch barns appear to have had a limited acceptance insofar as non-Dutch cultural groups were concerned and were generally associated with large, prosperous farms owned by settlers of Dutch extraction. The Dutch barn type has entirely disappeared from the Musconetcong Valley but occasional relict barns are still to be found in the environs of the Raritan Valley.

Bank Barns

The accounts of early settlement and the newspaper advertisements of the day refrain from any mention of the dominant barn type in much of northwestern New Jersey today. This is the "bank barn" or "Pennsylvania barn" which today dominates the Musconetcong Valley southwest of Hackettstown (Fig. 32). Locally, where there are English barns extant, the term is "overshot barn" in opposition to "undershot barn" for those of English type.

The bank or overshot barns which are today found in northwestern New Jersey (Fig. 33), are almost universally of frame construction lying over fieldstone foundations, and have two levels, the second level being used for grain, hay, implement and vehicle storage, and also for
Fig. 31. Source: Whitehead, et al. (eds.), Archives of the State of New Jersey, First Series; and Stryker, et al. (eds.), Archives of the State of New Jersey, Second Series.
MUSCONETCONG VALLEY
DISTRIBUTION OF
BANK BARNs-1965

○ = TWO BARNs

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Fig. 33. A prosperous late-nineteenth-century farmstead. Lopatcong Township, Warren County, New Jersey. Note especially the presence of the "I" house, the bank barn, with side in view (front) facing south, and the springhouse. Source: James P. Snell (ed.), History of Sussex and Warren Counties, New Jersey (Philadelphia: Everts & Peck, 1881).
threshing. The first level is primarily used to house the farm stock, today mostly dairy cattle. The bank barn is often built into the side of a "bank" or hill, so that one can enter the second level, the doors of which face the road, at ground level. In some cases a ramp is built to facilitate entry. In most cases the second level of the barn projects over the first level. The entrances to the first level almost always face south, so as to take advantage of as much sunlight during the winter months as possible.

Many scholars have associated the Pennsylvania or bank barn with German settlement in the Middle States. Wertenbaker\textsuperscript{104} has sought its origin in the great peasant houses of the Black Forest, the Jura, and upland locations in Switzerland and southern Germany. The superiority of German methods of animal husbandry, especially in relation to the casual attitudes of early English and Scotch-Irish settlers, has by many writers been associated with the use of the bank barn. Later investigation has shown, however, that as late as 1798, the barns of Germans and other settlers in Pennsylvania did not differ markedly.\textsuperscript{105} It would appear that the bank barn, so often attributed entirely to the Germans and Swiss, also partially owes its origins to English influence, and perhaps to frontier innovation. The bank barn is of much later origin than earlier investigators realized. The first use of any term to delineate this most distinctive barn type appears to have been in York County, Pennsylvania, in 1796.\textsuperscript{106}

In northwestern New Jersey, where this barn is so prevalent today, its appearance also must have been relatively late. Although
Advertisements of the 1740's through 1780's often mention "Dutch" barns and occasionally "English" barns, there is never a mention of any other kind in the state. The earliest recorded occurrence of a barn which may have been a bank barn, or an embryonic bank barn, is at Stillwater in 1792 or 1793. The barn was described as having been of frame, having two levels, an upper, on which the hay was stored, and a lower on which the animals were kept. The general inference is that this was a bank barn. This apparently was the first barn erected by this German family, the first member of which had settled there in 1741 or 1742.

The most significant difference between bank barns in Pennsylvania and those of northwestern New Jersey is in terms of size. In Pennsylvania such barns are often of great size, perhaps forty by one hundred feet in floor plan. In northwestern New Jersey such structures might average thirty by forty feet, and serve to house only six to eight cows.

It is probable, then, that the major route of entry of the bank barn into northwestern New Jersey was by way of eastern Pennsylvania, perhaps by the agency of the later German emigrants from eastern Pennsylvania to the cheaper land of northwestern New Jersey. In the Musconetcong Valley the present distribution of the bank barn correlates most closely with those of the "I" house and springhouse, indicating that these structures are culturally related.

Barracks

A common feature of the eighteenth-century agricultural landscape in northern New Jersey was the barrack (Fig. 34). This was a
Fig. 34. Raising a barrack roof, early twentieth century. Warren County, New Jersey. Source: Cummins, History of Warren County.
device which was used both to store hay and protect one or two head of cattle. It consisted of four stationary posts, and a simple gable\textsuperscript{110} or pyramidal\textsuperscript{111} thatched roof which could be adjusted to the height of the haystack by moving it up and down the posts. Barracks were encountered by Pehr Kalm in 1748 while he was enroute from the Swedish settlements on the Delaware to Philadelphia.\textsuperscript{112}

A description of a barrack by an English immigrant to Hunterdon County in 1787 is very similar to Kalm's description almost forty years earlier.\textsuperscript{113}

\textbf{Barracks are a building...I noticed...at first coming into the country. It has four poles fixed in the ground at the distance of fifteen feet in a square. The poles are square fifteen feet or more at top and five feet at bottom unsquared. This is all above ground. In the square part of the poles there are holes bored thro at the distance of twelve inches big enough for a strong iron pin to be put thro to support four wall plates which are tennanted at the ends, then some light spars are put upon the wall plates and thatch upon them. When it was only five feet from the ground, the room can be raised at pleasure 21 feet or any distance from the ground between that and five feet. These are to put hay or any kind of grain under and the roof is always ready to shelter it from hasty rains which is common hear\textit{sic} in summer. Those that have only two cows have the bottom part boarded at the sides and a floor laid over and the hay at top and the cow stable under.}

On more than one occasion the erection of barracks preceded the building of a barn in northwestern New Jersey. In 1761, Richard Shackleton offered a farm located approximately six miles north of Easton for sale, which included "a good Log-house, two good barracks,"\textsuperscript{114} but no mention of a barn. These barracks were probably also utilized as animal shelters. Later, however, most barracks were
used mainly to store hay, and there was no inclusion of a shelter for
stock. Occasionally, barracks were used to store grain. Silas
Chesebrough, en route from Newton to Johnsonburg in 1817, noted "very
large stacks of grain with roofs thatched with straw." Barracks
in use in the Musconetcong Valley in the early twentieth century
were approximately twenty feet square and were enclosed with boards
when the roof was half way up.

The origin of the barrack in New Jersey is surely Dutch. Such
structures are still important features of the rural landscape in
the northern Netherlands. They have largely disappeared from the
rural landscape in New Jersey, however, which prompted Wertenbaker
to assert in 1938 that "in searching through the Raritan and Passaic
valleys I have never seen a sliding-roof haystack outside of the
regions of original Dutch settlement. Apparently it has been a
tough bit of inheritance for the melting pot." An examination
of the early advertisements of farms, however, shows that barracks
were adopted as early as 1730 by other ethnic groups. The
distribution of barracks in the state as reflected in eighteenth-
century advertisements (Fig. 35), shows them to have been far more
widely diffused than Dutch barns. It is probable that during the
eighteenth century the barrack was far more widely distributed in
the Musconetcong Valley than were the settlers of Dutch ethnic origin.
At the present time an occasional barrack is still to be found in
the Valley, notably in the vicinity of Hackettstown, Port Colden, and
Asbury.
Fig. 35. Source: Whitehead, et al. (eds.), Archives of the State of New Jersey, First Series; and Stryker, et al. (eds.), Archives of the State of New Jersey, Second Series.
CHAPTER VI

THE CHARCOAL IRON INDUSTRY

The Highlands Charcoal Iron Industry

The charcoal iron industry entered the Highlands at an early date, perhaps at the very beginning of the eighteenth century,¹ and for over a hundred years exerted a most powerful economic influence in the region. Many portions of the Highlands were settled first by ironworkers, who later gave way to agriculturists after deforestation occurred. This fact was not overlooked by the early historians of the region. Gordon,² in 1834, wrote that the first settlers of the Highlands were:

...rather manufacturers than agriculturists; and the narrow valleys of the mountain region, which contain many and excellent mill seats, were only partially tilled for the subsistence of wood cutters and bloomers. The forge was universally the precursor of the farm. The iron master occupied large tracts of land, which, when stripped of timber, were sub-divided among agricultural successors, operating on the smallest scale.

In the Musconetcong Valley, however, and possibly in other broad limestone valleys in the Highlands, agriculturists preceded iron-workers by perhaps two decades. The first agriculturists were small in numbers, however, and the charcoal iron industry probably wrought

¹For notes to Chapter VI see page 315.
more significant changes for many years in the landscape than did farming.

Location

Three main resources influenced the location of the various eighteenth-century iron enterprises of the Highlands. These three resources were: (1) readily available iron ore, (2) abundant power in the form of rushing streams, and (3) a large supply of fuel (charcoal), which could be made from the rich deciduous forests of the region. Of the three resources, the latter two were most important. The Highlands were rich in deposits of hematite and magnetite, and even in the early days of the charcoal iron industry it was feasible to transport the rich ores overland for many miles, especially to the small extractive forges. On the other hand, waterpower in most cases could not be transported far from streamside, nor could bulky loads of charcoal fuel be transported as cheaply as could rich iron ore.

The iron industry, because of its requirements of fuel and power, generally became established in the van of dense agricultural settlement. Where millers had preempted the best power sites and where deforestation had taken place due to agricultural clearing, the charcoal iron industry simply was not economically viable.

Foreign and Domestic Economic Influences

In addition to the need for certain raw materials, the establishment and viability of the charcoal iron industry of the Highlands was affected by the general economic conditions of the day.
An important economic influence on the iron industry of the Highlands emanated from the British Isles. British iron interests were antagonistic towards the ironworks of the American colonies and as early as 1719 sought by legislative means to prevent the manufacture of iron wares from raw iron, and the erection of forges to convert raw iron into refined iron by American companies. This legislation, and similar measures advocated by British iron interests ten years later, did not become law, but resentment toward the American iron interests did not cease until the Revolution. The chief reason for the hostility of British interests was the fact that they feared that cheaper American bar and pig iron, produced with the abundance of inexpensive charcoal not readily available in the British Isles, would flood the English market. This fear was well founded, as American iron began to enter the British Isles in quantity in 1735.

A major encouragement to American producers appeared in 1750. Due to the unfavorable balance of trade with Sweden, which was a major supplier to the English ironmongers, a law was passed eliminating all of the duties which had been imposed on iron from the colonies. Construction of facilities in the colonies to fabricate iron beyond its refined stage was forbidden, however.

Official encouragement spurred iron exports from America to the British Isles, and in 1771 they rose to a peak of five thousand tons. In reality, this was a small proportion of the iron imported from other sources at the same time, perhaps forty to fifty thousand tons a year. Despite the poor showing of American iron in relation
to the imports from Sweden and Russia, a great many forges and furnaces in the Highlands were erected to exploit the steady market for their products which existed in Britain and the colonies.

Toward the end of the seventh decade of the eighteenth century many Highland iron interests fell upon bad times. This difficult period was felt by many other enterprises of the day, and can most likely be attributed to the difficult and deteriorating political situation. A typical victim of the hard times was Thomas Reading, who was interested in the Squire's Point Forge property on the Musconetcong. Reading made public his plight in an advertisement in the *Pennsylvania Gazette* on August 30, 1770.

Whereas the subscriber has been concerned in trade, and carrying on iron-works, for a number of years past, by which, meeting with many losses, and, by the hardness of the times, is unable to procure money to pay the debts contracted at said works, whereby they, and the lands belonging to them, which cost several Thousand Pounds, have been sold, by execution, for only as many Hundreds, as also a large estate besides, sold nearly in the same proportion to its value; I am therefore under the disagreeable necessity of giving my creditors notice, that in order to free my body from confinement, I intend to petition the legislature of the province of New-Jersey, at their next sessions, for relief in the premises.

In 1773 a group of New Jersey ironmasters issued an invitation for others associated with their industry to meet with them at Morristown in order to consider measures necessary to the better fortune of the iron business, but there is no record of any agreement having been reached.

The Revolution further served to depress the iron industry in many areas. British markets, which had consumed a large percentage of the iron produced, were closed, loyalist ironmasters had their
property confiscated or closed their works down and competent managers
and workmen, who were always in short supply, found their way into
the army.\(^{13}\) Forges and furnaces remaining in operation also suffered
financially, despite the heavy demand for their products. The lack
of hard currency often caused iron interests to expedite the sale of
their iron through barter.\(^{14}\) The lack of cash on the part of forge
owners along the Musconetcong at this time is illustrated by the
fact that in 1780 the proprietor of Greenwich Forge wrote the
proprietor of Durham Furnace that he "would be very glad to get
cash...as soon as possible\(^{sic}\) as we are much Distressed for want of
cash to pay for a Night's Lodging..."\(^{15}\)

Conditions did not improve after the war. There was, rather,
a period of retrogression in which the industry reverted from an
export-commercial focus to a primarily local market.\(^{16}\) In addition
to the loss of the English market, foreign iron began to undersell
the domestic product in America, primarily due to the fact that
American labor was so costly,\(^{17}\) and that widespread deforestation in
the environs of established furnaces and forges had made fuel much
more expensive than it had been in the past.\(^{18}\) Also, the quality of
American iron was often not as high as that of the competing foreign
product. In 1785, the firm of Jones and Lownes, in Philadelphia,
informed Richard Backhouse, then lessee of Durham Furnace, that the
iron produced by his New Jersey forges (Greenwich and Chelsea, on the
Musconetcong) was "very flawey" and that "Neat Sound Iron will take
the Preference here."\(^{19}\) Also, Backhouse's product had been sold to
them for £ 29 per ton, while the competitors of Jones and Lownes
were able to buy "furrin [sic] Iron" for £25 per ton, which was "very Neatly Drawn..."\textsuperscript{20} The concluding statement of Jones and Lownes' missive could have been profitably considered by most Highland iron manufacturers of the day: "It will be very necessary for us to have our iron better manufactured very few forges but what hath Room for improvement...."\textsuperscript{21}

Ironworking Enterprises

The charcoal iron industry of the New Jersey Highlands consisted of three different types of ironworking enterprises. Of primary importance were the furnaces, which were producers of metallic iron which was supplied to the often independent forges, which refined the raw iron of the furnace to the "bar" or wrought iron of commerce. Independent of both forge and furnace were the bloomeries, or extractive forges, which manufactured wrought iron in small quantities directly from the ore.

Furnaces

Of all American furnaces, those of Pennsylvania and New Jersey were especially noted for their advanced design.\textsuperscript{22} There are few data extant to indicate the type of furnace erected in the Musconetcong Valley and its environs. The inference is that they were similar to those of nearby eastern Pennsylvania, since Pennsylvania interests were responsible for their construction. These furnaces were, apparently, immediately derived from English precedent.\textsuperscript{23} This, in turn, depended on developments in continental Europe during the Middle Ages. French and German terms associated with the operations of
both forges and furnaces in England and the colonies offer abundant testimony in this vein.24

The typical eighteenth-century iron furnace of Pennsylvania and West Jersey consisted primarily of square stacks of stone or brick, broad at the base and narrow at the top, which reached heights of twenty feet or more25 (Fig. 36). The widest portion of the inner part of the stack was termed the "bosh," and usually reached nine feet in diameter.26 The interior of the stack was lined with a refractory material, perhaps fire brick, and the outside with blocks of limestone or other locally obtainable rocks. The stack was open at both ends, and rested on a square chamber called the hearth, built of fire bricks,27 or of sandstone.28 On each side of the stack were arches which extended into the masonry and helped to support the structure. Through one of these the tuyere penetrated the stack, in order to admit a blast of air.29

Most furnaces were built into the sides of hills in order to facilitate the placing of fuel, flux, and ore in the stack.30 In front of the furnace, protected by a simple roof, or an enclosed building, was the casting or molding shed or house. On the floor of this structure were located the sand molds into which the molten iron was channeled from the hearth of the furnace.31

Additional structures were grouped around the furnace. Typically, these would include the mansion of the ironmaster, other more humble structures for the workmen, coal houses for the charcoal fuel, a store, perhaps a gristmill and sawmill, a blacksmith shop, and other miscellaneous structures. If agriculture was also carried on, as was
often the case, buildings devoted to grain storage and the protection of stock would also be found.32

The reduction of iron ore to metallic iron in the eighteenth century was through methods which were much the same in principle as those employed today. Layers of charcoal, iron ore, and limestone were alternated in the stack of the furnace. Charcoal was used as fuel because it was the only fuel known in America which attained temperatures high enough to melt iron ore. Mineral coals were not utilized for the reduction of ores in North America until the nineteenth century.33 Limestone was included in the charge because of its value as a flux, a material which would combine easily with impurities in the iron ore.

Once a furnace had started operation or had been "blowed in," its use was continuous. A stream of air entered the stack through the tuyere, bringing the oxygen needed for combustion of the charcoal and reduction of the iron. The air was forced through the tuyere by bellows which were activated by a waterwheel. The high temperatures induced by the blast of air and the combustion of the charcoal liquified both ore and limestone, which tended to drip down into the hearth. The liquid iron was heavier than the slag which formed through the combination of impurities in the ore with the flux, and thus settled to the bottom of the hearth chamber.34

Twice a day, or more often, depending on circumstance, the molten iron was run into the casting house from the hearth. The main stream of iron, and the molds lying on each side of it, were reminiscent of a sow and her sucking piglets, thus the terms sow and pig iron for the iron cast.35
The production of metallic iron by a typical Pennsylvania furnace in the eighteenth century, was about twenty-five tons per week. Durham Furnace, which supplied many forges along the Musconetcong, turned out three tons every twenty-four hours. The average furnace employed a little over a dozen men, who worked in two twelve-hour shifts. In most cases the furnace did not operate during the winter months due to freezing weather which prevented the waterwheel from operating the bellows and providing the air blast necessary for smelting.

Furnaces in or Near the Musconetcong Valley

Several furnaces were erected at an early date in or near the valley of the Musconetcong (Fig. 37), but not, as we have seen, before the first agriculturists began entering the area. These establishments included Durham Furnace (1727), Oxford Furnace (1734), Union Iron Works (1743), Norton Furnace (ca. 1743), Johnston's Furnace (1753), Andover Furnace (1760), and a small furnace erected at Changewater Forge before 1774.

Forges

Although the eighteenth-century furnaces could sell and export much of their pig iron, many turned to the establishment of forges where pig iron could be processed into bar iron, which sold for three and a half times the price of ordinary pig iron. The forges in the Musconetcong drainage system, and in West Jersey in general, were often erected by Philadelphia interests, so that it is probable that English methods of construction and ironworking were in use there as they were in Pennsylvania.
CHARCOAL IRONWORKS ERECTED IN AND NEAR THE MUSCONETCONG VALLEY BEFORE 1805

Fig. 37. Compiled from various sources.
Eighteenth-century forges in the Highlands varied in size, small ones having but one hearth and one hammer, the largest including perhaps four fires and two hammers. Pig iron, in the form of rough bars five or six feet long and about six inches wide, was brought to these forges from the furnaces.

The pig iron was fabricated into bar iron at the forges. The first step was to place the pig iron in the first hearth of the forge, which was termed the "finery." After the pig had softened into a lump, it was removed from the hearth with a hook and tongs and placed on an anvil under a great iron hammer activated by a waterwheel. After having been pounded by the hammer, the iron was replaced in the hearth, and heated to a bright-red color. It was then again placed under the hammer. The result of this treatment was an "ancony," a bar of wrought iron which was flat, thick, and had a rough nob at each end. The anconies were usually reheated at another hearth, known as the chafery, and reworked under the hammer to form the "bar iron" of commerce.49

Individual pieces of bar iron varied greatly in size, but were often drawn about fourteen feet in length, two inches in breadth, and half an inch thick.50 In 1783, John Stotesbury, then manager of Chelsea Forge on the Musconetcong, sent Richard Backhouse at Durham Furnace two one-ton batches of bar iron. One contained sixty-eight and the other seventy-one individual pieces.51

The processing of pig iron into bar iron was necessary due to the brittle nature of the iron produced by the early charcoal blast furnaces. Pig iron was actually an alloy of iron with carbon, which
had been introduced by charcoal, and also contained a varying amount of slag.\textsuperscript{52} The processes employed by the eighteenth-century forgemen served to drive out the carbon, and to extend the slag throughout the bar in a fibrous structure. This strengthened the metal but did not alter its chemical composition.\textsuperscript{53}

Both the finery and the chafery consisted of open hearths covered with heaps of coals, which were surmounted by huge chimneys.\textsuperscript{54} As was the case in a furnace of the day, a blast of air was supplied to the hearth by bellows activated by a waterwheel.\textsuperscript{55}

Forge hammers were truly massive, being four-to six-hundred pounds in weight,\textsuperscript{56} and were mounted on oak beams which ran parallel to the shaft of the waterwheel. A waterwheel measured twenty-five feet or more in diameter and activated the hammers by means of trunnions catching the oak beams immediately behind the hammer heads.\textsuperscript{57}

Waterwheels in use at the forges were most likely of the undershot type in early days, as Peter Hasenclever is generally credited with introducing the use of the overshot wheel for the working of iron in New Jersey in the middle of the eighteenth century. The idea was still thought to be novel as late as 1768.\textsuperscript{58}

Hasenclever, a German who operated the Ringwood Iron Works, introduced other advanced ideas for ironworking into the state. He was credited by contemporaries with being the first to use "shafts with strong cast-iron rings, whose arms served as cogs to lift the hammer handle," and also was "the first person that we know who has so greatly improved the use of the great natural ponds of this country as by damming them to secure reservoirs of water for the use
of iron works in the dry season, without which the best streams are liable to fail in the great droughts we are subject to.\(^59\)

Indeed, drought and an increased rate of evapotranspiration during the warm months were common problems throughout the Highlands, causing many smaller streams to run too low for the operation of a waterwheel. This problem affected ironworks on the Musconetcong less than it did on other streams. Eighteenth-century advertisements constantly referred to the Musconetcong as "a never-failing stream of water,"\(^60\) and as being "noted for a fine constant stream of water."\(^61\)

Another problem affecting forge and furnace operations alike was freezing in the winter. Forges generally operated during periods of open water during the winter. Not being continuous operations, as were the furnaces, forges could operate in a stop-and-go fashion, taking advantage of the periods of high water in winter. The problems of winter operation are illustrated by letters emanating from some of the Musconetcong forges.\(^62\) On January 10, 1784, Thomas Wright of Greenwich Forge wrote Richard Backhouse at Durham Furnace: "We are entirely Froze up for some days past or else you should have had a Tun of Barr Iron this day...Our Race is...much Damaged, by the Snow and Ice...."\(^63\)

Location

Eighteenth-century charcoal iron forges in both England and America were generally somewhat removed from the furnaces from which they drew their raw material. This was due chiefly to the fact that both operations utilized waterpower, and suitable sites for the same
were limited, often effecting a distance of several miles between forge and furnace. Another consideration was the fact that both forge and furnace used large quantities of charcoal, which may not have been available in amounts to allow both operations in the same locality.

Production

Eighteenth-century forges varied in productivity. In Pennsylvania, a small forge might produce about two tons of bar iron a week, while a larger forge, with three or four hearths and two hammers, working doublehanded, could produce three hundred to three hundred and fifty tons per year. In 1777, the Brookland Forge, located on the Musconetcong near Lake Hopatcong, which possessed four hearths and two hammers, was said to be able to produce three hundred tons of bar iron per year, indicating a similarity in amount of production to the forges of Pennsylvania. On the other hand, the Greenwich Forge, also on the Musconetcong, and also having four hearths and two hammers, produced only one hundred and forty-seven tons of bar iron in the period from April 6, 1780, to July 1, 1782. This low rate of production may have been due to the exigencies of times of war, however.

The shrunken local market which existed at the end of the eighteenth century encouraged at least some forges to produce quite diverse goods in addition to turning out bar iron. Greenwich Forge frequently produced nails in the 1780's. Other products included "RINGERS' BARRS for hoops," "Shear moles," "Land Slides,"

The Forge Community

Forge communities in the Highlands generally, and in the Musconetcong Valley particularly, varied considerably in their constituent parts. Most contained some sort of relatively pretentious dwelling for the proprietor or manager, smaller dwellings, often of logs, for workmen, the building or buildings containing hearths and hammers, which were built of stone or frame construction, and a coal house, often built of stone, for storing large amounts of charcoal. Other buildings housed services necessary to or convenient for, the forge workers and also for the subsistence agriculturists who lived nearby, but who were independent of the forge company. The services included a company store, a smithy, and often a sawmill and a gristmill. The latter two frequently occupied the same structure.70

Labor

The labor utilized by the forge owners varied from place to place. In many cases, negroes or redemptioners were used.71 When the Greenwich Forge, on the lower Musconetcong, was offered for sale in 1768, the owner indicated that "there will also be rented with the works, seven negro men, who have been employed for many years past in the Forge, and understand the making of iron."72 Negroes remained a large part of the labor force at Greenwich Forge as late as the 1780's.73 In 1770, Negroes were also represented among forge laborers in the northeastern part of the Musconetocong drainage
system. In that year, Andover Forge employed "six Negroe Slaves..., who are good Forgemen, and understand the making and drawing of Iron well...."\textsuperscript{74}

The redemptioners, who were employed by the majority of forges, were often dissatisfied with their working conditions and attempted to escape. The plethora of forges in the Musconetcong Valley advertising rewards for runaway redemptioners in the eighteenth century illustrate the universality of this problem. Names and descriptions included in the advertisements for runaways indicate that the majority in the Musconetcong Valley were of English or Irish descent.\textsuperscript{75}

Whether the workman was a slave, redemptioner, or wage laborer, he often fared poorly at the iron forges. According to William Kirby, who worked at the Andover Iron Works in 1762:\textsuperscript{76}

\begin{quote}
The wood chopper piled his wood so as to cheat the collier. The collier put his charcoal into baskets in such a manner as to deceive the iron master; and the iron master, not to be outdone, sold his provisions to the men at an extortionate price.
\end{quote}

The result was that very little in the sense of real wages was ever seen by even the free workman, and that the work of the forge was carried on in a more slipshod manner than obtained in northwestern Europe at the same time.\textsuperscript{77}

Forges Erected in the Musconetcong Valley

The erection of forges at suitable sites in the Musconetcong drainage system soon followed the establishment of the charcoal iron furnaces, which assured a ready supply of pig iron. In many cases, furnace and forge were erected by the same companies. Forges erected
in the Musconetcong Valley during the eighteenth century included Changewater Forge (ca. 1741), Greenwich Forge (ca. 1750), Chelsea Forge (ca. 1751), Brookland Forge (ca. 1760), Squire's Point Forge (ca. 1760), Andover Forge (1763), and Bloomsbury Forge (ca. 1766).

Bloomeries

The charcoal iron industry of the Highlands included not only the interrelated forges and furnaces but also bloomeries, which produced bar iron directly from the ore. Most eighteenth-century bloomeries in northern New Jersey consisted of one or more hearths constructed very much like a blacksmith's forge, except larger. Air was introduced by means of a tuyere and was forced into the bed of hot coals by means of bellows activated by a waterwheel, as was the case with forges and furnaces.

The production of bar iron at a bloomery involved the acquisition of relatively rich ore from nearby mines, breaking it into small pieces and then placing it in the heated hearth along with limestone and large quantities of charcoal. As the ore softened, it was worked with a long bar by the forgeman, until a lump of metallic iron, known as the "bloom," or "loop" was formed. This pasty ball of iron, when of a suitable size, was withdrawn from the forge and was placed on an anvil to be pounded under a heavy hammer, as was done in the refinery forges. Successive heatings and hammerings drove out most of the impurities, and the resulting bar iron was appropriate for the use of local smiths and artisans.
Most bloomeries were relatively small enterprises, consisting of but one or two fires and one hammer. The maximum production of most bloomeries was one ton of bar iron per week. Bloomery bar iron sold for approximately three times the price of ordinary pig iron, but was not valued as highly as was the refined bar iron of the typical forge, which brought a slightly higher price. This was probably due to the relatively larger amounts of impurities in the bloomery iron.

Bloomeries were often simply called "forges" in eighteenth-century accounts, since their operations were quite similar to the forges which refined the pig iron of the furnaces. Thus, it is often difficult to identify a bloomery as such.

Despite their less advanced technology and independent nature, bloomeries generally succeeded instead of preceded the erection of forges. The reason for this is to be found in the fact that the loss of the English market made the larger iron enterprises increasingly uneconomic, while the independent bloomeries could better adjust their production to the shrunken local market. Also, in many areas deforestation had removed the fuel supply so badly needed by the larger iron enterprises. The bloomeries located, for the most part, in relatively rugged, glaciated areas, where large-scale, economic production of pig and bar iron was impossible, but where there was a good supply of wood available, and where a sufficient demand existed.
Bloomeries in the Musconetcong Watershed

Several bloomeries were established in the Musconetcong Valley during the latter portion of the eighteenth century and the first few years of the nineteenth century. These included a relatively early one associated with, and on the site of Andover Forge (1763), two in the environs of present Stanhope (ca. 1780-1801), two on Weldon Brook (1800-1805) and one on Lubber's Run (1802).

Mining

In order to obtain iron ore for the furnaces established at Bloomsbury and Changewater and for the bloomeries which were established at Andover, Stanhope, and on Weldon Brook and Lubber's Run, many mine pits were opened. Since there was not the demand for the large quantities of ore that characterized later nineteenth-century operations, and quite rich ores outcropped at the surface in many locations, mining was a casual affair in that little in the way of technical knowledge was needed to remove the ore. An observer in 1783 mentioned that "any knowledge of mining is superfluous here in Pennsylvania where there is neither shaft nor gallery to be driven, all work being done at the surface, or in great, wide trenches or pits." A similar situation obtained in New Jersey. When a pit became too deep for efficient operation, or a high water table caused flooding, the miners simply began to dig elsewhere.

The value of iron mines was well known to the early surveyors of the Highlands, who had staked out most of the productive mines of the area before the Revolution. The earliest mine in operation seems to have been the Dickerson Mine at Succasunna, the ore of which
was being utilized as early as 1700.\footnote{100} This was one of the richest mines ever opened in the state and in early days supplied many extractive forges located at a distance.\footnote{101}

The earliest mine located in the Musconetcong Valley appears to have been the one owned by Martin Ryerson, who in 1750 possessed a body of ore "on ye North East Side of a Brooke that Runs in the Most northerly Branch of Maskinitkonck river [Lubber's Run]\ldots\"\footnote{102}

By 1761, Johnston Furnace at present Bloomsbury was making use of ore "carted from the south side of Musconetcong Mountain,"\footnote{103} This ore lay "within a quarter of a mile of the furnace\ldots\"\footnote{104} Andover Forge worked up ore from the Rossville Mine, which lay approximately two miles to the northeast of the forge.\footnote{105}

"Iron Mines" are shown prominently to the northwest of Changewater on the Faden map of 1769 (Appendix I). It is possible that it was from this location that the small furnace at Changewater drew its ore.

Later bloomeries were most likely supplied by outcroppings of ore which were locally abundant, or by the extremely rich ore from the Dickerson Mine at Succasunna. Lockwood Forge, on Lubber's Run, was supplied by the Stanhope or Hude Mine, opened in 1802.\footnote{106}

**Charcoal Burning**

An extremely important activity upon which all iron interests depended was the burning of charcoal. Forges in the Musconetcong Valley employed both woodcutters and colliers. Much of the work probably was done by local farmers on a part-time basis, since the forges paid woodcutters by the cord, and also paid daily wages for
"coaling." Much of this work was done during the cold portion of the year, when agriculturists had time to spare.\textsuperscript{107}

The open-pit process of producing charcoal in use at this time varied only slightly from place to place in the Middle Colonies. Wood was cut in approximately four-foot lengths and piled tightly, on end, in a hole dug in the ground. The conical stack resulting varied in circumference and height according to the number of cords in the charge. The center of the stack was occupied by a shaft in which small pieces of kindling were placed. Large sheets of sod and several inches of earth were used to cover the entire mass, with the exception of strategically placed vent holes. A fire was then started in the central shaft, and by carefully regulating the air supply by opening and closing the vents, the wood was evenly charred. A fifteen-cord charge required approximately two weeks before the charcoal could be utilized.\textsuperscript{108}

Forge account books indicate that open-pit charcoal kilns were constructed on the sites where cut wood was available, and the charcoal was then hauled to the forges.\textsuperscript{109}

**Deforestation**

The presence of sufficient wooded land to allow the production of an ample supply of charcoal was vital to the continued operation of forge, furnace, and bloomery alike. Unfortunately, the general policy on the part of the owners of ironworks seems to have been to clear-cut the forest as rapidly as possible without thought as to regeneration. This practice was universally denounced by European travellers who were cognizant of the more-enlightened forest management
carried on in their homelands.\textsuperscript{110} The remarks of Johann Schoepf in 1783 are of special note in this regard:\textsuperscript{111}

The business of the mines and foundries, in New Jersey as well as throughout America, cannot be said to be on as firm a basis as in most parts of Europe, because nobody is concerned about forest preservation and without an uninterrupted supply of fuel and timber many works must go to ruin, as indeed has already been the case here and there. Not the least economy is observed with regard to forests. The owners of furnaces and foundries possess for the most part great tracts of appurtenant woods, which are cut off, however, without any system or order. The bulk of the inhabitants sell wood only in so far as to bring the land they own into cultivation, reserving a certain acreage of forest necessary for domestic consumption. The Union, a high furnace in Jersey, exhausted a forest of nearly 20,000 acres in about twelve to fifteen years, and the works had to be abandoned for lack of wood.

In similar fashion, at an early date, iron interests in the Musconetcong Valley began to experience a shortage of wood for charcoal. As early as the 1750's and 1760's proprietors of forges in the southwestern portion of the Valley began buying additional property in order to secure additional woodland.\textsuperscript{112}

Owners of wooded property located near ironworks continually had difficulties in protecting their timber from being cut and spirited away to be sold to the forge owners - a common practice in many thinly settled areas. In 176\textsubscript{4}, a report on the Barker tract in Alexandria Township described the incursions of timber thieves.\textsuperscript{113}

The Timber cut down and wasted and Three hundred Cord laying in the woods ready to be converted into charcoal for supplying the two Iron Forges /Greenwich and Chelsea/ in the Neighbourhood - We had great reason to think the Owners of the Forges did every thing in their power to prevent the settlers from coming under Lease which would deprive them of getting the Wood at a very low
price. One Starr /Jacob Starr/ who owned the larger Forge /Greenwich Forge/ and was Sheriff of the County seemed to be the leading man in that part of the Country. I threatened him with a suit for Trespass and Waste, he begged hard and promised that he would neither cut himself or buy from any of the settlers on the Tract. We then found that Mr. Starr was not on good terms with his neighbours and we engaged them to watch that no timber should be cut on the Estate hereafter.

More than twenty years later, due to the turbulence of the Revolutionary War years, the same situation existed on the tract. A report written in the year 1785 indicates that wood stealing was still a major problem. 114

The common Convention on this Subject is that these people are encouraged in their opposing Sir Roberts Title by Hugh Hughes who is one of the Judges of the Court of Common Pleas in the County of Sussex and is concerned in Iron works on the River Mosconetcunk /Greenwich Forge/ and I think it very likely because he has no coal wood to his works and by stirring up this Spirit of opposition and keeping the owner off the Land he has an opportunity of buying wood of the Trespassers on the Tract, at a very low rate.

As woodlands became more and more depleted of coal-size trees, and the carriage of charcoal to ironworks became more expensive, the larger iron interests, which were located on fertile limestone soils, were forced to sell off their cleared lands to agriculturists. By 1774, Changewater Forge's lands had been "divided into plantations of about 200 acres each." 115 In the same year, Squire's Point Forge was advertised as "the noted farm, late the property of Ryerson and Reading...." 116 Andover Forge was abandoned after the Revolution because of the lack of fuel wood, and "for years thereafter the locality...was a barren waste." 117
Changes in Forest Composition

The result of the general deforestation encouraged by the iron industry was not only the encouragement of agriculture where the soils allowed, but also a change in the species composition of the forests. Wherever the land was not immediately placed in agricultural use, sprouts from the stumps of certain species of clear-cut trees began to regenerate the forest. The "piece of young timber" which James Parker noted on the slope of Musconetcong Mountain in 1789 had its parallels elsewhere. Since clear-cutting encouraged sprout rather than seedling reproduction, certain vigorously sprouting and rapidly growing hardwoods soon dominated the second-growth woodlands. The chestnut and the various oaks were especially favored.

Impoundments

Another change from the natural landscape due to the iron industry was the impoundment of waters so as to provide a steady source of power during periods of low water, or to raise the head of the water and thus provide a greater fall of the water and more power.

Impoundments during the eighteenth century consisted of crude stone dams built by placing large stones in the stream at a rapids, small waterfall, or downstream from a basin or widening in the stream which would receive the impoundment. Other dams consisted of large timbers with an earth, boulder, and gravel fill (Fig. 38).

The most impressive impoundment was at Lake Hopatcong where an earthen-fill dam raised the level of the Great Pond approximately five feet, backing it up and joining it to the Little Pond to the northeast. The Faden map shows that more-humble impoundments served
Fig. 38. Remnant of the Brookland Forge earth, boulder, and gravel fill dam, approximately six feet in height. This dam was responsible for greatly enlarging Lake Hopatcong after ca. 1760. Lake Hopatcong State Park, New Jersey.
the waterwheels at Andover and Bloomsbury. New Partners Forge was supplied by "a pond of large dimensions"\textsuperscript{122} (now Lake Shawnee) in 1818. This body of water existed as early as 1769, as it is shown on the Faden map, but may well have been expanded by impoundment when the forge was built.
CHAPTER VII

PIONEER INDUSTRIES AND VILLAGES

The Importance of Waterpower

As significant numbers of agriculturists settled in the Musconetcong drainage system it became possible for entrepreneurs to erect industrial establishments to serve their needs. The most significant of these industries, in both their appearance on the landscape and their impact on the local economy, were those which utilized the power inherent in the fast-flowing river. In some cases, those industries serving mainly agrarian needs shared power sites with ironworks; in other cases they stood alone, perhaps at a site bypassed by the iron interests. The value of waterpower was well appreciated by early speculators, and promising sites were acquired well in advance of the tide of settlement.

Grain Milling

The earliest and most important application of waterpower in a pioneer agrarian community for local needs involved the grinding of grain. In the period before gristmills were established locally for this purpose, settlers had the choice of an inordinately long trip over difficult trails to a distant mill, or of having the grain ground at home by hand. The latter was often the choice first made in remote settlements.
In northwestern New Jersey, the home grinding of grain depended on the utilization of either of two implements. Many women, adhering to Old World precedent, preferred the rotary quern, which consisted of two specially ground and fitted circular stones, perhaps eighteen inches in diameter, the upper of which revolved upon the lower and, in so doing, ground the grain which lay between.\(^{1}\) Other settlers, who had been more influenced by aboriginal example, used mortars and pestles. The pestle was often of stone, and the mortar of wood.\(^{2}\) In some cases, the settlers used a section of a hardwood tree for the mortar and a wooden pestle, which was fastened to a bent sapling, thus lessening the work involved. Such devices were termed "plumping mills."\(^{3}\)

**The Importance of Gristmills**

The establishment of grain mills activated by waterpower caused the discontinuance of home grinding. Settlers travelled long distances, their grain contained in long bags draped over the backs of several horses, and often spent several days in travel in order to save their wives the arduous work involved in hand grinding wheat to a flour fine enough for baking purposes.\(^{4}\) At the time of first agricultural settlement in the Musconetcong Valley, John Bowlby, owner of an extensive property in the vicinity of Hampton, made use of mill facilities at Pittstown, a little less than ten miles to the south. His route was by way of an Indian path, and often, upon his arrival at the mill, he found that he had to wait his turn.

\(^{1}\) For notes to Chapter VII, see page 321.

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Upon occasion, this meant a stay of two or three days away from home.\textsuperscript{5}

The role of gristmills in the early settlement of many areas has not been properly examined. It was obviously of benefit to the pioneer to have a mill located relatively nearby and thus save on the inordinate amount of time spent on travel to and from the mill. For example, as early as 1737, a property on the banks of the Musconetcong was advertised as being only "6 Miles from the Place where a new Grist-Mill is going to be erected by Samuel Green."\textsuperscript{6}

**Early Gristmills**

Unfortunately, there is little information extant on the type or morphology of the early gristmills of northwestern New Jersey. Even those scholars whose interests have included mills have not been concerned with this problem,\textsuperscript{7} and the early mills themselves have all vanished. Of log, frame, or a combination of these two building materials, early mills were subject to cannibalization when superseded by more-advanced structures, or, as was true in many cases, were destroyed by fire.\textsuperscript{8}

The best description of an early mill near the Musconetcong Valley and generally in northwestern New Jersey, is contained in Casper Schaeffer's reminiscences of his grandfather, a German pioneer who settled at Stillwater on the Paulinskill, approximately thirteen miles north of Hackettstown, in 1741 or 1742. Within the first few years of his settlement, Schaeffer's grandfather built a simple mill which served the surrounding farming community for many years. His grandson described the structure and its capacity as follows:\textsuperscript{9}
To create a water power, he threw a low dam of cobbled stones, filled in with gravel, across the stream. He then proceeded to drive in the ground, at the west end of the dam, piles, over which he erected his log mill superstructure; it was now ready for business. Its dimensions being small, its execution was on a corresponding scale, from three to five bushels being the ordinary quantity it would grind in a day.

It can be seen that the small capacity of this mill may have caused many to wait their turn just as did John Bowlby at Pittstown.

Although the description of the original Schaeffer mill, compiled through both the author's memory of the remains of the mill in his youth and by conversations with his grandfather, is slight, available evidence indicates that it was most likely a tub mill.

Tub mills were the simplest and most inexpensive mills that the pioneers could build. They were activated by a horizontal waterwheel approximately eight feet in diameter or less, with oblique paddles. Water was channeled in to strike the upper part of the wheel in the direction of a tangent with its circumference. Buckets were set in the wheel obliquely so that the water struck them at right angles. The wheel, the vertical shaft to which it was attached, and the upper millstone revolved as one unit. The term "tub mill" was applied because the wheel had a tub or hoop around it which confined the water until its motive force was extracted. All parts of the early tub mills, save the millstones, could be easily made of wood, thereby saving the pioneer miller great trouble and expense. Tub mills were certainly present in early settlements in Hunterdon County, and tradition indicates that they were almost universal among the early German settlers of that county.
Gristmills in the Musconetcong Valley

The rapid increase in population experienced throughout northwestern New Jersey, especially during the seventh decade of the eighteenth century, heightened the demand for local milling services in the region. On the Musconetcong as well as on neighboring streams, gristmills were erected to service this demand (Fig. 39).

Gristmills were built as early as 1758 at Bloomsbury, before 1761 at present Warren Glen, and before 1763 near Hackettstown. A map published in 1776 shows only the place name "Salmons Mill" at what was then the settlement of Bloomsbury. Gristmills which may have been built at least as early were in operation between Changewater and Penwell in 1765, at Squire's Point in 1769, and at Waterloo in 1770, and at the outlet of Lake Hopatcong in 1773. Mills which were known to have been in operation before the Revolution were located at Beattystown, Asbury, and on the Barker property northeast of Finesville. Mill construction was adversely affected by the economic dislocations resulting from the Revolution and probably ceased for the duration.

In 1784, two gristmills were being operated in Asbury, and another was built near Penwell, perhaps as early as 1785. In the next decade a gristmill was built on the north bank of the stream at Finesville in 1791, on the north bank at Riegelsville before 1793, on the south bank in the same vicinity in 1796, and on a small brook entering the Musconetcong at Anderson in 1798. In 1800 a gristmill was built on the south bank of the Musconetcong at New Hampton, and about the same time the "Point Mills," were constructed at Squire's Point.
Fig. 39. Compiled from various sources.
Later Gristmills

With the probable exception of the gristmills constructed on brooks tributary to the main stream, the mills established on the Musconetcong proper were probably not simple tub mills. They were designed to make use of a larger quantity of water than tub mills required, and also to satisfy a demand greater than could be met by smaller-scale operations. Also, at least half of the mills were established at the iron forges, where a more advanced technological knowledge than that possessed by simple farmers was available. Unfortunately, again data are limited, and little has been published on the early mills, and fires and cannibalization have taken their toll.

The best account of the establishment of a gristmill during the later phase of pioneer settlement in northwestern New Jersey is again that of Casper Schaeffer's grandson. Fortunately, the younger Schaeffer was himself a miller for part of his life, and was familiar with the second structure erected by his grandfather, which was located on a site near that of the first mill.32

About the year 1761 the second mill was built... having a head race about a quarter of a mile long, and twenty-five or thirty feet wide by which a greater fall and water power were obtained. This mill, though not large, was a great advance on the former one, containing two runs of stones, with bolts and other appurtenances, rendering it much more efficient.... Connected with this establishment there was also a sawmill and an oil-mill.

Apparently this mill was of wood construction, as it burned to the ground in the early part of the nineteenth century. The mill was a three-story affair, with outside stairs which the miller used to
carry the grain in to be ground, and later, out to the waiting horse or wagon of the farmer. The later nineteenth-century mill, built after the destruction of its predecessor by fire, was described as having been able to "perform three times as much work as the old mill," with the use of the same amount of waterpower.

Another gristmill of the day, located on the Musconetcong at Hackettstown, was advertised for sale in 1777. It was described as being "a large frame mill with two pair of stones, the one pair sopes, the other cullen, one pair for merchant and the other for country work, with four boulting cloths, all in good order...."

Although most of the early mills served a local market, grinding wheat, rye, buckwheat, oats, and maize for farmers who came as often as twice a week for this service, later mills also engaged in merchant work. Merchant mills bought grain from the farmers, manufactured it into flour, and then sent it to a larger market.

The mill located at Hackettstown, and its associated property, was leased by a miller named William Allen in 1778 from Garret Rapalje, the owner, for six hundred bushels of wheat per year. Payment in kind most probably indicates that Allen received a toll from the farmers in payment for his services rather than hard cash. This was a common practice in the eighteenth and nineteenth centuries.

The mills in use on the Musconetcong, and elsewhere in the northwestern part of the state during the eighteenth century, most likely were powered through the use of undershot waterwheels. This type of wheel was placed in running water in such a way that the paddles on its lower side would be struck by the flowing water and...
thus rotate the wheel. The undershot waterwheels in use usually consisted of two large wooden wheels on the same shaft, often being from twenty-five to thirty feet in diameter and having paddles one-to two-feet wide. These wheels turned in shallow water and did not require the construction of dams as did the later overshot wheels.\textsuperscript{39}

On occasion, simple dams were built, at first probably much like Casper Schaeffer's grandfather's first dam. The mill at Hackettstown may have lain below such a dam.\textsuperscript{40} In such a case, water was probably conveyed to the waterwheel by means of a small canal or race dug from just above the dam to the mill site. This was a practice well known in northwestern Europe as early as medieval times, and was of relatively easy execution.\textsuperscript{41} At the Squire's Point Forge in 1769, the gristmill joined "one end of the forge dam..."\textsuperscript{42}

In the case of the later Schaeffer mill, no dam is mentioned, and it is possible that many of the early undershot mills were not associated with dams. The Schaeffer mill had an extraordinarily long and wide raceway, implying that an undershot wheel, activated by the force of the current, rather than an overshot wheel, activated by the weight of the falling water, was in use.

Other evidence for the presence of undershot rather than overshot mill wheels includes Schaeffer's statement that a still-later mill, built in the nineteenth century, was three times as effective, with the same power source, as was the mill built in 1764. This may well reflect a switch to an overshot wheel in the later mill. John Smeaton's experiments in England, beginning in the 1750's, indicated that while an undershot wheel could have an efficiency of twenty-two
percent, an overshot wheel could transfer up to sixty-three percent of the force of falling water to a mill shaft.\(^3\) Also, Johann Schoepf, travelling through the Middle States after the Revolution, thought of overshot wheels as being "a sort rare in America,"\(^4\) and a committee report, published in 1769, stated that the use of the overshot wheel in the iron industry of New Jersey was "new in America."\(^5\) Since at least half of the mills in use on the Musconetcong at that time were erected by iron interests, it is unlikely that a more-sophisticated device would be utilized to power mills, which were a secondary interest, than was used to power the forges.

The foregoing is not to disclaim the use of overshot wheels early in the eighteenth century. Indeed, Charles Hoff of Kingwood, approximately six miles south of the Musconetcong, possessed "One over-shot Stone Grist-mill,"\(^6\) in 1755. On the Musconetcong, however, it is most likely that the eighteenth-century mills were undershot.

**Sawmills**

Another quite necessary pioneer industry which depended on waterpower in the eighteenth century was sawmilling. At some sites sawmilling preceded the milling of grain. This occurred at Coe's Forge at the outlet of Lake Hopatcong in 1764,\(^7\) where a gristmill did not appear until perhaps 1773,\(^8\) and also at present Bloomsbury, where a sawmill seems to have preceded the establishment of a gristmill in 1758.\(^9\) At Changoewater Forge, a sawmill was established as early as 1756,\(^10\) and at Chelsea Forge as early as 1763.\(^11\) In both
cases, gristmills do not seem to have been established until a much later date.

In 1770 a survey mentions that one Doctor Ogden had lately built a sawmill on "the Main Branch of Musquenetung Pond [Lake Hopatcong] about 2 Miles and 1/2 up sd. Branch from sd. Pond." The report also stated that "the water Stands ponded for a considerable distance," indicating that a dam had been built. This sawmill was apparently an uneconomic investment, for a survey sixteen years later in the same vicinity mentions "an old Frame of a Sawmill built by Doctor Ogden...." Sparsity of settlement in this rugged glaciated region probably generated at best a low demand for lumber products.

Other sawmills were associated with gristmills. In many eighteenth-century advertisements, the term "Grist and Saw-Mill" or "Grist-mill and Saw-mill," is used, indicating that one structure served to house both activities. Such, apparently, was the case at Greenwich Forge in 1761, at Squire's Point Forge in 1765, and at Andover Forge in 1770. A sawmill was also attached to Helm's Mill, built near Hackettstown before 1763. The property advertised by Mark Thompson in 1777, which lay in Hackettstown, included a gristmill and also "a saw mill joining to the other mills...." In 1796, William, John, and Edward Hunt erected a sawmill on the north bank of the river in Greenwich Township. This apparently was an operation independent of grain milling and may have in part depended on the timber being rafted down the Delaware at the time.

The early sawmills, which were apparently mostly of wood construction, met the needs of the settlers for home construction.
There was a preference among many pioneers for construction in frame instead of log or stone. Before the construction of sawmills in the region, lumber went through a laborious process of being squared with a broadaxe, raised on a scaffold six- or seven-feet high, and then being sawed by two men, one above and one below, operating a pitsaw. One-hundred feet per day was a good output for two men working hard. This was much too slow a process to provide the lumber needed for the wave of settlers which engulfed northwestern New Jersey in the 1760's, and the establishment of water-driven sawmills was much encouraged by the increased demand for lumber.  

Sawmills, as with gristmills, were most likely activated by undershot wheels. The waterwheel activated a crank which powered a sash saw. This consisted of a saw sliding up and down in a frame like the mechanism of a modern window sash.

Comparative Values

It is instructive to note that a will probated in 1749 included the estimated value of a gristmill and a sawmill on the Union Furnace property in Hunterdon County. The gristmill was valued at one-hundred pounds sterling and the sawmill at but thirty. This probably reflects the basic difference in value between these two structures in eighteenth-century New Jersey.

Fulling Mills

Another need of the pioneer farmer was clothing. In early days, and even well into the nineteenth century, much cloth was woven in the home. Homespun, especially woolens, was not suitable for wear
until it had been further processed. Fulling was especially necessary. This involved beating the cloth vigorously with paddles and compressing it in water. This process caused the cloth to shrink and greatly reduced its length and width. Also, the fibers became so entangled that the pattern of the weave was less noticeable, and the fabric became smoother, thicker, and firmer. Such cloth lasted much longer than ordinary homespun. Fulling was at first a home industry but there is little evidence as to how it was done in New Jersey. The task, however, was probably onerous, and the application of waterpower for the purpose was welcomed.

In 1773 "a fulling mill with a new dam, new snait, and all necessary implements in good repair," was in operation near Hackettstown. John Crooks was apparently the fuller at that time. The mill was still in operation in 1778, being run by one Peter Caskey.

**Oil Mills**

Another use for waterpower was the crushing of flaxseed for linseed oil. Oil mills were rare in the eighteenth century and little is known of them. In some cases a waterwheel activated pestles which crushed the seed, while in smaller operations the seed was crushed by being passed through rollers. An oil mill is said to have been located at Halls Mills (Asbury) in 1781.

**Flax Manufacture**

In 1790 John Smith, who had been a boss collier at Andover, leased the land associated with the forge. He and his brothers farmed the
denuded tract and carried on linen manufacturing in the old mill building associated with the forge. This enterprise met an early end due to the burning of the mill. The mill presently on the site is of stone, indicating that its origin is in the nineteenth century, and was most likely prompted by the construction of the Morris Canal through the site.

Tanning

Another household occupation which later became a local industry was tanning. In the days of first settlement, each family did its own tanning and currying. These operations were carried out mostly in the fall. Skins were soaked in lye to loosen the hair, which was later scraped off. The hides were then soaked in a strong solution of tannin which was derived from oak and hemlock bark. The tanning solution was contained in a large wooden vat or trough sunk into the ground.

Commercial Tanning

As more hides became available it became profitable for individuals to engage in tanning on a commercial scale. Commercial tanning was generally done on a snare basis, with the farmer paying for the tanner's services in kind. The tanner could then sell his skins elsewhere for cash.

The typical commercial tannery of the eighteenth century in New Jersey was located along the banks of a stream and consisted of several sheds containing vats and a tan mill. The vats or troughs were of two types. One type was oblong, of wood, and sunk into the ground.
near a stream with the upper portion protruding slightly above ground level. These were open at the top and closed at the bottom. The other type of trough was of similar construction but was located entirely above ground level. Those above ground level acted as "limes" in which lime water would remove hair from the hide. The pits or vats below ground level had several functions. Some held fermented infusions of dog or chicken manure which removed the lime and softened the fibers of the hide. Others held tan liquor produced by steeping oak or hemlock bark in water. The hides were worked in these vats after being removed from the infusion of fermented manure. The need for relatively large quantities of water served to limit tanneries to streamside sites.\(^{75}\)

Tan mills were integral parts of commercial tanneries and were generally housed in open sheds. Horses were utilized to turn alternate wooden and stone wheels in a trough about fifteen feet in diameter in order to crush the bark from which tannin was extracted.\(^{76}\)

**Tanneries in the Musconetcong Valley**

In the Musconetcong Valley, where the vicinity known as "Hacket's" had early prominence as a source of supply for skins,\(^{77}\) there were at least two and probably three early tanneries. The earliest of these, possibly established before 1764, was at Hacketstown. John Buckley, of English descent, was the tanner and apparently his business prospered.\(^{78}\) Another early tannery, probably relying on the Musconetcong for its water supply, was the "tan mill" located on Sir Robert Barker's tract in Alexandria Township. Reference to this
operation is contained in an advertisement of the Barker tract for auction by James Parker, possibly dating immediately after the Revolution. At any rate, a "Tan Yard" was listed on the tax records of Alexandria Township in 1785 as belonging to one Alexander Lock. In 1805, Thomas Elder of Bloomsbury offered a 'tanyard to let' on the banks of the 'Musconitkong' River near the village of Bloomsbury. In this tanyard the vats were filled by spouts from the forebay of the mill, indicating that waterpower was used to crush the bark.

Elder's tanyard was said to have access to quantities of bark on reasonable terms. It is probable that the continuing utilization of surviving woodlands for the burning of charcoal made large quantities of bark available for the tanning industry. This was probably an additional factor which had encouraged tanners to locate in the Valley.

Distilling

Another industry of some local importance which arose as large quantities of grain and apples became available was distilling. In 1811, Francis Asbury lamented that his namesake village would be a pleasant place if it were not for "the brewing and drinking of miserable whisky...." Stills were common on large farms in the state in the late eighteenth century. In 1792, Thomas Bowlby paid ten shillings "for brick to set the still" on a property in Bethlehem Township. Joseph Anderson built a still at Anderson in the early years of the nineteenth century and Ziba Osmun constructed an apple-brandy
distillery in Beattystown before the end of the eighteenth century.\textsuperscript{85}

Stills depended upon grain and apples as raw materials, both of which were available in large amounts toward the end of the eighteenth century. Another consideration was the presence of a small, cool rivulet or spring, the waters of which could be used in condensing the evaporated spirits.\textsuperscript{86}

Stills were commonly made by coppersmiths, and consisted of three main parts: (1) a large bulbous vessel which varied in capacity, to which was attached a tube through which non-volatile material was drawn off; (2) a smaller bulbous vessel fitted into the top of the larger vessel and which in turn fed into a tapering tube which was attached to (3) the condenser, which consisted of a "worm" or coil of copper tubing immersed in cool water.\textsuperscript{87} The whole was set in a brickwork stove and a wood fire was used to evaporate the alcohol.\textsuperscript{88}

The structures enclosing stills were often of a temporary nature\textsuperscript{89} but some were built of stone. Surviving structures are narrow in relation to length, possess gable roofs, and have their entrances located on the long side. Quite often, distilleries were set into the sides of hills, evidently to make use of springs.\textsuperscript{90}

\textbf{Ratios of Service Industries to Population}

The lists of county tax ratables extant indicate the numbers of mills, stills, and tanyards in existence in particular townships for certain years. In the Musconetcong drainage system and environs, such lists, including the number of taxpayers, are available for Greenwich Township in 1774, Alexandria Township in 1785, Bethlehem
Township in 1785, Lebanon Township in 1785, and Roxbury Township in 1788.91

The earliest records, those of Greenwich Township, indicate that nine gristmills, three sawmills, and one fulling mill were located there in 1774. The number of taxpayers is set at 204. In Alexandria Township, eleven years later, there were four gristmills, one sawmill, and one tanyard, and 273 taxpayers. At the same time, in Bethlehem Township, four gristmills, four sawmills, one still, and 239 taxpayers existed. In Lebanon Township, also in 1785, there were eleven gristmills, five sawmills, three stills, one fulling mill, and 299 taxpayers. In Roxbury Township, three years later, there existed eight gristmills, eleven sawmills, one fulling mill, two tanyards, three stills and 713 taxpayers.

Unfortunately, enough dates are not available to indicate whether or not the above ratios are truly representative of the relative numbers of population and service industries in the region during the eighteenth century. If they are, it would indicate that the approximate ratio of families to gristmills would be 48:1, to sawmills 72:1; to stills 247:1; and to fulling mills and tanyards 576:1.

Household Industries

There are frequent references in the wills of residents of the townships lying partially in or contiguous to the Musconetcong Valley of industries which were conducted in the household, but were largely commercial in nature. There are many references to weavers and their
tools and also to blacksmiths, who also seem to have worked at home. Other occupations included that of "cupper," "wheel wright," "tailor," and "cordwainer."  

The Settlement Pattern

Dispersed settlement was the rule in most of northwestern New Jersey during the eighteenth century. Settlers thought of themselves as living in certain "towns," and their mail was so addressed, but the nature of these towns was far different from those of the present day. Johann Schoepf, in describing Maidenhead, six miles southwest of Princeton, as consisting of but five or six houses in 1783, was speaking of a common situation in the state at that time.

There are in America a number of such places called towns, where one must look for the houses, either not built or scattered a good distance apart, that is to say, certain districts are set off as Townships, (market or town districts), the residents of which live apart on their farms, a particular spot being called the town, where the church and tavern stand and the smiths have their shops—because in one or the other of these community buildings the neighbors are accustomed to meet. And when later professional men, shop-keepers, and other people who are not farmers come to settle, their dwellings group themselves about the church and the shops.

This was the situation which obtained in the Musconetcong Valley at the same time. Settlement was not planned. The mixed ethnic origins of the settlers allowed hamlets to evolve in haphazard fashion.

The Location of Villages

The location of agglomerated settlements in the Musconetcong Valley (Fig. 40) seems to have been due to several factors. The river, in nearly every case, as a supplier of waterpower, acted as a focal
Fig. 40. Compiled from various sources.
point, but other considerations as well influenced community locations. Accessibility was a major factor. The more-successful villages in terms of later growth were located on major thoroughfares and often in crossroads locations. Most of these routeways were of aboriginal origin. In addition, in the case of ironworking communities, supplies of wood and ore were important locational factors, as was access to pig iron and markets. On the other hand, pioneer service centers depended on a fairly numerous nearby agricultural population, and this, in turn, depended on fairly level, fertile limestone soils.

Ironworking Communities

The first nuclei of later agglomerated settlements to become established were the ironworking communities. As has been seen, at an early date most of these were already performing the functions of service communities for the surrounding agricultural population. Sawmills, gristmills, general stores, and smithies, which were patronized by the surrounding farmers, encouraged many iron communities to remain in existence after the manufacture of iron was no longer a major activity. Especially durable were those communities which had access to important roads and a numerous agricultural population.

Changewater

The first settlement in the Musconetcong Valley to warrant cartographic recognition was Changewater, which appeared on the Lotter map of ca. 1748. Only the nearby furnaces at Durham, Oxford, and Union appeared as place-names at that time, indicating the preeminence of iron communities as population concentrations. Ten
years later, a map of similar scale again showed only the place-name Changewater in the Musconetcong Valley.

Other Early Iron Centers

The most accurate and complete listing of place-names in the Musconetcong Valley appears on the Faden map, the data for which was gathered in 1769 (Appendix I). The Faden map locates nine communities in the Valley of which all but one (Hackettstown) were ironworking communities.

Stanhope

A later forge community, which also acted as an agricultural service center, arose at the intersection of the improved Minisink path with the Musconetcong, probably shortly before 1800. Waterpower, the presence of excellent overland transport for the day, a ready supply of wood, and a prosperous agricultural population encouraged the establishment of "two iron forges, a gristmill, two sawmills, a blacksmith shop, and about a dozen dwelling houses," but with "no hotel, church, schoolhouse, or store in the place...."96

Unsuccessful Forge Communities

Of the iron communities established in the eighteenth century, only two declined to mere mill sites in the nineteenth century. These were Squire's Point and Brookland forges. Both were in narrow portions of the Valley where good agricultural land was limited, and all were far from the sites of important crossroads.
Agricultural Service Centers

The appearance of communities which served primarily the needs of the agricultural population followed the establishment of commercial agriculture and dense agricultural settlement.

Hackettstown

The first of the service centers which arose to serve local needs was Hackettstown, a focal point for the roads of the day, and a site of some importance to the former aboriginal inhabitants of the area. As late as 1773, Hackettstown consisted of but five or six structures, one of which was an inn. The settlement coalesced around a mill and a Presbyterian meeting house, both of which were built in the early 1760's. In later years grist, saw, and fulling mills were added to the village as was the inn and a store.97

Beattystown

Beattystown was first known as "Beatty's Mills" after the grist-mill which was erected before 1776.98 There was also a tavern at that time which was of some importance locally.99 Before 1800 the village was quite a thriving one and was apparently more of a business center than was Hackettstown, being the chief market in that part of the state for grain and other produce. This was perhaps due to the vigor of local capitalists.100 One of the few general stores in the Musconetcong Valley was located there in 1800.101

Asbury

Asbury also antedated the Revolution in its origin. At the time of the war it consisted of only two buildings, a gristmill on the north
bank of the river, and a dwelling on the south bank.\textsuperscript{102} By 1807, there were "about forty houses in or near this village, of all descriptions,"\textsuperscript{103} indicating the rapid period of growth which occurred generally in agglomerated settlements in the late eighteenth and early nineteenth centuries.

\textbf{Taverns as Village Foci}

Two other villages in the Musconetcong Valley, Anderson and New Hampton, coalesced about the establishment of important inns or taverns. Mills were erected somewhat later in order to fulfill the local demand.

\textit{Anderson}

Anderson was established by Joseph Anderson, who settled about 1787 and built a hotel shortly thereafter. He was a large landholder and encouraged others to settle near him. In 1800 the hamlet boasted a physician, a blacksmith, and a gristmill.\textsuperscript{104}

\textit{New Hampton}

New Hampton owed its existence to the location of several taverns, which served the needs of travelers passing through the area. The first tavern was established before 1763.\textsuperscript{105} A gristmill was built in 1800.\textsuperscript{106}

\textit{Toponymy}

The naming of communities in the Musconetcong Valley during the eighteenth century followed no set procedure. Some place-names were derived from the family names of actual settlers, forge owners, or
men of note; some were descriptive; some were derived from place-names elsewhere; and the origin of others is obscure.

Family Names

The greater number of settlements in the Valley during the eighteenth century were named after actual family names. "Hughes," the forge community which is shown on the Faden map, became Hughesville in the nineteenth century. The name is derived from the Hughes family who owned Greenwich Forge and who were long resident in the area. The "Bloomsburg" of Faden was a mistake in orthography and was actually Bloomsbury, a forge community named after the Bloom family who resided in the area. Faden's "Squire's Point" became "Squier's Point" in later maps but the forge community itself evaporated. Squier may be a family name, although this is uncertain. The "Point" most likely refers to a local promontory. Hacketstown, which Faden also misspells as "Halketstown," was named after Samuel Hackett, an influential landowner who was one of the first settlers. The place-name was originally Helms' Mills in 1763 but by 1768 was named after Hackett as a will dated in that year listed Edward Dunlop of "Hacketstown" as executor.

Later and less important settlements were also named after local settlers and entrepreneurs. "Beatty's Mills" became Beattystown after the mill owner, and "Anderson" or "Andersontown" was named after Joseph Anderson, the founder of the village. Hall's Mills, named after the owner of the local gristmills, became Asbury, after Bishop Francis Asbury laid the cornerstone of the small Methodist church erected in that community in 1800.
There is great doubt as to the origin of the place-name Stanhope. It is possible that "the English people first resident there christened it after the somewhat noted Stanhopes of England."¹¹⁵

Namesake Communities

The place-names of some settlements were inspired by localities far removed. Andover, for example, which became Waterloo in the nineteenth century, was named after Andover, in Hampshire, England, the birthplace of one of the owners of the ironworks established there.¹¹⁶

The community of New Hampton was probably named after a "Hampton" elsewhere, but exactly where is not certain. New Hampton preceded the establishment of Hampton, formerly known as Hampton Junction, by many years.¹¹⁷ The place-name New Hampton is at least as early as 1809, since Jacob Swayze's estate in that year included "wheat in the ground at New Hampton."¹¹⁸

Descriptive Place Names

The smallest number of community place-names seem to have been those which were essentially descriptive. Changewater, the earliest agglomerated settlement, was originally "Change Water."¹¹⁹ A lame explanation for this designation is that it was so-called "because of the separation and conducting of the waters from the upper and lower banks of the Musconetcong into two counties, Warren and Hunterdon, by the mill races of the 'Old Forge'."¹²⁰

Brookland, the forge community located at the outlet of Lake Hopatcong, also may have owed its name to a description of the locale.
Brookland is the name given the forge in every early account. It is only after 1810, when a tax assessor listed the property as "Brooklyn Forge," that the latter name came into use. Later writers have stated that a former owner of the forge named it after his birthplace, Brooklyn, New York, but this is unlikely considering the universal use of the name Brookland by eighteenth-century writers. It is, however, also of interest to note that a Brookland existed on western Long Island in the middle of the eighteenth century (Appendix I) and that settlers from this area settled much of Morris County.
CHAPTER VIII

MARKETS AND TRANSPORT

Pioneer Markets

Essential to the ultimate success of agricultural settlement was a market for the products of the pioneers. As early as the latter part of the seventeenth century this need was recognized by the duly constituted authorities of the settled areas. As early as 1681 a market was opened at Burlington in West Jersey, and in 1686 one was established at Perth Amboy in East Jersey.\(^1\) Undoubtedly, during the days of earliest settlement, the pioneer farmers of the Musconetcong Valley drove their livestock south by way of the existing network of Indian paths to these weekly markets.

Although the Burlington and Perth Amboy markets may have sufficed in early times, when the settlement of the northwestern portion of New Jersey was relatively sparse, as settlement progressed there was much desire on the part of agriculturists to have nearer outlets for their livestock and produce. In 1746, the authorities of Trenton felt that the demand was strong enough to establish another official outlet for the pioneer farmers.\(^2\)

These are to give Notice, that on Wednesday the 16th Day of April next, at the Borough Town of Trenton, in the County of Hunterdon, in the Province of New Jersey, will be held and kept a FAIR for

\(^1\)For notes to Chapter VIII, see page 326.

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selling and buying of all Manner of Horses, Mares, Colts, Cows, Calves, Steers, Hogs, Sheep, and all other Cattle, Goods, Wares, and Merchandizes whatsoever: Which said FAIR will be held and kept the same Day abovementioned, and two Days next following pursuant to a Clause in a Charter of Privileges lately granted to the said Borough Town of Trenton, for that Purpose.

Twenty-two years later, the town of Newark initiated a three-day fair in the third week of October, which was to be a yearly occurrence. The fair was established because of the fact that at that time "many Inconveniencies frequently attended the Sale of Horses, Horn Cattle, Sheep and Swine, for want of some publick convenient stated Market or Fair, where Sellers and Buyers may meet for that purpose." The emphasis on livestock probably indicates that traffic was expected to come from a distance, and quite possibly northwestern New Jersey was included in the hinterland of the Newark Fair.

Later Markets

Although markets and fairs retained some importance in New Jersey during the eighteenth century, port cities such as New Brunswick, New York, and Philadelphia soon became the immediate or ultimate destination of most agricultural products. An observer in 1783 noted the primacy of New York and Philadelphia in this regard. New York on the one side and Philadelphia on the other long since drew to themselves the trade of Jersey, and without great exertions and the capital assistance of rich merchants this established course of trade is not to be altered. The produce of Jersey is the same as that of both adjoining provinces, and the Jerseymen find a better market and longer credit in those two cities than in their own.
In northwestern New Jersey, Philadelphia was the market most often used by farmers and iron interests. Grain and bar iron were conveyed to Philadelphia by way of the Delaware in the spring, and livestock was driven overland to Newark and New York.\(^5\)

Locations too far from the Delaware to make profitable use of conveyance by water sent their produce overland to New Brunswick, and to a port a few miles up the Raritan from that city, Raritan Landing. The reason for the popularity of these two markets in the mid-eighteenth century was the fact that cash transactions were the rule, whereas in Newark and Philadelphia barter was often the method of exchange.\(^6\) Also, goods were regularly transshipped from Raritan Landing and New Brunswick by sloop to New York, where prices were higher than in Philadelphia. Pehr Kalm,\(^7\) the Swedish traveller, noted that in 1749 it was a regular practice to transport produce by wagon from the Trenton area to New Brunswick, from where it would be conveyed by sloop to New York, and sold there.

New Brunswick was also nearer northwestern New Jersey in terms of linear distance and in terms of actual travel over the poor roads of the day. In 1777 a property in Hackettstown was advertised as being "35 miles from Brunswick Landing and 50 from New York, but the passage to the latter is not very clear at present."\(^8\)

Traffic to New Brunswick from northwestern New Jersey came by way of the Amwell road by wagon. New Brunswick drew produce from as far west as Bloomsbury in the Musconetcong Valley, less than ten miles from the Delaware, during the late eighteenth century.\(^9\) From New Brunswick produce was taken by sloop to New York where Pehr Kalm saw
"vessels from New Brunswick, laden with wheat which lay loose on board, with flour packed up in barrels, and also with great quantities of linseed..." New Brunswick's trade during the eighteenth century covered a wide area, extending all the way from the West Indies to the Atlantic seaboard to the north. Grain, pork, and leather were the major exports at this time.

Iron also reached the seaboard by way of the Raritan Valley. Cornelius Low of Raritan Landing offered, among other goods, the "best refined and bloomery Iron" for sale in 1761.

The Road Network

Transition from a pioneer agricultural economy, dependent upon subsistence agriculture and the casual raising of livestock for market, to one of commercial grain farming greatly depended upon improvements in the transportation network. Needless to say, the prosperity of the iron industry and the various pioneer industries serving the agricultural population also required improvement in communications.

The Indian Paths

Earliest contact and travel between older communities and those on the fringes of pioneer settlement had been by means of the dense network of Indian trails already in existence at the time of first European contact. These, however, being footpaths, limited traffic to travel on foot or horseback, and imposed a serious obstacle to increased trade.
In order to facilitate faster and more voluminous travel and trade, the early settlers soon set to work to widen and level the Indian paths, which then provided the basis for widened trade and faster travel.\textsuperscript{14} It is of interest to note that many of the most important roads to and from the Musconetcong drainage system, as depicted on a map compiled from data gathered in 1769, followed the original aboriginal alignment (Appendix I).

Despite the ease with which the system of Indian paths could be utilized, from the time of earliest settlement the system proved inadequate for the needs of Europeans. European traffic often emanated from points not served by the footpaths of the Indians. These ran primarily between village and garden sites to hunting grounds and the sea, and not to locations of great interest to Europeans such as power sites.

Road Construction

From the first, the Lords Proprietor of New Jersey had realized the inadequacy of the Indian footpaths, and had encouraged the establishment of true roads.\textsuperscript{15} The General Assembly later also provided for road construction, unfortunately at the option of locally elected officials, and by means of haphazard labor levies on the local inhabitants, who were at best unwilling workers.\textsuperscript{16}

An act of the Assembly which greatly influenced road construction throughout the state was first promulgated in 1716 and remained in force until 1760, by which time many of the major arteries in northern New Jersey had been completed. The act required that roads be four
rods in width, laid out for the convenience of the inhabitants, and cause as little disadvantage as possible for the property holders. 17 Although the width of public roads was set by this act, the wording was rather vague as to the proper course they should take. As early surveys had most often been laid out by the metes-and-bounds system, and as each deed included "an allowance for high ways," 18 roads were most often constructed along the periphery of property lines, so as best to accommodate the owners. Also, as many property boundaries were laid along former Indian paths, this eased road construction. The result of this legislated influence on road construction was, then, a network of roads which was, considering the nature of the terrain, often far more sinuous than was necessary. 19

In later days, private interests also improved or constructed roads to serve their own needs. Forges in the Musconetcong Valley during the 1780's supplied rum "for the use of the working on the Roads." 20 In 1794, James Parker wrote to John Cooley "I have not done with the road intended to be laid out in the Valley of the Musconetcong Valley near Riegelsville where I shall be next Thursday for that purpose...." 21

Narrow private farm roads were also being laid out in the area during the latter portion of the eighteenth century. In 1789, Joseph Lewis recorded going to "Adam Winegardens on Schooly's Mountain to lay a drift way for him across a field in possession of W. Searle...." On the same day, Lewis also "went to lay a road from David Sovereens corner by the road leading to Hackettstown thro' by
Henry Sovereens Fred Sovereens and so on to the main road by Will Allpock's about 3 1-4 miles, which we laid."22

Condition of the Roads

Throughout the eighteenth century most of the roads in New Jersey were poor, and those in the more sparsely settled areas were doubly so. Tree stumps often remained in the right-of-way to harass travellers and many roads were ungraded, causing great difficulties for both travellers on horseback and vehicles. Poorly drained areas were corduroyed or filled in with broken stone, causing an extremely rough transit. Washouts occurred after nearly every heavy rain.23

Road Conditions in the Musconetcong Valley

In common with the roads of the rest of the state, those of the Musconetcong Valley remained poor throughout the eighteenth century. In 1768, the Reverend William Frazer reported that his congregation near Changewater24

...does not seem calculated to be joined with Amwell and Kingwood as they are separated by a ridge of high mountains which the frost and snow in winter render quite impassable and even in good weather I find it very troublesome from the distance which is 25 miles and the roughness of the roads - to attend once in three weeks.

In February of 1780, Samuel Williams of Greenwich Forge wrote Richard Backhouse at Durham Furnace that he had to send a lighter wagon to transport charcoal since "the Roads is So bad I was afraid to Send the Coal Waggon...."25 James Parker complained in December of 1789 that he had to get an employee to "Geer up his Waggon and drive me to Jno Sherrard the road so Ruff and Mountainous that there is no
possibility of going in my sulky..."26 Road conditions did not improve much before the advent of the turnpike era. In the spring of 1807, Francis Asbury complained that "rough roads, damp weather, and daily preaching, has brought me low."27

In addition to being in poor condition, roads in the area were inadequately marked, and strangers often lost their way. Thomas Anburey, who traveled through Hackettstown in 1778, noted that the "inhabitants only compute the distance [by road] at a guess."28 He compared New Jersey unfavorably to Pennsylvania, where there were at least milestones.

Bridges

Another problem for eighteenth-century traffic in northern New Jersey was the crossing of the many swift streams of the Highlands. Local officials were responsible for initiating and carrying through bridge construction, as they were for the roads.29 In many localities bridge construction lagged. The first bridge built over the Musconetcong by Sussex County was in 1770.30 Although the location of this structure is not given, it most likely did not lie near the stream's mouth, since on April 25th, 1789, James Parker recorded in his diary that he had tried to cross the lower portion of the river "but the waters were so high I could not cross...at any of the fording places."31 Twenty-one years before, the Reverend Frazer, probably residing near Changewater, described the Musconetocong as "a River which the heavy rains and snow in the winter time render almost impassable..."32
Bridges built in New Jersey during colonial days were almost all built of wood. Timbers spanned the river while planks were laid as flooring. In 1774 an act of the Assembly provided that bridges were to have well-fitted flooring. Bridges spanning the Musconetcong in the latter days of the eighteenth century were probably built in this way.

Ferries Across the Delaware

Crossing the Delaware was a problem of greater magnitude, but was essential to the well-being of iron forges receiving pig iron from Durham Furnace. The early agricultural pioneers who preceded the iron interests into the area probably crossed by means of canoes, as had John Reading in 1715. Later traffic could not be accommodated by such frail craft, and ferry service soon was established to meet the greater demands of the iron interests and commercial agriculture.

The first ferry which crossed the Delaware in the vicinity of the Musconetcong Valley came into existence after 1742, in response, especially, to the establishment of forges in the Valley. It was known as Stillwell's, Brink's, or the Durham Cave Ferry, and served to link Holland Township, Hunterdon County, with the riverbank immediately in front of Durham Cave on the Pennsylvania side, and ultimately, with the Durham Furnace.

Shortly after 1774, the Durham Cave Ferry was superseded by a ferry established by Benjamin Shenk, which connected the site of present Riegelsville, Pennsylvania, with the river frontage on the
Delaware immediately north of the Musconetcong in present Riegelsville, New Jersey. Shenks or "Shanks" Ferry remained as an important link between the forges on the Musconetcong and Durham Furnace throughout the eighteenth century.36

Ferries in use on the Delaware during the eighteenth century were described by Thomas Anburey in 1778 as being "flat bottom boats, large enough to contain a waggon and horses; they are a safe conveyance; and...they are rowed with oars...."37

In times of high water, ferries had difficulty in crossing. During the 1780's, a request was sent to the manager of Durham Furnace, urging that he "send Piggs to the River as fast as Convenient, as there may be a Difficulty in getting them over for sometime to come...."38

The Road Network in and Near the Musconetcong Valley

The earliest cartographic representation of the road network of northwestern New Jersey insofar as it affected the Musconetcong Valley is depicted on Thomas Jefferys' map of the state for 1758 (Appendix V). Only one road is shown crossing the Musconetcong. This major route of the day ran from Easton-Phillipsburg southward, crossing the river in the vicinity of Bloomsbury, and continued on toward Trenton. Since iron forges having intercourse with Oxford and Durham furnaces were well established by this time, it can be assumed that at least secondary wagon trails had been established, probably insofar as possible making use of the existing network of Indian trails. The main road through Bloomsbury was itself an improvement on the Malayelick Path of Indian days.
Another major road shown on the Jefferys map, although not passing through the Musconetcong Valley, facilitated travel to New Brunswick by intersecting the Trenton-Phillipsburg road at "Hofs" (present Pittstown). From its intersection with the Trenton-Phillipsburg road, the road to New Brunswick continued on to the vicinity of Milford, on the Delaware. Thus, at least as early as 1758, main roads were open to move products of forge and farm to markets located to the south and southeast.

Finest in detail of the eighteenth-century maps dealing with New Jersey as a whole is the Faden map (Appendix I), which was published in London in 1777, but which relied upon data gathered in 1769. The Faden map depicts a well-developed road system linking all portions of the Musconetcong Valley with the major population agglomerations and markets to the south. The only major omission on the Faden map appears to be that of the 'New Road,' a much-travelled route of the first settlers which ran from Easton-Phillipsburg through Asbury to New Hampton.

The great density of the road pattern depicted on the Faden map in relation to that shown on the Jefferys' map does not suggest a flurry of road building activity in the eleven-year period between the date of publication of the latter and the period of data gathering for the former. Most likely, the road system depicted by Faden was largely in existence in 1758, but was imperfectly known to the cartographers of the day.

Several new roads were laid out after the Revolution and before the turnpike-building period. A main road was opened from Hackettstown...
southwest to Pittstown. This road is plainly shown on the Lewis map of 1795\(^{11}\) (Appendix VI), and was termed the "public or great road leading from the Union forge to Hacketts town," when it was altered in 1798.\(^{42}\)

Another main road, perhaps in existence before the Revolution, but not shown on maps of that day, was a route running north from Long (German) Valley to Andrew Miller's tavern on the Musconetcong at Penwell, and then to Philpburg-Easton via Washington. Theophile Cazenove travelled over this road in 1794, and mentioned that it was a major route for the "pioneers who go from the East to Pittsburg, Kentucky, etc...."\(^{13}\) This route was shorter than the one through Hackettstown. Cazenove described it as being "the upper road which is the shorter but not so good...."\(^{14}\) Most traffic went via Hackettstown and the "upper road" offered little in the way of accommodations for travelers. According to Cazenove "the innkeepers... were chiefly farmers, who ran hotels as a side line."\(^{15}\)

With the slight changes mentioned, which were probably accomplished mainly by widening and improving the existing system of secondary roads, the road network of 1769, as depicted by the Faden map, remained to furnish a relative ease of overland contact between the Musconetcong Valley and other areas in the state throughout the eighteenth and early nineteenth centuries.

Means of Overland Conveyance

The means of overland conveyance for both men and goods led progressively from pack and riding horses, carts and sleds, to
wagons and coaches as the road system gradually improved during the
nineteenth century.

Horses

Where adequate roads were lacking, riding, packing, or sled-
drawing horses were the major means of transport. Horses were
utilized to bring produce and grain to market\textsuperscript{46} or mill,\textsuperscript{47} and also
to transport iron ore to furnace and bloomery and finished bar iron
to market.\textsuperscript{48} Horses remained important for travel long after the
roads had improved enough to permit the use of wheeled vehicles.
Johann Schoepf, a German traveller, while en route between New York
and Philadelphia remarked that\textsuperscript{49}

The whole way...not a foot-passenger met us. Few
passengers met us at all, but in every case
riding or driving. To go a-foot is an abomination
to the American, no matter how poor or friendless,
and at times he hits upon a means - he steals a
nag from the pasture or borrows one without asking.

The horse as an important means of conveyance and as a prestige
symbol maintained its position throughout northwestern New Jersey in
pioneer days. Casper Schaeffer recalled that during the 1790's
horseback riding was universal, and that even "the ladies, both young
and old, were very expert at this exercise."\textsuperscript{50}

Sleds

One of the means of conveyance for both men and goods in early
days of settlement was the sled. These were of rude construction,
being entirely of wood at first. Runners were made of split hickory
saplings and were fastened to the body by means of wooden pins.\textsuperscript{51}
Sleds were drawn by two horses and were used both in summer and winter. During the summer they acted as vehicles for general use on and about the farm, and in winter were used to transport produce to market. In the 1780's, wagons were practically unknown in much of Sussex County (then including Warren County), and sleds were the primary means of conveying grain to market. In 1794, Theophile Cazenove spoke of Easton as a great center of trade, and noted that the farmers of the area, which included northwestern New Jersey, "bring here the produce of the neighborhood, especially in winter, when there is snow...." This occurred most often during January and February. The frequent references to the use of sleds in other portions of the northwestern part of New Jersey indicate that the practice was almost universal.

Oxcarts

As roads improved, carts and wagons gradually replaced horses and sleds in the conveyance of produce and goods.

Oxcarts made their appearance at an early date. The sale of "one yoke of oxen and the cart with chain and other tackling belonging thereto," in 1754 by Robert Schooley, residing just a few miles north of the Musconetcong Valley, indicates that such conveyances were certainly known before that time. Oxcarts were of crude construction, consisting of wheels made from the bases of tree trunks, preferably white oak, and a simple wooden frame.
The Jersey Wagon

As roads improved, heavy ox carts gave way to the lighter, horse-drawn Jersey wagon. This vehicle was derived from earlier crude uncovered wagons in use on the farm. It consisted of a long flat-bottomed chassis resting on enormous wheels, with a white or black canvas roof supported by large hoops of which the front and rear were largest in circumference. Four to six horses were required to draw the Jersey wagon, and it was widely used in the latter portion of the eighteenth century for both freight and passengers. The wagons used in the Musconetcong Valley during the 1780's were probably of this type.

Wagons Used by the Iron Industry

The iron industry also turned to wagons for the purpose of transport when road conditions ameliorated. Wagons in use by iron interests were apparently of two types: a "Body Waggon" for the hauling of finished iron, and a "Coal Waggon" for transporting charcoal. The coal wagon was a huge wagon lined with iron sheeting, having a rectangular, flat bottomed chassis, and four spoked wheels of which the rear pair was the larger. Body wagons had a capacity of at least two tons and brought bar iron from the Musconetcong Valley to points as far away as Philadelphia. The body wagon was often substituted for the coal wagon in carrying charcoal during the winter. The greater weight of the coal wagon made travel more difficult when the roads were in poor condition.
The Conestoga Wagon

At the end of the eighteenth century, the Conestoga wagon began to replace the Jersey wagon for freighting in northwestern New Jersey. The Conestoga wagon was developed in the vicinity of Conestoga Creek in eastern Pennsylvania and first came into prominence in 1755. These were huge wagons, with chassis curved as in the bottom of a boat, ends slanted outward, and were covered with canvas stretched over hoops. The rear wheels were somewhat larger than the front wheels, having a diameter of five or six feet and being shod with tires six inches wide. The wagon itself was over twenty feet in length, required a six-horse team, and could carry six tons. 65

Stage Travel

An indication of the increasing economic importance of the Musconetcong Valley and its environs was the extension of a stage line to Hackettstown from Morristown in 1775. The proposed route of travel was by way of Flanders, Black River, and Mendem (Mendham) the first day, with an overnight stop in Morristown. From that point carriage was by way of Newark and Powles Hook Ferry (Jersey City) where a connection could be made with New York City. A one-way trip from Hackettstown to Powles Hook encompassed two days. 66

Travel by stage was perhaps less pleasant than on horseback. Passengers were expected to push the wagon when it got stuck, as it often did. 67 The stage wagon itself was merely an adaptation of the long-bodied Jersey wagon, without doors, windows, or panels. Passengers entered over the front wheels to the three or four benches of the
interior. There were no springs, and since only clumsy linchpins held the wheels, they had a tendency to slip and let the axle down, to the great discomfiture of the passengers. Heavy-sprung English mail coaches were not introduced until the nineteenth century.68

The appearance of the stage coach served to break the comparative isolation of the Musconetcong Valley, and newspapers, private letters, and light freight had an ease of access which had been denied them before.69

Transport on the Delaware

In the southwestern portion of the Musconetcong Valley, and in much of western New Jersey, where overland traffic to New York or New Brunswick was difficult or impossible in early days, the major outlet became the Delaware River and the major market the port of Philadelphia.70

Goods were carried down the Delaware by means of the Durham boat, a craft developed during the fourth decade of the eighteenth century at Durham Furnace, for the carriage of pig and bar iron to Philadelphia.71 One reliable source described the Durham boats in the mid-eighteenth century as being72

...made like troughs, square above the heads and sterns, sloping a little fore and aft; generally 40 or 50 feet long, 6 or seven feet wide, and 2 feet 9 inches, or 3 feet deep, and draw 20 or 22 inches water when loaden.

These craft were able to carry five- or six-hundred bushels of wheat per trip,73 or as much as twenty tons of iron.74 Later Durham boats were increased in size to a length of sixty feet, a width of eight
feet and a depth of forty-two inches. Durham boats ordinarily moved down the river with fRESHets, OF which there were generally three a year, each of which lasted from two or three weeks to three months. Before improvements in river navigation were completed in the 1790's, the boats took approximately two days to reach Philadelphia from Durham and roughly five days to make the return journey against the current. Propulsion downstream was assured by the current, and on occasion long oars or a sail attached to a moveable mast were used. The boats were poled and, where possible, sailed upstream.

Trade With Philadelphia

Trade between the Musconetcong Valley and Philadelphia by way of the Delaware probably began as early as the development of the Durham boat. Several letters still extant indicate some of the scope and nature of the trade. In November of 1767, one John Sherrard of Alexandria Township wrote Thomas Riche, a merchant in Philadelphia: "I am using my utmost Endeavours to get my Beef and Pork down to you which I hope shall do very soon." Three years later, in January, Sherrard wrote Riche again: "I have sent you 20 Bush Rye 14 D° Buckwheat. This Fresh came so sudden that I could not get any oats for you." In the 1780's, forges also were availing themselves of the services of Durham boats. John Stotesbury, at Greenwich Forge, noted sending "pr Walter Fields Boat Sixty five Barrs Iron to be delivered to Mess Miles & Morgan, Merchants Philada...." Trade by way of the Delaware increased greatly after 1770. In that year, the inhabitants of Sussex County, incensed because of the
failure of many New York merchants to accede to the Non-Importation Agreement of the American colonists on British goods, publicly declared that:

...altho' our Connections with them, have hitherto led us to their Markets, by a long and tedious LAND-Carriage, we will now turn out Trade of Wheat, Iron &c., by the more natural and easy Water Carriage down the River Delaware, to our Friends at Trenton and Philadelphia....

After the Revolution, traffic on the Delaware fell off for a few years. Business conditions were poor and several rapids in the river often made navigation a hazardous undertaking. In 1789, the Pennsylvania Assembly, realizing the importance of rapid, inexpensive transport on the river, made an appropriation for the improvement of navigation. In 1791 a contract was let to clear some of the rapids, and despite great difficulties, this was accomplished in the same year. Three years later, when Theophile Cazenove passed through Easton, he found that a Durham boat took only twenty-four to thirty hours to reach Philadelphia and three days to return, a great improvement. One of the more-prominent merchants of the town was Mordecay Peirson, who bought grain from nearby farmers during December, January, and February and sent it down the river to Philadelphia in April or March. Much of his business was probably conducted with grain from farms in the Musconetcong Valley.
SUMMARY AND CONCLUSIONS

Aboriginal Occupance

Aboriginal occupance of the Musconetcong drainage system occurred when men of the Paleo-Indian cultural tradition entered the region, perhaps as early as ten thousand or more years ago. Extensive burning may have been engaged in by these hunters in order to drive the typical fauna of the day to strategic points where they could be dispatched with ease. This burning may most certainly have altered the composition of the local flora.

Little is known of the prehistoric folk who succeeded the Paleo-Indians and preceded the Indians known historically. Since no sites are known for these people in the Highlands, data were used concerning the famed Abbott site near Trenton. The cultural sequence at the Abbott site indicates that a hunting, fishing, and gathering economy succeeded that of the Paleo-Indians. Later, shellfish from the Atlantic Coast were gathered, and agriculture, apparently at first concerned with the cultivation of tobacco, became a minor activity ca. A.D. 900. Forest clearing by these people was probably minimal, although it is not known whether or not fire had a role in their procurement of game.

Much direct evidence exists concerning the historic aborigines, who began to be encountered in large numbers by Europeans during the early seventeenth century. In New Jersey, these aborigines were
for the most part known as the Lenape, who became consolidated as a result of the European advance to the interior in the early years of the eighteenth century. The environs of the Musconetcong Valley were occupied by the Munsi subdivision of the Lenape, who may have numbered as many as three hundred persons in that locality. Indian settlements clustered in locations where an adequate supply of potable water was readily available, and where a southern exposure could be found. Of almost sixty sites known, but seven are located northeast of the terminal moraine, and but fifteen are more than a few yards from the Musconetcong itself. Further, the great majority of sites are associated with the remnants of the valley train of the Wisconsin terminal moraine, and few are located on the gneiss or slaty-shale uplands. This indicates the important place of agriculture in the economy of the historic aboriginal occupants of the Musconetcong Valley. Sandy gravels were much more amenable to being worked with the primitive implements at hand than were the soils generally found on upland surfaces or generally northeast of the terminal moraine. Lake Hopatcong was an exception to this rule. Prior to the impoundment of the lower pond, by a charcoal iron interest, abundant stretches of sandy gravel allowed cultivation. Also, the locale was favored insofar as both forest and lacustrine faunas were concerned.

Agriculture played a major role in the aboriginal economy. Hoe gardening, chiefly concerned with the cultivation of the maize-bean-squash complex, served to modify the natural landscape by the establishment of small garden plots, which were cleared by girdling the trees in the area to be cultivated, and then allowing them to defoliate.
Ancillary to agriculture, but still of great importance to the economy, was gathering. Gathering involved the collection of a large inventory of plant foods. At least some of the species which were collected may have been either favored or discouraged by this activity. Among the species favored may have been the potato-bean, which seems to have been favored by the loosening of the soil which occurred during the gathering process; and the hazelnut, which often surrounded village sites. Some species were affected adversely, but little is known of this. Certain tubers, which were prized by aborigine and European alike in the early eighteenth century, were later decimated by the semidomesticated hogs of both groups.

Hunting provided the major sources of protein for the aboriginal diet. Deer, bear, and elk were especially prized. These species were adversely affected during the time of first European contact by the fact that they were overhunted by Indians due to trade with the whites. The elk and the giant beaver may have been rendered extinct by aboriginal hunters in the prehistoric period.

A major effect on the flora of the region occurred through the use of fire to drive game. Wide spaces were devoid of forest vegetation at the time of first white contact. These were subsequently reforested by natural means after aboriginal burning ceased and, at least in one case, a forest almost entirely of chestnut resulted.

A major influence of the aborigines on the Europeans involved the early settlement by the latter group. Europeans desired cleared land for use as pasture, and Indian old fields were often favored sites for the efforts of the early surveyors. Also, the Indian network of
footpaths served as the prime routes of penetration into the Highlands by the early European settlers. In later days, these, only slightly altered in many cases, became the foundation for the present-day road network.

**Pioneer European Settlement**

Settlement in the Musconetcong drainage system by European pioneers occurred within the first two decades of the eighteenth century. Settlement by Europeans occurred largely after surveyors had penetrated the area and had surveyed the most valuable parcels of land -- those which included power sites, those which had obviously valuable deposits of minerals, and those which had fertile-seeming soils which had been denuded of forest by Indian burning or clearing. The metes-and-bounds system of surveying was in use, and often led to difficulties, when later, more-accurate surveys could be made.

The surveying of lands in the van of pioneer settlement in both East and West Jersey during the eighteenth century was for the benefit of the proprietors of both divisions of the state, who, in fact, owned the land. Because of the reluctance on the part of the proprietors to subdivide and sell outright small freeholds, the earliest agricultural settlement in the Musconetcong Valley was, in many cases, by squatting. This led to much difficulty for the holders of large parcels of land and also to a ruinous exploitation of the land they occupied by the squatters. Later, when effective law enforcement was extended to the frontier, many former squatters
were forced to come under lease. Smaller tracts, obviously intended for freeholders, became available only in the 1760's when the main influx of population into the region occurred.

Earliest of the ethnic groups to settle in the Musconetcong Valley were the English. This is clearly reflected in the toponymy of the region. English settlers were derived in large part from the older settlements in southwestern New Jersey and from the New Englanders who penetrated from the New England settlements in what was then East Jersey. Next of the ethnic groups on the scene seem to have been the Dutch, who largely were derived from the Dutch settlers of the Raritan watershed, although some had come overland from the older Dutch settlements in northeastern New Jersey and southern New York. Scotch-Irish settlers, who began to arrive in large numbers at the port of Philadelphia between 1710 and 1720, arrived in the Musconetcong Valley by 1739. German settlers inundated the earlier settlements in the southwestern portion of the Valley mostly after 1760, coming largely from the older German settlements in Pennsylvania.

In the last decade of the eighteenth century, settlers began to desert the more marginal agricultural lands of the Valley and move to the agricultural frontier in Ohio and New York. By this time, the entire Musconetcong drainage system was quite mixed as to ethnic stock. The largest unacculturated group was probably that of the Pennsylvania Germans, who were continuing to move into the area at the end of the century. It is probable that the southwestern
portion of the Valley remained as the most densely settled area in
the drainage system.

**Subsistence and Commercial Agriculture**

Even in the glaciated region northeast of the Wisconsin terminal
moraine, pioneer agricultural land use preceded the charcoal iron
industry into the Musconetcong Valley. Initial crops were for
subsistence and included chiefly buckwheat and flax. Livestock were
of greater importance than were crops in terms of what could be
economically transported to market. Cattle, hogs, and horses were
of primary importance in the days of earliest settlement, and were
allowed to wander about freely in the woods. Pioneers burnt the
woods, possibly in continuation of the aboriginal practice, in order
to keep them free of undergrowth and to free the native grasses for
immediate growth in the spring.

Improvements in the transportation network allowed a shift from
the subsistence agriculture and emphasis on livestock of the days of
earliest settlement, to the production of commercial grain crops,
chiefly wheat and rye. The establishment of many charcoal iron
industries in the Valley immediately after its first settlement by
subsistence farmers, also served to encourage commercial agriculture
by providing a good local market for agricultural produce.

Deforestation by the iron interests was a major influence in the
establishment of agriculture in many localities. Wide deforestation
encouraged the decline of the iron industry and the deforested land
was then occupied by pioneer agriculturists. This occupation was
permanent on the excellent limestone soils southwest of the Wisconsin terminal moraine, and temporary on the boulder-strewn, glaciated soils northeast of the terminal moraine.

In general, agricultural practices were quite poor among the pioneer settlers. There does not seem to be any correlation between land use and any particular ethnic group. Land was easily obtained, labor was dear. Squatters, especially, cultivated ruinously, and often illegally cut the woods for sale to the local charcoal iron interests. Freeholders were more concerned with maintaining their woodlands, and tenants were forced to do so, but both were not particularly sophisticated agriculturists.

It is instructive to note that land values and crop yields were higher in the German districts of Pennsylvania than they were in the Musconetcong Valley at the end of the eighteenth century. This encouraged the migration of Pennsylvania Germans into the Valley to take advantage of the excellent limestone soils and low land prices.

One of the major imprints of the agriculturists on the landscape of the Musconetcong Valley was that of fencing, which at first was used to keep wandering stock out of the enclosed crops. The snake, or worm fence, became the type most widely used, especially to separate field from field.

Permanent deforestation of the rich limestone soils located south of the terminal moraine in the Musconetcong Valley was the chief areal alteration of the landscape by the eighteenth century agriculturists. Although agriculture was carried on sporadically in the days of earliest settlement northeast of the Wisconsin terminal
moraine, most marginal locations were allowed to come back into woodland in later days. Woodlots were clear-cut, which allowed the sprout hardwoods to become the dominant flora. Among these, the chestnut, an especially vigorous sprouter and rapid-growing tree, was favored.

The Pioneer Farmstead

Occupation of the Musconetcong Valley by pioneers of European descent was first expressed in their habitations. These were erected near a ready source of water. Outbuildings and barns were built later, after agricultural clearing had taken place. Both habitations and outbuildings of the days of earliest settlement were largely of log construction, although frame structures were also known at an early date.

Eighteenth-century newspaper advertisements very clearly indicate that log structures entered the Highlands from the south and perhaps the west as well. The favored type of log dwelling appears to have been of one-and-one-half stories, and was perhaps of Pennsylvania German provenance. Details of the construction of similar structures which have been catalogued by the Historic American Buildings Survey show many Swedish traits, however. Thus, acculturation is indicated.

After the pioneer agriculturists had completed the initial phases of developing their farms, many turned to the improvement of their habitations, and substituted structures of frame or stone for those of logs.
New Englanders built either the one-room-deep or two-room-deep East Jersey cottage, which had evolved in the northeastern portion of the state through Flemish influence on a house type of New England origin. Both variations of the type can be easily traced from the east into the Musconetcong Valley.

The house type which dominates the Valley today, especially southwest of the terminal moraine, is the "I" house. This type is largely of English origin and entered the Highlands along with the stream of pioneers from southwestern New Jersey and southeastern Pennsylvania.

Structures auxiliary to habitations arose soon after housing had been constructed. Outside kitchens were built largely in those areas outside the New England sphere of influence. Stone springhouses are similarly located on the landscape today, and are probably in the main a German contribution.

Little information is available on the first structures utilized to protect livestock during the winter season. At first, abandoned log habitations may have been used. One solution was the erection of the barrack, the only important Dutch contribution to the farmstead. These were often built before barns appeared, and were widely adopted by all ethnic groups. When formal barns were erected, they seem to have been of two major types: (1) the English barn, and (2) the bank barn. The English barn seems to have been introduced largely by settlers of New England origin, as its present distribution in the Musconetcong Valley suggests. The bank barn, or as it is often known in the western part of New Jersey, the "overshot"
barn, seems to have arrived at the end of the pioneer period, probably through the agency of later German emigrants from Pennsylvania.

Dutch barns, which had their entrance at the gable end, in contrast to both the English and bank barns, probably did enter the Musconetcong Valley along with Dutch pioneers, but as with most Dutch material-culture traits other than the barrack, were not widely accepted by other ethnic groups.

The Charcoal Iron Industry

The charcoal iron industry entered the Highlands at the beginning of the eighteenth century and exerted the leading economic influence in many locations for much of the century. In the Musconetcong drainage system, however, the industry entered the region after initial pioneer agricultural occupance had been established. This was true even in the area which had felt the effects of the Wisconsin glacial advance.

Iron interests, in their location, depended on the ready availability of three major resources. These were: (1) iron ore; (2) dense woodlands which could be processed into charcoal; and (3) immediately accessible waterpower. With the deforestation of the Musconetoong Valley by both iron interests and agriculturists, the loss of the English market in the post-Revolutionary era, and successful foreign competition, the charcoal iron industry waned, and became almost entirely eclipsed southwest of the Wisconsin terminal moraine during the latter years of the eighteenth century.

Only in the locations which were not conducive to agricultural
pursuits was the cutover forest allowed to regenerate itself, and thus support a rather marginal iron industry.

The most important change in the landscape engendered by the activities of the iron interests was deforestation. Wide areas owned by the iron interests were clear-cut, without any thought as to regeneration, and forge interests also prevailed upon squatter and tenant alike to provide wood, which they did not own, for processing into the charcoal required for forge operation. Clear-cutting favored the rapid sprouters, and the composition of the regenerated woodlands, which could be found on steep slopes and in areas generally unfit for agriculture, changed to favor trees such as the chestnut.

Service Industries and Settlement

Pioneer service industries were established in response to local demand. Most important of the service industries were those which utilized waterpower. Many of these were established in conjunction with the charcoal iron industry. Early German pioneers seem to have introduced the tubmill, a simple water-driven device for grinding grain. Later, grain and other mills seem to have been powered mainly by undershot waterwheels, which did not demand the impoundment of water. Gristmills were of primary importance to the agriculturist and forge worker alike, but were concentrated in the fertile limestone belt. Sawmills were often constructed in conjunction with gristmills, but were generally later in time. Sawmills were constructed both northeast and southwest of
the terminal moraine. Their value was generally far less than the value of a gristmill.

Early mill structures appear to have been mostly of frame construction, although there are references to log structures. Unfortunately, the early wooden structures have all disappeared due to fire and cannibalization.

Additional industries depending at least in part on waterpower included fulling, oil milling, flax manufacture, and the crushing of tan bark. All of these were found in the Musconetcong Valley during the eighteenth century. Distilling was also of some local importance, and depended on a local supply of apples or grain, and on a source of cool water to effect condensation of the spirits.

Settlement in the Musconetcong Valley during the early pioneer days was not of the agglomerated type. The isolated farmstead prevailed, as it did for the most part in the Middle Colonies. Settlement was not planned, nor did intact groups take up blocks of land. Villages arose for several reasons. The earliest village nuclei were around the ironworking centers, which were also important service centers for the local agriculturists. As the iron industry declined, many of these settlements remained to use the waterpower for service industries. Other settlements also had as their chief locational factor the presence of waterpower, but in addition were near rapid routes of communication, and a dense agricultural population. This tended to concentrate villages on the fertile limestone soils southwest of the Wisconsin terminal moraine.
Markets and Transport

Essential to the ultimate success of pioneer settlement was a market for agricultural products. This was also true for the products of the forges and furnaces. The establishment of various markets early in the eighteenth century made possible the sale of livestock by the subsistence farmer. As the population grew more dense, the road system was improved and extended, most often taking a rather sinuous course, following the old Indian trails and the property lines laid out by the metes-and-bounds system of survey.

Transportation overland was effected largely by the use of the Jersey wagon, and later by the introduction of the Conestoga wagon from Pennsylvania, with the destination of both iron and agricultural products being New Brunswick and New York to the east, and Philadelphia to the west. In the western part of the Valley, much trade moved down the Delaware to Philadelphia in Durham boats, which had been first developed at nearby Durham, Pennsylvania.

Conclusions

The Musconetcong Valley has been occupied by man for perhaps ten thousand years. During this long period of time the most obvious effect of the physical environment has been that of the last glacial advance in limiting the sites of human occupancy. Known locations of aboriginal settlement are generally in much greater abundance in the limestone valley of earlier drift south of the Wisconsin terminal moraine than they are in either the limestone valley of later drift or the gneiss uplands of later drift north of
the terminal moraine. This is also true of the early farmsteads and later agglomerated settlements of the descendants of European pioneers. The effects of other aspects of the physical environment are more difficult to assess, and are actually mostly of importance in that they are perceived quite differently by people of varying cultural backgrounds. For example: aborigines relied on maize as their staple crop; European pioneers thought it difficult or impossible to raise in the Highlands at first, and instead relied on wheat and rye. Today maize is thought of as a much more suitable crop in the area than is wheat or rye. The climate has not changed; perception and economy have.

The principle of initial occupancy is well illustrated in the Musconetcong Valley today. The cultural landscape reflects a continuity from the eighteenth-century pioneer period to the present. Houses and barns, as well as many auxiliary structures, still reflect types established in the area during the eighteenth century. This is true despite the relatively recent arrival of many present owners of rural property.

The dominant assemblage of rural structures south of the terminal moraine today ("I" house, bank barn, springhouse), reflects the importance of the Delaware Valley as the main routeway of men and ideas into the southern Highlands. This situation has existed since the initial settlement of the region, as is indicated by the distribution of log structures in the eighteenth century. The "I" house and the springhouse are of undoubted eighteenth-century provenance in the Highlands, while the bank barn may be in large
part a function of the later arrival of Pennsylvania Germans seeking reasonably priced lime-rich farmland in the late eighteenth and early nineteenth centuries. In this connection, there does appear to be a definite orientation of all three of the structures involved in the Delaware Valley assemblage to the limestone valley of earlier drift.

A more poorly defined but distinct eighteenth-century imprint on the cultural landscape has been left by the apparently less vigorous diffusion of New England culture traits into the region. The New England assemblage in the region includes the English barn and variations of the East Jersey cottage. These structures are far fewer in total numbers in the region than are their counterparts from the Delaware Valley. The New England assemblage is far more likely to occur north of the terminal moraine or on the gneiss uplands than is the Delaware Valley assemblage.

Dutch influence on the cultural landscape seems to have vanished almost completely. Although the barrack rapidly diffused via the Raritan Valley and became a part of both the Delaware Valley and the New England assemblages in the state, the distinctive Dutch barn met with little acceptance by those whose cultural traditions were not Dutch. The lack of Dutch barns in the Musconetcong Valley today may also indicate a hitherto unrecognized sparsity of Dutch settlers in the area. Perhaps the same is true of New Englanders in relation to the large numbers penetrating the region via the Delaware Valley. The general lack of Dutch barns and barracks appearing in advertisements of farms in the extreme northwestern portion of the state certainly

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suggests a lack of significant numbers of Dutch pioneers entering the region by way of the Old Mine Road. The outside kitchen, so often associated with Dutch barns in eighteenth-century advertisements of property, is also associated with the Delaware Valley stream of diffusion of culture traits, and thus is not a suitable tool for determining cultural influence.

The continuity of aspects of the eighteenth-century landscape to the present can also be seen in the region's road network, settlement pattern, and property lines. The late eighteenth-century road pattern as shown by an early nineteenth-century map (Appendix II) agrees most closely with the present road pattern appearing on an aerial photo of the southwestern portion of the Musconetcong Valley taken in 1964 (Appendix VII). Dispersed farmsteads, probably largely of eighteenth-century origin, can also be discerned on this photo, as can the agglomerated settlement of Finesville, which owes its location to the establishment of Chelsea Forge on the site ca. 1751. A crossroads situation and the presence of fertile limestone soils also have helped the village to maintain itself to the present day. The metes-and-bounds system of survey can still be seen in the present field patterns. Some of the present field divisions at least in part hark back to the original early eighteenth-century property lines (cf., Appendix III and Appendix VII). One boundary is especially noteworthy. The line surveyed to bound Elizabeth Backon's property with that of John Bray and Andrew Heath, almost due north of Finesville, has remained intact for two-hundred-and-fifty years!
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Appendix II. The Musconetcong Valley in 1828. Scale approximately 1:633,000.
Source: Thomas F. Gordon, A Map of the State of New Jersey
(Philadelphia: H. S. Tanner, 1828). From the original in the New Jersey Historical Society.

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Appendix V. New Jersey in 1758. Scale approximately 1:1,310,000.
Source: Thomas Jefferys, A General Map of the Middle British Colonies in America (Philadelphia: Lewis Evans, 1758). From the original in the New Jersey Historical Society.
Appendix VII. Aerial photo of the southwestern portion of the Musconetcong Valley from northwest of Finetown to Riegelsville, New Jersey, 1964. The scale is 1:12,000. Here the southern course of the river is original, the northern course is man-made and of twentieth century provenance. Source: Albert C. Jones Associates, Consulting Engineers, Cornwells Heights, Pennsylvania.
VITA

Peter Oscar Wacker was born in Orange, New Jersey, on August 7, 1936. He received his primary and secondary schooling in Irvington, New Jersey. In June of 1959 he received his Bachelor of Arts in Social Studies (with honor) from Montclair State College. His education at Louisiana State University began in September of 1959. The degree of Master of Arts in Geography was conferred upon him in June of 1961. At that time he was elected to the honorary fraternity of Phi Kappa Phi and was awarded a Gottlieb Scholarship which enabled him to continue with his graduate work. His formal course work in the Department of Geography and Anthropology of Louisiana State University ended in June of 1962 when he was admitted to candidacy for the Ph.D. In September of 1962 he began his career as an academician by joining the faculty of Louisiana State University in New Orleans. In 1964 he moved on to Rutgers - The State University, where he is presently a member of the staff of the Department of Geography.
EXAMINATION AND THESIS REPORT

Candidate: Peter Oscar Wacker

Major Field: Geography

Title of Thesis: Forest, Forge, and Farm: An Historical Geography of the Musconetcong Valley, New Jersey

Approved:

[Signature]
Major Professor and Chairman

[Signature]
Dean of the Graduate School

EXAMINING COMMITTEE:

[Signature]
William G. Haag

[Signature]
W. J. McIntire

[Signature]
William H. Thomas, Jr.

[Signature]
Z. A. Walker

Date of Examination:

May 12, 1966