Agricultural Resources of Pennsylvania, c. 1700-1960

Southeastern Pennsylvania Historic Agricultural Region, c. 1750-1960

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This document is a parallel to the official National Register MPDF narrative. The two versions are not identical, but they contain the same information differently organized. National Register policy prohibits embedded images in official documentation. These PDF versions re-integrate the images for the reader's convenience. The National Register documentation was completed and submitted piecemeal. This PDF document reflects the updates made during the process of making statewide coverage together, again for the reader's convenience.

Conceptualization: Historical Farming Systems and Historic Agricultural Regions

Pennsylvania presents interesting intellectual challenges for the agricultural historian and archaeologist. The watchword for Pennsylvania's agricultural history is "diversity." The widespread transition to a relatively specialized monocrop or single-product system did not really take hold until after the Second World War in Pennsylvania. Beginning in the settlement era and stretching well into the 20th century, diversity of products was a hallmark of nearly every farming region as a whole, and of individual farms too. As late as 1930, the state Agricultural Experiment Station Bulletin proclaimed "the largest number of farms in Pennsylvania are the farms with some diversity of crops and livestock production."[1] According to the 1930 Federal census, nearly 53 percent of the state's farms were either "General," "Self-Sufficing," or "Abnormal" (mainly part-time) farms. "Specialized" farms were defined as those where at least 40 percent of farm income derived from a single source. These included types labeled variously as "dairy," "cash grain," "fruit," "poultry," and "truck farms."

Over time, regionalism declined in significance within Pennsylvania, yet farming across the state remained surprisingly diverse. Along with other eastern states, Pennsylvania agriculture shared in the general shift more towards specialization, commercialism, state oversight, industrialization, decline in farming population, and the like. This trend is recognized in the context narrative. However, it is

important always to keep in mind that existing literature on Pennsylvania agriculture exaggerates the degree of change before 1950. In 1946, Penn State agricultural economist Paul Wrigley identified "Types of Farming" areas in Pennsylvania. Only the Northeast and Northwest were given descriptors that implied specialization; these were dairying areas. The rest were given names like "General Farming and Local Market section." Equally significant was the fact that statewide, the top source of farming income – dairying -- only accounted for a third of farm income. To be sure, there were pockets where individual farms specialized to a greater degree (in terms of the percentage of income derived from a single product), but these were the exception rather than the rule; overall even in the mid-20th century, Pennsylvania agriculture was remarkably diversified both in the aggregate and on individual farms.[2]

Even many farms defined as "specialized" by the agricultural extension system were still highly diversified in their products and processes. This was because so many farm families still engaged in a plethora of small scale activities, from managing an orchard, to raising feed and bedding for farm animals, to making maple sugar or home cured hams. Many of the resulting products would not necessarily show up on farm ledger books because they were bartered, consumed by the family, or used by animals, or sold in informal markets. In other words, they fell outside strictly monetary calculations of "farm income." Yet they were important aspects of a farm family's life and took up a good deal of family members' time. Indeed, we can't understand the historic agricultural landscape without acknowledging these activities, because they so often took place in the smokehouses, poultry houses, potato cellars, summer kitchens, springhouses, and workshops that appear so frequently in the rural Pennsylvania landscape. These spaces might not be well accounted for (if at all) in a conceptualization that emphasizes commodity production, but they become more readily comprehensible when we take into account the broader diversity of farm productions. Another important benefit of this perspective is that it preserves—indeed reclaims—contributions that a preoccupation with specialized market commodities tends to obscure, for example those of women and children.

Acknowledging the historic diversity of Pennsylvania farm productions helps to clarify much, but it also raises a fundamental challenge for conceptualizing an approach that will faithfully convey Pennsylvania's agricultural history, and make

it possible to understand the landscape that was created as people farmed in the past. How can we make sense of this sometimes bewildering variety? Added to diversity of products we must consider a diversity of cultural repertoires; a diversity of labor systems; diversity of land tenure arrangements; varied levels of farm mechanization; 93 major soil series; ten different topographic regions; and growing seasons ranging from about 117 to over 200 days. The concept of a "farming system" was found to be particularly helpful as a framework for understanding how agriculture in Pennsylvania evolved. A "farming system" approach gathers physical, social, economic, and cultural factors together under the assumption that all these factors interact to create the agricultural landscape of a given historical era. Physical factors like topography, waterways, soils, and climate set basic conditions for agriculture. Markets and transportation shape production too. Other components, equally important but sometimes less tangible, form part of a "farming system." For example, cultural values (including those grounded in ethnicity) influence the choices farm families make and the processes they follow. So do ideas, especially ideas about the land. Social relationships, especially those revolving around gender, land tenure, labor systems, and household structure, are crucial dimensions of a farming system. Political environments, too, affect agriculture.

The idea of a "farming system" opens the way to a more comprehensive and accurate interpretation of the historic rural Pennsylvania landscape. For example, because the notion of a "farming system" includes land tenure and mechanization levels, we can identify a distinctive region in the heart of the state where sharecropping and high mechanization levels supported a cash-grain and livestock feeding system. This allows us to interpret the tenant houses, "mansion" houses, multiple barn granaries, large machine sheds, and crop rotation patterns that typify this region. Or, by including cultural forces as part of a system, we can differentiate a three-bay "English" barn from a three-bay German "ground" barn. By attending to labor systems, we can appropriately interpret the Adams and Erie fruit-belt areas that relied on migrant workers. And so on. So whether we seek to interpret German Pennsylvania, the "Yorker" northern tier, home dairying areas where women dominated, or tobacco farming in Lancaster County, the "farming system" approach is key to understanding all aspects of the rural Pennsylvania farm landscape—not only the house and barn.

Identification of Historic Agricultural Regions

Mapping done by agricultural economists in the early 20th century identified "Types of Farming" areas based on soil types, topography, markets, climate, and production. These helped to establish clear regional boundaries to the extent that topography, climate, and soil types set basic conditions for agriculture, and they also aided in identifying 20th century production patterns. However, the agricultural economists were mainly interested in production and markets; they did not take into account other important factors which shaped the landscape, especially ethnicity, labor patterns, and land tenure. For this cultural and social data, cultural geographers' work has proven valuable, because it maps information on settlement patterns, building types, ethnic groups, and even speech patterns. And finally, new maps of farm tenancy were generated for this report. Examples of these maps are reproduced below. Together, these resources were used to outline regions that allow us to avoid a "one size fits all" approach on the one hand, and the over-detailed focus on a single farm on the other.

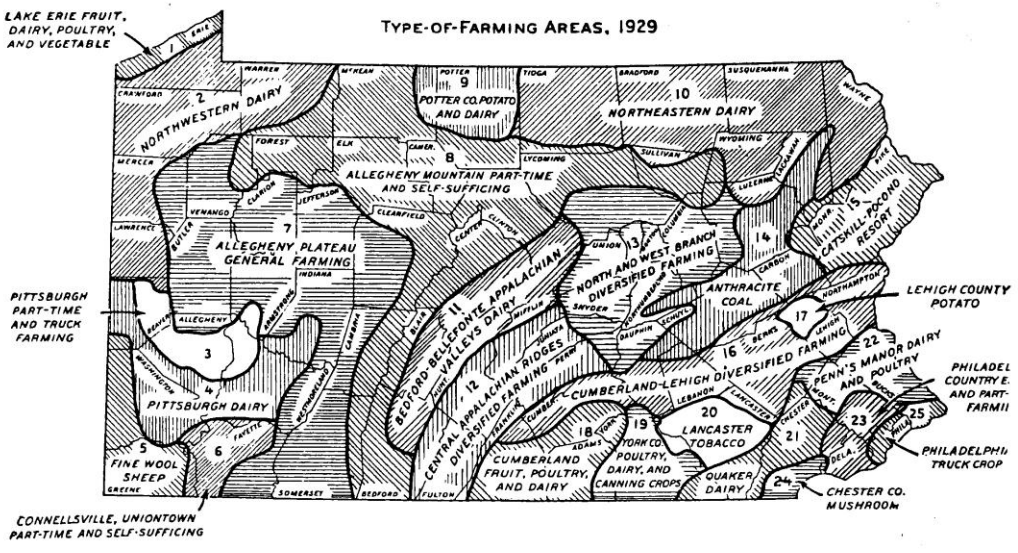
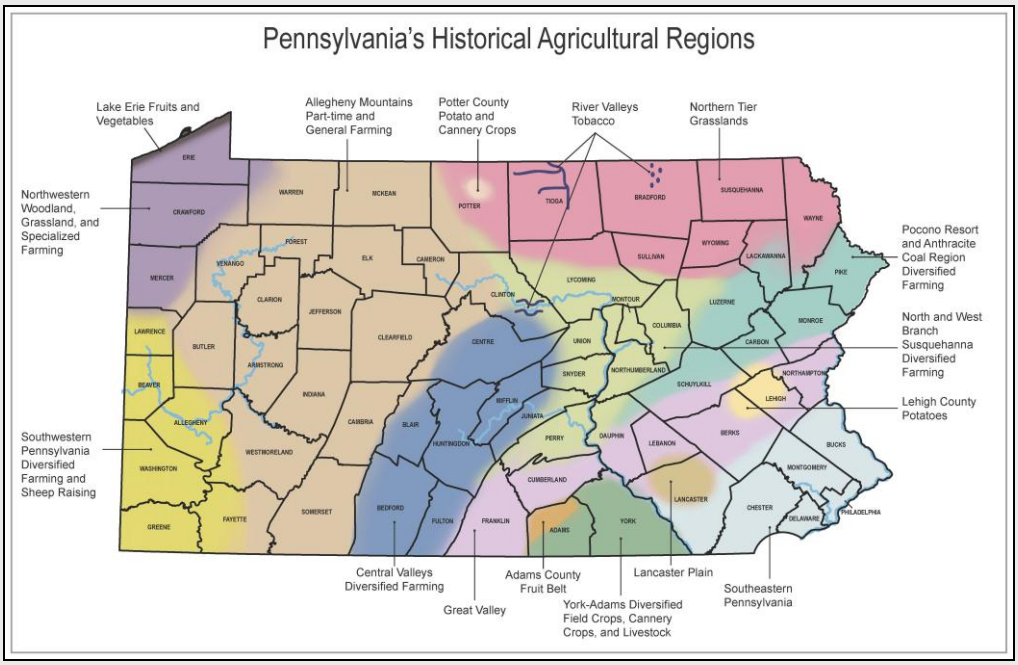


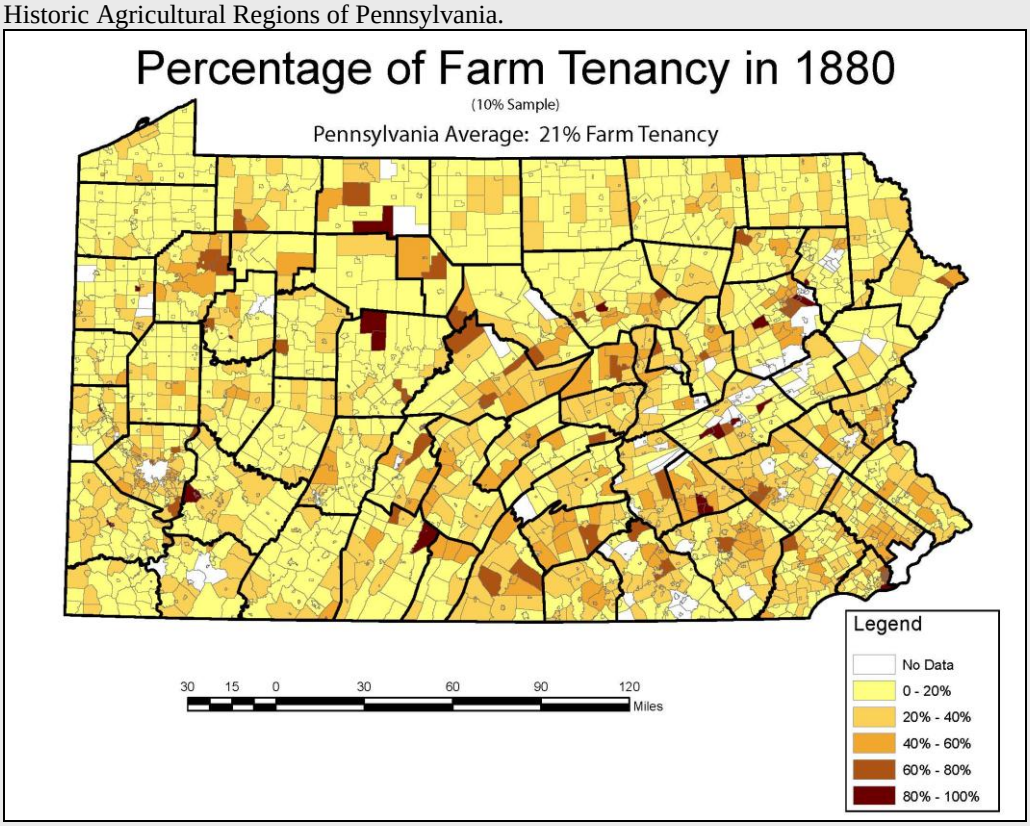
FIG. 35.—TYPE OF FARMING AREAS, 1929

Topography, soils, climate, and marketing opportunities divide Pennsylvania into 25 more or less distinct "type of farming" areas.

From Penn State College Agricultural Experiment Station Bulletin 305: "Types of Farming in Pennsylvania," April 1934.



Historic Agricultural Regions of Pennsylvania.



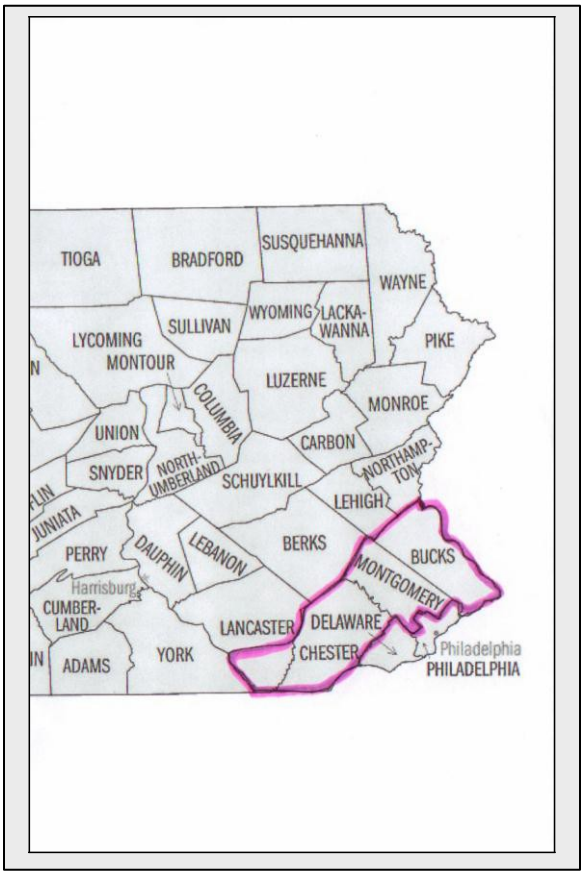
Share Tenants as a percentage of all farmers, 1880.

1 Emil Rauchenstein and F. P. Weaver, "Types of Farming in Pennsylvania." Pennsylvania Agricultural Experiment Station Bulletin # 305, April 1934, 39.
2 Paul I. Wrigley, "Types of Farming in Pennsylvania." Pennsylvania Agricultural Experiment Station Bulletin # 479, May 1946.

Location

The Southeastern Pennsylvania Historic Agricultural Region consists of the entire counties of Bucks, Montgomery, and Chester; and southern Lancaster County (south of the Lancaster Plain). Historically Delaware County would be included, but almost no agricultural resources remain there. The region is bounded on the west by the Susquehanna River; on the north by South Mountain and the southern edge of the Lancaster Plain; on the east by the Delaware River; and on the south by the urban counties of Delaware and Philadelphia and the state line. The boundaries reflect both geographic and historical factors which shaped the region. The Piedmont region, for example, extends beyond these boundaries, but historically the Susquehanna River, which cuts through it, constituted a barrier. The cities have long been very developed and lacking much agriculture.

Southeastern Pennsylvania Historic Agricultural Region



Climate, Soils, and Topography

Southeastern Pennsylvania has an average temperature between 50 and 52 degrees Fahrenheit, and between 42 and 44 inches of precipitation annually. It is wetter and warmer than the rest of Pennsylvania, with fairly long growing seasons. Most of the soils are alfisols derived from igneous or metamorphic rock; in the northeastern section of the region they are underlain by sandstone and shale. Specific soil types are quite varied and include such soils as the Bucks silt loam, Codorus silt loam, Manor loam, Croton silt loam, and Conestoga silt loam. The soils vary in their agricultural quality but many are excellent. Topographically, the region includes most of the Pennsylvania Piedmont, characterized by geographers as "a gently rolling, well-drained plain rarely more than 500 feet above sea level."[1] Northern Bucks County is part of the Triassic Lowland, which has a similar topography.

Historical Farming Systems

Overview: This region is quite diverse in topography and soils. Though these did play a role in the choices farming families made, the historic unifying factor that shaped production in the region was proximity to Philadelphia and other large cities. Philadelphia's size and its accessibility have historically driven agricultural choices and land use decisions. In the very beginning, settlers used its port to send products to distant destinations including the British Isles, continental Europe, coastwise to other North American colonies, and to the Caribbean. A little later, Philadelphia itself became the major regional market for farm products. Production patterns shifted away from less perishable products for long-distance trade, to stall feeding cattle and raising other livestock, and to fresh produce. In the early nineteenth century, western competition challenged these enterprises, and home butter dairying emerged in southeastern Pennsylvania. By the late nineteenth century, fluid milk dairying, market gardening, and ornamental horticulture were important farm income sources. In the twentieth century, these three pursuits continued, along with a rising role for poultry.[2]

Chester County is noted for its mushroom industry. This major sector of Pennsylvania's agriculture already has its own separate National Register context and so it will not be discussed here.

The urban hinterland also became noted for recreational "gentleman's" farms. These are not discussed here since they are a special category.

Diverse Production with wheat as an export crop, c. 1730 to about 1780

Note: This section of the narrative follows the one for the Lancaster Plain closely, but not entirely.

Products, c 1730-1780

This context is more heavily based on secondary sources than other narratives in this series, but primary material still informs the analysis to some extent. Colonial southeastern Pennsylvania has attracted considerable attention from scholars, and a body of secondary work has accumulated which will serve well to identify important agricultural trends for the colonial and revolutionary war period. The literature diverges somewhat in historiographical interpretation, with recent work modifying earlier conclusions.

Geographer James T. Lemon's account of *The Best Poor Man's Country* (1972) is still the place to begin for analysis of colonial southeastern Pennsylvania. Lemon's primary source base was vast, and included contemporary accounts, family papers, tax records, probate records, real estate records, and published materials. His account has held up quite well except for a few points which will be discussed below.

Chester, Montgomery, and Bucks Counties, as well as southern Lancaster County, were among the earliest of the Penn land acquisitions, being deeded by 1684. The region was settled by about 1730. By about 1760, the population in southeastern Pennsylvania (Lancaster, Chester, Berks, Bucks, Delaware, and Philadelphia Counties) exceeded 100,000. This population was very diverse: settlers came from German-speaking Europe, French-speaking Europe, the Netherlands, Sweden, and the British Isles, not to mention a few slaves from Africa and the Caribbean. The region was long noted for its English Quaker influence.[3] Welsh place names (Gwynned, Bryn Mawr, etc) still remain as well.[4] Agriculture in southeastern Pennsylvania took shape amid constant flux in population movement and makeup, land tenure arrangements, and economic development. Land prices rose, and the average size of land holdings dropped between 1730 and 1760. The tenant class grew, to about a third of taxables. Most people were engaged in agriculture.

Farming in southeastern Pennsylvania was conducted along the lines of what Lemon calls "general mixed farming and extensive use of the land." By "extensive," Lemon meant that land was cropped "superficially," without much in the way of fertilizer or sophisticated techniques. The cleared area was very small, but rather than husband it intensively to get the most from it, farmers simply cleared more to increase production. Fallow land, woodlot, and meadow (hay lands, often mown from whatever plants took root without deliberate seeding) took up a relatively large proportion of cleared land. Soil was "rested" through fallows rather than replenished through rotations, liming, and fertilizers. Scholars agree that in general, productivity was stagnant or even negative throughout the eighteenth century. Livestock were few and usually found their own forage, roaming unfenced. Orchard and gardens rounded out the typical farmstead land-use organization.[5]

Historians have often connected extensive farming with small-scale self-sufficing or non-market agriculture. However, colonial Pennsylvania's farms were rarely as self-sufficient as period observers such as Hector St. John de Crevecoeur claimed. Indeed, the often-made distinction between subsistence and market farming does not work well at all in the colonial Pennsylvania context. For one thing, likely the most self-sufficient farms were also the largest. More importantly, very early on, Pennsylvania farming families participated in the global commodities trade. Around 1730, historian Brooke Hunter notes, in Europe population growth, war, and crop failures stimulated an "explosive growth in demand" for grain, and Pennsylvania farmers were well positioned to respond. They raised wheat to sell to Philadelphia millers, who in turn exported flour. The burgeoning West Indies plantation economy soaked up all sorts of provisions including flour, butter, and meat. Joan Jensen notes that even before the Revolution, huge quantities of butter left Philadelphia for the coastal and foreign trades. Pennsylvania-produced foodstuffs were sent along the coastwise trade from New England to the Carolinas, and overseas as far as China. A network of roads, supplemented by waterways such as the Schuylkill, connected the rural hinterland to Philadelphia.[6]

The wheat crop was important as a source of farm income, and highly visible as well, because so much of it was exported. Also, wheat contributed to economic development because it stimulated industry (mills for processing) and transport infrastructure. However, viewed from the perspective of the individual farm, wheat was by no means the only farm product. Wheat yields were low (as little as 10 bushels per acre), and Lemon estimates that a 125-acre farm in 1760 would have only eight acres planted in

wheat. Thus wheat production was but one element in most farm families' diversified market and subsistence strategies. Lemon and others have noted a variety of farm products, evidence for which appeared in wills, journals, travelers' accounts, and other sources. Besides wheat, crops included rye, barley, oats, buckwheat, Indian corn, potatoes, turnips, cabbage, apples, peaches, cherries, flax, flax seed, hemp, and hay. Pork, beef, mutton, eggs, wool, and butter were typical animal products. Fruit and grain were processed into cider and liquor. Barley was sold to Philadelphia maltsters. Farmers raised and sold small numbers of cattle, sheep, swine, horses, poultry, and bees. They gathered nuts and berries, and made maple sugar, lumber, cordwood, and potash from their woodlots. Fish and game provided vital protein in their diets.[7]

Michael Kennedy, in a well-researched 2000 article, has modified some of Lemon's arguments about local markets in colonial Pennsylvania. Lemon, as a historical geographer, assumed that central places (i.e. towns) were necessary to the creation of local markets for farm produce; he was preoccupied with testing von Thünen's famous hypothesis about how distance from a central place determines the nature of agricultural production. Because of this perspective, Lemon's work left unanswered questions. There were few such population centers in mid 18th century Pennsylvania; indeed, Lemon himself noted that the colonists preferred dispersed settlement. At the same time, the percentage of non-farmers – i.e. consumers -- was growing, and clearly farmers were marketing products. So, where did they sell their wares if not in towns? Kennedy has solved this puzzle convincingly; he shows that the central place function was served not by towns but by stores located at rural ironworks and mills. These stores were liberally and widely distributed, and virtually every southeastern Pennsylvania household was situated near at least one. Kennedy explains not only where the markets were located physically, but also links them to the growing population of landless consumers.

Kennedy also adds to the list of products marketed. Beans, onions, wood, veal, parsnips, venison, cucumbers, molasses, greens, peas, leather, limestone, tallow, wax, straw, hops, hides, and feathers were raw farm products mentioned in mill and ironwork store records. Others included processed items such as stockings, clothing, linen, baskets, soap, thread, cheese, vinegar, shingles, charcoal, and candles. In all, Kennedy enumerated 118 different farm products traded at these outlets. Kennedy concludes that "many more Pennsylvanians produced more crops for markets than previously assumed." His work is persuasive because, unlike Lemon, he is able to document actual sales rather than needing to rely on extrapolation as Lemon often did. Kennedy also makes other important observations. His estimate for average farm acreage is significantly lower than

Lemon's (88 vs. about 125 across the region); and he contends that given their limited space, a typical farm family would have less diversified production than Lemon assumed. In other words, all southeastern Pennsylvania farms were diversified, but they didn't all produce the same broad mix. It was the collective total that created the overall diversification.[8]

It is important to keep in mind Kennedy's observation that even though colonial Pennsylvania farms collectively produced an astonishing variety of items, typically on an individual farm agriculture took place on a quite modest scale. In the first instance, clearing took a long while, and well into the eighteenth century most southeastern Pennsylvania farms still had large uncleared spaces. Farm families might actually be tilling perhaps only half of the total. Lemon estimates that on a farm of 125 acres, about 46 would be cleared and planted with small grains, fiber plants, vegetables, and fruit. Hay meadow or pasture were probably not deliberately planted, just alternately mown and grazed, but they counted as cleared land. Advertisements from the *Pennsylvania Gazette* describe farms for sale that had anywhere from just a quarter to over half the acreage cleared. For example, an April 30, 1761 advertisement read: "To be SOLD by the Subscribers, A Valuable Tract of Land, in Haverford Township, Chester County, late Rowland Parry, consisting of 101 Acres, 60 of which Woodland, 6 of good Meadow, and a great deal more may be made..." No farm described in *Gazette* ads from the mid eighteenth century to the 1780s was more than three-quarters cleared.

Labor and Land Tenure, 1730-1780

Labor and land tenure were intertwined during this period. Tenancy was a pervasive institution in southeastern Pennsylvania during the colonial period. Lemon estimated that "... in 1760 and 1782 about thirty percent of Lancaster's and Chester's married taxpayers were landless, and about the same number of farmers fell into the tenant category, possibly half of them sharecroppers." These figures pertain only to taxables, not representing even all household heads. Lucy Simler's detailed research has shown that in colonial Chester County, an important unit of society was the large farm with its associated tenants. There was a hierarchy among the tenantry. Farm tenants leased a large property, bringing with them considerable resources such as livestock and implements. Less well-off "smallholders" leased small acreages (usually less than twenty) from the landowner, keeping a few animals, growing food, and following a trade. They "held" land even if they didn't own it. "Inmates," on the other hand, were married non-landowners living in a landlord's house. Inmates often were allotted only a garden

plot, worked for the landowner, and/or followed artisan trades. Single freemen did not even head a family; they were usually young men residing in another's household and working for wages. [9]

Below these were others whose poverty and low status often meant they could not even belong to the ranks of "taxables." Farm workers were often "bound" or "unfree" in some way: some were family members, and others were un-free redemptioners, indentured servants, cottager tenants, or (infrequently) slaves. In 1753, for example, Jacob Clemens recorded in his account book that he and his brother "freed a carpenter from the ship and each of us paid one-half of his freight... he belongs to each of us in equal shares."[10] The master of a runaway servant, the "Welchman" Thomas Davis, conceded that he was "very handy on a farm" in advertising in 1768 for Davis's apprehension and return. Notices in the *Pennsylvania Gazette* advertised slave women who knew dairying, and slave men who knew farming.

Much farm work did not even involve raising crops or livestock at this early time. During the eighteenth century, agrarian families and hired workers applied their energies to the basic tasks of making a farm: clearing, plowing, and fencing, before any planting could take place. Clearing generally involved felling massive trees and cutting them into logs, making potash or lumber, and pulling stumps – all done without major mechanical aids.[11] Breaking land was done with rudimentary equipment as well. Early fencing laws put the onus for fencing on the crop grower, so crops had to be enclosed, rather than animals. Probably most fencing was the "worm" type, with split rails stacked in a zigzag pattern. Again, making the fence and erecting it was almost all done by hand. The clearing process continued long into the 19th century.

In southeastern Pennsylvania, laborers spent a good deal of time making meadows. Eighteenth-century advertisements frequently made a point of discussing farm meadow acreage, both actual and potential. Notably, they emphasized that meadow was "made." Robert Bucher, in an article on "Meadow Irrigation in Pennsylvania," explained how this was done in the 18th and early 19th centuries. Meadows occupied low lying areas along streams. Using the stream waters, farm people dug irrigation ditches, made dams, and cut outlets into the ditches at intervals. They diverted water from a stream along a ridge and let the water run back down along the slope by gravity. Bathing the grasses in water increased the productivity of these meadows and thus of the farm animals that ate the resultant hay. At haying time, the dam was shut and the meadow allowed to dry out before the hay was made. These works required large outlays of labor in initial

construction, and then also they demanded continual maintenance. As well, often animals had to be fenced out of the meadow area.[12]

Once cultivating and livestock raising got underway, men and women worked together in complementary tasks. Michael Kennedy, Joan Jensen, and Lucy Simler have persuasively documented that women performed a very large portion of agricultural labor, not only in tasks traditionally associated with women (spinning, dairying, needlework, cooking, poultry keeping, gardening, food preservation, baking) but field work as well. At haying time, for example, the men cut the grass, while women followed and raked it. Women and men worked together in other tasks such as rye harvest, flax pulling, and apple gathering.[13] The dairy deserves special mention because the foundations of an important industry were established during this period. Joan Jensen has explained how colonial-era Chester County women developed butter making into a lucrative business during the eighteenth century, not just supplying their own households but selling large or small quantities. The setting was being created for later expansion.

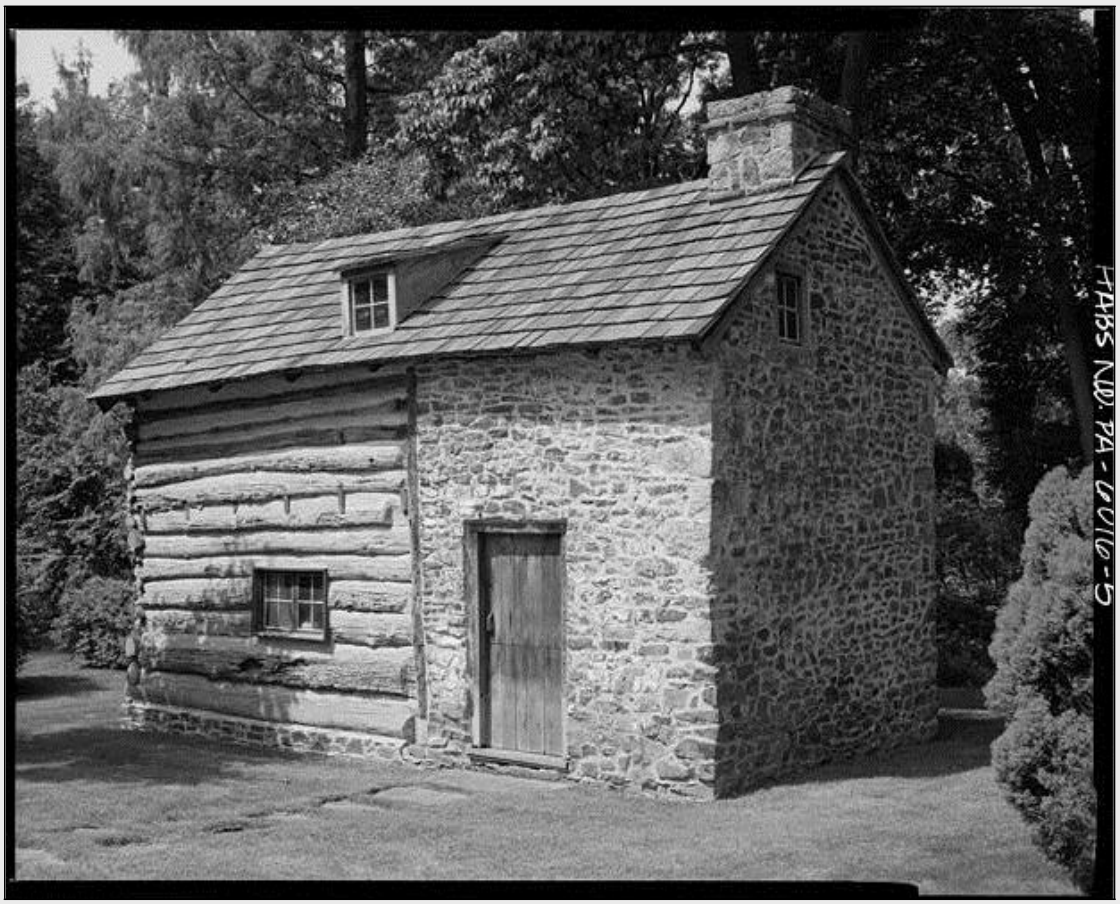
Another notable aspect of rural labor patterns was nonagricultural work carried on by landowners. In Bucks County, for example, a study of estate papers and tax lists indicated that "the farmer-craftsman was a common figure in Bucks County..." Both Simler and Duane Ball, author of a dissertation on colonial Chester County, noted that farmers practiced other trades and occupations. Ball detected a "growing tendency for [farmers] to take on relatively specialized non-farming activities, undertaken concurrently with their farming..." over the eighteenth century. He and Simler attributed the trend to relatively plentiful "down" time in the wheat farming cycle. However, this interpretation now seems open to question since the diversity of early southeastern Pennsylvania production has been better documented since the thesis was written. It is more likely that the farming regime demanded much labor, spread out over the seasons. It seems more likely that multi-occupationalism was another aspect to economic diversification. Indeed, it makes equal sense that rather than being retained for one frenzied harvest season, "inmates" could labor year-round farm and thus free up landowners to pursue nonfarming occupations.[14]

Buildings, 1730-1780

Houses, c. 1730-1780

Rural houses of southeastern Pennsylvania have been so well documented and analyzed that there is little need for further comment. See the Bibliography for further references. Two examples are offered here.

Yost log house, Whitpain Township, Montgomery County, date unknown. HABS/HAER, Digital ID http://hdl.loc.gov/loc.pnp/hhh.pa2969



Yost log house, Whitpain Township, Montgomery County, date unknown. HABS/HAER, Digital ID http://hdl.loc.gov/loc.pnp/hhh.pa2969

"Penn Plan" house, Lower Oxford Township, Chester County, late 18th century. Site 029-LO-003.

Tenant House, Springbrook Farmstead, East Norriton Township, Montgomery County, 18th century. Pennsylvania Historic Preservation Bureau file photo.

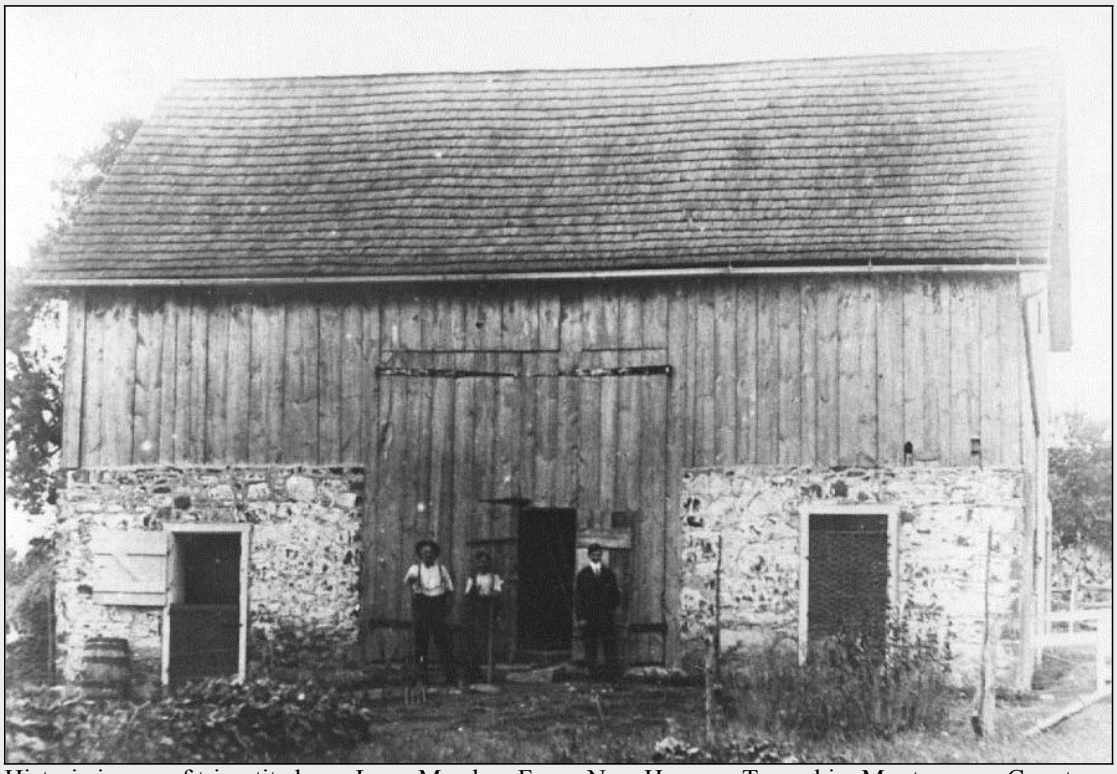
Barns, c. 1730-1780

Few barns survive from this period. As we have seen, crop acreage was limited. Farm animals often were let loose to graze in forests and pastures, finding their own forage. One historian notes that since animals found their own feed, colonial era livestock numbers were relatively high even though pasture and hay lands were limited. However, it seems that few must have been kept over the winter, because shelter was so limited. Relatively small log barns were the norm, if indeed a farm had one at all. A local history of Bucks County described a farm complex around 1760 that contained a "barn with a threshing floor..." and a "crib for Indian corn." The barn must have been small, because the hay and even grain were stacked outdoors. The author noted: "Before 1790, our commodious cellar barns were unknown, as grain was generally stacked."[15]

The Zook log barn in Chester County is a rare example, documented by the Historic American Buildings Survey in the early twentieth century.

Zook log barn, East Whiteland Township, Chester County, 18th century. HABS documentation. Digital ID http://hdl.loc.gov/loc.pnp/hhh.pa0278

The Zook barn is an early "Sweitzer" barn, and at 86 by 25 feet was large for its day. Its two log cribs and central threshing floor accommodated hay and straw storage and threshing. Below were stables.



Historic image of tripartite barn, Long Meadow Farm, New Hanover Township, Montgomery County c. 1750. Pennsylvania Historic Preservation Bureau file photo.

The William Moore Barn in Doylestown Township, Bucks County, 1797, is a one-level barn documented by HABS in the early twentieth century. The photographs do not reveal the barn well so they are not reproduced here.

Tripartite barn, Long Meadow Farm, New Hanover Township, Montgomery County, c. 1750. Pennsylvania Historic Preservation Bureau file photo.

Stabling area on lower level of c. 1760 bank barn, Springbrook Farm, East Norriton Township, Montgomery County. Pennsylvania Historic Preservation Bureau file photo.

Outbuildings, c. 1730-1780

Few outbuildings can definitively be dated to this period.

Smokehouse, Village Farm, Middletown Township, Bucks County, c. 1770. Pennsylvania Historic Preservation Bureau file photo.

Two and one-half story privy, Thomas Leiper Farm, Nether Providence Township, Delaware County, c. 1780. Pennsylvania Historic Preservation Bureau file photo.

Wagon Shed/Carriage House, Humphrey-Eaton Farmstead, Montgomery Township, Montgomery County, c. 1730. Pennsylvania Historic Preservation Bureau file photo.

Jerman-Walker Spring house, Tredyffrin Township, Chester County, 18th century. HABS photograph. Digital ID http://hdl.loc.gov/loc.pnp/hhh.pa

Springhouse, John Eakin Farm, New Hanover Township, Bucks County, Late 18th century. Pennsylvania Historic Preservation Bureau file photo.

The HABS documented Lundale spring house in South Coventry Township, Chester County, has an estimated 1713 date. It was a two and a half story stone structure with living space in the upper portions and spring house below. It reflects the early importance of dairying in Chester County.

Landscape features, c. 1730-1780

The rural landscape has been so thoroughly reworked that its eighteenth century features have been largely erased. Irrigation ditches, for example, so important two and a half centuries ago, are long effaced. It is likely, however, that in a few cases the old metes-and-bounds property divisions may be reflected in field shapes and boundaries.

Livestock Feeding and Home Dairying in a diversified system, 1780-1870

Introduction:

Several important agricultural developments occurred in the years between the Revolutionary War and the Civil War. In 1850 Pennsylvania still led the nation in total wheat production, but the new West was mounting a strong challenge and Pennsylvania farmers were already responding to the competition by reorienting their business. Overseas markets became less important as domestic markets burgeoned. The nonagricultural population grew and furnished more consumers. Philadelphia, New York City, and points west were made accessible by new highways, canals, and rail links. Rural southeastern Pennsylvania farm families turned to producing beef cattle, butter, hay, truck garden produce, and pork for sale to city dwellers and townsfolk. Their farming system reoriented away from a diversified crop based system, to a diversified livestock based system. Pasture and "domesticated" upland hay grasses were its centerpieces; cash grain took a secondary role and feed grain rose in importance. Farming mechanized and the overall proportion of farmers in the work force declined.

Products, 1780-1870

The 1842 *Farmer's Register* described the standard "cropping system" in southeastern Pennsylvania: farmers "plough a sod field, in the fall or spring, for corn, which is cut up at the ground, following crop oats or barley, then manured and put into wheat; after which it is put down to grass, generally clover, without and with timothy..." The article

noted that many farmers practiced what he called "mixed" farming, combining grass and livestock production.

In 1861, the editor of the *Cultivator* toured Chester County. He gave his impressions in a four-part series on "The Agriculture of Chester County, Pennsylvania." His descriptions reveal how Chester County agriculture had changed since the colonial period. In the opening column, he offered this overview:

> The Agriculture of Chester County is exclusively of a grazing and dairying kind, including only about a sufficient extent of wheat land for the bread of those who cultivate it; enough oats, straw and hay for the farm and village horses, and enough of the two latter and Indian corn for the cattle and sheep which make the butter or are fattened for the Philadelphia butchers.

Colonial Chester County residents might have been surprised to see wheat demoted to such an extent. The old crop-oriented system had given way decisively to integrated farming which combined crop and livestock production.[16]

Numerous accounts agree that systematic rotations, manuring, and liming had become standard practice. The cropping system followed an "apparently unvarying rotation of corn, oats and wheat, followed by grass..." with the grass often being pastured for several years after it was mown. The "grass" actually, according to the author, consisted of a mix including clover, timothy, Kentucky bluegrass, two grasses vaguely identified as "smooth-stalked meadow grass" and "green grass," and white clover. These plant mixes (especially the timothy and clover) were quite different from the lowland meadow grasses of the earlier era. Clover played a role in maintaining fertility as a nitrogen fixing legume. These pastures were manured and limed so that they lasted several years before needing to be turned over. Animals were essential in the new regime, because they consumed the crops and produced manure, thus creating a renewable cycle.[17]

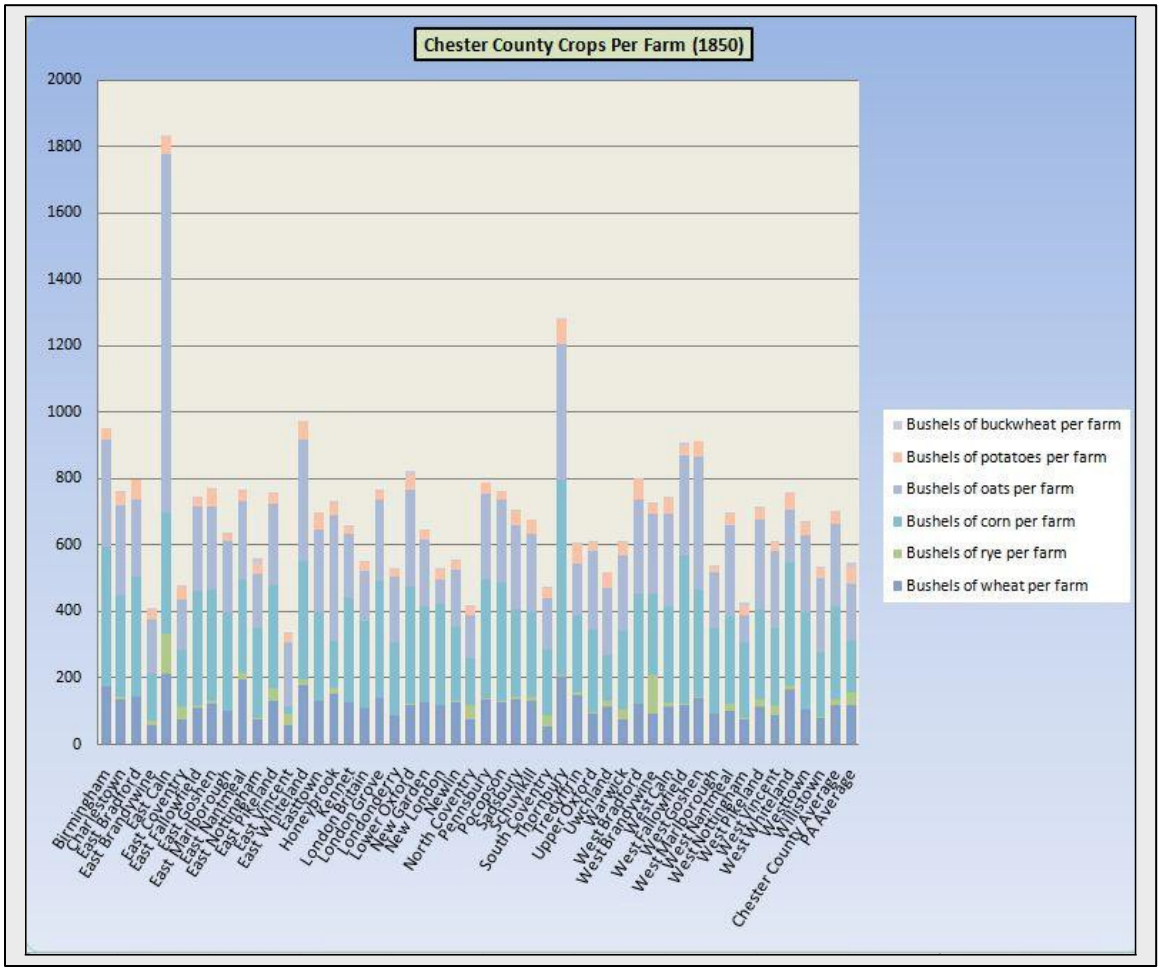
The precise timing and nature of this shift are very difficult to ascertain. Local tax assessors ceased systematically to collect agricultural data late in the 18th century, and the federal government did not begin its agricultural census effort until 1840. So there is a half-century gap in quantitative data. For a time after the Revolutionary War, the reckoning was postponed because a resurgent demand for wheat, flour, and other foodstuffs stimulated Pennsylvania production for export, into the first decade of the new century. The available data confirm at any rate that farming systems had decisively

changed by about 1840.[18]

There were multiple reasons for this major change. The infamous Hessian fly invaded southeastern Pennsylvania in the 1790s and caused widespread devastation, prompting farmers to reconsider their overreliance on wheat. In 1807, Thomas Jefferson's Embargo delivered another blow to grain producers. The Panic of 1819 and ensuing depression also forced readjustments. Some histories mention problems with soil exhaustion. Newly opened wheat lands in the Genesee River Valley of New York State and in the nascent Midwest brought low priced grain into competition with Pennsylvania wheat. Though painful, these disruptions were eventually overcome, because the much anticipated "home market" was becoming a reality, as the nonagricultural population in the young republic expanded. The emergence of nearby Philadelphia and the general affluence of American consumers turned farmers' attention to producing meat, as well as bulky items that could be marketed locally. Thus livestock, dairy products, and hay became attractive. The Lancaster Pike opened in 1795; it was the first well maintained and paved road in the region. Southeastern Pennsylvania soon was laced with roads and eventually with railroads, and was ideally positioned to participate fully in economic development.[19]

Hay was a premier item in the new regime. Production and acreage were much higher than average throughout all of southeastern Pennsylvania. Chester County farms, for example, averaged over 20 tons of hay in 1850, when the typical Pennsylvania farm produced only 13 tons. Together with pasture, hay lands took up as much as three-quarters of the improved acreage on a typical southeastern Pennsylvania farm. Both the composition and location of hay meadows had changed decisively since the colonial period. The new pastures and meadows tended to be on upland slopes and to be deliberately set in timothy and clover. Not only were they just as productive, perhaps even more so, but they did not need the time and labor-consuming irrigation works.

Of small grains in the rotation, southeastern Pennsylvania farms produced substantially more corn and oats than average, and about average quantities of wheat – a notable shift in the relative importance of these grains, both within the local farming system and with relation to the rest of the state. Corn and oats rose in importance because they were fed to cattle, oxen, horses, pigs, and chickens.



In turn the grass and grain eventually became butter, eggs, and meat. Butter was a very important product in nineteenth-century southeastern Pennsylvania agricultural schemes. Overall, farms – even though smaller than average – had relatively large numbers of milk cows and produced well beyond the state average of 312 pounds of butter per farm. By 1860 Montgomery County led the state in total farm butter production (3 million plus pounds) and per-farm butter production (about 660 pounds). Chester and Bucks County each produced over 2 million pounds and well over 400 pounds per farm. Joan Jensen's account of butter making in Chester County ends around 1850, but it is clear that southeastern Pennsylvania farm women found themselves making more butter than ever in the next decades. In Chester County, the average farm in 1850 produced 433 pounds

of butter; by 1880 that figure was close to 700. Many farms were producing over a thousand pounds. Chester, Bucks and Montgomery occupied second, third, and fourth place respectively in state butter production totals.[20]

This production increase was accomplished in two ways. Adding cows to the herd was one important strategy. Chester County's dairy herd more than doubled in size between 1850 and 1880. Herds in Bucks and Montgomery also grew, though not as much; only in Chester did the herd size rise on a per-farm basis. This was because overall the number of farms was still rising and consequently the average farm size was declining, so even though Montgomery and Bucks added cows to their totals, individual farm butter production averages did not rise as much. The second strategy for increasing dairy production was to feed and shelter milk cows better than before. Crop rotations and stepped-up hay production served this end. Cows consumed more and better quality feed and thus produced more milk. Better shelter (i.e. barns, discussed below) protected their health and meant that they need not expend energy just staying warm. Breeding was not yet a prime factor in dairy productivity. The *Cultivator* editor lauded a few Chester County farmers who kept Alderney cows, but likely most dairy cattle were not pure bred or even "grades" at this time. A critic in the same journal thought that Bucks County cattle were "of mixed blood, and mixed too, without regard to any particular rules or object..."[21]

The increase in butter production was only one component in overall dairy production. By 1870, in the three southeastern counties a considerable percentage of milk produced did not go to home butter production, but instead was diverted to centralized creameries. These are further discussed below under "Labor and Land Tenure." As far as production is concerned, the important thing to note is that farm-made butter does not account for all dairy production; the amount of milk being produced was even higher.

Finishing beef cattle was a very important farm enterprise in the mid nineteenth century, particularly in Chester County. (Montgomery and Bucks Counties had more dairy cattle than beef cattle in 1860, but all three counties did produce beef animals.) At the time the 1860 agricultural census was taken, for example, of Chester County's roughly 50,000 cattle, half were for dairy and the other half for beef purposes. Chester was well situated to receive young cattle that had been driven from further west, fatten them, and then send them east to the cities and towns. These animals were "purchased in autumn, wintered on hay with little or no grain, and fattened on the pastures to go to the butcher along about harvest time." Observers stressed that grazing could only be profitable if cheap cattle were purchased from the west – not raised on the farm. The 1842 *Farmer's Register*

described how cattle from Greene and Mercer Counties (in western Pennsylvania) were being driven east and "sold in Lancaster and Chester counties, to be fed off." In 1846, another author noted the "...example of Chester" in fattening beef animals; this writer attributed the trend to the decline in distilling as a destination for grain.[22]

Horses and oxen provided transportation and draft power. Oxen were still relatively popular in the region; the 1850 census shows that in Chester County, for example, many farms still had a team of oxen, often in addition to horses.

The 1861 *Cultivator* series gave undue prominence to sheep in southeastern Pennsylvania; in fact, Chester and the other southeastern counties were not major sheep producers in the nineteenth century. The abundance of pastures made sheep a logical choice at first glance, but competition with the West was too severe.

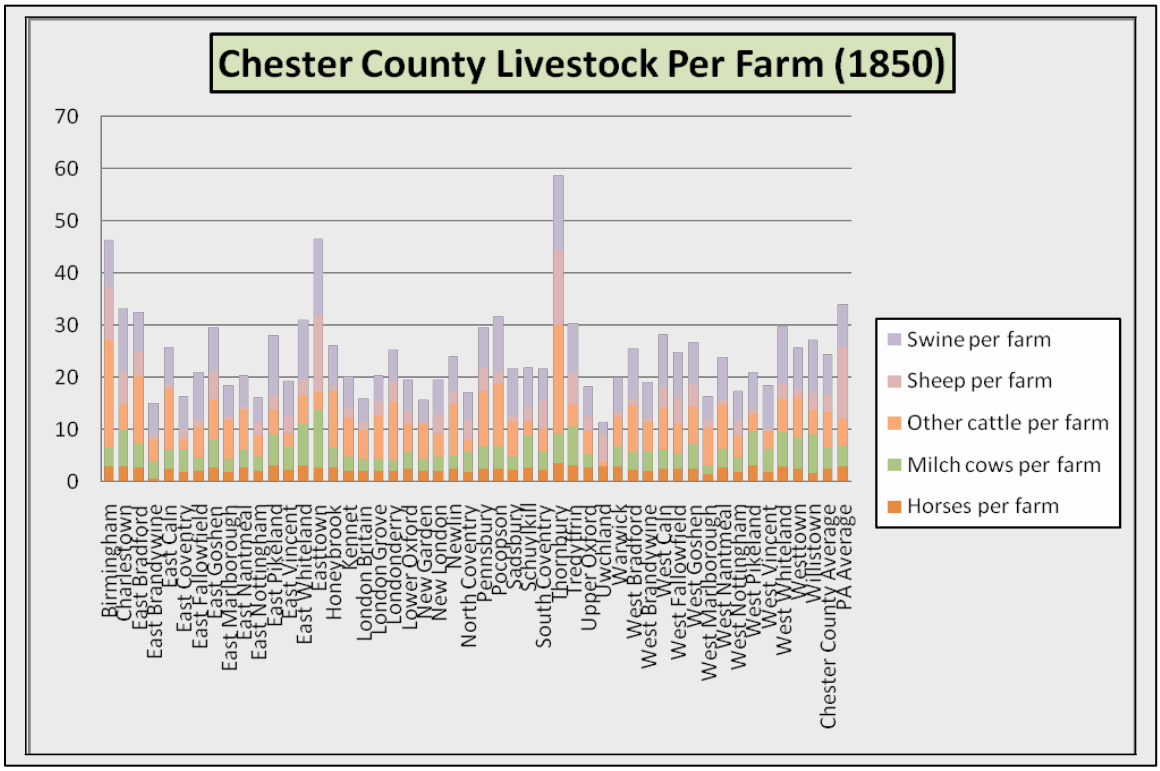
Hogs, on the other hand, did occupy an important niche in the local agricultural economy. While not quite at state averages on a per-farm basis, most farms here had at least half a dozen hogs, and some had far more. The hog's significance for southeastern Pennsylvania is twofold. First, as the *Cultivator* editor noted, hogs complemented home dairy production nicely. They could consume butter making by-products, excess milk, kitchen slops, and corn meal, and also benefited from abundant pasturage. The 1861 author noted: "where so much butter is manufactured, there must of course be many a populous sty to consume the buttermilk to advantage." The resulting pork could be consumed in the household or easily marketed nearby.[23]

Second, some farm families in the region raised breeding animals, a profitable business in itself. The Chester White pig was claimed as an American breed developed beginning in the early 19th century in the Chester County and northern Delaware by the efforts of several breeders working with imports having various characteristics. The Chester White was prized for its large frame, compliant nature, good mothering qualities, fecundity, and above all for its ability to lay on more pork and lard for a given amount of feed than any other breed. Chester County stockmen made a national reputation as breeders and sold foundation animals throughout the country. Chester County breeder Thomas Wood wrote in 1860 that he had sold animals to every state in the Union except Oregon. Demand was allegedly so great that imposters took to passing off ordinary white "land pike" swine as the genuine article, and the agricultural press boiled with disputes about the purity of various animals. In the end, especially after various breed associations were

consolidated in the early twentieth century, the Chester White was an enormously successful American breed. Chester Whites are still raised today.[24]

Poultry was only modestly important on southeastern Pennsylvania farms during this period. Virtually every farm had a flock of two or three dozen, which mainly supplied the household.

The nursery and seed business in the region began in the mid 19th century.[25] These were substantial businesses, but did not yet have a significant presence in the overall agricultural economy.



Family subsistence and market activity intertwined on southeastern Pennsylvania farms during this period. Most farm products had multiple uses: they could be sold at market, exchanged with neighbors, or consumed by family members or livestock. So for example, families would slaughter one steer and sell the rest; they would preserve meat from one or two pigs for family use and sell others. A large vegetable garden and potato patch supplied food, and every farm had an orchard planted mainly with apples but also other fruit trees. Poultry were kept for meat and eggs. Over time, orchards matured, vegetable garden varieties increased, and dietary standards rose. Canning was not yet very important, but pickling, drying, and smoking were important food preservation

methods. Fiber processing demands lessened as factory made cloth became available, but it seems likely that food preservation work grew more time consuming than before.[26]

Labor and Land Tenure, 1780-1870

Family still predominated as the main labor force, though hired hands and "apprentices" supplemented the family members on a seasonal or sometimes annual basis. During this period, wage labor replaced various types of bound labor. Available data seems to suggest that while some farms had one or even two hired hands, most only hired on a seasonal basis.

The new intensive farming practices of crop rotation, manuring, and liming – on larger acreages -- probably took more work. Corn was an increasingly important crop, but harvesting and processing it was not yet extensively mechanized. Feeding regimens were more complicated, and storage for feed received more attention and care.[27] Clearing continued, even well into the nineteenth century, and slowly the woodlands disappeared.

Stepped-up dairy production meant important changes in farm labor patterns. One analyst remarked: "... it is a bitter pill to the stockmen whose business has been based on beef cattle, swine, and sheep to descend to the continuous and laborious work of caring for dairy cows and their products..."[28] For men, perhaps, the change was noticeable. Men were becoming more involved in dairy work. For example, one large Chester County operation described in 1861 had a spring house "with a neat cottage residence over it, for the dairyman and his family..." Yet women still did most of the dairy work; for them the changes in the post Civil War period were more in quantity than in new skills. One observer remarked that "there is nothing of an agricultural or domestic nature, with which the Chester County farmers' wives are not thoroughly cognizant, 'from baking a buckwheat cake to milking a dozen cows..."[29]

Home butter making reached a peak in southeastern Pennsylvania after the Civil War. Meticulous cleanliness and care were required to produce "gilt edge" butter. The milk was set in shallow pans to allow the cream to rise. Shelves ranged around the cool interior walls of the spring house accommodated milk pans. Once the cream had risen, it was skimmed off the top and placed in a churn. Various patent churns appeared during the period, but vigorous action was invariably required until the butter "came." It was "worked" to remove the buttermilk; salted; and put into containers, sometimes finished off with a decorative "print."[30]

Gender patterns in dairying in the region began an important transition towards the end of this period. Creameries were introduced by the 1870s. Creameries were centralized processing plants where cream was made into butter for marketing in quantity. (In this period, creamery processing rather than fluid milk for direct consumption accounted for most milk sold from the farm.) Overall in the region, by about 1880, about half of farm milk went to homemade butter and the other half was sold. The manuscript census reports for 1880 suggest that most farm families either sold milk OR made butter. Relatively few did both. This means that on milk selling farms, women's dairy labor was significantly and rather suddenly reduced, and men's probably increased. Conversely, on farms where families kept on making butter, everyone's labor must have increased.

In some cases, tenants may have furnished needed labor. Tenancy rates in the region were at or above state averages, around 25 percent. The 1850 agricultural census recorder in Sadsbury Township, Chester County, noted "Tenant," "Agent," or "Manager" in his list, so it seems that various arrangements were made for managing farms when they were not owner-operated. The 1861 *Cultivator* correspondent said that "the butter in Chester county (sic) is very commonly made by contract. The proprietor rents a tenement to a family, who milk the cows and prepare the butter for market, for three cents per pound, having generally included in the bargain, house rent, fire wood, and such other privileges as may be agreed upon between the parties at the time of making the contract. An additional price is also paid the tenant for other labor, such as for feeding and taking care of the cows – sometimes as much as $200 per annum extra."[31]

Mechanization helped to offset some of the labor demands of the new regime. Southeastern Pennsylvania farms were heavily mechanized, with average implement values well above state figures, even accounting for a greater amount of improved land per farm. Animal powered stationary machines, plows, and mower machines attracted a great deal of attention, since there was so much hay to be cut and moved.[32] A popular implement, for example, was the horse powered hay lift. In Chester County, oxen continued to be popular at midcentury, but thereafter the shift to horses took place everywhere. Chester County farmers fashioned improved hay-forks and threshing-machines, for example. In Bucks County, clover hulling mills and wheat drilling machines were in use in the 1840s. The Montgomery County Agricultural Society in 1857 had on exhibit mowers, reapers, threshing machines, and "a great variety of smaller agricultural implements." Business directories indicate that there were a great many agricultural implement dealers in the region, selling drills, ploughs, threshing machines, grain fans, corn shellers, corn planters, cradles, and mowing machines.[33]

Buildings and Landscapes, 1780-1870

Houses, 1780-1870

As for the colonial period, houses are well documented for southeastern Pennsylvania. See the Bibliography for references. Many fine farm houses were erected during the prosperous years of the early national period. The c. 1815 house pictured below is a good example.

Farm house, West Bradford Township, Chester County, early 19th century. Site 029-WD-005

Tenant houses appeared frequently on southeastern Pennsylvania farms. Usually they were smaller and simpler than the main farm house.

William Miller tenant house, Avondale Borough, Chester County, c. 1800, photographed 1958. HABS. Digital ID http://hdl.loc.gov/loc.pnp/hhh.pa0235.

Detached kitchen, 1780-1870

Some farms had detached kitchens. These structures housed facilities for heavy cooking, food processing, and washing.

Slifer Log Kitchen, Meadowbrook Farm, Springtown, Bucks County,1815. HABS. Digital ID http://hdl.loc.gov/loc.pnp/hhh.pa3562

Barns, 1780-1870

During this period, southeastern Pennsylvania became famous for its substantial barns. The so-called "Pennsylvania barn" emerged in the late eighteenth century and gained popularity. The discussion here makes use of research from the Lancaster Plain context; the analysis is applicable for southeastern Pennsylvania since early Pennsylvania barns appeared throughout the region, for essentially the same reasons. This famous type has as its main diagnostic feature the projecting 7-8 foot forebay, or overshoot. The barn is

banked, and organized such that the upper level consists of central threshing floor(s), flanked by mows for hay, straw, or unthreshed grain; and one or more granaries (sometimes in the forebay, sometimes next to a mow on the bank side). The Pennsylvania Barn almost always has a gable roof. On the lower level, stable and stalls (organized crosswise to the roof ridge, separated by alleyways for humans) housed horses, milk cows, beef cattle, and sometimes sheep or hogs. The Pennsylvania Barn has been clearly traced back to Switzerland and in Pennsylvania was originally associated with Pennsylvania Germans; but its advantages were such that all groups built in the design.

The Pennsylvania Barn was a highly flexible form. It ranged in size from just twenty feet long to over a hundred. It could also accommodate features such as an "outshoot" or "outshed" that would extend back from the bank side; multiple threshing floors and haymows[34]; a root cellar; a corncrib/machinery shed extension; a machinery bay on the lower level; or a 'horse power' on the bank side, or sometimes in the basement. The forebay might project unsupported, or it might have supporting end walls or posts. Nomenclature for these various features varies, too. But, it is important to remember that in order to considered a Pennsylvania Barn, a barn must have these essential features: a projecting forebay and banked construction, almost invariably with the eaves side in the bank.

The Pennsylvania Barn exemplified and facilitated the new grain-and-livestock agriculture. That is why it appeared when it did. Historian Steven Stoll has compared the Pennsylvania Barn to a cow – taking in raw materials and producing milk, meat, and manure. Indeed, the barn promoted productivity in several ways. Its stable level and yard functioned to collect the valuable manure (generated with feed stored in the upper levels) and to combine it with straw to make it the perfect dressing for crop fields. A local historian wrote that “straw, grain, corn stalks, and refuse from the stables” were “trampled under the feet of fattening cattle during the winter. The barn-yards were cleaned once a year... and this refuse was spread over the fields and plowed under the soil.... the farmer who had a large barn-yard full of manure to haul out, after harvest, was looked upon as a model.”[35] The barn’s thick walls and sheltering overhang kept animals comfortable in bad weather and made them more productive simply because they could devote body energy to making meat or milk instead of keeping warm and dry. With its rational, centralized organization and gravity-fed multi-level arrangement, the Pennsylvania Barn also represented a response to an increased need for labor efficiency. Provision for horses reflected mechanization.

Pennsylvania Barn, John Eakin Farm, Springfield Township, Bucks County, c. 1825. Pennsylvania Historic Preservation Bureau file photo.

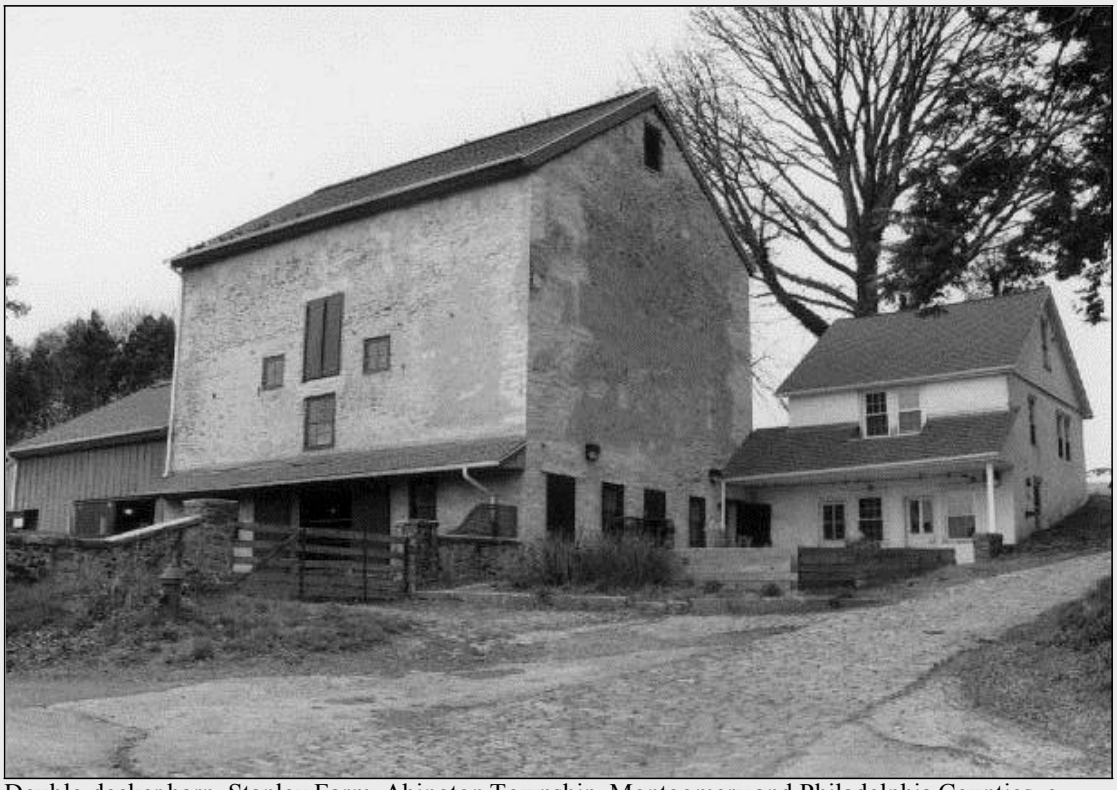
Pennsylvania Barn with stone arch forebay, Four-Way Farm, Springfield Township, Montgomery County, Early 19th century. Pennsylvania Historic Preservation Bureau file photo.

Especially in Chester County, a distinctive local variation appeared. The forebay was stretched out to a proportionately much larger size, and often supported with large conical stone posts.

Pennsylvania Barn with large posted forebay, Temora Farm, Newtown Township, Bucks County, Early 19th century. Pennsylvania Historic Preservation Bureau file photo.

Another important variant found more frequently in the region than elsewhere is the "double decker." In the "double decker," the Pennsylvania Barn principle is extended vertically. There are three levels rather than two (confusing, given the nomenclature). In the lowest level are the stables, as in all Pennsylvania Barns. In the uppermost level there is the threshing floor, also typical of all Pennsylvania Barns. But instead of having the mow floor even with the threshing floor, there is a third level between these two. It contains the lower portion of each mow, plus space for grain storage. In order to provide access to this middle level, the barn is built with a bridge to the upper level, rather than a bank. Under the bridge there is a door to the granary storage space. The "double decker" design permitted hay to be tossed down from the threshing floor level, and it also significantly increased the storage capacity of the mows.[36] This type of mow is called a "sunken" mow or "sink mow."

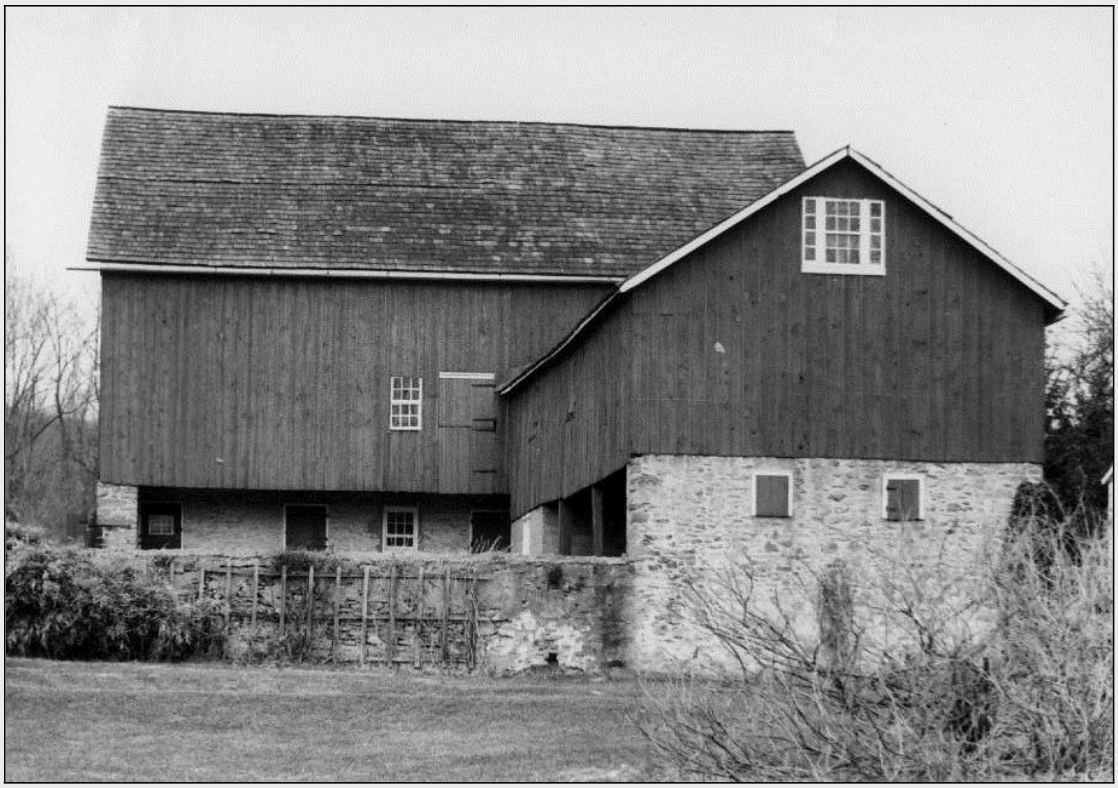
Double-decker barn, "sink mow" seen from threshing floor, West Bradford Township, Chester County, late 19th century. Site 029-WD-001. Note the opening in the floor for throwing hay down to the stables below.



Double-decker barn, Stanley Farm, Abington Township, Montgomery and Philadelphia Counties, c. 1780-1800. Pennsylvania Historic Preservation Bureau file photo.

"Double Decker" barn showing granary door under bridge, Newlin Township, Chester County, late 19th century. Site 029-NE-001

Often, barns in the region have a feature that can be regarded as being like a very large forebay with a gabled second story. It often extends across the entire lower side eaves side. The lower level beneath is not enclosed, but rather remains open, so in this respect it continues and further exaggerates the forebay function. Upstairs, there is ample hay and straw storage.



Pennsylvania barn with gabled ell open beneath, Lydia & Thomas Gilbert Farm, Buckingham Township, Bucks County, c. 1850. Pennsylvania Historic Preservation Bureau file photo.

Finally, in this region a great many Pennsylvania Barns sprouted narrower gabled ells off the forebay side. Historical accounts sometimes call these straw sheds.[37]

Pennsylvania Barn with ell extensions off the forebay, Buckingham Township, Bucks County, date not given, photographed 1941. HABS documentation. Digital ID http://hel.loc.gov/loc.pnp/hhh.pa1570

Walter Pyle Barn, Kaolin vicinity, Chester County, c 1768. Pennsylvania Barn with twin straw sheds. HABS documentation. Digital ID http://hdl.loc.gov/loc.pnp/hhh.pa1501

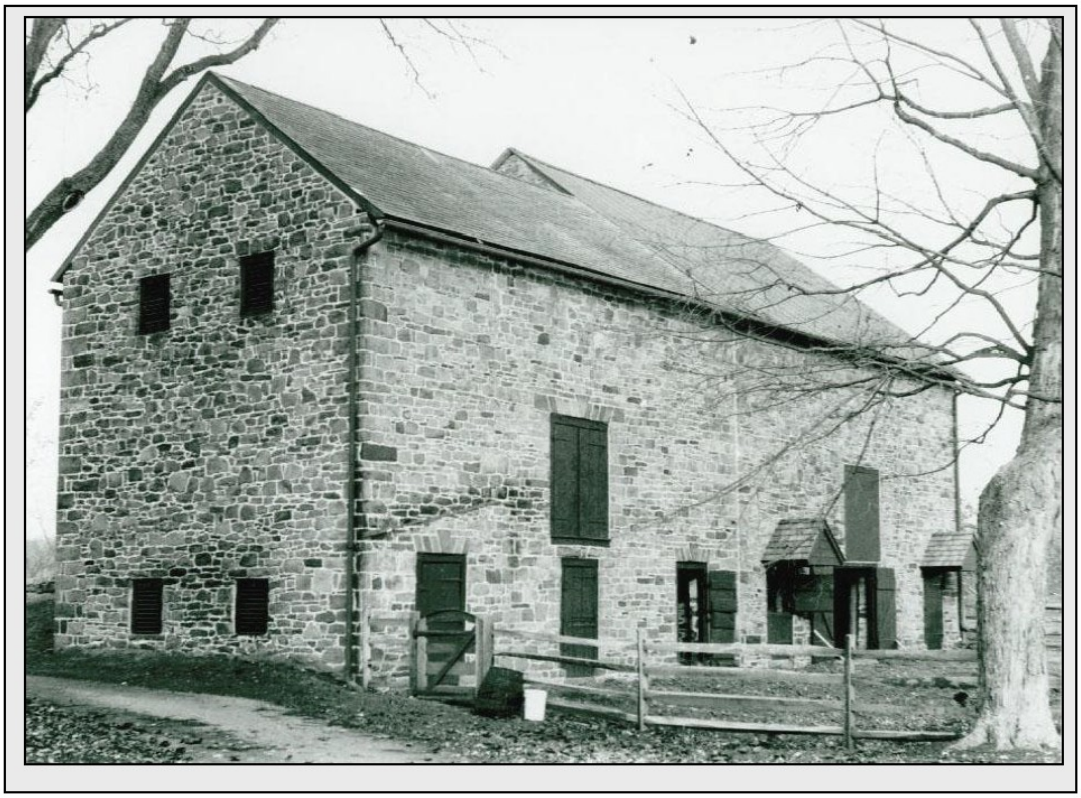
Pennsylvania Barn with ell extension off the forebay, Raven Hill Farm, Edgmont Township, Delaware County, date not given. Pennsylvania Historic Preservation Bureau file photo.

Barn with gabled entry addition, Edgmont Township, Delaware County, c. 1796. Pennsylvania Historic Preservation Bureau file.

Another barn type known as the "English Lake District" also appears in southeastern Pennsylvania. "English Lake District" barns are similar in function to Pennsylvania Barns. For instance, in both barns the bottom is used to house animals while the top can be used to store hay and straw as well as allow for the threshing of grains. Additionally, "English Lake District" barns are similar in function to what Thomas Visser refers to as "Side Hill English" barns, also known as "English Bank" barns. However, "English Lake District" barns differ from Pennsylvania Barns in several ways. First, they are not always banked; they may just have a ramp. Second, they are commonly made from stone. Finally, they do not have forebays, instead they contain pent roofs which shelter the entrance doors to the stables below. It is believed that these barns derive their name from those found in the northwestern section of England known as the English Lake District.

"English Lake District" barn, Jacob Funk House, Springfield Township, Bucks County, c. 1810. Pennsylvania Historic Preservation Bureau file.

"English Lake District" barn with rear addition, Yard View Farm, Marple Township, Delaware County, no date given. Pennsylvania Historic Preservation Bureau file.



Front and rear elevations of "English Lake District"barn. The barn features a double ramp, and was constructed in two sections. The first portion (foreground) was constructed in 1796, and the larger section featuring a higher roofline was constructed in 1813. Isaiah Paxon Fann, Solebury Township, Bucks County. Pennsylvania Historic Preservation Bureau file.

The barns described in the foregoing discussion – standard Pennsylvania barn, Pennsylvania barn with extended posted forebay, double-decker barn, "English Lake district" barn -- are often treated separately as distinct types. Excellent scholarly works analyze formal, stylistic, ethnic origins, and construction nuances of each type. For our purposes, however, we may gain different insights if we consider what they have in common rather than their differences. These common features are significant because they served and thus reflect the emerging regional agricultural system.

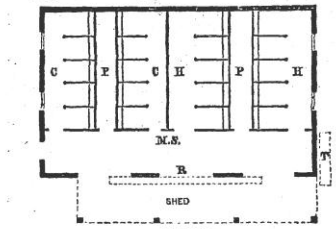
These barns all have at least two and sometimes three levels arranged vertically. In all cases, the vertical arrangement increased hay and straw storage space, and made labor more efficient. The "double decker" barn enhanced, but did not fundamentally diverge from, the functions of the regular Pennsylvania Barn. The "sink mow" feature permitted more hay storage, and this was an important consideration in Chester, Bucks, and Montgomery Counties, where the average hay production was so high. The average farm in the region put up 20-25 tons of hay per year; but it was not uncommon for a farm to report 60 or more tons of hay. This was in loose form, not baled, so it took up considerable volume. One Bucks County historian estimated that some barns could hold 100 tons of hay.[38] The sunken mow afforded the extra volume needed for such large outputs. Another important consideration is straw. Straw (the stalks left over after grain harvesting) was an essential component of animal bedding and was ultimately returned to the land mixed in with manure. It was therefore carefully saved in barn spaces along with hay, and often had its own shed. One observer noted of Chester County double-decker barns that "there are very often sheds around three sides, perhaps open through into the barn, ... for they generally have a large loft for the storage of straw." The granary feature efficiently stored grain and "chaff" beneath the threshing floor, and made the grain more accessible too.[39]

All of these barn designs facilitated manure collection very efficiently. As we have seen, the standard Pennsylvania barn was praised for this feature; the extended forebay and ell with open stable level improved on it. As the 19th-century plans below show, they allowed for orderly management of livestock and manures.

PLAN OF A THREE STORY BARN.
S S R
The Cultivator (1834-1865); Mar 1861; 9, 3; American Periodicals Series Online
pg. 82

PLAN OF A THREE STORY BARN.

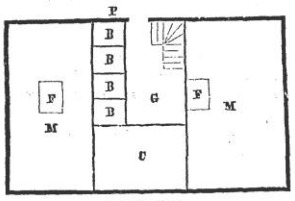
L. TUCKER & SON—I have read several articles and seen several plans in your valuable journal for building barns, but none I like so well as my own, which I built last year at a cost of about $1,000, besides our own labor. It is what is sometimes called a three story or a "double decker" barn, built on the south side of an abrupt or steep little hill, or "bench," as they are called in this country, being the first rise from the Whitewater creek bottom. It is about 36 by 60 feet, with a 14 feet "over-shoot;" the hillside was dug out for the cellar or stable, and being chiefly gravel was very useful for making the roads and



BASEMENT.

C. C.—Cow stables. H. H.—Horse stables. P. P.—Feeding passages. M. S.—Manure shed or overshoot. R.—Straw rack for cattle, with shed 14 feet wide over it on posts. T.—Water trough.

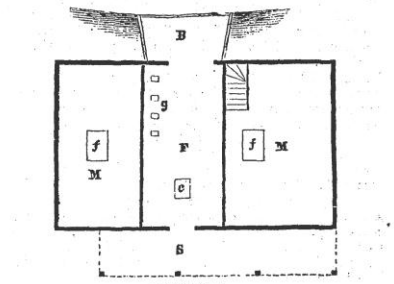
leveling off the barnyard, which I coated over to the depth of a foot with hard solid gravel. The lower story is divided into two horse stables and two cow stables, with an entry between each, and will accommodate 10 horses and 12 cows in stalls. The walls are about 17 feet high, extending up to the barn floor. On the north side the bank is leveled off 8 feet above the stable floor, about 10 feet from the wall, forming a roadway or passage like an area, on the north side of which is a wall and bank to the top of the hill 5 to 7 feet higher, from which and over this passage extends the bridge-way to the barn floor, the large doors of which are hung on rollers. Under the barn floor,



MIDDLE STORY.

G.—Granary. B. B.—Bins. C.—Chaff room. M. M.—Mows or bays. F. F.—Funnels, for pitching down hay. P.—Passage or wagon way, on north side of and level with granary.

which is near the middle, are the granaries and chaff-room—the mows or bays on the east and west sides of the barn floor, extending 8 feet below it, to the level of the granary floor and over the stables. In the barn floor are several holes with lids, through which we run the grain into the bins as it is cleaned up. At the south or back end of the granary is the chaff-room, into which the chaff falls from the barn floor through a hole. There is a door out on the north side of the granary, under the bridgeway, where we load and unload the grain, feed, &c. There are two flights of stairs, one from the barn floor to the granary, and one from the granary to the entry below. In each of the mows is a funnel extending from over the entry up to the top of the barn, for ventilation and to throw hay, &c., down. The frame is about 16 feet high, weather boarded and painted. We fill the lower part of the mows with hay, which is much easier pitched *down* than up, and put our wheat on top,



UPPER STORY.

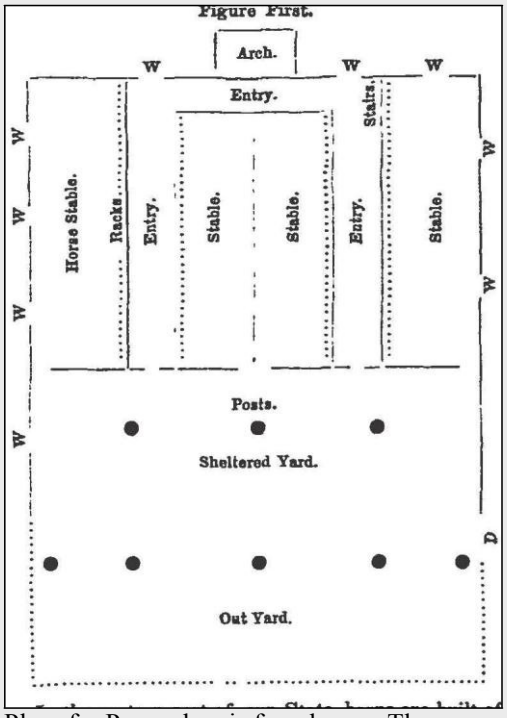
B.—Bridge way. F.—Barn floor. M. M.—Mows or bays—f. f.—Funnels for throwing down hay. C.—Trap-door to chaff room—g.—Trap-doors to granary. S.—Straw shed.

which we thresh at odd times and in rough weather through the winter, economizing our straw, using a two-horse endless chain power, and also for grinding corn on the cob, and for sawing wood. A trough of running water is in the barnyard, which is warm and sheltered on the west by shed stables. The barn having sky-light windows, we can see well to work in rough weather when closely shut up. S. S. R.

New Paris, Preble Co., Ohio.

This appears to be a good and very convenient barn, and admirably adapted to saving the labor of pitching grain, straw and hay, carrying grain, and to preserving chaff and straw. The horse stables being in the basement, special pains should be taken to have it dry, airy, well ventilated and protected well from the usual dampness of such stables, which proves injurious to horses.—EDS.

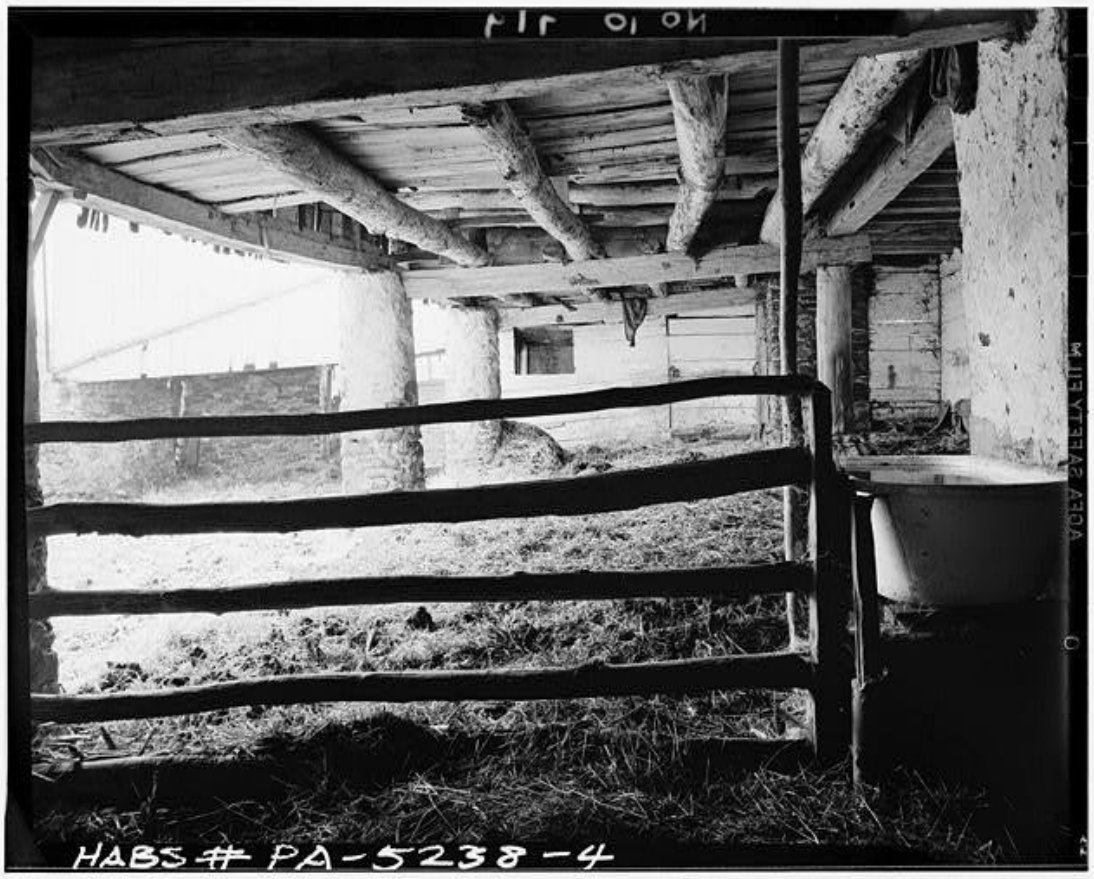
This "Plan of a Three Story Barn" explains in detail how the "double-decker" worked.



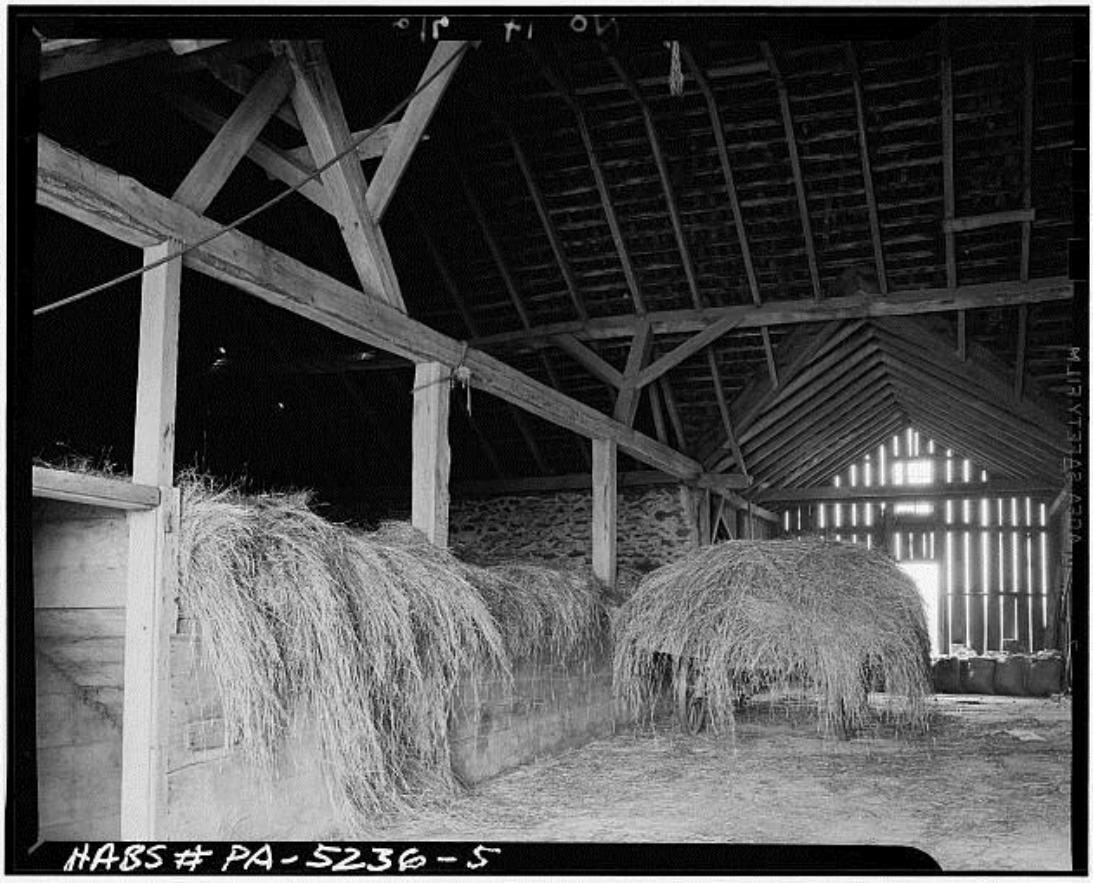
Plans for Pennsylvania farm barns. Thomas Wood, "PLAN OF PENNSYLVANIA FARM BARNS.," Ohio Cultivator (1845-1866); Apr 15, 1855; 114; American Periodicals Series Online

A barn plan submitted in 1855 to the *Ohio Cultivator* by Chester County farmer Thomas Wood give an excellent idea of how these barns functioned. It has a "sheltered yard" extended and supported with posts. This yard took the forebay concept and expanded it to create a space that not only sheltered animals, but facilitated the important process of collecting manures. Straw could be distributed here to mix with the animal waste, and the resulting valuable fertilizer would not lose nutrients through exposure to the elements.

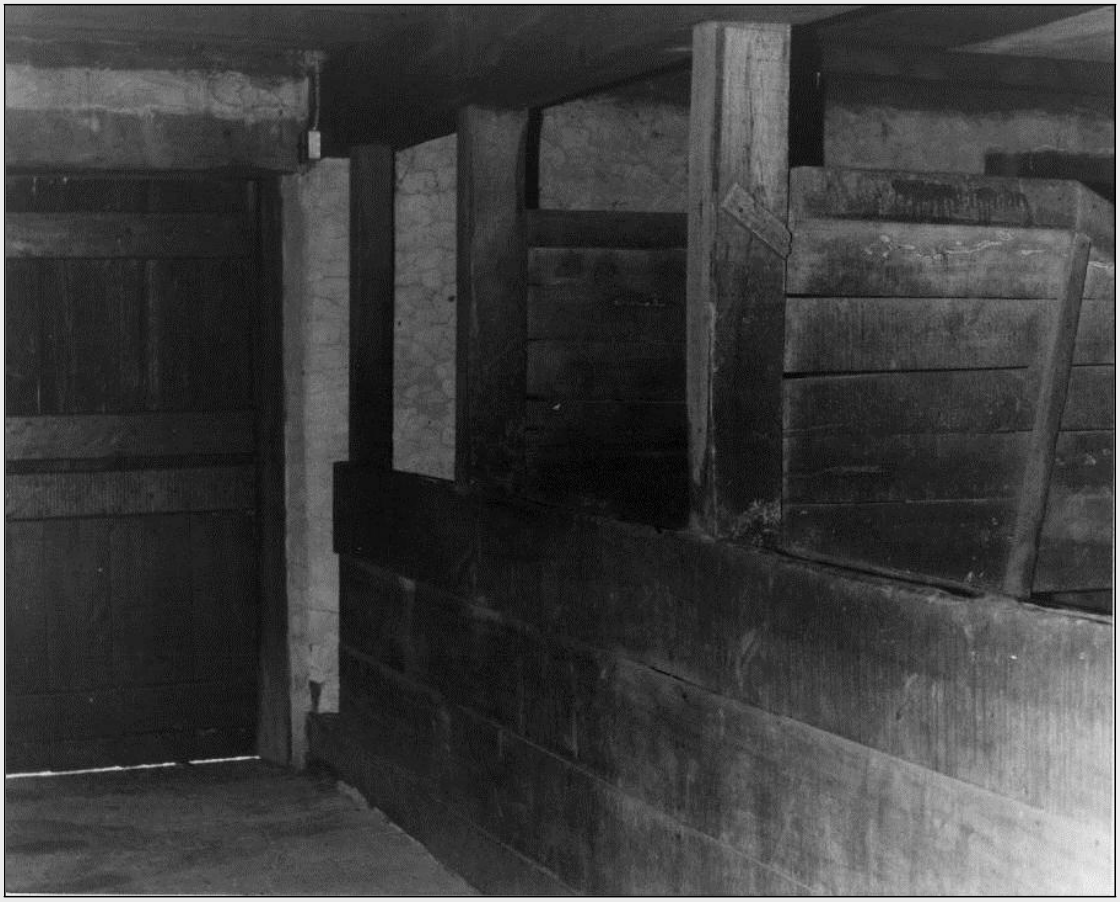
The narrower gabled ells extending from the forebay side of a Pennsylvania Barn served the same function as the extended, posted forebay: they provided more space for hay and/or straw storage, and sheltered horses, cattle, and manure. Thus they were variations on the theme.



Sheltered yard, Walter C. Pyle Barn, 1768, Chester County PA. This "sheltered yard" shows the principle in actual execution. HABS documentation. Digital ID http://hdl.loc.gov/loc.pnp/hhh.pa1501



Tom Clark barn, Pocopson Township, Chester County, c. 1795. HABS documentation. Digital ID http://hdl.loc.gov/loc.pnp.hhh.pa1499. This photo shows hay spilling out of the sunken mow to the left.



Stabling area below forebay in c. 1840 Pennsylvania bank barn, Eriwin-Stover House and Barn, Tinicum Township, Bucks County. Pennsylvania Historic Preservation Bureau file photo.

We may conclude that regardless of their cultural origins, the 19th-century barns in the region reflected the farming system that had taken shape there. They facilitated hay and straw storage, grain storage, cattle feeding (whether dairy or beef), and manure handling on a large scale with sophisticated architectural accommodation. Some barns had cow houses for milking and shedding along the barnyard periphery.[40]

Typical southeastern Pennsylvania farmsteads of the period had multiple outbuildings, but the scale and intensity of agricultural change and other development since then has eliminated many. However, good examples remain of the most important types.

Spring Houses and other dairy related buildings, 1780-1870

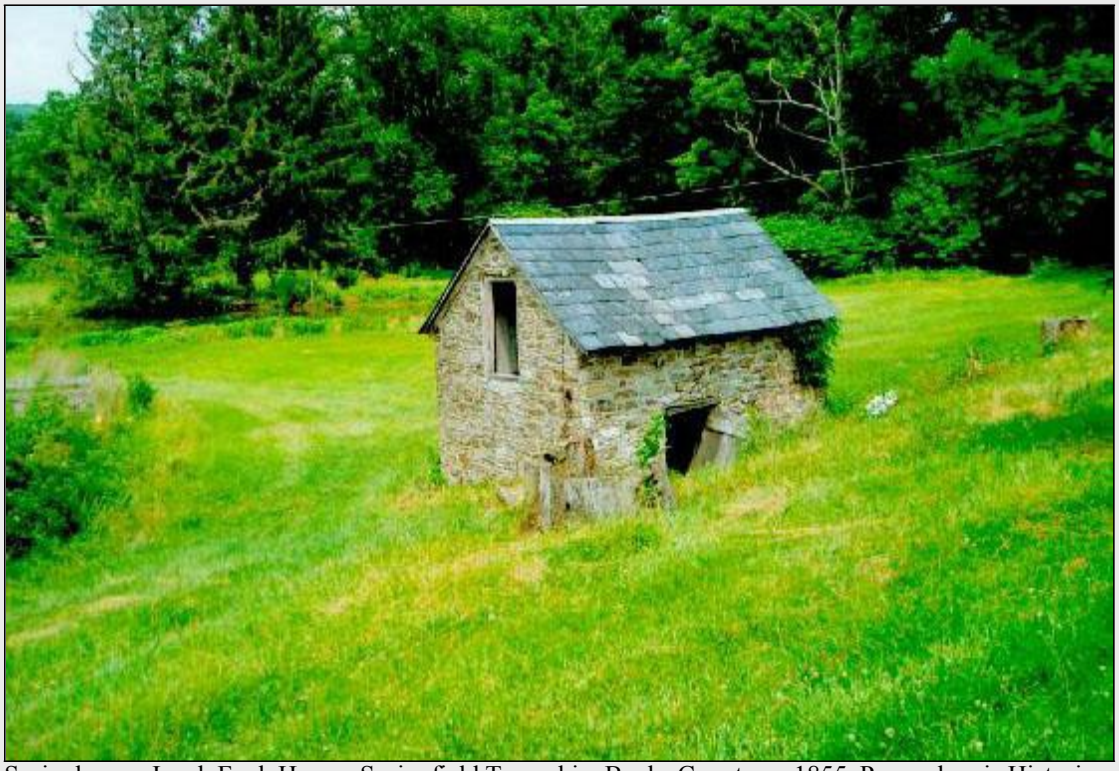
The spring house was a key building in the home dairying farming system. Southeastern Pennsylvania spring houses got larger and more elaborate during this period. Historian Joan Jensen studied the 1798 Direct Tax for Chester County and found that about half of Chester County farms had spring houses, averaging 125-150 square feet. By about 1830, spring house size in Chester County had doubled. Jensen writes:

> Water flowed into a paved sunken trench about two feet wide and three inches deep around a raised center platform. Milk pans were placed in the water to cool, while wooden or stone shelves and benches lining the walls provided space for tubs, bowls, and other processing equipment. Shelves on the outside provided space for drying containers and churns after they had been cleaned. Larger springhouses had two or three compartments, one of which usually housed the spring with the others devoted to processing. ... [and] overhanging roof... gave an additional outdoor work space.

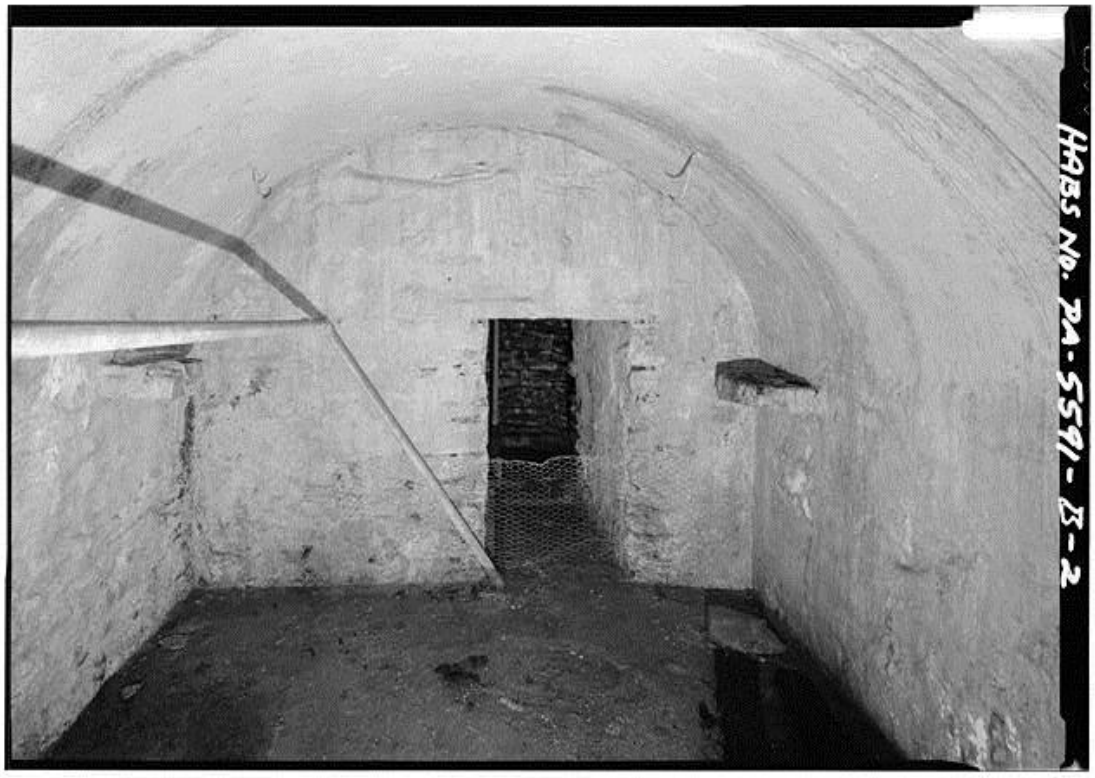
Spring houses still survive on many southeastern Pennsylvania farms. They were very definitely women's work spaces.

Springhouse, West Bradford Township, Chester County, c 1850-70. Site 029-WD-003.

Springhouse, Bethel Township, Delaware County, c. 1800. Pennsylvania Historic Preservation Bureau file photo.

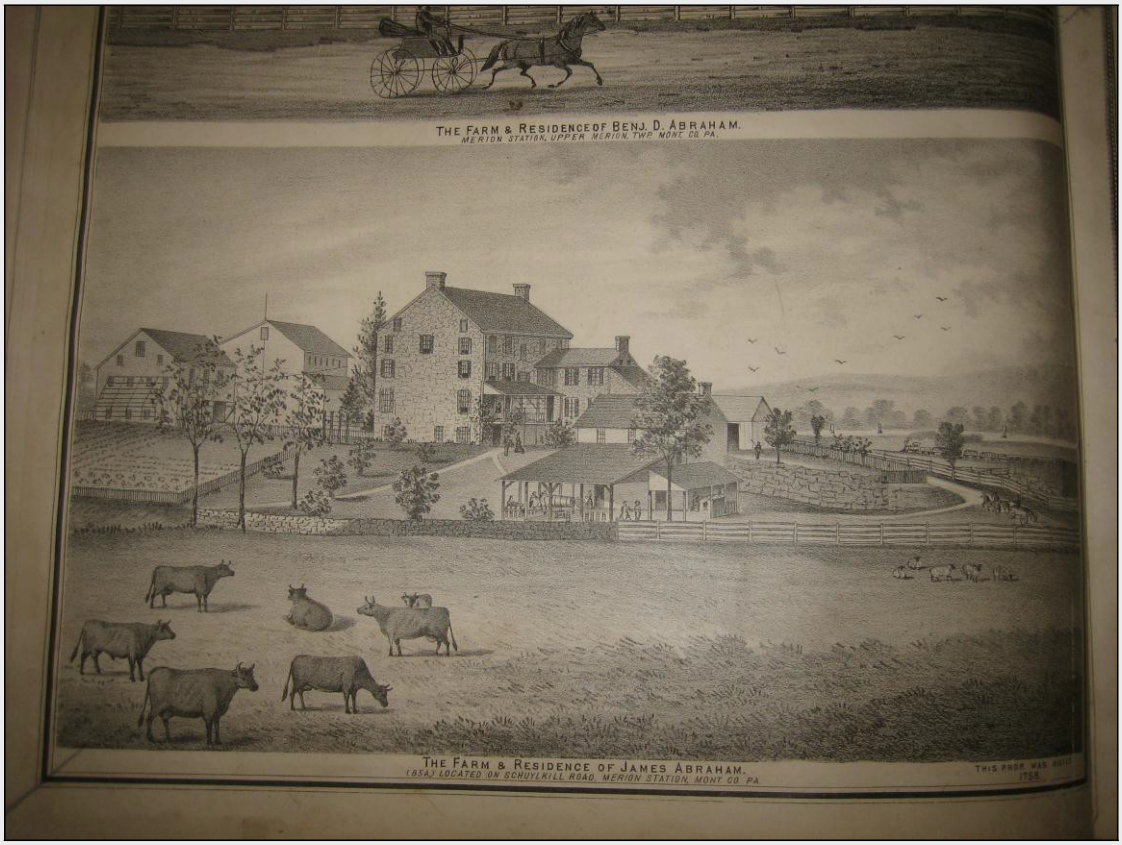


Springhouse, Jacob Funk House, Springfield Township, Bucks County, c. 1855. Pennsylvania Historic Preservation Bureau file photo.



Spring house interior, High Farm, Perkasie, Bucks County, PA, no date given. HABS documentation. Digital ID http://hdl.loc.gov/loc.pnp/hhh.pa2197

An engraving of the "Farm and Residence of James Abraham" from 1877 shows a large-scale butter making operation. A two story building sits along a road, across from a cow pasture. Off the eaves side is a long, open shed roof area where women are depicted at work. A horse powered barrel churn is in use. The 1880 agricultural census for Upper Merion Township shows that Abraham reported 2,600 pounds of butter from sixteen milk cows.[41]



"Farm and Residence of James Abraham." Combination Atlas Map of Montgomery County Pennsylvania... (Philadelphia, 1877).

HABS documented spring houses in the region include the Fell spring house, Buckingham, Bucks County; one at the Varnum Headquarters, Valley Forge National Historical Park, Chester County; and a large two-story example at the William and Rebecca Bones farm, Charlestown Township, Chester County.

Ice House, 1780-1870

Ice House, Fifer's Folly, Edgmont Township, Delaware County, c. 1800. Pennsylvania Historic Preservation Bureau file photo.

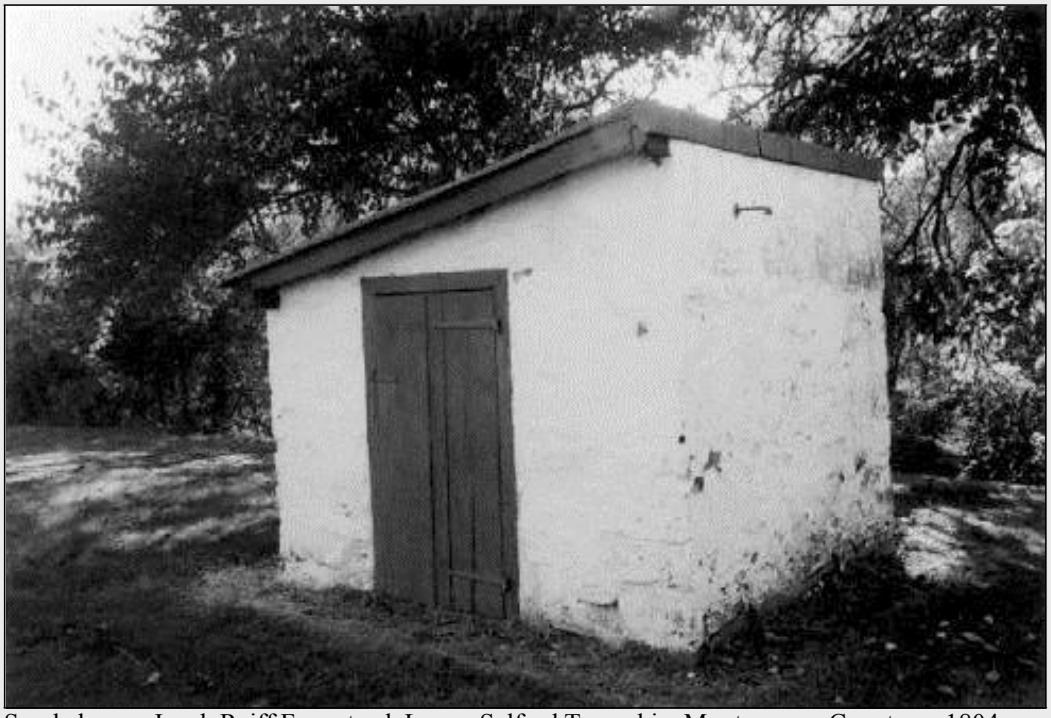
Ice Cave, Vanderslice/Custer Farm, Upper Providence Township, Montgomery County, no date given. Pennsylvania Historic Preservation Bureau file photo.

Root Cellar, 1780-1870

Root Cellar entrance, Craven Hall, Johnsville, Bucks County, no date given. HABS documentation. Digital ID http://hdl.loc.gov/loc.pnp/hhh.pa3169

Root cellars were important subsistence spaces for storing root crops and other vegetables over the winter. They took advantage of a constant below ground temperature of about 55 degrees Fahrenheit.

Brick smoke house, Franklin Township, Chester County, mid 19th century. Pennsylvania CRGIS record.



Smokehouse, Jacob Reiff Farmstead, Lower Salford Township, Montgomery County, c. 1804. Pennsylvania Historic Preservation Bureau file photo.

Smokehouse, Joseph Supplee Farmstead, Worcester Township, Montgomery County, no date given. Pennsylvania Historic Preservation Bureau file photo.

Smokehouse, springhouse, ice house combination, Upper Gwynedd Township, Montgomery County, Early 19th century. Pennsylvania Historic Preservation Bureau file photo.

Smoke houses were also important subsistence structures for preserving meat, mainly pork. For an interior view, see the HABS documented Lakeside farm smoke house, Yardley, Bucks County, PA. Other HABS documented smoke houses include one at the Lowndes Taylor farm, West Goshen Township, Chester County; and the 1815 Hause log smoke house in East Nantmeal Township, Chester County.

Carriage/Wagon Sheds, 1780-1870

As roads improved, prosperous southeastern Pennsylvania farm families acquired horse drawn carriages and wagons. These were housed in carriage houses or wagon sheds. They are distinguished from farm machinery sheds by their generally better level of finish, and by siting near the house and farm lane.

Wagon Shed, Lower Oxford Township, Chester County, c. 1880. Site 029-LO-002. This board and batten shed had ornamental trim on the cornices.

Wagon Shed, Upper Oxford Township, Chester County, c. 1880. Site 029-UO-002.

Wagon shed, James Cornell Farm, Northampton Township, Bucks County, no date given. Pennsylvania Historic Preservation Bureau file photo.

A HABS documented carriage house and wagon shed can be viewed at the Lakeside farm, Yardley, Bucks County, PA; and a c. 1850 “cart shed” at the Woodward-Pennock farm, London Grove, Chester County.

Corn Cribs, 1780-1870

Corn cribs were important buildings on southeastern Pennsylvania farms in this period. Corn production rose significantly both in absolute and per-farm terms, so storage space was much needed. Often corn storage was combined with machinery storage. Few extant corn cribs in the region can be definitively dated before c. 1870.

Drive through machine shed with corn crib, West Nantmeal township, Chester County, c. 1880. Site 029-WN-004.

Double corn crib (right), c. 1865 and wagon shed (left), c. 1861, Lewis Summers Farm, Tinicum Township, Bucks County. Pennsylvania Historic Preservation Bureau file photo.

Machine Sheds, 1780-1870

Southeastern Pennsylvania farms had a lot of equipment. Machine sheds soon appeared to house it.

Machine Shed, West Brandywine Township, Chester County, late 19th century. Site 029-WB-001. This shed also has a corn crib at one end.

Pig Pen, 1780-1870

Pig pen, West Nantmeal Township, Chester County, mid 19th century.

Since hogs were not especially numerous in Chester County, examples of hog houses are limited. This pig pen in Londonderry Township, however, is a good example. It has a tiny forebay at the front (not visible here). Above the forebay are windows, presumably for poultry; below are the small openings typical of hog houses. They lead to a small formerly enclosed yard.

Butcher House, 1780-1870

Butcher house, Fulmer-Rosenberger Farm, Hilltown Township, Bucks County, c. 1850-1870. Pennsylvania Historic Preservation Bureau file photo.

Butcher house/Spring house combination, J. Kirk Farmstead, Chalfont Borough, Bucks County, c. 1840-1850. Pennsylvania Historic Preservation Bureau file photo.

Outdoor Bake Oven, 1780-1870

Outdoor Bake Oven, West Nantmeal Township, c. 1850. Site 029-WN-004

Subsistence activities continued to be varied and important on southeastern Pennsylvania farms. This outdoor bake oven is a particularly good example of the type. It has a "squirrel tail" oven.

Summer Kitchen, 1780-1870

Throughout Pennsylvania in the late nineteenth and early twentieth centuries, farm families elaborated and diversified their diets. Of course rural people had long possessed numerous and subtle skills relating to food preparation and processing; but now newly available supplies and technologies reworked the possibilities. Orchards matured, garden patches expanded, products from far away became available, and to the old staples of corn mush, meat, and sauerkraut, farm families added more cakes, pies, preserves; made more poultry dishes; and slowly shifted away from pork to beef. There were several key ingredients to this change. One was the cook stove. Reliable, affordable coal-burning cook stoves were now far more widely available, just as the

wood supply for traditional outdoor ovens diminished. As the cook stove replaced the open hearth and the outdoor bake oven, two important consequences followed. Cook stoves generated intense heat in the farm kitchen, so summertime cooking became difficult. Second, food preparation changed. More separate dishes could be prepared simultaneously. Expectations rose for dietary variety.

Another important change was in the increased availability of cheap sugar, produced on Caribbean and Latin American sugar plantations, and later US possessions in Puerto Rico and the Philippines. Consumption rose and the repertoire of jams, jellies, preserves, cakes, and puddings expanded.[42] Tropical fruits became available too. A recipe in the *Lancaster Farmer* for 1884, for example, explained how to make a "Cream Cake":

> One teacup cream, two teacups sugar, three well-beaten eggs, teaspoon saleratus, dissolved in wineglass of milk, butter size half an egg, flour to make as thick as pound cake; add raisins and spice to taste; wine and brandy if you like.[43]

It is impossible to know how many people actually made "cream cake," but the instructions in themselves are revealing for what they assume about ingredients the farm wife might have on hand.

To accommodate the intensified subsistence activity, and to get the hot summertime cooking out of the house kitchen, more summer kitchens appeared. The summer kitchen was not a new building type, but it became more common in this period. In southeastern Pennsylvania, the summer kitchen is less common than in more heavily Pennsylvania German regions, and it tends to be associated with Pennsylvania Germans within the region. (At site 029-WN-004, for example, where there is a summer kitchen, the 1860 map lists a "Handwork" family.) The typical summer kitchen would be a small detached building, usually gabled and made of frame. It would have ample windows for light, at least one door for access, a stove, and sometimes a set-kettle for heavy work. It was usually very close to the main kitchen. Often a decorative cupola with dinner bell sat on the roof ridge. The summer kitchen facilitated increasingly complex and demanding women's productive work. The work was productive because it resulted in tangible articles to consume, sell, or trade. The summer kitchen's siting near the main house reflects its preeminence as primarily a women's space.

Summer Kitchen, Glengary Farm, Doylestown Township, Bucks County, c. 1840. Pennsylvania Historic Preservation Bureau file photo.

Summer Kitchen, Newtown Township, Delaware County, c. 1857. Pennsylvania Historic Preservation Bureau file photo.

Landscape Features, 1780-1870

Lime kilns were important landscape features in nineteenth-century southeastern Pennsylvania. Lime kilns were dry laid masonry structures which tapered from base to top and had openings in the base. Limestone was deposited into the stack through a hole in the top; the fire was built in the hearth below. The intense temperature caused a reaction which converted limestone (calcium carbonate) to lime (calcium oxide). After cooling, the lime was raked from the bottom. Lime in turn had many uses, not only agricultural, but also for whitewash, masonry mortar, etc. None were documented on farms in southeastern Pennsylvania field work, but other historical evidence is plentiful.[44]

Pasture and cropland, as we have seen, took up most of the southeastern Pennsylvania rural landscape. Fencing was needed for pasture; atlas views show stone, board, "worm," and picket fences. See the atlas views above for typical examples.[45]

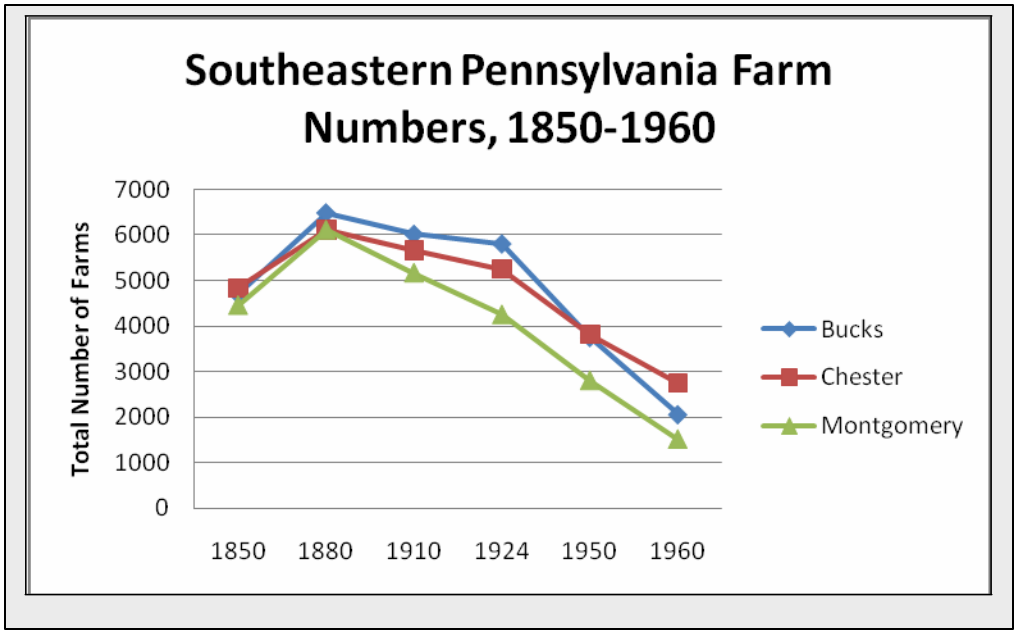
Cropland was divided into irregularly shaped small fields, often bounded by tree lines. Remnant fields occasionally survive and can be identified in aerial photographs.

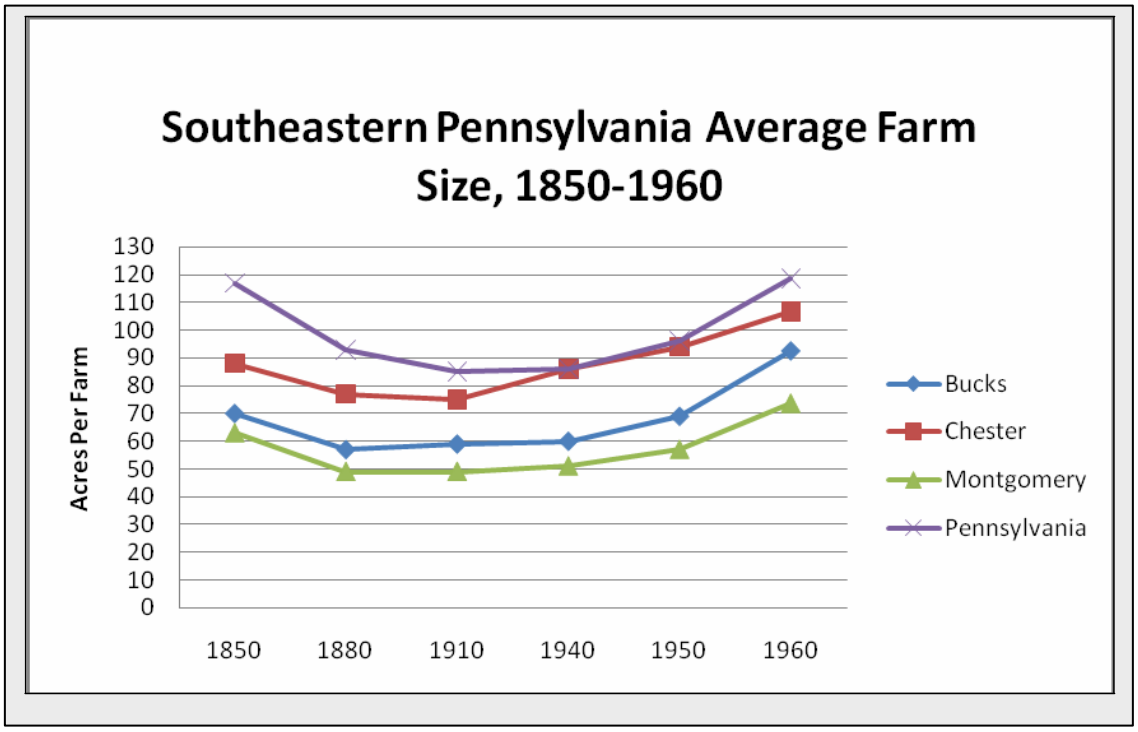
Farm woodlots typically would also be small and irregularly shaped and usually at the farm's periphery.

Fluid Milk Dairying, Poultry, Truck Farming, Nurseries, and Specialty products, 1870-1940

Introduction and Summary:

In the three southeastern counties, the number of farms dropped significantly after 1880. The acreage of land in farms also declined.[46] These trends took place everywhere. In the southeast, the declines resulted not only from periodic agricultural depressions as elsewhere, but also from urban expansion, which not only removed farmland from production but offered nonfarm employment. Farms that managed to continue adjusted to new economic circumstances. Except for Chester County, the average farm size held more or less steady during this period. Farms were quite small in Montgomery and Bucks Counties, and closer to the Pennsylvania average in Chester. The average farm sizes reflect the small scale, intensive nature of farming in Bucks and Montgomery, and the emergence of diversified fluid milk dairying in Chester County.





From the late nineteenth century up until the Second World War, a new farming system evolved in southeastern Pennsylvania. As before and as elsewhere in the state, overall farming strategies were diversified, but products, crop mix, and processes changed. Several features contributed to the distinctiveness of the southeast with respect to other Pennsylvania agricultural regions. Above all, proximity to huge population centers more than ever shaped the region's agriculture. More than any other place in Pennsylvania,

the southeastern counties enjoyed excellent, relatively affluent nearby markets combined with good soils and climatic conditions. Conditions in the southeast contrasted markedly with other agricultural regions in the state. The Lancaster Plain had prime farmland but it was just far enough away from major cities to reduce (though by no means eliminate) their effect relative to the impact in the nearer counties. Around the other two large metropolitan areas in Pennsylvania (Pittsburgh and Scranton), poor soils, rugged topography, and unfavorable climatic conditions prevented nearby farmers from being able to take full advantage. They practiced a diversified system, but on a small and relatively unremunerated scale. Conversely, in the northeast and northwest, farming was *more* specialized than the southeast, because there were so few profitable alternatives to dairying. Nowhere else were prime farmland and proximity to large markets combined as in the counties bordering Philadelphia.

Fluid milk, poultry products, potatoes, vegetables, corn, wheat, and hay formed the foundation of the typical southeastern Pennsylvania farm enterprise. Prices (especially for milk) were relatively high in the region, and farm incomes were also higher than average for the state.[47] Southeastern Pennsylvania farm families were often able to invest in new methods and technologies, and to maintain and renovate their physical plant. To its already distinctive historic fabric the rural landscape in the southeast added a modern layer.

Dairying and poultry raising were the most important, but far from the only, farm enterprises in the southeastern Pennsylvania. A 1935 study of "Types of Farming in Pennsylvania" defined different types in terms of the proportion of farm income generated. To qualify as a specialized dairy, poultry, etc. farm, a single product had to account for at least 40 percent of farm income. According to this definition, in 1929, 46 percent of Chester County farms were dairy farms; eighteen percent of farms in Bucks and Montgomery were classed as poultry farms. In all three counties, dairy farms were the "predominant type" of farm. These figures suggest that while these two specialties were important, farming in southeastern Pennsylvania was still quite diversified. For one thing, a farm could qualify as a "dairy" farm with more than half of its income *not* coming from dairy products. Moreover, among the "second most predominant types" "General" and "Abnormal" farms were well represented in the southeast. On "general" farms, no one item accounted even for as much as 40 percent of farm income. These farms made up the "second most predominant" type in southern Lancaster County, western and northern Chester County, and northern Bucks County. The "Abnormal" category was a catch-all which included widely dissimilar operations: part-time farms,

where the operator worked off the farm; institution farms; and country estates, defined as "those where the value of the residence was $25,000 or more on farms of 10 acres and over. These farms averaged 192 acres.... in several counties, such as Chester and Montgomery, institution farms and country estates occupied nearly as much area as the part-time farms."[48]

Chester, Bucks, and Montgomery Counties also claimed some important agriculture-related enterprises that did not take up large acreages. Mushrooms were one; they are treated elsewhere. Nursery businesses, greenhouses for flower production, and truck farming did not take up great acreage or account for a large percentage of farms, but nonetheless ranked high in the state for their type, and produced large revenues in proportion to acreage occupied.

The Southeastern Pennsylvania Farming System, 1870-1940

Products, 1870 – 1940

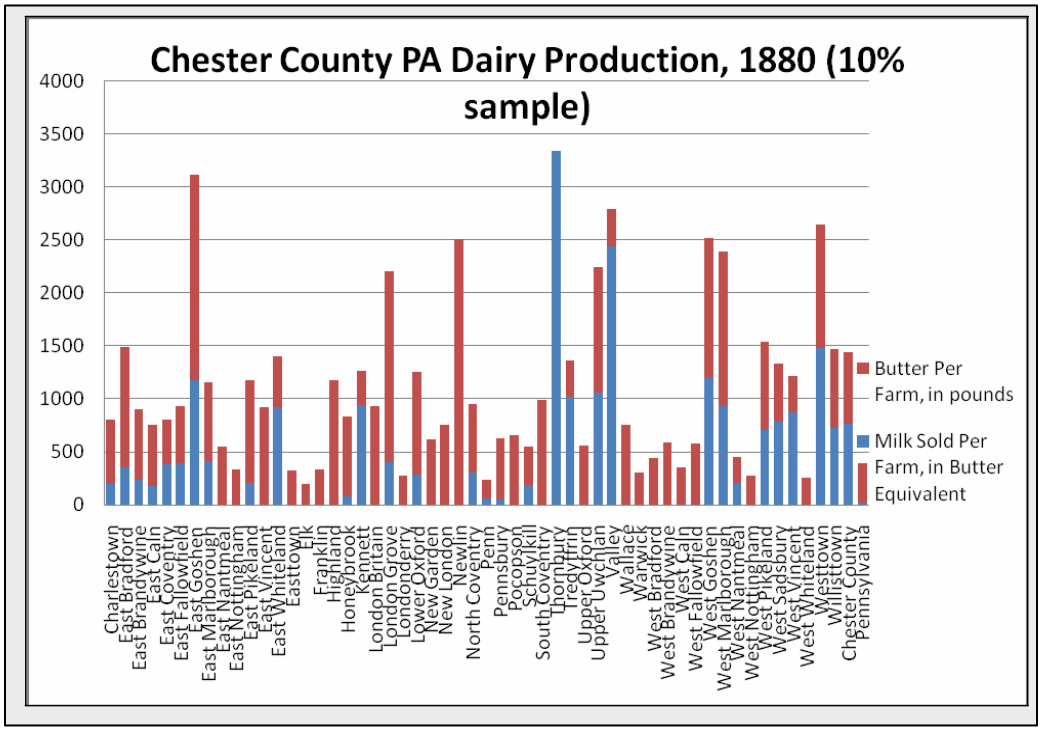
Dairy Products:

In 1884, Theodore W. Bean published a *History of Montgomery County, Pennsylvania.* In typical fashion for the day, he offered a colorful assessment of the county's important personages and economic successes. After the usual survey covering topography and colonial history, Bean turned to the present.

> Our proximity to the great cities and large manufacturing towns has also nearly revolutionized agriculture in another particular. The farmers of Montgomery County, instead of raising beef, pork, and mutton for Philadelphia market, as formerly, have to some extent come to consuming meat grown and fattened on the great plains of the far West, and it is no unusual thing to see beef-cattle driven through our streets bearing the brands of herders of Texas or Arizona. Thus transformed, husbandry in our county largely takes the exclusive type of 'the dairy,' boys and men doing the milking, while the product is worked into marketable shape at 'creameries,' now recently built and furnished all over the county, the latter worked also by men and boys, while many of our mothers and sisters only ply the needle and sewing-machine, or perhaps finger the piano or harp.[49]

Bean's reference to idle women may be discounted as a hackneyed trope for the period. Otherwise his picture was quite telling. He did identify an important change in southeastern Pennsylvania agriculture for this period – the shift in livestock farming to fluid milk dairying, in which milk was sold off the farm rather than processed on the farm. This shift had far reaching implications.

A tipping point was reached between 1880 and 1890. In 1880 around half of the milk produced on southeastern Pennsylvania farms went to home butter production; by 1890 that percentage was under two. (Statewide, it was around 30). The introduction of the "dairy centrifuge" (separator) in 1879 accelerated the rise of creameries. An 1884 report noted that there were 25 creameries and butter factories in Chester county.[50] Also, increasingly milk was consumed in its fluid form rather than as butter or cheese.[51] Southeastern Pennsylvania dairy farmers found markets in Philadelphia, New York, Pottstown, and Norristown. By 1924, agricultural economist George Fiske Johnson wrote that "few farm enterprises in Pennsylvania have changed so completely in both their production and marketing aspects during the past 40 years as the dairy industry."[52] This trend occurred first and fastest in the southeast. [53]



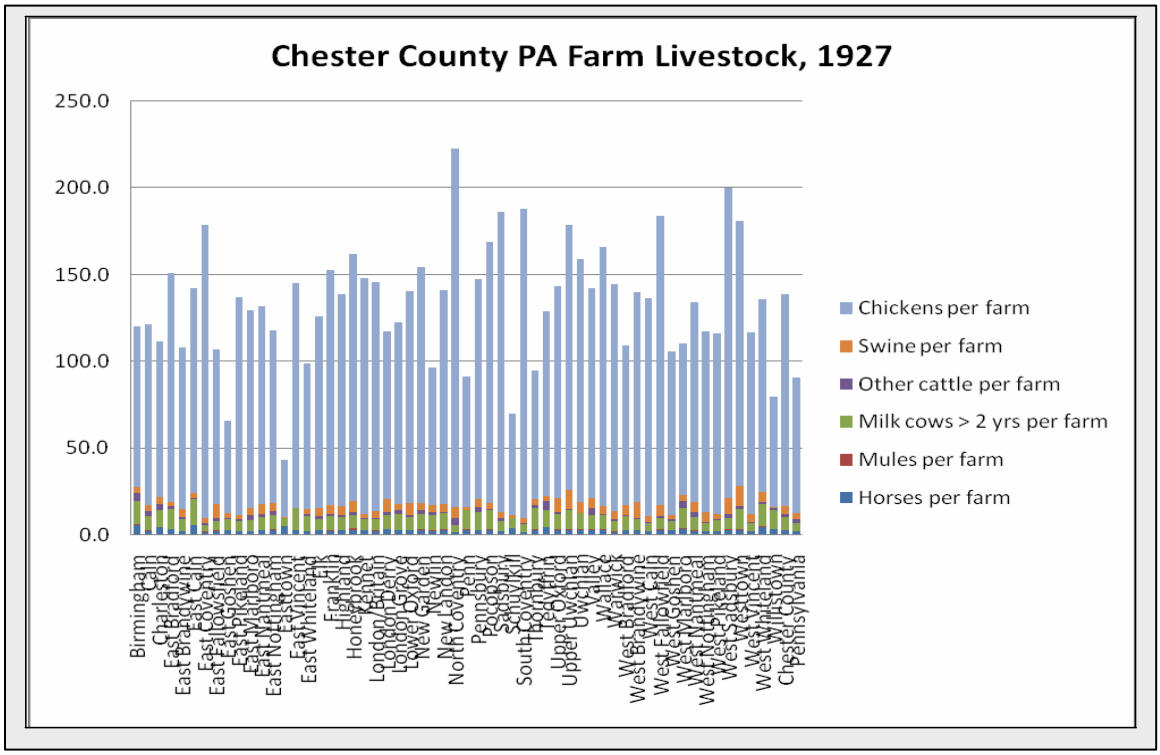
The shift to fluid milk had many important implications for labor, landscape, and even breed choice. Total milk production and milk cattle numbers in the region actually dropped because total farm numbers and acreage were down, but per-cow productivity

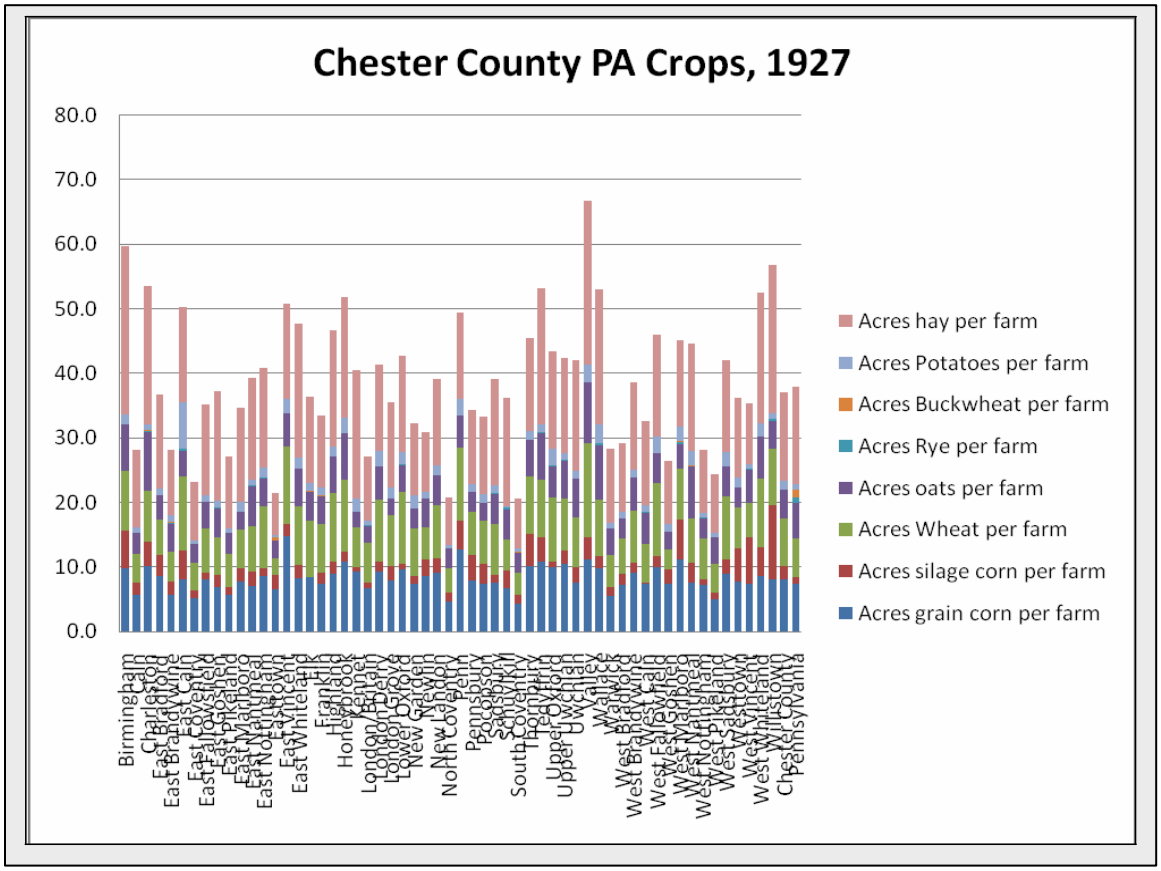
rose. Not surprisingly, southeastern cows were among the highest producers in the state. With a shift away from on-farm butter production, different priorities took hold. Income depended no longer so much on "value added," but on sheer quantity of milk produced. Attention therefore focused on quantity production and somewhat less on butterfat content. Pure blooded dairy cattle commanded more attention. Independent associations devoted to Holstein, Guernsey, Jersey, Ayrshire, and "Suburban Cattle" flourished in the area. Even so, it is very important to note that even in this sophisticated dairy region, the transition to purebred herds happened slowly and was not thoroughgoing until after artificial insemination was introduced in the World War II period.[54] Pure blood dairy cows were comparatively rare. The agricultural extension agent reports in the 1920s, for example, frequently mention efforts to interest local farmers in "systematic" breeding programs, with mixed results. The average dairy cow was usually a "grade" or even a "native" with no definite bloodlines; a 1919 study of southeastern Pennsylvania dairy farming noted that "the pure bred stock industry has not been highly developed on any of the 50 farms selected for study, the farmers having depended... on buying grade animals to replace discarded ones..."[55] "High feeding," improved shelter, and disease control contributed as much to improved milk cow productivity during this period as did breeding. Feed ingredients and feeding methods are discussed below in the section on crops.

Horses, swine, and poultry rounded out the complement of farm livestock. Horses still provided most farm power and if anything were more important as mechanization intensified, even well into the new century. Swine numbers had fallen; swine were now mainly raised for household use. Their role in consuming butter dairy by products had disappeared with the farm butter dairy. Also by this time, beef feeding had virtually disappeared from the region.[56]

The poultry business was profitable in this region because local markets were abundant and relatively affluent. Bucks and Montgomery ranked at the top in Pennsylvania (next to York) for commercial poultry farms. An 1877 description of the Bucks County poultry business already boasted that the Bucks poultry business was "worth $2,000,000 a year." The 1905 Montgomery County soil survey reported that the local poultry market was excellent and increasing. The Montgomery and Bucks agricultural extension agents focused on poultry increasingly in the 1920s and onward. They reported flocks numbering up to a thousand. The total value of poultry products in the three counties actually exceeded the value of dairy products in 1924. The average farm in 1927 in the southeast had from 100 to 200 hens. In some areas poultry production was "under the

radar" for many agricultural economists because of its association with women and the perception that it was merely a "sideline." Yet clearly it was an important component of the overall farm economy. By the early 1930s the business was growing more elaborate; electric lights were sometimes used in winter to increase production, and by 1932, a Tri County cooperative egg auction had been established.[57]





Crops: A 1919 study of "Dairy Farming in Southeastern Pennsylvania" estimated that about twenty percent of farmland was in pasture, eleven percent in woodland, ten percent in farmstead and lanes, and the rest in crops. (The 1925 federal census confirms this distribution.) The author examined "representative" Chester County dairy farms. He chose "representative" farms based on average size and above average labor income, so his sample wasn't based on averages. However, the study is still instructive. He noted that the principal crop was hay, accounting for 44 percent of crop acreage. Hay was crucial, not only because it was fed to dairy cattle, but because there was a robust market nearby, at least until the early twentieth century when urban transit and some industrial concerns switched from horse power to electricity and gasoline engine powered vehicles. The Montgomery County Soil Survey of 1905 reported that hay was the "principal money crop." Commercial presses sprang up along the routes into the city. One historian noted that the "heavy demand for hay in Philadelphia livery stables" prompted farmers in Franconia to sell their best hay off the farm. After the horse era, Chester County farmers found new markets to make up for the loss of the livery trade. As the mushroom industry developed, hay sometimes was sold to make mushroom compost. They also sold hay to dairy farms in the anthracite regions. Meanwhile the ingredients of southeastern

Pennsylvania were changing and its quality was probably increasing. By the 1920s and 1930s, alfalfa was increasingly popular for its high quality hay. In Chester County, the agricultural extension agent reported a rapid increase in alfalfa acreage between 1919 and 1930.[58]

The second most important field crop in the region was grain corn. Grain corn acreage and yield had both risen significantly in the region since the late nineteenth century. Against a backdrop of declining farm size, this was an important trend, as it meant that corn was far more prominent in the crop mix. This reflected more intensive feeding; corn made up "a large part of the poultry ration," for example. By far the majority was fed as grain, not silage. Silage corn in 1927 in the region accounted for about 20 percent of all corn acreage as compared with around 17 percent statewide. Silage corn was gradually replacing oats in the crop rotation, now that there were fewer horses to feed. Wheat production and yield rose, though acreage declined, and potatoes increased substantially. The potato crop was not especially large, but it was growing and it attracted attention from agricultural extension agents in the region. Good markets for table potatoes were right nearby. Pasture grass, though not strictly a "crop," was very important in the southeast. According to the 1919 study, most dairy farmers still turned their cows out to pasture for the summer. Agricultural extension reports for the following decades also noted the importance of pasture.[59]

Despite the immense quantities of feed grown on farms, it seems as though the region's farming system relied increasingly upon feed and fertilizers not raised or produced on the farm. In other words, the "farming system" was probably less self-sustaining than before. For example, an 1882 report from Montgomery County claimed that "Most of the farmers not only feed all the corn, oats, &c., that they raise, but, in addition, buy large amounts of corn-meal, bran, brewers' grains, malt-dust, &c, in many cases to two or three times the amount of feed their farms produce." In 1895 a farmer from Jarrettown, Montgomery County, wrote that "My plan is to use stable manure on all crops, but it so happens sometimes that we have not enough" and so he purchased fertilizers such as "South Carolina rock" or "bone." Many farmers reportedly hauled manure from Philadelphia on the return journey from delivering hay to market. The Montgomery County Soil Survey of 1905 held that reliance on purchased fertilizers increased with proximity to the city, since further away there were more livestock to supply manure and pasture was more plentiful because of lower land values. The extension reports and census data further corroborate the importance of purchased fertilizer and feed. In 1880, for example, the federal agriculture census shows that all of the southeastern Pennsylvania counties spent substantially more on average than in the state as a whole, on a per-farm basis. By 1925,

around ninety percent of farmers in the region used commercial fertilizers, applying well above average amounts except in Montgomery County.[60]

Although dairy production received much attention, the overall agricultural scene was still rather diverse. The agricultural extension auto tour for 1917-18 gives a sense of the variety in Bucks County: "the first stop was made at the poultry farm of A. O. Histand, Second, the orchard of S. L. Paxson. Third, orchard and poultry combined, Ed. Johnson. Fourth, soybeans and hogs, George Mason. Fifth, truck and market gardening, ... Sixth, potatoes and asparagus, ... Seventh, dairy..." A "History of Silver Lake Farm, Blue Bell, Pennsylvania" (in Montgomery County) noted the many activities engaged in by this successful farming family: selling raw Guernsey milk on a retail route; selling cream to a local confectionary; custom combining and silo filling; raising broilers, selling eggs, and raising turkeys.[61]

The Bucks tour itinerary gives clues as to other important agricultural enterprises in the region. In some townships, especially lower Bucks County, vegetable production for canneries and fresh sales assumed an important place in the farming regimen. Even as early as the 1870s, Bristol Township in Bucks County was noted for "trucking and grazing" and for the "hundreds of acres" belonging to the concerns like the Landreth Agricultural Seed Farm.[62] A photo in the 1914 Wilmer Atkinson directory of Bucks County shows irrigated vegetable fields in Middleton Township. The county had 19,000 acres in commercial vegetable production by 1940. By the mid 1940s truck farming was the third leading source of income for Bucks County farmers.[63] Truck gardening was also followed in Chester and Montgomery Counties. The Montgomery County soil survey mentioned tomatoes, sweet corn, asparagus, rhubarb, cabbage, and small fruits.[64]

Often truck farmers used direct-marketing techniques. In Montgomery County, for example, a local history notes that "Over the years many farmers improved their profit margin by marketing their own farm products, either at a stall or on a door-to-door route in Philadelphia or on a route in Lansdale or another local town. Additionally, storekeepers in the Franconia Township villages of Franconia Square, Morwood, Elroy, and Earlington took farm products in exchange for store goods. Often farmers not engaged in direct marketing sold their products to other market men. Philadelphia markets where Franconia Township products were sold (and sometimes continue to be sold) included Reading Terminal, Germantown, Girard Avenue, Spring Garden Street, and Olney Avenue. Markets outside Philadelphia included Sharon Hill, Broomall, Sixty-ninth Street, Narberth, Chester, Glenside, Oreland, and Allentown. Farm products sold in

these places included chickens and other poultry, butter, cottage cheese, apples, beef and pork products, flowers, vegetables, and potato chips."[65]

In all three counties, nursery and greenhouse businesses achieved some importance. Probably there was some overlap with truck farming, but these businesses generally stressed plants, trees, and flowers rather than produce. Raising flowers for the city market was a profitable enterprise. In the 1890s, rose growers came into the Roslyn, Montgomery County area. In Montgomery County, Roberts's *Biographical Annals* lauded Thomas Foulds, who founded the Gwynedd Rose Nurseries, with its "seven large houses embracing 22,000 feet of glass." Horsham in Montgomery County became a flower growing center in the 1920s, one nursery having 20,000 rose bushes. Carnations and roses were also raised in greenhouses in West Grove, Chester County. Nurseries in the region also grew plants and trees. In 1910 Bucks County reported nine nurseries covering 500 acres. Altogether in the mid 1920s there were about 1,000 acres in nurseries in Chester county – a quarter of all the acreage in the state. Hoopes Brothers, Thomas Company, Morris Nurseries, Isaac Thomas Nurseries, and Longwood Gardens were important nursery concerns in the region. Even today, Chester County is a state leader in value of this business.[66]

The mushroom industry in Chester County was beginning to develop by the 1920s. This industry has been covered in a separate context. However, it is worth noting that mushroom production and other farming frequently overlapped. Some farms carried on mushroom production as a complementary business. The mushroom industry provided a growing market for hay and horse manure. In 1927 the Chester County extension agent noted that "A large number of our mushroom growers are growing potatoes in conjunction with their mushroom business as they have a surplus of manure to be used up..."[67]

Tobacco was a minor crop in the region between about 1875 and 1890. Bucks County census returns, for example, listed 150,000 pounds in 1870 and over a million pounds in 1880. However, compared with Lancaster County's production, these were tiny quantities. It is likely that the numerous cigar factories in the southeast imported most of their raw materials from Lancaster County.

Finally, subsistence activities still took up significant time and labor on the average southeastern Pennsylvania farm throughout this period. In Hatfield Township, Montgomery County, for instance, a local historian writes that in the late 19th century,

"some local farmers' operations made them almost self-sufficient. They grew wheat, oats, rye, corn, potatoes, turnips, cabbage, beets, and other vegetables. They raised cattle, sheep, and poultry to supply their own meat, milk, and eggs. They churned butter. Their farm products, especially milk and eggs, were traded for cloth and other necessities. Practically the only things they had to purchase or barter for were sugar, coffee, tea, spices, and molasses. The entire family (even preteen children) helped with the household and farming chores." A Montgomery County man who grew up in early twentieth-century Limerick Township described numerous and elaborate subsistence activities. The family made sausage and cured other cuts of meat. He continued, "In most attics, bags of dried corn, dried soup beans, and dried lima beans were stored. Lime was added to the dried beans to prevent bugs from eating them. Dried apples were hung on a string from rafter to rafter....Canning was a big chore, but most cellars were fitted with shelves and cupboards from floor to ceiling to hold the season's canned goods—as many as one hundred jars of tomatoes, string beans, cauliflower, eggplant, red beets, and other vegetables. Fruits might include jars of peaches, applesauce, cherries, plums, raspberries, rhubarb, and strawberries, to mention a few. Sours could include chow-chow, apple butter, cucumber rings, Indian relish, mincemeat, spiced peaches, pears, watermelon rinds, and sweet and sour pickles." Subsistence activity took on particular urgency during lean years; during the Depression an Agricultural Extension sponsored relief garden program engaged 6,000 people in Montgomery County, according to the agricultural extension agent in 1931.[68]

Labor and Land Tenure, 1870-1940

Southeastern Pennsylvania farm labor continued to be drawn mainly from family and neighbors, supplemented by seasonal or year-round wage hands and in some instances by tenancy arrangements. Mechanization was high, and scarcity of wage laborers is evidenced in anecdotal sources as well as in census manuscripts. Family labor included men, women, and children. The Montgomery County soil survey in 1905 noted: "...it is necessary to hire much less farm labor than the amount of the agricultural products would lead one unacquainted with the conditions to expect. This is because the women and girls, particularly in the northern and western parts of the county, do so much work, not only about the barns in caring for stock and milking, but also in the fields, that the amount of labor performed by a man and his family may be very large." Men's involvement in milking and feeding dairy cattle continued to grow and some reports indicate declining women's involvement. Women's work likely shifted to some extent to rising fields such as poultry raising.[69]

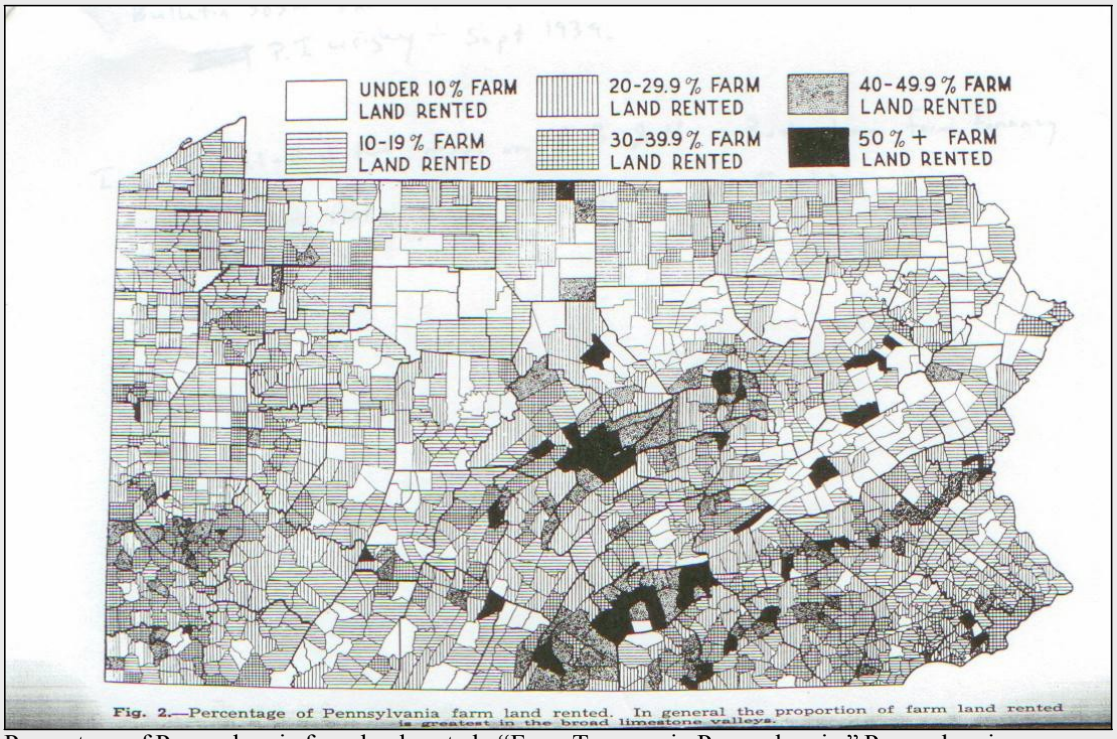
New jobs such as silo filling appeared; this work was often done by neighborhood groups exchanging work. For example, a 1914 photo of "silo filling" in Bucks County shows two men and a boy feeding stalks into a cutter. Sometimes neighborhood groups would make use of machinery owned by itinerant silo fillers. A 1904 biography of George Dean Murphy of Montgomery County noted that he made a business of filling silos, "for which purpose he furnishes the machinery and power that is necessary."[70]

Off-farm employment showed both continuity and change from earlier years; where before perhaps trades might be practiced, now wage labor took the place of these other nonfarm occupations. The home economics extension agent in Bucks County reported in 1936 that "a good share of those that live on farms belong to families who derive much of the income from factories or mills." A history of Green Lane Borough in Montgomery County noted that farmers worked in the "ice industry" in the winter months. [71]

High mechanization levels attracted firms to the area. Heebner and Sons of Lansdale (Montgomery County) became a nationally noted farm machinery firm, selling "level tread horse powers, Little Giant threshers and Union feed cutters." They also supplied creameries with "engines and boilers." The 1905 soil survey for Chester County declared the machinery situation "excellent. Besides tillage implements farmers are well supplied with grain drills, mowing machines, hay rakes, tedders, and horse forks. Hay loaders and corn harvesters are not uncommon, and self-binding reapers are on nearly every farm." Traction engines provided stationary power. The 1914 Wilmer Atkinson Company Directory for Bucks County shows a photo of a reaper. By the early twentieth century, gasoline powered stationary engines were frequently used. A photo from the Atkinson directory of Bucks County, 1914, shows "threshing with gasoline power." Stationary gasoline engines were much more common than were tractors. Around half of farms had stationary engines, but only about a quarter of farms in the region had tractors in 1927. Even so, this was double the state average.[72]

Tenancy rates in the region were now actually lower than the state averages. Only 15-20 percent of farms were run by tenants. Where it was used, it seems that farm tenancy in the region took distinctive forms. The 1905 soil survey for Bucks County that "married men are given the use of a tenant house, a garden, the crop grown from 1 bushel of seed potatoes... and from $25 to $35 a month." This description bears a striking resemblance to the "house and garden" arrangements dating all the way back to the colonial period.

The rise of "country estates" brought with it another form of tenancy, the farm manager system. The 1943 Bucks County agricultural extension report noted the rise in "city folks buying farms as a home and hiring a farm manager." The Montgomery County agricultural extension agent in 1920 declared that "in the lower half of the county we have many farms owned and occupied by businessmen who do not depend on the farm for a living..." These operations were highly visible, but their numbers were quite small in the overall context.



Percentage of Pennsylvania farm land rented. "Farm Tenancy in Pennsylvania," Pennsylvania Agricultural Experiment Station Bulletin 283, September 1939, page 4.

Buildings and Landscapes, 1870-1940

Houses, 1870-1940

Houses are well covered in standard architectural histories. See the Bibliography section for references. In general, during this period new houses exhibited stylistic features fashionable for the time, and older ones were often updated. The early house pictured below, for example, was updated with a mansard roof, new windows, and a wraparound porch in the late 19th century.

Early nineteenth century house with Victorian era updates, East Brandywine Township, Chester County, 1815-1890. Site 029-EB-001

Stone house with Colonial Revival update, West Bradford Township, Chester County, c. 1820-1920. Site 029-WD-001

This house was given a Colonial Revival update in the early twentieth century.

029-LO-003-027 house 2. This c. 1875 house was probably given its center gable a little later.

Tenant house, c 1880-1890, West Bradford Township, Chester County, c. 1880-1890. Site 029-EB-001. This is a high end Craftsman style tenant house on "Allerton Farm."

Tenant house, Concord Township, Delaware County, c. 1890. Pennsylvania Historic Preservation Bureau file photo.

Barns, 1870-1940

The types developed in the earlier period continued to be built and used. Adaptations to older barns and the emergence of new forms are the important story in barns for the period.

As agricultural conditions changed, farmers were encouraged to remodel their barns. An emerging critique of the Pennsylvania Barn, for example, condemned it as unsanitary and unhealthy. The forebay and lower-level basement animal quarters were now regarded as liabilities. The forebay kept out light from an already dim interior. Wood stalls were thought to harbor germs. The conventional short crosswise ranks of stalls were criticized as inefficient. Manure collection, too, was now thought to be difficult in the traditional Pennsylvania barn. Reformers recommended that barns be renovated to admit more light; increase and reorganize stable room; cement the stable floors and create manure alleys; install metal stanchions; and improve ventilation. Southeastern Pennsylvania barns illustrate these changes.[73]

Lower Level interior, twentieth century dairy alterations to forebay barn, West Brandywine Township, Chester County. Site 029-WB-001.

The two preceding illustrations show a good example of dairying alterations to a Pennsylvania forebay barn. One forebay wall section and one Dutch door are all that remain of the original forebay wall. The rest of it was removed, a large gabled addition put on, and the entire lower level redone with concrete floors, manure gutters, metal stanchions, and metal framed windows, essentially just as recommended.

Barn interior showing 1930s – 40s installation of concrete floors, feeding troughs, and gutters to accommodate 20th C. dairy regulations. Rhoads-Lorah House and Barn, Amity Township, Berks County. Pennsylvania Historic Preservation Bureau file photo.

Forebay barn with two and one-half story ell addition and later shed addition, Humphrey-Eaton Farmstead, Montgomery Township, Montgomery County, no date given. Pennsylvania Historic Preservation Bureau file photo.

Barn adapted for straw storage and dairy production, McCoach Farm, Lower Salford Township, Montgomery County, no date given. Pennsylvania Historic Preservation Bureau file photo.

Double bank barn, High Hill Farm, Concord Township, Delaware County, c. 1910. Pennsylvania Historic Preservation Bureau file photo.

The preceding two images show a different strategy for meeting the increasingly stringent demands of the dairy markets. Neither barn had a forebay originally; these represented the earlier type of a banked two level barn with no forebay. To accommodate bigger herds and sanitary requirements, each of these nineteenth century barns received a large shed roof addition in the twentieth century, and at the same time window openings were created in the original lower level foundation wall.

This barn shows a third strategy for altering barns in the early twentieth century. It has a gambrel roof. The gambrel roof was a popular choice for situations where increased hay storage was needed; its framing permitted much greater upper level storage volume.

Gambrel roof barn with dairy adaptations, Temora Farm, Newtown Township, Bucks County, no date given. Pennsylvania Historic Preservation Bureau file photo.

Stable barn, Londonderry Township, Chester County, c. 1945. Site 029-LN-001

Finally, entirely new types appeared. The barn depicted above is a stable barn with a rainbow roof, concrete block wall, and multiple square windows on the lower level. It has a bank in the eaves side, with a hay door leading to the cavernous upper level storage

space. The stable bam represents new sources for design and specialized function. The stable bam was a type developed and promoted by the emerging "agricultural establishment." State agricultural extension services (especially in Wisconsin) and even

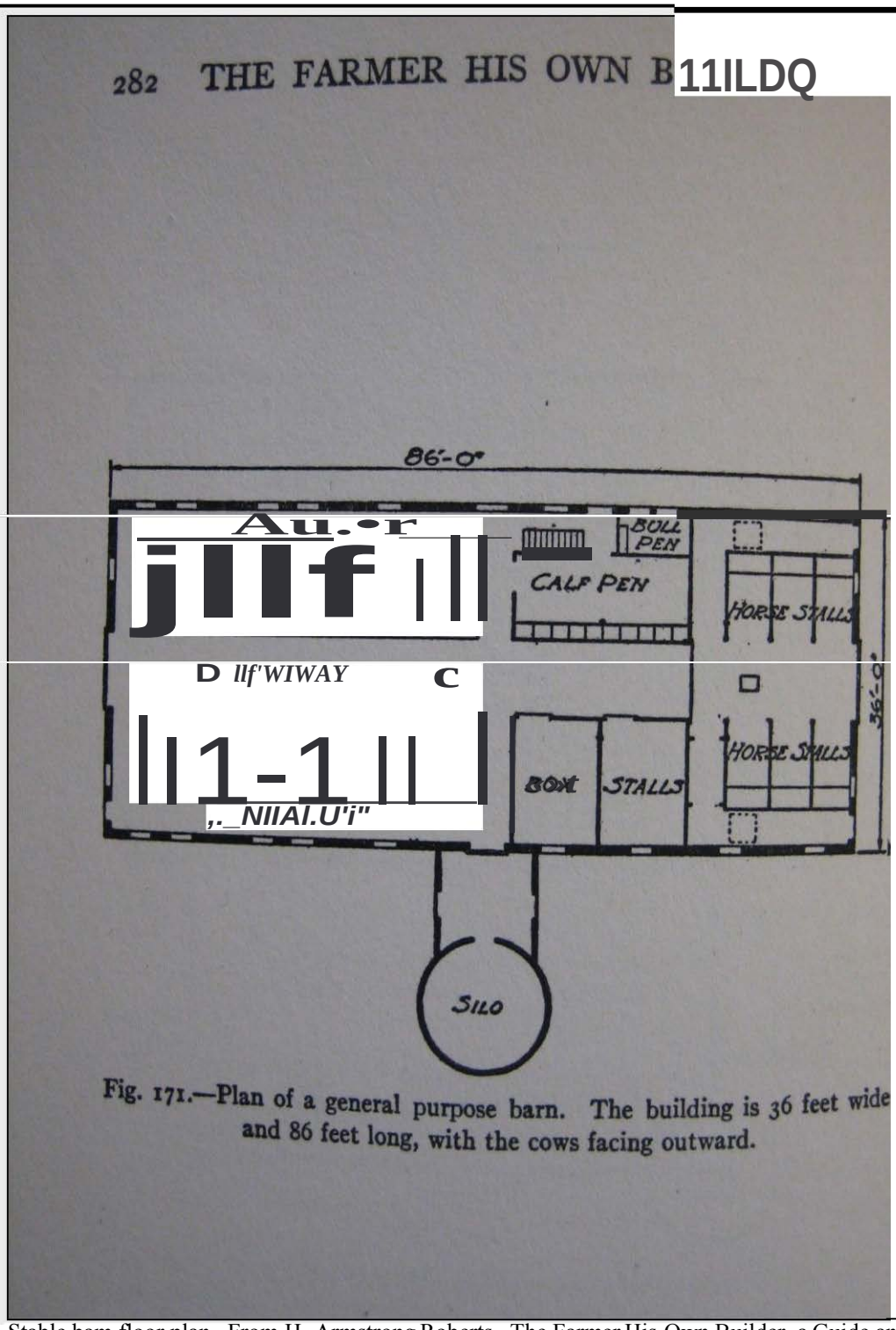


Fig. 171.—Plan of a general purpose barn. The building is 36 feet wide and 86 feet long, with the cows facing outward.

Stable bam floor plan. From H. Armstrong Roberts, The Farmer His Own Builder, a Guide and Reference Book. Philadelphia: David McKay, 1918, page 282. The plan accommodates only horses and cows, and is organized lengthwise with a center aisle.

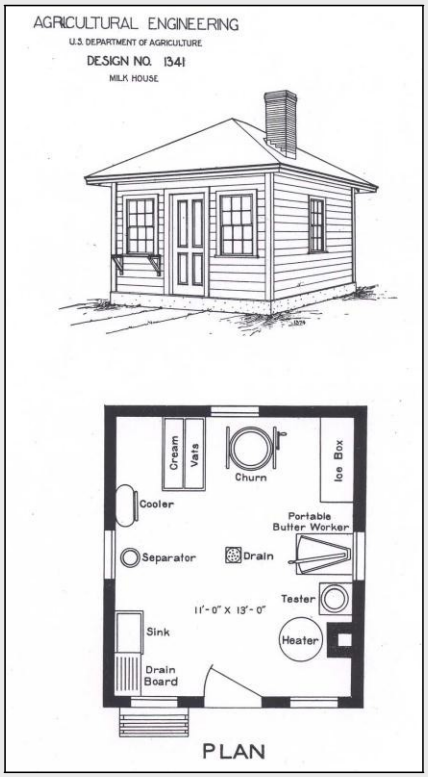
commercial firms such as Sears, Roebuck publicized floor plans and designs. Materials were industrially produced and nationally distributed. The interior organization now focused on dairying alone; the lower level was organized lengthwise for efficient feeding and manure removal, and the upper level was designed just to hold hay.

Granary, 1870-1940

Granary, Curtis McCullough Farm, West Nottingham Township, Chester County, no date given. West Nottingham Township files.

Though many farms had granary storage space within large barns, some freestanding granaries did appear. Granaries can be identified by tight, windowless cladding; foundations raised off the ground to keep vermin out; pass doors in the upper gable; and interior bins.

Milk Houses, 1870-1940



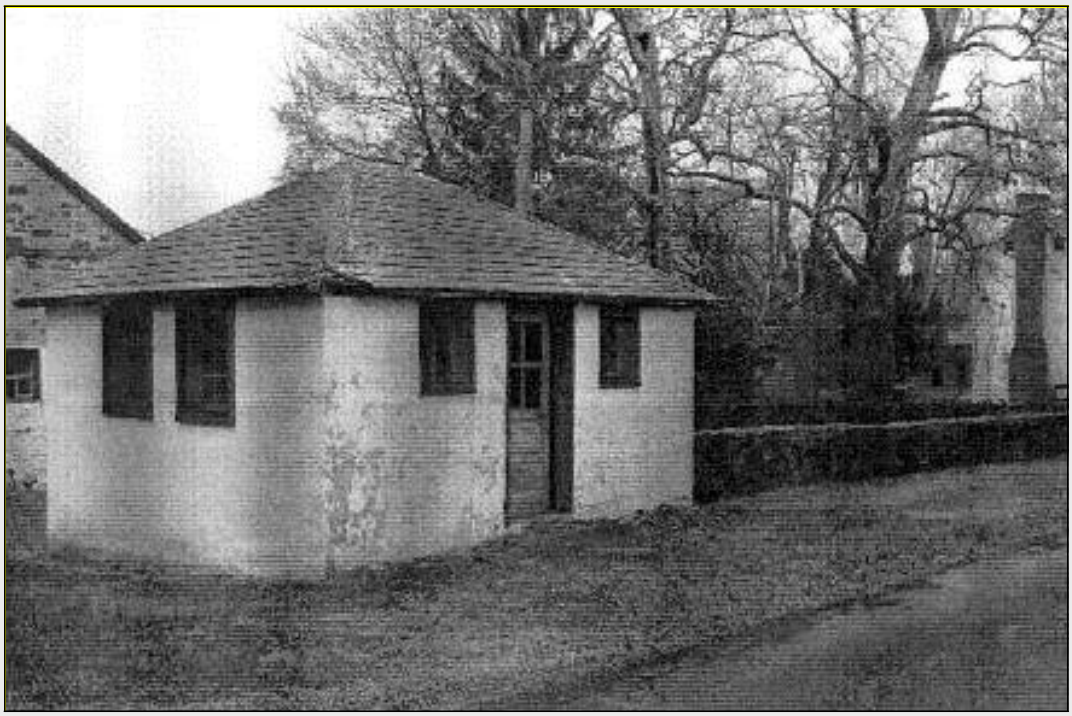
Milk House #1341, USDA design taken from: USDA Office of Cooperative Extension Work and Bureau of Public Roads Cooperation, Farm Building and Equipment Plans and Information Series, 1929.

The milk house was another major new form on the early twentieth-century dairy farm. It wasn't a big building, but is an important reminder of the new role of the state and the agricultural establishment in agriculture. The state (meaning the government at any level) influenced the construction of milk houses in the first place, because during the Progressive and New Deal eras, legislatures and municipalities passed sanitary codes that required inspection not only of milk, but of dairy herds and milk production facilities.[74] New York City pioneered in these efforts, and also seems to have been more effective at enforcement than other areas. In Pennsylvania, according to Stevenson Fletcher, a very few municipalities had inspection laws starting in the late 19th and early 20th centuries; however, enforcement was patchy. The first statewide dairy inspection law was passed in 1929, with a revision in 1933. This law provided for inspection of farm sanitary conditions, including facilities for sterilizing dairy equipment and milk houses for isolating milk.[75] It is not clear how well these were enforced. These regulations were a

facet of the assault that was launched on bovine tuberculosis and other diseases in this period, aiming at ensuring a fresh, uncontaminated milk supply. In order to market milk, increasingly farm producers had to comply with regulations that required them to install easily cleaned surfaces (like concrete) in barns, remove milk storage areas from dirt and odors (by building milk houses), cool milk, sterilize equipment, and the like. In Pennsylvania, these regulations took effect relatively early in the southeast. The milk house was one product of these new laws. In turn, its form and construction were influenced significantly by the agricultural establishment (meaning the complex that included state departments of agriculture, the land-grant university and extension apparatus, and agribusinesses). This new element in the farm landscape, therefore, illustrates the growing influence of the "agricultural establishment" on everyday farming practices and landscapes. Agricultural extension agents regularly disseminated plans for milk houses. Likely, for every farmer who followed a plan exactly there were more who either copied his building, or who adapted the basic guidelines using available materials and expertise. The overall result was a new level of homogeneity and standardization.

Milk houses provided a place to store and cool fluid milk before it was transported to market; to store milk cans not in use; and to wash containers (and sometimes other equipment like separators). Plans offered by the USDA for farm milk houses typically gave dimensions ranging about 10 by 13 feet up to around 12 by 20 feet. Interior plans for a 10 by 13 milk house with ell (# 909, "capacity 20 to 30 head market milk") show a two-room plan with door leading to a wash room; milk room to one side, which contained a cooling tank and led to raised loading/unloading platforms and sunning racks, mounted on the outside. The ell contained a boiler room[76] with its fuel supply, and back door. Larger milk houses had the same basic three spaces, only larger, and sometimes equipped with testers and separators. One (#1337) had a churn, butter worker, ripening vat, and refrigerator, and another (#1339) had quarters for workers. Another small, 12 by 14, one-room milk house (#1341, see illustration) was designed for "butter making by hand" for 20 cows. It contained the same basic spaces, but not divided. The very smallest, at 7 by 9, had a concrete foundation with a sunken vat for cooling cans of milk.[77] All of these plans had sloping floors with drains, and provision for ventilation and light. After about 1950, milk houses were sometimes altered to accommodate bulk tanks.

Milk houses are ubiquitous in the southeast. Following is a selection.



Milk house, Horsham Township, Penrose-Strawbridge Farm, Montgomery County, c. 1940. Pennsylvania Historic Preservation Bureau file photo.

Hip roofed milk house, New Garden Township, Chester County, c. 1940. Site 029-NG-002.

Two milk houses, West Brandywine Township, Chester County, c. 1945 and 1935 respectively. The concrete block one on the left probably postdates the frame one on the right. Site 029-WB-001.

Silos, 1870-1940

A significant new outbuilding to appear on the agricultural landscape in this period was the silo. A silo is an airtight structure that holds fresh organic matter (moisture content 50-65 percent) destined for winter animal feed. It is filled with shredded or chopped grass, corn, or sometimes other plant material, which ferments into a highly nutritious and palatable feed. Silage feed resulted in significant productivity increases for dairy cows, and also permitted marginal farms to carry more animals. Ensilage was first publicized in the US in the late 19th century when the results of experiments in Europe became known. Some of Pennsylvania's earliest silos appeared in the southeast. However, its adoption took a long time. Even in Chester County, less than a third of all farms had silos in 1927, and fewer than a fifth of Montgomery County farms had silos that year.

Silos can be constructed horizontally in pits, or vertically. Most silos of the first half of the twentieth century were vertical. Early silos were sometimes placed inside the barn, rectangular in shape, and of wood construction. These were quickly supplanted by round vertical silos located outside the barn, usually in a spot that would permit efficient filling (usually from holes in the top) and unloading (usually from a tier of doors from which silage was thrown down an exterior chute, which contained a ladder for access to the doors). Early silos were unloaded by hand, from the top. The land-grant establishment published many "how-to" brochures aimed at helping farmers build their own silos of wood or concrete. A 1918 Pennsylvania State College circular (# 72) mentioned wood stave, hollow tile block, poured concrete rings, concrete staves, concrete blocks, metal, and bricks as silo construction materials.[78] Commercial organizations marketed many types of silos too. Some sold special curved brick; others made tiles; still others advertised systems depending on interlocking rings of poured concrete. Cement staves became popular after about 1910 and continued in popularity for several more decades. Galvanized iron was a less important but not uncommon material.[79]

Wood Stave Silo, Lamborn Farm, West Nottingham Township, Chester County, no date given. West Brandywine Township files.

Square stone silo, Londonderry Township, Chester County, c. 1890. Site 029-LN-005

Interior view of the square stone silo depicted above. The corners are rounded, because farmers quickly discovered that silage got caught in square corners and was difficult to remove. Londonderry Township, Chester County.

Tile silo with multi-sided shingle roof, West Brandywine Township, Chester County, c. 1930. Site 029-WB-001.

Concrete stave silo, Londonderry Township, Chester County, c. 1940. Site 029-LN-004

Remains of a circular silo built integrally in a barn interior, West Bradford Township, Chester County, c. 1890-1910. Site 029-WD-003

Wood Stave Silo, Griffith Farm, Sadsbury Township, Lancaster County, Early 20th century.
Pennsylvania Historic Preservation Bureau file photo.

Cow Houses, 1870-1940

Sometimes a one-story structure for housing and/or milking cows was either erected separately or added to an existing barn. In Upper Oxford Township, Chester County, for example, a farm family erected a separate cow house in 1936 when regulations forbade housing horses and cows in the same stables. The horses remained in the main barn and the cows were moved to this concrete block shed.

Cow house, Upper Oxford Township, Chester County, 1936. Site 029-UO-002

Corn Cribs, 1870-1940

As corn became much more important, corn cribs also grew more elaborate. The three depicted below all have machinery storage and upper level storage in addition to large slatted cribs. All date to about 1935-50.

Corncrib and machine shed, West Nantmeal Township, Chester County, c. 1930-40. Site 029-WN-002

Corn crib (later adapted for garage), Byecroft Farm Complex, Buckingham Township, Bucks County, c. 1775. Pennsylvania Historic Preservation Bureau file photo.

Drive through corn crib, Lower Oxford Township, Chester County, c. 1940. Site 029-LO-006-004

Drive through corn crib, Lower Oxford Township, Chester County, c. 1940. Site 029-LO-004

Machine Sheds, 1870-1940

As farm machinery became even more important, still more dedicated machine sheds appeared.

Machine Shed, West Nantmeal Township, Chester County, c. 1900. Site 029-WN-006

Machine shed, West Nantmeal Township, Chester County, c. 1940. Site 029-WN-001

Windmills, 1870-1940

Relatively few windmills remain on farms, but at one time they were common. Farm windmills were used mainly to raise water for human or animal consumption. They are often found near the farm house. Sometimes their power also drove small machines.

Windmill remains, Upper Oxford Township, Chester County, c. 1930. Site 029-UO-002

Two windmills depicted on a Montgomery County farm. Clearly advertising was a motive here, but the images do give valuable information on siting and potential uses. From the Combination Atlas Map of Montgomery County 1877, page 65.

Garages, 1870-1940

By 1927, virtually every southeastern Pennsylvania farm had either an auto or a truck. Many had more than one motor vehicle. Hence the need for garages, which began to appear after about 1925.

Garage, Lower Oxford Township, Chester County, c. 1935-50. Site 029-LO-005

Poultry houses, 1870-1940

Poultry houses in Chester County reflected their place in the farm economy. Chickens were important enough to demand dedicated buildings, but not raised on a scale that would necessitate really large poultry houses. Larger multistory houses would found in Montgomery and Bucks Counties.

Poultry house, West Brandywine Township, Chester County, c. 1940. Site 029-WB-001

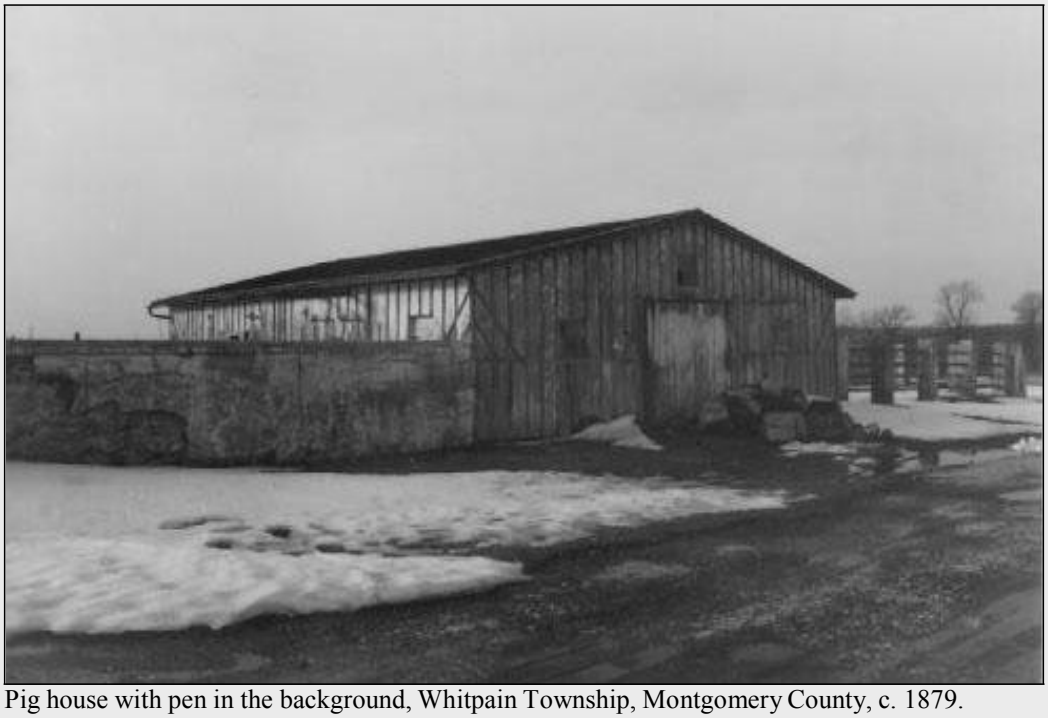
Poultry house, Londonderry Township, Chester County, c. 1935-50. Site 029-LN-001

Poultry houses, Henry Farmstead, Doylestown Township, Bucks County, c. 1930. Pennsylvania Historic Preservation Bureau file photo.

Poultry house, Hoffman Farm, Lower Salford Township, Montgomery County, early to mid 20th C. Pennsylvania Historic Preservation Bureau file photo.

Pine Run Poultry Yard. J. D. Scott, Combination Atlas Map of Bucks County, 1876.

Pig House, 1870-1940



Pig house with pen in the background, Whitpain Township, Montgomery County, c. 1879.

Privies, 1870-1940

In 1927, close to half of southeastern Pennsylvania farm households had running water. Fully operational bathroom and toilet facilities probably lagged behind. Extant farm privies do still remain. However, they are less common than in other parts of the state, reflecting the relatively early access to indoor plumbing.

Privy, John Eakin Farm, Springfield Township, Bucks County, c. 1900. Pennsylvania Historic Preservation Bureau file.

Privy, Upper Oxford Township, Chester County, c. 1930. Site 029-UO-002

Workshops, 1870-1940

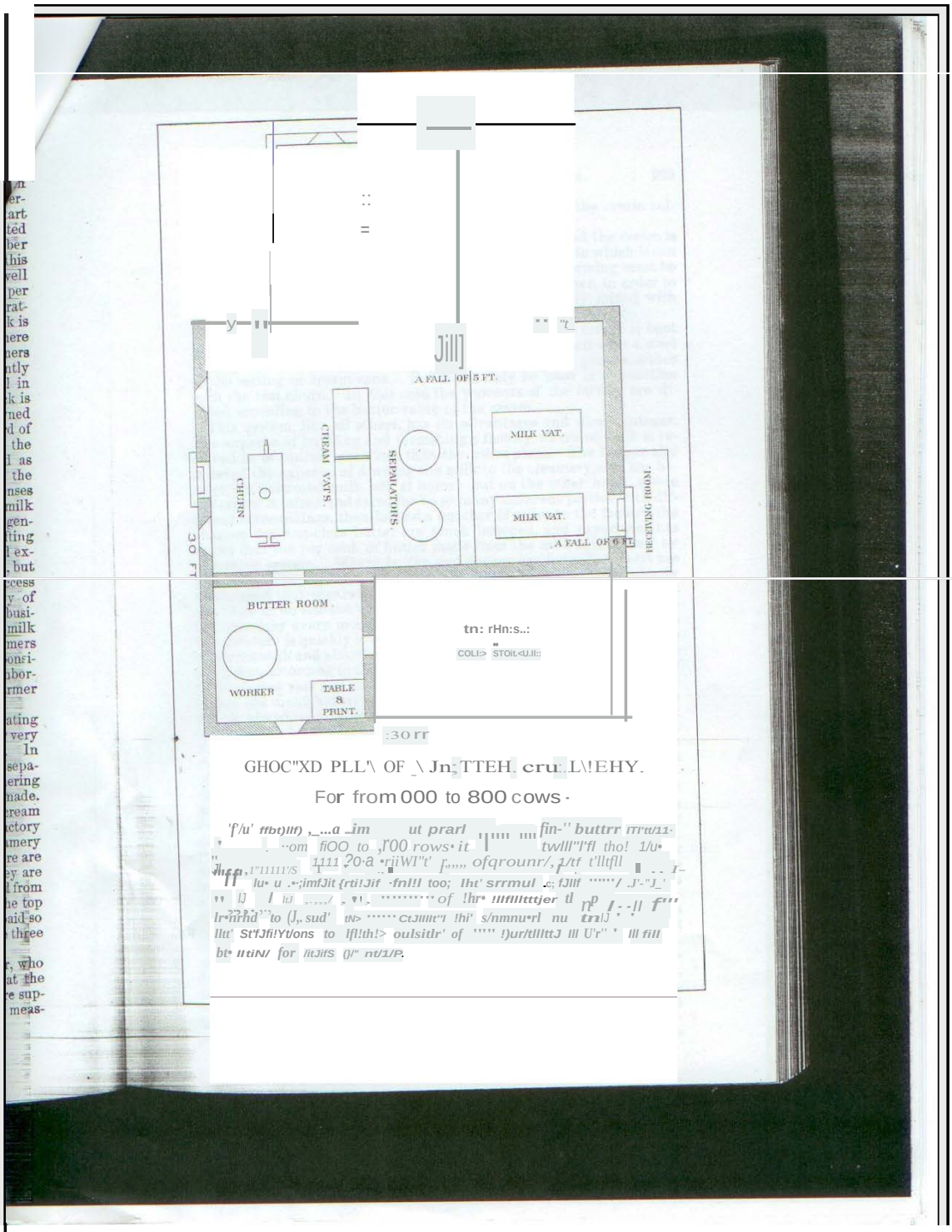
Only a few farms surveyed had identifiable workshops. Farm workshops might be found on especially prosperous farms where "progressive" farmers could afford a dedicated space to house tasks like harness or machinery repair. Or, they might represent non-farming economic activity. The late 19th century workshop depicted below has a forge for blacksmithing.

Carpenter and blacksmith shop, Newlin Township, Chester County, late 19th century. Site 029-NE-001.

Farm Creameries, 1870-1940

Creameries usually were located at a central crossroads or in towns, especially in later years. However, field survey definitely documented one creamery on a farm, and tentatively identified several others. Moreover, print sources confirm that there were creameries on farms.[80]

Creameries are described as ideally having a supply of cold water, either naturally running or pumped; a hillside location so the milk could be easily unloaded into separators or vats; separator room; and sometimes a room cooled with ice. A separate room for boiler was sometimes recommended.



Creamery floor plan. E. Brinton, "The Creamery System of Eastern Pennsylvania," Pennsylvania State Board of Agriculture Report, 1887, page 239.

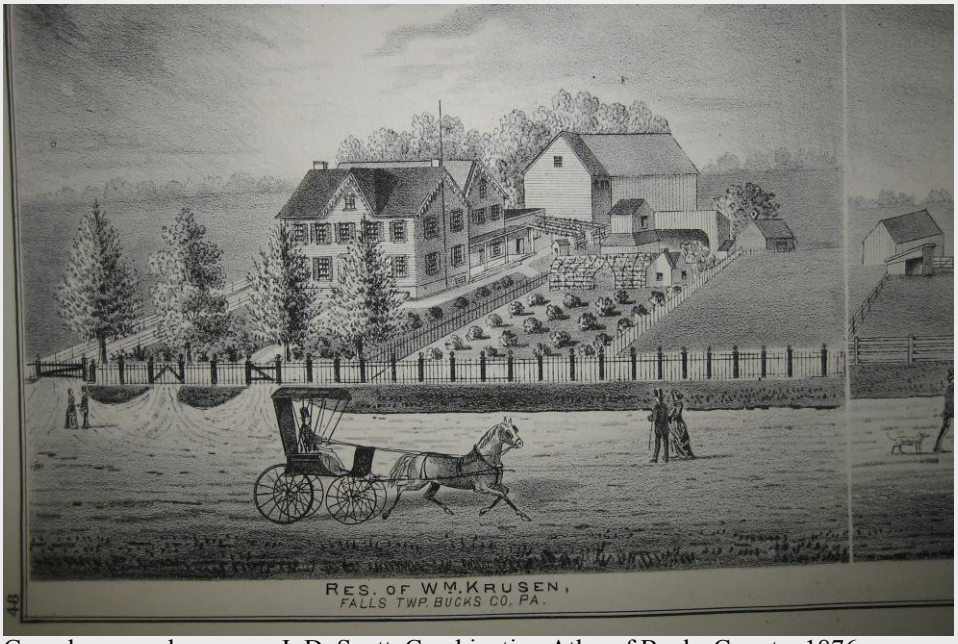
Farm Creamery, Highland Township, Chester County, c. 1940. Site 029-HI-001. This concrete block building has a well-lighted upper level and a lower level which originally had a large gable end door on the road front. According to the current occupant, dairy products were manufactured here and sold retail.

This building is located on a lane; has a well-lighted second story with loading door; has a shed roof extension which could have housed a boiler room; and is situated on a farm with a history of substantial butter production. Its identification as a creamery is not certain, but it has some important architectural characteristics associated with creamery design. Londonderry Township, Chester County, c. 1900.

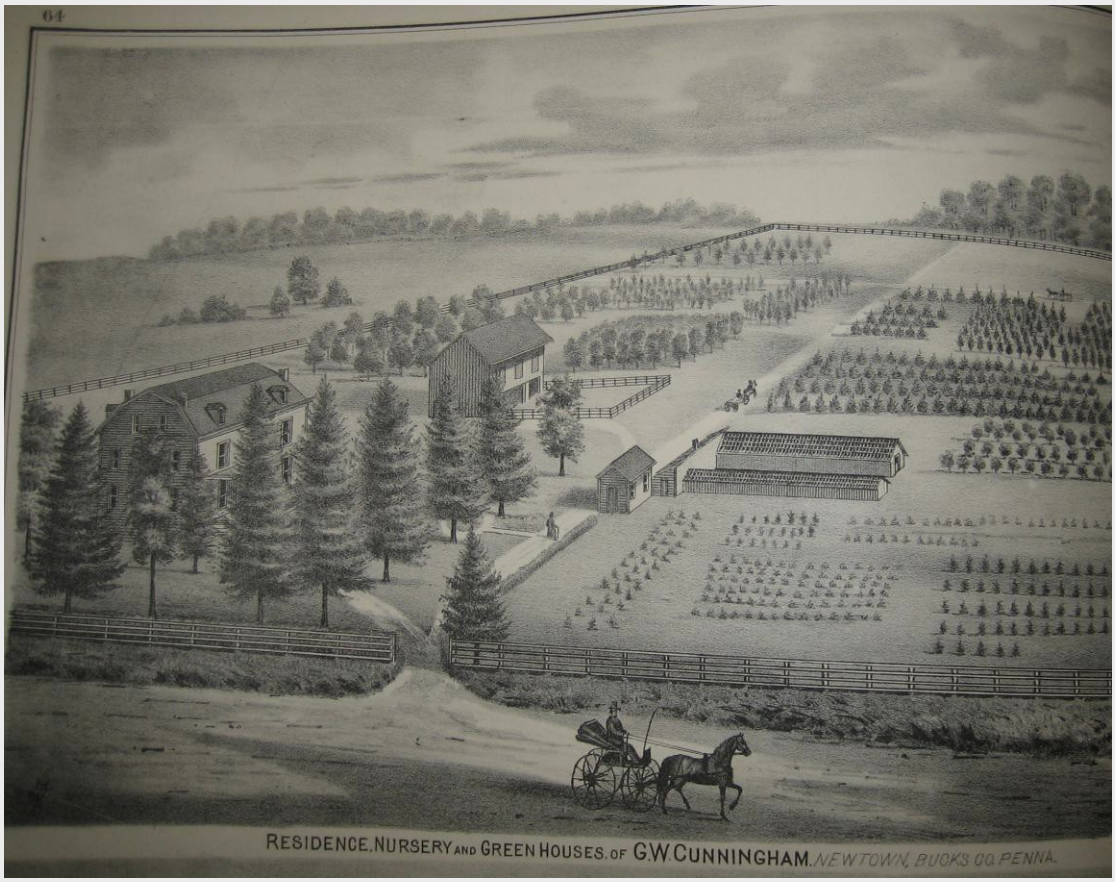
Greenhouses and nurseries, 1870-1940

Greenhouse, Waggonseller-Wismer Farm, Lower Providence Township, Montgomery County, early 20th C. Pennsylvania Historic Preservation Bureau file photo.

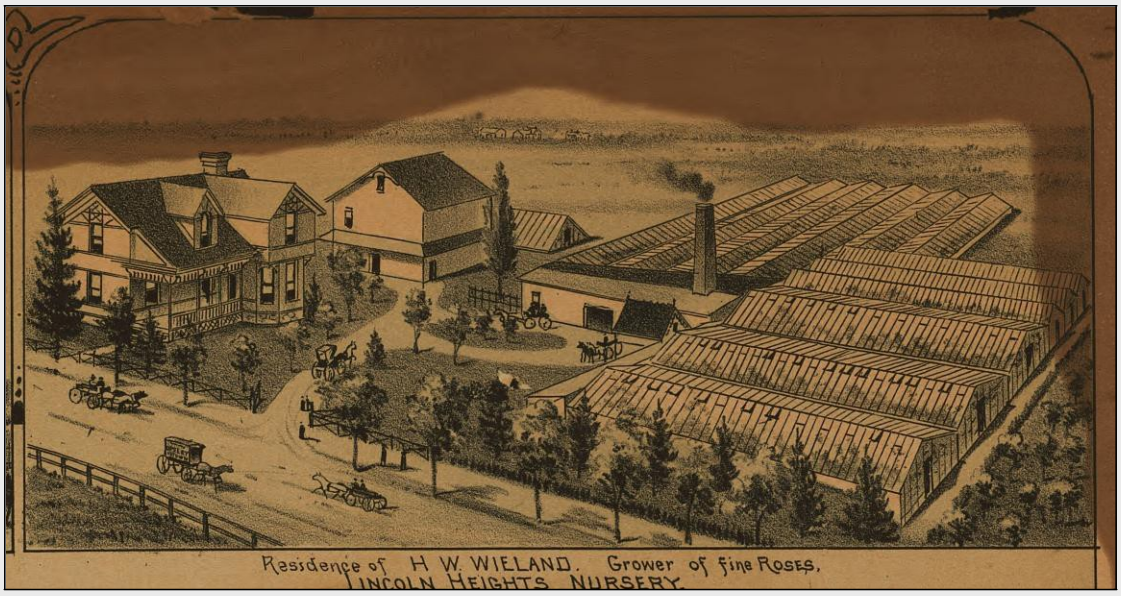
Further field study may locate extant nursery, truck farming, or greenhouse facilities. These historic images are provided in order to furnish information about these building types.



Greenhouse and nursery. J. D. Scott, Combination Atlas of Bucks County, 1876, page 48



Nursery and greenhouse. J. D. Scott Combination Atlas of Bucks County, 1876, page 64.



Newtown, PA Nursery. From Fowler's Bird's Eye View, 1893.

The Historic American Buildings Survey recorded a disused greenhouse at the Normandy Farm in Franklinville, Montgomery County.

Packing House, 1870-1940

Field survey did not document any packing houses, and it is unlikely that very many survive. However, the Farm Security Administration photo below shows a packing house in Bucks County. Packing houses would have ample lighting and often be organized with tables or shelving inside or around the edges.

"Italian workers from Trenton and nearby areas grading and bunching asparagus in packing house. Starkey Farms, Morrisville, Pennsylvania." FSA/OWI collection, digital ID fsa 8c15013 http://hdl.loc.gov/loc.pnp/fsa.8c15013. Photo 1941 by Marion Post Walcott

Ice House, 1870-1940

One possible ice house representative of this time period was located during field documentation. This was a little surprising in light of the importance of cooling materials in the era before mechanical means.[81]

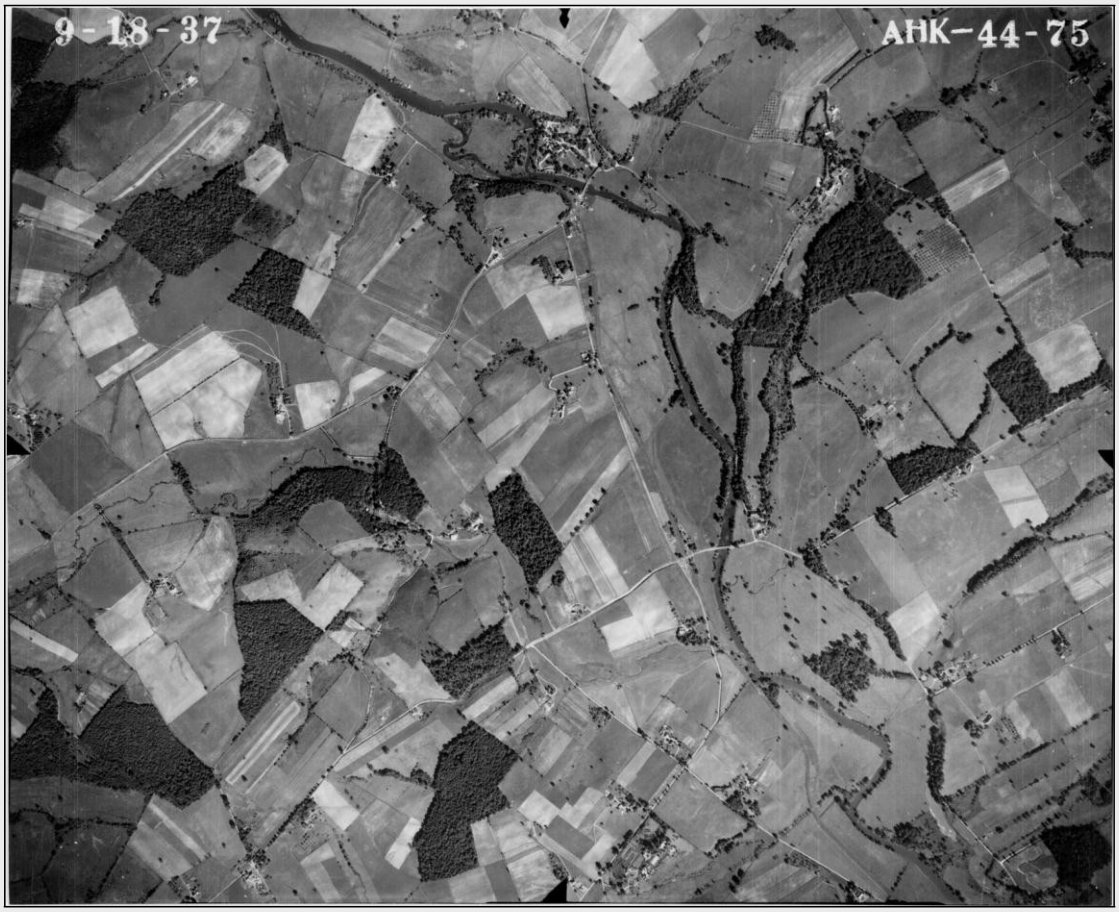
Combined Ice and Dairy House, J. D. Scott, Combination Atlas Map of Bucks County, 1876, page 35. The ice-house section is to the left.

Landscape Features, 1870-1940

Pasture, 1870-1940: As we have seen, pasture was still an important component of southeastern Pennsylvania livestock management, especially in Chester County. Enclosed pasture areas were therefore common landscape features. There are still a great many pastures in Chester County, so there has been continuity of use; but now the pastures are for horses rather than cattle. Various types of fencing were used, usually in a hierarchy beginning with simple wood or barbed wire fences in outer pastures, progressing to board fences closer in and picket fences around the house.

Pasture and crop field, Highland Township, Chester County. Site 029-HI-001

Crop Fields, 1870-1940: Even in the late 1930s, crop fields in the region were small and irregularly shaped. Aerials show this clearly.



Pocopson vicinity, Chester County, 1937. Note the many small, irregularly shaped fields. Penn Pilot.

Farm woodlot, 1870-1940: Woodlots took up a relatively small percentage of southeastern Pennsylvania farmland. Many farms probably lacked a woodlot altogether. However, as the aerials show, there were wooded parcels scattered throughout the region.

Tree lines, 1870-1940: As the above aerial shows, tree lines often demarcated crop field boundaries and property boundaries. Many tree lines from the period are still there.

Orchards, 1870-1940: Almost any aerial from the 1930s in the region will show a few orchards. These are almost entirely gone.

Utility Poles and Wires, 1870-1940: These appeared during this period.

Ornamental Plantings, 1870-1940: Many farms have fine, large deciduous shade trees or evergreen windbreaks. Some may date to this period.

Cedar wind break, Kennett Township, Chester County. Site 029-KE-001

Contour Plowing and Strip Cropping, 1870-1940: Though the county agents heavily promoted these techniques, the aerial photographs from the late 1930s show very little evidence for the practice. Indeed, the Chester County agent noted in 1940 that there was resistance to contour plowing, as farmers voiced a fear that "crooked" rows would diminish their reputation for orderliness.[82]

Truck patches and nurseries, 1870-1940: Using landownership atlases and other sources to learn where nurseries and truck farms were located, it was then possible to find several on historic aerials. Few if any survive.

The small patches in the center of the picture, running to the lower right, are the grounds of the Andorra Nurseries Company of Whitemarsh Township, Montgomery County, as photographed in 1937. The location was determined from the 1935 property atlas of the county, Volume D.

"Portable irrigation unit in bean field. Starkey Farms, Morrisville Pennsylvania." FSA/OWI photograph, digital ID fsa 8c15007 http://hdl.loc.gov/loc.pnp/fsa.8c15007. Photograph by Marion Post Wolcott, 1941.

Suburbanization and Specialization, 1940-1960

Products, 1940-1960

The Second World War period brought fundamental changes to southeastern Pennsylvania farming. A local history tells the story: "The World War II years changed the family financial pattern. The small dairy farm no longer supported the average family. The dairy industry's requirement for holding tanks and sanitary precautions forced many to seek a living in other ways. Women began to take jobs in industry. While people continued to live on the farmsteads, they worked in nearby offices or plants." The cost-price squeeze that affected farmers everywhere fell with extra force in southeastern Pennsylvania, where suburban development encroached on farmland, drove up real estate prices and thus taxes, and compromised the viability of farming. [83] The few remaining farms expanded and specialized to an unprecedented degree.

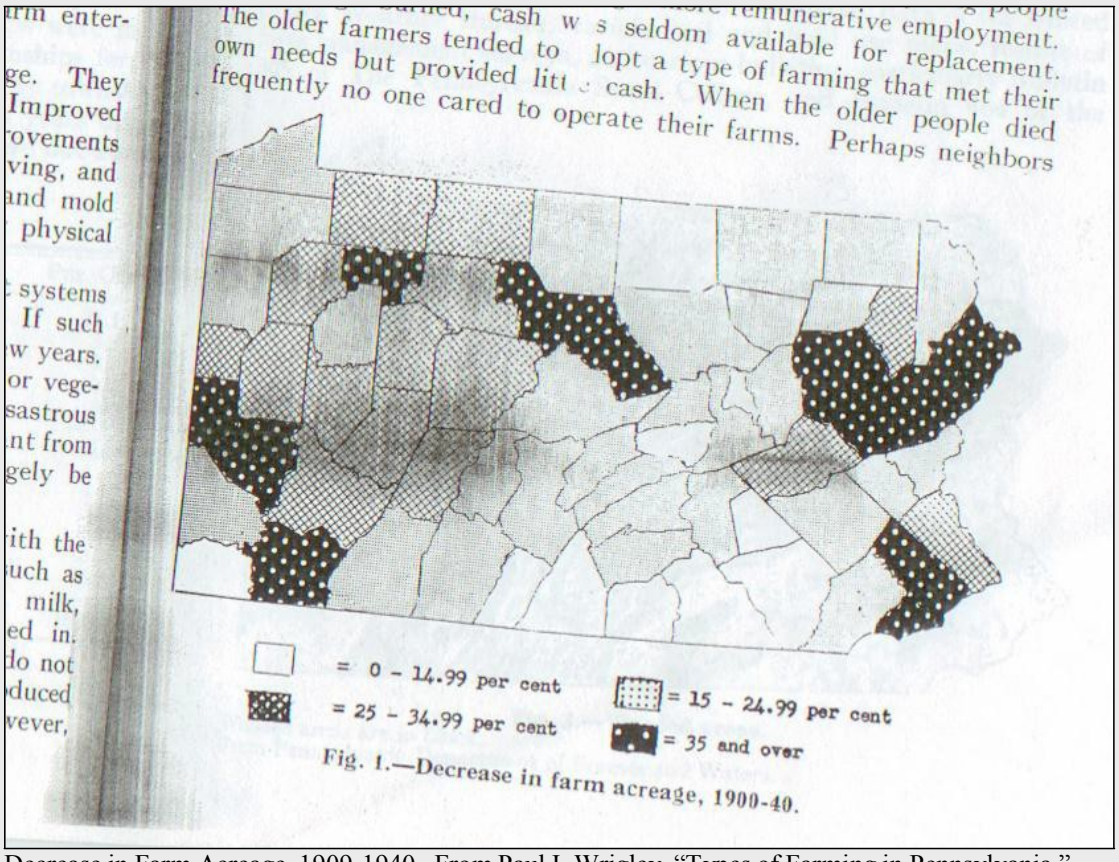
The agricultural extension agent annual reports and local planning reports give a picture of the key changes. The postwar cost-price squeeze forced out all but the biggest and best capitalized farms. Capital investments in cattle, feed, equipment, fertilizer, pesticides, sanitary equipment, and labor rose rapidly. Some large investments were demanded as milk companies switched to bulk tanks and as sanitation regulations tightened. Many other new investments were made to allow farmers to compete. These included larger herds of purebred animals, larger silos, and larger, more expensive and more complicated farm machinery. The era of petroleum derived fuel, plastics, fertilizers, and pesticides had arrived. These made farming highly productive but also involved considerable expense. Barnyard manure was still used, but slowly it shifted from being an asset to a waste disposal problem. Hybrid corn and other seed raised the cost of raising those crops. Feed costs reached 50% of dairy expenses in Chester County by 1955. Meanwhile prices for farm commodities did not keep pace. Indeed, with productivity rising so rapidly, surpluses accumulated and prices sometimes even dropped.[84]

These trends occurred everywhere. Indeed, a hallmark of the post 1940 agricultural economy is the extent to which it was so much more national, even global, than local. Of course, farming had never been completely local; after all, southeastern Pennsylvania farmers were eager to sell on the global market already in colonial days. The change was not in the fact of global impact, but in the proportion and extent of it. The economic environment for mid 20th century agriculture challenged the viability of small scale diversified regionally oriented farms. Bucks County vegetable growers struggled to compete with inexpensive produce trucked in from California. Dairying was still geographically constrained to some extent, but even so "milk sheds" were larger than before and milk prices low. Poultry farming faced stiff competition from the rapidly developing Delmarva peninsula and beyond.

In southeastern Pennsylvania, rapid suburbanization exacerbated challenges for agriculture. One of the nation's first mass produced postwar Levittown suburbs went up in the Philadelphia area and a rush of imitators followed. A cliché of the day was that the best farm crop was houses – an often heard statement, but accurate in this period. Given the economic challenges of farming, it is no wonder that so many farmers sold out and retired. A long train of planning documents generated in the 1950s through the present testifies to the intractability of the issues. They optimistically mapped out areas targeted for development and those designated for "open space" or even farming, but the welter of political interests and structures, class divides, and the structure of the market

itself militated against efforts to protect farming from the impact of development. In the end, farm numbers dropped steadily. In Bucks County, there were 3,751 farms in 1950 and just 2,049 in 1960.

Rapid suburban expansion brought other changes to rural areas. Suburbanization and postwar economic prosperity brought nonagricultural employment opportunities for farm people and conversely attracted nonfarm workers to the country. By 1956 an estimated 60,000 Montgomery County rural residents were "retired business couples and those who prefer the open country to the city. Many of these are commuters to their jobs..." The Montgomery County home extension agent in 1955 mentioned that "a large percent of our rural families do not farm. Many supplement their farm income by working in industry." Census figures show that in the three southeastern counties, about half of farm operators reported working off the farm in 1950, and at least a third reported having family off-farm income exceed farm income. These numbers were actually not far from state averages, and they underscore the continuing importance of "multi-occupationalism" in new guises.[85]



Decrease in Farm Acreage, 1909-1940. From Paul I. Wrigley, "Types of Farming in Pennsylvania," Pennsylvania Agricultural Experiment Station Bulletin 479 (May 1946), 3. Bucks, Montgomery, and Delaware Counties all lost more than a quarter of their farm acreage between 1900 and 1940.

As farm numbers dwindled, the remaining farms specialized more heavily. The percentage of Chester County income from dairy cattle rose during the 1950s – an indication of specialization. Chester County in particular continued to have a strong record in dairy production and also in cattle sales. The same list of local agricultural activities obtained as before, only the level of specialization was higher. Family subsistence activity diminished and all farm labor was bent toward one or two purposes. These were, as before, dairying; poultry raising; mushroom growing; horticulture; nurseries; and vegetable growing for canneries and fresh consumption. Bucks County's $4.9 million worth of vegetables harvested for sales in 1950 led the state far and away, outdistancing second-place Lancaster and York Counties by a wide margin. Bucks was the only county to increase vegetable sales between 1945 and 1950.[86] But by 1960 the county's vegetable acreage was half of what it had been in 1950.

In dairying, the postwar period witnessed the final dominance of the Holstein cow, perpetuated through artificial insemination. Interestingly, pasture was still mentioned by the county agricultural extension agent even in the 1950s; and the 1950 census figures show that of Chester County's 360,000 acres in farmland, 211,500 were pasture. The modern confinement systems were yet in the future. At the same time, the extension agent noted that feed costs now accounted for nearly half the dairy farmer's expenses. 1960 figures were presented differently, but pasture was clearly still quite important.

The three southeastern counties continued to stand among the state's leaders in value of poultry production in 1950 and in 1960, but in absolute dollar amounts, sales fell during that period.

As the national and global transport grid delivered vegetables from afar, southeastern Pennsylvania truck farmers ironically found it difficult to compete. Bucks County still led the state in vegetable acreage in 1950, though, with over 21,000 acres. By the late 1950s the extension agent reported a decline in growing for cannery or fresh markets, and indeed Bucks county acreage had fallen by half. In 1959 the region was still first in flower growing and high in nursery business, but these were too small a proportion of land area and income to make a large difference in the overall agricultural picture. Mushroom farming continued to be profitable and to expand.[87]

Horse raising is very important in today's Chester County, but this is a relatively recent development. Today there are around 8,000 horses and ponies in the county; in 1950 there were only about 3,700, and in 1960, just 2,567, down from a peak of 20,000 in 1910. Only about 20 percent of Chester County farms reported horses in 1960, as

opposed to a statewide average of around a third. Only 131 (just 5%) of Chester County farms in 1960 reported selling horses. While there were probably a few horse boarding and raising establishments, it seems that the revival of horse farming in Chester County happened after 1960.

Labor and Land Tenure, 1940-1960

During the war, POWs, women and girls, and Caribbean migrants were all hired to work the fields and truck plots in the southeast. To an extent, this continued after the war, when a labor shortage forced greater reliance on migrants and immigrants. Occasional conflicts boiled; in 1938 the Farm Security Administration documented a strike of Italian workers at the King Farm in Morrisville, Bucks County.[88] Family labor continued to play an important role, but with the increase in off-farm work especially among farm women, adjustments had to be made. Farm work was mechanized as never before. Expensive machinery drastically reduced human labor requirements in every aspect of farming: milking, harvesting, silo filling, and so on.

By 1950, the overall tenancy rate was low. Only 9.4 percent of farms were tenanted statewide, and in the southeastern counties the rate ranged from 8.4 percent in Bucks County to around 12 percent in Chester County. However, these rates tell only part of the story. When we consider the percentage of *acreage* tenanted, the southeastern counties exceeded state averages by a significant margin. Statewide about 19 percent of farm acreage was tenanted; in the southeast, about 30 percent. The "country estate" phenomenon complicated the tenancy picture. The agricultural extension agent reported in 1944 in Bucks County that "the past ten years have seen a very definite change in the farm program in Bucks County. City folks buying farms as a home and hiring a farm manager has added the manager operated farm to the owner operated farm and the tenant farm." It seems likely that larger commercial farms were more likely to be tenanted, smaller farms operated part-time but by owners, and "country estates" managed.[89]

Buildings and Landscapes, 1940-1960

Houses, 1940-1960

Field survey work did not document any houses that were built during this period. New farm housing during this time would likely draw from the nearby example of suburban types.

Barns, 1940-1960

As in the previous period, older barns continued in use, renovated and adapted to new circumstances.[90] As well, some new barn forms appeared.

The Chester County agricultural extension reports for 1953 mentioned pole barns. A pole barn is a one-story barn constructed from lightweight, regularly-spaced vertical posts or poles, beneath a shallow-pitched, gable roof. The "poles" for which the type is named can be wood or metal. Generally they are set directly into post holes dug into the ground; there is no foundation or basement. This means that wooden poles must be treated to prevent rot and damage from insects. Creosote made from coal tar was a common preservative before about 1950. Pole barns can have concrete floors or dirt floors. Some pole barns have metal, board, or plywood sheathing; others are left open on one or more sides. Roof structures can be integrated with the pole design, but sometimes self-supporting roof trusses are used with pole designs.

Several important forces converged after World War II to dramatically increase the pole barn's popularity. Postwar inflation forced farmers to seek cost savings everywhere, and the capital-intensive building process was one obvious target. Materials such as plywood, metal roofing and siding, and pressure-treated wood challenged the increasingly expensive traditional dimensioned lumber. Large companies, seeking to redirect their enormous wartime production capacity towards peacetime markets, developed and aggressively marketed these mass produced materials. Dow Chemical Company, for example, promoted "penta-treated" poles and posts in the farm press.[91] Steel companies developed subsidiaries which produced poles and metal exterior paneling combining steel, aluminum, and zinc. National Steel Corporation had a division called Stran-Steel which made all-steel farm buildings, many of which were pole barns.[92] The Douglas Fir Plywood Association countered with a claim that their plywood was

"stronger than steel," and argued, a bit defensively, that it "fits in better with your present wood structures" than would metal siding.[93]

At the same time, research in land-grant system demonstrated the effectiveness of "loose housing" for dairy cows, and pole construction fit very well with loose housing designs. Farm mechanization accelerated rapidly, and inexpensive shelters were needed to protect the farmer's investment; pole barns were a common choice.

Metal pole barn, Lower Oxford Township, Chester County, c. 1990. Site 029-LO-001. This recent building represents a type, but not a historical example.

Horse Barn, Liseter Hall Farm, Newtown Township, Delaware County, c. 1950. Pennsylvania Historic Preservation Bureau file.

Free Stall Animal Housing, 1940-1960

Free stall barns were another innovation of the postwar period. In the post World War II period, free stall housing became more highly recommended by agricultural engineers. Some farmers used the system to replace the stall-and-stanchion type of arrangement. Its advantages involved financial savings (on labor and construction costs), and improved animal health and productivity. A famous University of Wisconsin study offered powerful evidence that dairy animals had fewer injuries and infections, and actually gave more milk under the loose housing regime. When not being milked, cows roamed freely in a large open space with dirt floor and ready access to hay or silage. This space sometimes had minimal walls, admitting plenty of air and sunlight. As long as cows were protected from winds, they were not bothered even by very low winter temperatures. This saved on labor costs in feeding (the animals fed themselves in the pen, and were fed concentrates simultaneously with milking) and stable cleaning, and it saved construction costs because the pen barn lacked full walls, expensive stanchions and full concrete floors, and was less well insulated. The free stall barn system often incorporated a milking parlor, and often the milk house then adjoined the parlor.

Free stall animal housing, c. 1960, Londonderry Township, Chester County. Site 029-LN-004.

Bulk Tank House, 1940-1960

Traditional milk houses continued to be built during this period, but an important new development was the bulk tank. More milk companies required that farms direct cows' milk directly to a large stainless steel tank where it could be quickly and cleanly cooled. Milk trucks then pumped it into their own tanks. The bulk tank was an expensive innovation which eliminated milk cans and often required a larger structure to house it than the standard milk house. Bulk tank housing was usually a gabled concrete block structure next to the barn.

Beveled block milk house (rear), c. 1930, and concrete block bulk tank house, c. 1965. Lower Oxford Township, Chester County. Site 029-LO-004.

Cow shed or milking parlor, 1940-1960

These low, one story buildings fit with the free stall system of housing. At milking time, the cows were trained to walk into a milking parlor, where they ate feed concentrates while being milked, then proceeded straight ahead back into the pen or pasture.

Cow shed, Londonderry Township, Chester County, c. 1960-80. Site 029-LN-001

Silos, 1940-1960

Silos continued to be constructed much as before. Tile was used less, concrete and metal more. A few trench silos appeared in the 1950s, but they were rare.

Poured concrete ring silo, c. 1950, West Nantmeal Township, Chester County. Site 029-WN-004

Corn cribs, 1940-1960

The new look in corn cribs was the cylindrical, wire mesh crib with conical metal roof. These gained in popularity during the postwar period. Traditional forms also continued, sometimes with mass produced wire mesh sides.

Corn cribs, East Bradford Township, Chester County. Both date to about 1950. Site 029-EB-001

Poultry Housing, 1940-1960

Poultry housing generally increased in scale during the period. New housing often had multiple stories and was constructed of concrete block. Occasionally specialty buildings such as turkey houses appeared.

Poultry house, Highland Township, Chester County, c. 1960. Site 029-HI-002

Poultry house, Swartz Farm, Franconia Township, Montgomery County, c. 1940. Pennsylvania Historic Preservation Bureau file photo.

Turkey house, c. 1970, Londonderry Township, Chester County. Site 029-LN-002. This is a later example but there is documentary evidence of turkey production in the region before 1960.

Garage, 1940-1960

Garages were more than ever needed, and newer ones tended to be made of concrete block.

Garage, West Brandywine Township, Chester County, c. 1960. Site 029-WB-001

Landscape Features, 1940-1960

Ponds, 1940-1960: Farm ponds became more popular as large scale earth moving equipment got cheaper and more available. Insurance companies offered premium reductions to farms with ponds, so a small pond building boom occurred in the post war period.

Farm pond, Highland Township, Chester County. Site 029-HI-002

Contour Plowing and Strip Cropping, 1940-1960: Contour plowing follows the contours of hills and slopes, rather than orienting crop rows up and down a slope. Strip cropping often accompanies contour plowing, but it can be implemented in flatter terrain too. Strip cropping adds to erosion protection by alternating crops so that one slows water down and the next absorbs it. Fence rows often were taken out when strips were installed. By the postwar period, southeastern Pennsylvania farm landscapes had changed decisively to contour plowing and strip cropping. Aerials show this well, and many contours and strips remain from this period.

Contour strips, Highland Township, Chester County. Site 029-HI-002

Farmstead landscape with footbridge in foreground, McCoach Farm, Lower Salford Township, Montgomery County. Pennsylvania Historic Preservation Bureau file photo.

Aerial photograph of the Cochranville, Chester County vicinity, 1958. Note the many fields that have been contoured and strip cropped. All appeared since 1938.

Property Types and Registration Requirements – Criterion A, Agriculture

Property Types: These property types apply to properties in all regions.

Farmstead

A farmstead is defined here as encompassing the farm dwelling[s]; barn; outbuildings; and the immediately surrounding land on which these buildings are situated. It normally excludes cropland, meadow, pasture, orchard, and woodland, but would include such landscape features as yards, windbreaks, ponds, gardens, ornamental trees, decorative fences, driveways, etc.

Farm

A farmstead plus crop fields, meadows, pastures, orchards, woodlots, etc., including landscape features such as fences, tree lines, contour strips, streams, etc. and circulation networks.

Historic Agricultural District

A group of farms which share common architectural and agricultural landscape features; are linked together by historic transportation corridors, including roads, railroads, paths, and/ or canals; and together express characteristic features of local historical agricultural patterns.

A. Criterion A, Agriculture

This section first outlines general consideration for Pennsylvania as a whole, with reference to considerations related to labor, gender, and tenure. These are followed by Criterion A requirements for each region and subregion.

General Considerations for Pennsylvania as a Whole

National Register eligibility with respect to agriculture in each Historic Agricultural Region of Pennsylvania will depend upon how well a given property reflects the historical farming system in that region. It is very important to remember that Criterion A significance should be assessed in relation to how a given property typifies a farming system, not in relation to whether a property is exceptional or unusual. A property should exemplify a farming system in all its aspects. The totality of a property's representation

in the areas of production, labor patterns, land tenure, mechanization, and cultural traditions will determine its National Register eligibility.

Historic Patterns of Agricultural Production

A key characteristic of Pennsylvania agricultural production from settlement to about 1960 is diversification on small, family farms. Therefore, a farmstead, farm, or historic agricultural district must reflect diversified agriculture through a variety in historic buildings and landscape features. It is critical to note that diversified agricultural production involves two facets:

1) a mix of products. This mix varied with time, place, and culture. For each region, the narrative explains the prevalent mix.

-AND-

2) a variety in use for those products, ranging from direct household consumption, to animal consumption, barter exchange, and cash sale to local or distant markets. In general, as far as use is concerned, over time a larger proportion of products went to cash markets, and money figured more and more prominently as farm income. However, production for family consumption, animal consumption, and barter exchange continued to occupy a significant position well into the twentieth century, with a notable surge during the Depression years. Historic resources should reflect the variety of household and market strategies employed by farming families.

Social Organization of Agricultural Practice

Historic production patterns are necessary but not sufficient to determine eligibility. Social organization of agricultural practice had a profound influence on the landscape that must be recognized. Labor, land tenure, mechanization, and cultural practice should be considered. For example, in the Central Limestone Valleys, share tenancy was an important and enduring practice that significantly influenced the architecture and landscape of farmsteads, farms, and farm districts. In the Northern Tier, conversely, high rates of owner-occupation lent a different appearance to the landscape. The level of mechanization was related to labor practices, and also shaped the landscape through field patterns and architectural accommodation (or lack thereof) for machinery storage. Insofar as cultural factors influenced agricultural production or practice, they should be taken into account in determining the eligibility of farmsteads, farms, and farm districts. For example, Pennsylvania German food ways may have influenced agricultural production patterns and hence architectural forms; Yankee/Yorker families brought with

them the English barn (which, because of its organization, shaped farming practice) and the penchant for classical revival styling.[94]

Issues of Chronology

To be determined significant with respect to Criterion A for agriculture, a farmstead should either:

1) possess a strong representation of typical buildings and landscape features from one chronological phase of the region's agricultural history,

-OR-

2) possess a strong representation of typical buildings and landscape features that shows important agricultural changes over time.

How to Measure a Property in its Regional Context

Whether it depicts one chronological period or change over time, a farmstead, farm, or historic agricultural district will normally be significant under Criterion A only if:

1) its individual production, for the period in question, reflects the average or above average levels for its township in the same period. (This can be determined by comparing the farm's manuscript agriculture figures to township figures.)

2) its built environment reflects that product mix. (The Narrative explains how different agricultural building types relate to agricultural production.)

3) its built environment reflects locally prevalent social organization of agriculture including a) levels of mechanization, b) labor organization (including gender patterns) and c) tenancy.

3a) levels of mechanization: in highly mechanized areas (relative to the state levels) we would normally expect an array of machine sheds, machinery bays integrally placed in barns, horse-power extensions, etc.[95] Conversely, in low-mechanization areas such as the Northern Tier, these facilities will likely be less visible.

3 b) labor organization: Patterns of collective neighborhood labor may be present; for example, a butcher house might be located near the road. For early phases of agricultural development, we would not expect to find overt architectural accommodation for hired laborers. But in the wage-labor era, those expressions would range from accommodations on the

farm (rooms over springhouses, wings of houses) to purpose-built migrant housing. Mechanization could affect labor organization because it eliminates workers. Architectural and landscape elements that illustrate patterns of labor organization should be assessed for significance (with respect to agriculture) based on the level of clarity, intensity, and chronological consistency with which they show labor patterns. For example, if a c. 1850 farm house has a c.1880 workers' wing with back stair and no access to the family living area, that is both a clear and chronologically consistent illustration of shifts in hired labor's status.

Establishing significance for the gender organization of labor is more complex. We could think in terms of a continuum: from work almost always done by men—to work almost always equally shared by men and women – to work almost always done by women. In general, the farmstead and even the farm should be regarded as a mixed-gender workspace, because so much farm work was shared. However, there are a few cases where work was not only clearly associated with either men or women, but also had spatial and architectural manifestations to match. So we should focus on these cases when assessing significance with respect to gender patterns of agricultural labor. In the regions under discussion here, besides work done in the house (by women), several cases fit these criteria. On Northern Tier farms (1830–1900), men generally milked, and women made butter; the former activity occurred in the barn, the latter either in a farmhouse ell or in a separate "dairy kitchen" sited between house and barn. Later, fluid milk sale (mainly organized and conducted by men) replaced home butter making. Some sort of facility for home dairying is a sine qua non; one that is sited and oriented efficiently with respect to house and work-yard would be of greater significance than one that was not. And, a farmstead that contained both an ell or kitchen and a milk house located by the barn would demonstrate the shift in gender patterns better than a farm with just one of each. Another important case is pre-1945 poultry raising, which was dominated by women. If a pre-1945 poultry house is located well within the house's orbit, it suggests that expresses more significance with respect to women's agricultural labor than a pre-1945 poultry house that sits on the edge of a field. And, if a farmstead has both a pre-1945, small poultry house located between house and barn, and a large, post-1945 poultry house sited far from the house,

only one poultry house.

3 c) Tenancy: This aspect of social organization will be reflected most in historic agricultural districts (rather than on farmsteads or farms). A historic agricultural district should reflect prevalent levels of tenancy for its region. So, we would expect to see fewer documented tenant properties in Northern Tier districts than in a Central Limestone valleys district. Where individual farms or farmsteads are concerned, a farm or farmstead with a documented history of tenancy are significant for tenancy, but only in regions where tenancy rates were historically higher than the state average.

Cultural Patterns

If, in instances where a farm has a strong, documented connection to a particular ethnic group, its architecture and landscape should show evidence of that connection. [See Narrative for discussion]. Significance should be evaluated by the degree of clarity with which ethnic heritage is expressed (i.e. is it highly visible in more than one way, for example in both construction details and use?); and in cases of farmsteads, the extent to which multiple buildings and landscape features express ethnically derived agricultural practice.

In every case, even where all of these substantive requirements are met, there will be degrees of quality in representation. In other words, it is not just the presence of links to the region's agricultural history (i.e. the overall property's integrity) that makes a property outstanding, but also the quality and consistency of those links. Where possible, nominations should attempt to assess what we might call "intensity" or "layering" of representation. This intensity of representation may appear in the way the farm's component parts preserve historical relationships. For example, if a farmstead retains a springhouse near the main house and a milk house sited near the barn, that is an especially intense illustration of changes in the dairy industry. The idea of "layering" connotes the multiple meanings that can be contained in the siting, layout, and content of the architectural and landscape features. The farmstead and farm features together might, for instance, offer expressions that are simultaneously cultural and local, and also show how wider trends affected agriculture. For example, a Northern Basement Barn indicates cultural heritage (in placing an "English barn" above a basement) and agricultural change (in dairying-oriented basement level). Another example of "layering" could be if the

economic and cultural importance of livestock is illustrated by several buildings and landscape features – not just one or two. And, there could be a variety of farm workspaces that testify to the diversified strategies historically pursued by farming families in the region.

When assessing agricultural change, remember to consider not only changes in barn, outbuildings, and landscape, but also in the farmhouse. For example, on a farm where large-scale production was accompanied by a shift in gender patterns of labor, look for changes in the farmhouse's interior work space; typically these might include smaller, more isolated kitchen spaces and more spaces devoted to display or leisure. Or, where dairy processing became centralized, dairy dependencies attached to a house might be converted to other uses. Rural electrification and the shift away from wood for fuel could also affect interior farmhouse organization. For example, with electrification, the summer kitchen's function often moved back inside the house.

Registration Requirements for the Southeastern Pennsylvania Historic Agricultural Region

To be determined significant with respect to Criterion A for agriculture in this region, a farmstead should either:
1) possess a strong representation of typical buildings and landscape features from one chronological phase of the region's agricultural history,

-or-

2) possess a range of buildings and landscape features that illustrate change over time in the region's agricultural history.

Substantive Guidelines:

Strong representation of typical buildings and landscape features from one chronological phase of the region's agricultural history (#1): A farmstead will normally be significant under Criterion A only if: 1) its individual production system, for the period in question, reflects the average or above average production levels for its township in the same period, 2) its built environment and landscape reflects that product mix, 3) its built environment and landscape reflects locally prevalent levels of

strong, documented connection to a particular ethnic group or land tenure system, its architecture and landscape shows show evidence of that connection. [See Narrative for discussion].

To be considered significant for the period "Diverse Production with wheat as an export crop, c. 1730 to about 1780" a farmstead should include, at a minimum, a farmhouse typical for the region, dating to the period; and at least one barn or outbuildings related to diverse production with wheat as an export crop, dating to the period. A farm should have remnant crop fields or pasture. It is a plus if historic field or property boundary lines are represented. A historic agricultural district would need a collection of farms representing these features.

To be considered significant for the period 1780-1870, "Livestock Feeding and Home Dairying in a diversified system," a farmstead should have a farm house typical of the period and place, or an older house showing period modifications; a barn typical of the period; at least one dairy related or cattle feeding related outbuilding; and architectural evidence for farm mechanization. The more outbuildings there are which illustrate agricultural diversification, the better. A farm should have pasture land and crop land. A historic agricultural district should have a more or less contiguous collection of farms representing these features.

To be considered significant for the period 1870-1940, "Fluid Milk Dairying, Poultry, Truck Farming, Nurseries, and Specialty products," a farmstead should include a house typical of the time and place or an older house showing period modifications; an older barn showing 20th century adaptations, or a new type such as a stable barn; a milk house; architectural accommodation for farm machinery; and architectural evidence for subsistence activity. The more outbuildings there are which illustrate agricultural diversification, the better. If the farm has a history of specializations such as a nursery business, the buildings should reflect that. A farm should have these features plus cropland and pasture land. A historic agricultural district should have a more or less contiguous collection of farms representing these features.

To be considered significant for the period 1940-1960, "Suburbanization and Specialization," a farmstead need not have a house which dates precisely from this period, but should have barn dating from the period or a barn with

adaptations dating from the period, and a silo dating from the period. A farm should have pasture and cropland. A historic agricultural district should have a more or less contiguous collection of farms representing these features.

2) a range of buildings and landscape features that illustrate change over time in the region's agricultural history.

To be considered significant for representing the major agricultural changes in the Southeastern Pennsylvania Historic Agricultural Region, a farmstead should have architectural evidence of the major shifts over time. An 18th century house, late 19th century double decker barn and granary, and 20th-century milk house and silo, for instance, would effectively portray a shift from very small-scale agriculture to diversified grain and livestock farming to dairying. A farm should have cropland, pasture, and tree lines or woodlots. Orchards are desirable but not required. A historic agricultural district should have a more or less contiguous collection of farms representing these features.

Property Types and Registration Requirements – Criterion B, Association with the lives of Significant Persons

These requirements apply to properties in all regions. To be eligible under Criterion B, a farmstead, farm, or historic agricultural district must establish a documented link to an individual who had a sustained and influential leadership role which resulted in a verifiable impact on local, state, or national agricultural practices, trends, or thought. A "sustained" leadership role would mean long-term involvement in important agricultural organizations such as the Grange, Dairymen's League, rural electric cooperative, and so on. Impact should be demonstrated, not asserted. An agrarian figure who achieved a higher than usual degree of productivity or prosperity in farming would not normally meet this standard, nor would one who was an early adopter of new agricultural methods or technologies. But, an individual who influenced others to adopt new practices could. For example, Robert Rodale clearly played a foundational role in the rise of the organic farming movement nationally. On a more local level, a hatchery owner who initiated a new industry in an area, thus creating a shift in production patterns on many farms, might qualify.

Property Types and Registration Requirements – Criterion C, Design and Construction

These requirements apply to properties in all regions. Typical examples are encouraged to satisfy Criterion A for agriculture, but average or ordinary examples are not likely to qualify under Criterion C for Design and Construction. A farm or farmstead will not be eligible under Criterion C simply because it has farm buildings that retain integrity. Under Criterion C, to be eligible as property must exhibit the "distinctive characteristics of a type, period, or method of construction or that represent the work of a master, of that possess high artistic values, or, as a rural historic district, that represent a significant and distinguishable entity whose components lack individual distinction".[96]

This MPDF follows the evaluation models established by the 1992 MPDF *Farms in Berks County* and the 1994 MPDF *Historic Farming Resources of Lancaster County,* which defines standards for architectural significance of farm buildings as "a rare or intact example of a period, style or type" or as a "noteworthy example of a particular building type ...".[97] To be eligible under Criterion C for Architecture, a farm building, farmstead, farm, or historic agricultural district must possess physical characteristics that specifically reflect aesthetic, cultural, craftsmanship, or production values associated with regional agriculture and rural life. Farm buildings and structures must exhibit qualities of design, workmanship, and artistic merit that are tied to the period of construction.

This document explains the specific Criterion C issues that apply to farm buildings and structures. Criterion C relates to significance primarily for Architecture, Art, and Engineering. While most farm structures will not be evaluated individually, structures notable for their construction technology or design may factor into the Criterion C significance of a property.

Evaluation conventions for the architectural style of dwellings are well established so they are not covered here. However, what constitutes architectural significance for farm dwellings and agricultural buildings and structures in the area of Agriculture is less widely defined.[98] This section lays out some considerations for how to assess architectural significance for farm buildings and structures based on their engineering and design characteristics related to agriculture.

As with any other architecturally significant building type, resources must conform closely to the seven aspects of integrity. Significance must be demonstrated, not merely asserted.

What does qualify as a significant design?
A barn might qualify if its design reflected essential characteristics of specific barn types, such as Pennsylvania bank barn, Stable barn, English Barn etc. (The salient architectural features of each type are defined within the narratives that accompany this MPDF.) The significant elements of barn layout (location of threshing floors, hay mows, stables, granaries; typical interior organization for a given type; vertical work-flow arrangement where relevant) should retain integrity. The same would be true for outbuildings, for example if a granary or spring house retained essential characteristics of its type. A house, barn, or outbuilding that has been altered or modified to accommodate changing maintenance habits, popular taste, or the convenience of the farmer would not be considered significant unless the new features are demonstrably tied to regional patterns in agricultural buildings and the built environment for the period of significance. For instance, a mid-19th century vernacular farmhouse that was Colonial Revitalized in the early 20th century might be significant for its stylistic features outside this MPDF but would not be architecturally significant under this MPDF because the alterations are not associated with the needs and priorities of farm life. But a farmhouse modified to reflect important transitions in the relationships of farm family members to each other, labor, or the market could be considered significant (such as the addition or removal of quarters for hired hands, cooking facilities for feeding threshing crews, social spaces separated from spaces devoted farm matters, etc). Changes reflecting access to modern amenities and willingness to adopt modern amenities could also be considered significant, such as the addition of a bathroom, running water, a heating plant, or electrification. However, the design features reflecting these changes must be demonstrated to be part of a local or regional pattern of construction; individual, personalized or idiosyncratic alterations that lack design features not adopted elsewhere in the community would not be considered significant under Criterion C, but would support significance under Criterion A for their association with labor and production patterns. In the post-World War 2 era, many farmhouses have undergone dramatic changes in ways that make them indistinguishable from contemporary suburban residences in their materials, styles, amenities, and use. Thus it will be difficult to evaluate the Criterion C significance of post war farmhouses without further study.

Design includes massing, proportion, fenestration, and ornament. Ornamentation will be very important in determining Criterion C eligibility. It could include decorative ironwork

(hinges especially); roof-ridge cupolas; gable-end "stars"; painted or trimmed louvers; datestones; painted decorations; cutout designs; cornice detailing; brick-end patterns; and bracketing.

Design could include examples of marked visual relationship of buildings to one another through such qualities as colors (historically), siting, proportions, and materials. Thus significant design can potentially apply to a farmstead or even a historic agricultural district.

Design also includes overall layout of the farmstead or farm, for instance if buildings are arranged in a recognized, regionally typical pattern in orientation and layout, such as linear organization of eastern and central Pennsylvania (as described by Henry Glassie, Joseph Glass, and others); or; farmsteads bisected by a road as is common in the Northern Tier (as described by Trewartha).

What qualifies as significant workmanship?
Workmanship is evidenced in quality of masonry, timber framing, durable construction, including evidence of skilled workmanship in details such as hardware or even nails. Masonry, for example, might exhibit carefully cut stone rather than fieldstone. Another facet of workmanship would be cases where there is a good quality example of particular construction method such as log, *blockstanderbau*, plank, timber frame, Shawver Truss, etc. Workmanship applies primarily to individual buildings.

What qualifies as significant "artistic merit"?
This is the most hard to define category of the three. It connotes skill in achieving desired aesthetic qualities. For example, careful proportions, sensitive siting, and originality of design are important components of aesthetic merit. Again, ornament is where aesthetic merit shows most clearly, for example in locally characteristic designs for hardware, weathervanes, bracketing, and the like.

Examples

Example 1: Hodge Barn, Centre County, c. 1870. This is a double-decker Pennsylvania barn with decorative ornament, double bankside bridges, and struts under the forebay, located in Centre County. This barn would qualify under Architecture because of its design features (double decker with multiple mows and floors), its workmanship (technical mastery represented in bridges, struts, and interior framing), and its artistic merit (decorative ornament).

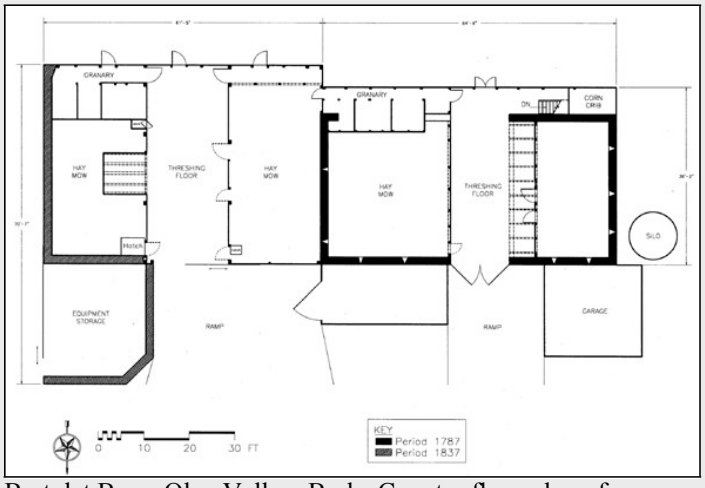
Ornament on Hodge Barn, Centre County

Hodge Barn, Centre County, struts under forebay

Hodge Barn, Centre County, struts under forebay

Example 2: The Bertolet Barn in the Oley Valley of Berks County, 1787 and 1839. This barn shows the evolution of the Pennsylvania Barn. The 1787, stone portion has a Germanic *liegender stuhl* framing system; forebay granary with bins; two mows flanking a threshing floor; and intact stable level. It is significant because of its design (the multi-level system was worked out to perfection), workmanship (the masonry and the timber framing) and artistic merit (in its proportions, materials, etc). The 1787 date is inscribed over the bankside door. The 1839 portion (also dated, thus affording a rare chronological benchmark) is significant for different reasons: it shows adaptations of framing systems, but still assembled with a high degree of skilled workmanship; it shows continuity of design and artistic merit from the earlier portion.

Bertolet Barn, Oley Valley, 1787 and 1839.



Bertolet Barn, Oley Valley, Berks County, floor plan of upper level. University of Delaware Center for Historic Architecture and Design.

Example 3: the Plank Barn in Cumberland County. This brick-end barn was built in 1853. It is significant for its design, workmanship, and artistic merit. Its significant design features clearly include attention to simple proportions. Its workmanship is important in the significant masonry technique needed to create the openwork patterns in the gable ends. Its artistic merit is represented in the diamond motifs. The datestone helps to establish chronological frameworks for these barns. The owner manufactured a local plow and the barn is evidence that he was consolidating his wealth.


Plank Barn, Cumberland County, 1853

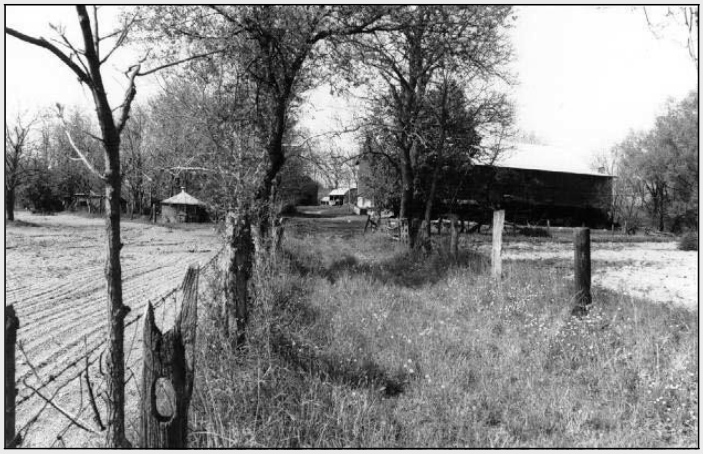
Example 4: Smokehouse, Tulpehocken Manor, Lebanon County, late 18th century. Most examples of architectural significance will likely be larger buildings such as barns, but this smokehouse (in Lebanon County) is an example of a smaller building which might qualify because of its masonry (which qualifies both under workmanship and design, because its decorative corner quoins are clearly ornamental) and the hand-wrought ironwork, which includes a bar against thieves which is inscribed with the owner's name and date. The building clearly exhibits all the characteristics of its type.


Smokehouse, Tulpehocken Manor, Lebanon County, late 18th century

Example 5: Chicken house at Landis Valley Museum, Lancaster County, early twentieth century. Although in poor condition, this chicken house, located in what is now the Landis Valley Farm Museum, embodies the character-defining features of "modern" housing recommended by the extension services and growers associations for optimum management of large flocks. The massing, proportion, and fenestration, as well as the interior arrangement maximize efficient work flow and healthy stock management.

Chicken house at Landis Valley Museum, Lancaster County, early 20th century.

Example 6: Joel Dreibelbis Farm in Berks County. Properties can be significant under Criterion C for reasons other than their architecture. The farm plan with the siting of the buildings in relation to each other and to the surrounding fields make up a carefully planned complex. The spatial organization of the buildings and the land use patterns, which include a wet meadow, reflect traditional German labor and conservation ethics.



Joel Dreibelbis Farm, Berks County, farm lane, fields, outbuildings. Pennsylvania Historic Preservation Bureau file photo.

Property Types and Registration Requirements – Criterion D, Archaeology

These requirements apply to properties in all regions. The examples below are not meant to be an exhaustive list of ways in which a farm or farmstead site could be eligible under Criterion D in Agriculture; instead, they are meant to provide a limited overview of current research into the archaeology of farms or farmsteads and of data that these excavations have yielded. Other datasets could yield significant information about agriculture. In addition, many of these research topics pertain equally well to both demolished and extant farms or farmsteads. In addition, keep in mind that archaeology can be used to support evaluation under any Criterion or area of significance.

To be eligible under Criterion D, a property must "have yielded or…be likely to yield information important in prehistory or history." For Agriculture, although farms and farmsteads may contribute other (or various types of) information to the study of Pennsylvania history important information on archaeological farm properties in Pennsylvania is information that contributes to the understanding of the major themes identified in this context either for the state or for the individual agricultural regions or for both. To recap, these themes include representation of agriculture of one time period or representation of agricultural change over time; representation of typical production, in terms of both production and use; and representation of labor patterns, land tenure, mechanization, and cultural traditions. These requirements should not be considered in a vacuum; they must be examined in the context of the cultural milieu of the historic agricultural regions developed elsewhere in this MPDF.

Based on current research in historical archaeology, the registration requirements for archaeological properties that are farmsteads in Pennsylvania are that the site provide important information on changes to landscape and the built environment over time; on the use of agricultural products; on labor and land tenure; and on cultural patterns. To be eligible under these registration requirements, a site must provide important information on the topics listed below and must also demonstrate integrity. For archaeology, integrity should be measured in light of the current state of archaeological knowledge for that region, the research questions being addressed, and the unit of analysis. For example, the standards of integrity for a region without a robust archaeological record would be less stringent than for an area that is well-documented archaeologically. In addition, a site

where the significance lies in its ability to provide information about change over time should have discrete deposits that can be directly associated with different time periods. The above are only two general examples to guide assessments of integrity.

Change Over Time

Agricultural resources may yield important information about modifications to the landscape to accommodate both farming and changes in farming. The creation of a farm obviously involves alteration of the landscape; archaeology can document this alteration. For example, Mary Beaudry (2001-2002: 137-138), working at Milton Farm in Scotland, was able to document how the landscape was altered to accommodate the creation of a farm dedicated to raising sheep. Excavations revealed the massive drainage efforts that were undertaken to turn the land from marsh into productive pastureland. Therefore, important information would document how farmers modified the landscape to begin farming as well as to keep up with changing agricultural practices in their region.

Archaeology can also provide important information on the evolution of the built environment. "The rendering of a farmstead on an atlas dating to the middle of the 19th century does not mean the site sprang from the ground full blown… (Catts 2001-2002: 145)." Often, buildings were moved or reused over time (Beaudry 2001-2002: 130). In some cases, buildings were never even documented in the historical record or the documentation is contradictory (Garrison 1996: 24, 32). These data can provide important information on how farmers responded to the larger movements and innovations in agricultural practice for their regions, documenting both the degree to which farmers followed the latest prescriptions, and the amount of time it took for these ideas to diffuse from other areas (Beaudry 2001-2002: 130; Catts 2001-2002: 145). Archaeology can also provide important information on how changing patterns of refuse disposal illustrate larger changes in farming practice. For example, archaeologists were able to tie modernization theory into their study of South Carolina farmsteads by examining refuse disposal at these sites (Cabak, Groover, and Inkrot 1999: 35). Comparing the density of artifacts at both "modern" and "traditional" farmsteads, archaeologists were able to document the ways that disposal patterns reflected modernization. In addition, useful features may be filled with refuse later on. Mary Beaudry (1986: 39) documents the filling in of water-related features, pointing out that that process can be related to "…an ongoing series of changes made in response to technological innovations, economic and social pressures…" etc. Catts (2001-2002: 148) also documents a trend of refuse disposal in specific dumping areas away from the farmstead. The timing and reasons for this change could provide important information

on the evolution of agricultural practice, as well as on the degree with which innovations diffused from other areas.

Agricultural Production

In terms of production, archaeology can provide important information on agricultural production for a market economy. One of the most fruitful lines of evidence, faunal analysis, has the potential to reveal a great deal of important information regarding how market forces shaped production patterns on farms. By comparing faunal remains from both rural and urban sites in Massachusetts, archaeologists were able to document changes in rural production to meet urban demand (Bowen 1998). The percentage of calves in urban assemblages was much higher than in rural assemblages; therefore, it appears that increased production of milk for urban areas also led to increased production of veal for those same areas. Rather than spend precious resources on animals that were useless for dairying, farmers would sell male calves to urban consumers (Bowen 1998: 143).

Examination of faunal disposal patterns is most profitable when done in conjunction with oral historical or other information (Whittaker 1999: 53-54). In Iowa, for instance, archaeologists found that, in general animals that were slaughtered for farm consumption were generally either burned or discarded; rarely, they were buried. The existence of a large, rapidly filled pit, filled with more remains than would be necessary for a farm family, therefore, pointed out that slaughter for market was taking place at this site (Whittaker 1999: 53-54). These types of data could provide important information on the degree to which individual farms participated in the market system.

Labor and Land Tenure

In terms of labor and land tenure, archaeology can produce important information on the interplay between land tenure and changes over time. For example, archaeologists in Massachusetts were able to correlate changes to the landscape with specific changes in ownership in Estabrook Woods (Garman et al. 1997: 65-66). One owner clearly modified the yard to create better drainage. In addition, as ownership changed, the field layout also changed: earlier field features (mounds for corn cultivation) were incorporated into later field patterns. This type of information could be especially useful if different owners represented different ethnic groups. For example, archaeology could provide important information on the changes wrought when a Welsh family purchased a farm from a Pennsylvania German family, and how those changes are manifested in the archaeological record.

Aside from providing important information on individual farms and individual ownership, archaeology can provide important information on the effects of larger events on the farming culture. For example, during the Napoleonic Wars in Europe, European demand for American goods (including agricultural products) rose dramatically. With this in mind, archaeology can document the effects of this heightened demand on agricultural production and practice in each agricultural region in Pennsylvania (Garman et al. 1985: 73). In addition, the Civil War was another event that had a dramatic impact on agricultural society. Besides raids, forage, and simply the movement of large bodies of troops across the agricultural landscape, this event occasioned a tremendous loss of life and shortage of manpower after the war. In the southern United States, this loss of manpower hastened the mechanization of many farms. Archaeology could demonstrate how this loss of manpower was manifested in the landscape and material culture of Pennsylvania's agricultural regions (Catts 2001-2002: 149).

Labor and land tenure also ties into several major research themes within historical archaeology, including status (e.g. Miller 1980), class (e.g. McGuire and Walker 1999), and ethnicity (e.g. Stine 1990). In terms of status, the archaeology of Pennsylvania farms can provide important information about the ways in which farmers displayed their status. For instance, investigations in New Jersey suggest that farmers chose to display their status by improving their agricultural holdings, as opposed to participating in the consumer culture (Friedlander 1991: 27). Ceramic and glass artifacts indicated a status position that was not in keeping with the farmer's status as derived from the historic record. Tenant farmers, on the other hand, may have more fully embraced consumer culture since there was little use in improving structures and land that they did not own (Rotman and Nassaney 1997: 56). Archaeology within Pennsylvania's agricultural regions could provide important information on the general applicability of these findings.

Status, in combination with ethnicity and role (owner, tenant, etc.), has the potential to yield important information on the social hierarchy of agriculture. For example, statistical analyses in North Carolina found that the material remains of African American landowners were more similar to those of white tenants than to those of either African American tenants, or white owners (Stine 1990: 40). African American and white tenants, on the other hand, were nearly impossible to distinguish. Overall, ethnicity played a role in the ranking of landholding farmers; however, economics appears to have played a more important role than ethnicity in the rank of tenant farmers. Investigations in Pennsylvania could test this model across regional lines.

Closely related to the above themes of ethnicity, status, and role, is the concept of class. Class has variously been defined as "the relationship of a social group to the means of production" (McGwire and Walker 1999: 160), as a description of a fixed position in society, and as a relative measure of the relationships between different social groups (Wurst and Fitts 1999: 1). According to some archaeologists, however, regardless of the definition of class, its role has not been sufficiently examined in the archaeological record; the historical archaeology of class has been "meager." (Wurst and Fitts, 1999). Therefore, this concept may yield important information for the study of Pennsylvania agriculture. For example, in New York state, archaeologists examined the manifestations of class between servants and their employers in Binghamton and found that artifact types and locations can represent different classes within the same property and that mixed assemblages may be the result of different class structures on the same property (Wurst 1999: 17). In agricultural regions of Pennsylvania where migrant labor was important, this type of study could produce important information on the differences between the owners and the workers. In addition, Wurst (1999: 13) demonstrated how, at a rural tannery, the owners minimized the material cultural differences between themselves and the workers.

Cultural Patterns

In terms of cultural patterns, archaeology can provide important information about the degree of cultural exchange that took place in agricultural communities (i.e. assimilation and acculturation). In some areas of New Jersey, for example, English and Scottish farmers borrowed certain architectural elements from their Dutch neighbors; archaeology may be able to document this exchange in other areas, such as land use and other material culture. In addition, the historical record indicates that the Dutch maintained many of their ethnic ties, including language; however, other aspects of material culture, such as ceramics, indicate that some cultural exchange was taking place (Scharfenberger and Veit 2001-2002: 68). For Pennsylvania, archaeology can provide important information on assimilation within the cultural milieu of the agricultural regions discussed within this MPDF.

Archaeology can also provide important information about cultural patterns, as manifested in religion and religious practice. For example, in Arkansas, archaeology, in conjunction with the documentary record, was able to document the degree to which one family maintained its Jewish heritage, despite being isolated from any large Jewish congregation. The faunal assemblage demonstrated that this family did not observe kosher law; however, the documentary record points out that the family was active in

establishing a synagogue in New Orleans and was still a participant in the larger Jewish world. It appears, therefore, that the family's location in an isolated, non-Jewish area led to certain changes (e.g. not keeping Kosher law), but did not break all of their ties to the Jewish community (Stewart-Abernathy and Ruff 1989: 97 and 105). In Pennsylvania, archaeological investigations at a Quaker-owned farmstead in Chester County were able to provide important information on the interplay (and contradictions) between Quaker belief and Quaker participation in the larger market system (Bailey et al. 2004:131).

Faunal Studies

Although not one of the overarching themes in Pennsylvania agriculture, faunal analyses have the potential to provide a great deal of important information about the above themes. For example, past archaeological studies have used faunal analyses to examine the use of the landscape and change over time, as well as status. By combining oral history with faunal analysis, archaeologists in Missouri were able to provide information on different processing methods and disposal of fauna (Price 1985: 46-47). For example, smaller animals, such as squirrels, would have been processed in the yard, leaving some bones there. Other bones, however, would have been discarded at the margins of the yard after the meal. Larger animals, such as pigs, would have been slaughtered near the smokehouse (Price 1985: 48). In areas without standing remains, or where spatial relationships are not clear, this data could provide important information on the layout of agricultural properties through time. Also, the use of wild animals in the diet can point out the status of the site's inhabitants. Both higher status and lower status farmers would likely have a larger percentage of wild animals in their diet, either through conscious choice, or due to economics (Scharfenberger and Veit 2001-2002: 64).

Conclusion

The registration requirements for archaeological properties that are farmsteads in Pennsylvania are that they must provide important information on the themes developed in this MPDF. It is important that the important information relate not only to the themes, but also to the themes as they are manifested in each agricultural region. Broadly, these themes are change over time, agricultural production, labor and land tenure, and cultural patterns. In addition, a separate category, faunal analysis, has the potential to yield important information on several of the themes identified in the MPDF. Aside from significance, as represented by the potential to yield important information, farmsteads must also display integrity. The assessment of integrity should be based on the archaeological record of a particular region, as well as the research questions and the unit of analysis.

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Statement of Integrity

This Statement of Integrity discusses the seven categories of integrity as defined by the National Register, for each of the three Property Types (farmstead, farm, historic agricultural district) defined in this context. This statement applies to properties in all regions.

Location:
Integrity of Location refers to the requirement that buildings and landscape elements remain in their original location. Normally, a building loses eligibility if it has been moved. However, where a farmstead is concerned, farm buildings present a challenge to the normally straightforward rule. Historically it has been very common to move and reuse farm buildings. Some, like poultry houses, were actually designed to be easily moved. Other types of smaller farm buildings were frequently rearranged. The New England Connected Farm complex, for example, resulted from moving buildings. Therefore, if an agricultural building has been moved, and the change in location can be interpreted as a reflection of changing agricultural patterns, integrity of location has not been compromised. If a farm building has been moved or reused after the period it is supposed to represent, integrity of location is not present.
Integrity of Location for a farm is well defined by the SR 30 context, which says "an agricultural property must be located either where it was constructed or where important trends or patterns in agriculture occurred…. Siting with respect to natural features and topography, use of local and indigenous materials, relationship to roadways, the presence of native species… and other responses to the natural environment all add to integrity of location."[99]

Integrity of Location by definition is present in a historic agricultural district, as it is unlikely that an entire area would be relocated.

Design:
To quote the Georgia agricultural context, design is the "combination of natural and cultural elements that create the form, plan, style, and spatial organization of a property."[100]

For individual farmstead buildings, design includes such elements as siting, orientation, form, massing, proportion, fenestration, location of doors, roof types, and ornament. Integrity of Design applies to both exterior and interior elements. For houses, interior integrity is well established elsewhere; for barns and outbuildings, interior integrity of design refers to the presence of significant plan elements characteristic of a given barn type. So, for example, an English Barn should retain the characteristic one-level, three-bay layout with mow, threshing floor, and stables arranged crosswise to the roof ridge. A Pennsylvania Barn should exhibit the characteristic multi-level work-flow arrangement, and the diagnostic features of the type (forebay, banked construction, and so forth.) Another aspect of interior design would be framing systems; while these are covered under Workmanship, they also fall under Design because often they were assembled to permit hay tracks, expand storage space, and delineate spatial divisions both vertically and horizontally. Barn and outbuilding interior alterations that show significant agricultural changes in a region do not compromise integrity, because they can contribute to significance based on change over time. However, if they postdate the period of significance and/or obliterate historical fabric, then integrity is not present. For example, a Pennsylvania Barn whose lower level was cemented and fitted with stanchions for dairy cows in the 1930s could retain integrity because it illustrates changes within a period of significance, but if its entire lower level was gutted, expanded, cemented, with new partitions in the 1980s, it would likely not retain integrity.
Farmstead layout and the relationship of buildings to topography are important elements in Integrity of Design. Farm layout should retain integrity with respect to farm labor patterns for the period of significance in the region where the farmstead is located. In most cases, this means spatial organization to facilitate family and neighborhood labor. So, for most pre-1930 farms, a poultry house, detached dairy house, or hog facility should show a siting relationship to both house and barn, usually being situated between house and barn, or in a clear relationship to the house's dooryard (as in the Yankee Northern Tier) or *vorhof* (more common in German Pennsylvania), or in an arrangement where all buildings are closely clustered. Integrity of farmstead design also can apply to characteristic cultural or regional patterns. In the Northern Tier, for example, it was common for a road to bisect the farmstead, whereas in German Pennsylvania, a linear or court-yard organization was more prevalent.

For farmstead landscape elements, Integrity of Design applies to whether the farmstead retains traces of the fabric and location of boundaries, lawns, fences, ponds, circulation elements (paths, drives), gardens, farm lanes, orchards, and ornamental plantings. It would be rare for these to survive in their entirety, but some vestiges should be present.

Integrity of Design also applies to the collection of buildings on a farmstead. Most farmsteads will contain a mix of contributing and noncontributing buildings and structures. A determination must be made as to whether there is too high a presence of noncontributing elements. In such cases, it is important that the farmstead adequately reflect the composite patterns of the relevant agricultural region and period. For example, a farmstead might have an early wood-stave silo, a c. 1940 concrete stave silo, and a c. 1975 Harvestore silo all clustered together, next to a barn complex that includes a c. 1900 Northern Basement barn, a milk house, and a c. 1950 cow shed. In this context, the noncontributing Harvestore silo does not detract from Integrity of Design, because its scale and siting relate to the historical fabric. On the other hand, a farmstead may have a Pennsylvania Barn surrounded by a 1990s livestock loafing shed twice its size, and a 1980s manure lagoon. If modern livestock-handling facilities dwarf the historic building in scale, or if they are sited so close as to overshadow the historic fabric, then Integrity of Design is doubtful. However, it should be noted that in many cases, modern livestock handling facilities are sited away from older buildings, and in these cases (especially if the modern facilities are all concentrated in one place), Integrity of Design may still be present. Scale and location should be considered in determining Integrity of Design in cases like these.

At the farm scale, Integrity of Design is present only when a significant proportion of acreage remains. It is desirable, though not an absolute requirement, if continuity of use is present – ie crop production, pasture, livestock raising, and so on. In addition, a farm's Integrity of Design depends on the extent to which it retains traces of field divisions, fields (such as small fields or historic strip cropping) property boundaries, treelines, hedgerows, fencing, woodlots, circulation paths, and the like. If continuity of use is present, it is unlikely that all historic landscape features will have survived intact, because of the needs of modern farming; but at least some traces should be evident. If large-scale monocropping resulted in the removal of field boundaries, woodlots, treelines, fencing, and circulation paths in the 1990s, Integrity of Design may have been lost.

A historic agricultural district retains Integrity of Design when its constituent farms have an acceptable level of integrity collectively. Since contributing resources are counted

individually (so, each resource, even within a farmstead, would be counted), this must be determined with respect to whether and how the sum total of contributing resources creates a coherent whole. For example, there may be cases in which one or two farms are included because they have one outstanding building, even though its other resources are not exceptional. But overall, there should be a consistent presence of contributing resources on farms that make up the district. Also, elements of the historic transportation routes, waterways, etc. that connected the farms in the district should remain.

A historic agricultural district's integrity of design depends very much upon landscape features. Intact historic field patterns, treelines, ponds, disposition of pasture and woodlot, etc. should count heavily in an assessment of integrity in a district. Consider also that since farm fields, waterways, and woodlots are such crucial components of an agricultural district, their integrity should weigh equally with architectural integrity of buildings. So for example, a district might contain buildings where there has been some impairment to integrity, but if many landscape features are clearly intact, the overall district's integrity would still meet National Register standards. Another example would be a situation where small patches of modern development are interspersed within the boundaries of a historic agricultural district. In a case like this, the total number of noncontributing resources might be relatively high, but overall integrity would still meet National Register standards because the land area occupied by the intrusions would be minimal compared with the total area taken up by the district.

Setting:
Integrity of Setting with respect to a farmstead has two dimensions. Integrity of Setting can be present with respect to the farmstead's interior organization, for example if it retains its original relationships among buildings, natural features, and landscape elements that make up the farmstead. Integrity of Setting also applies to the farmstead's surroundings, so at least part of a farmstead (one or two sides at least) should border on open space, woodland, or agricultural land. If a literal spatial buffer is not present, Integrity of Setting may still be present if the farmstead retains visual buffers. For example, what if a farmstead lacks much original acreage, and abuts on a modern subdivision? It may retain Integrity of Setting if it is visually set off from the subdivision through such means as topographical features. However, if not, the farmstead probably does not retain Integrity of Setting.

Integrity of Setting with respect to a farm normally involves continuity of use. There may, however, be cases where continued farming with modern methods has all but wiped

out historic farm landscape elements such as patterns of crop rotation and field organization, hedgerows, treelines, shade trees, rock piles, fencelines, fences, and the like. In extreme instances, Integrity of Setting may be compromised by continuous farming. An example would be if 1930s aerial photographs showed all of these features, and a present-day site visit showed that a large monocropped field had supplanted these earlier farm landscape features. Integrity of Setting for a farm is also present if a farm abuts open land, woodland, and/or historic transportation corridors.
Integrity of Setting with respect to a historic agricultural district can be reckoned with respect to internal relationships among buildings, landscapes, natural features, and transportation corridors. So for example a district along a historic canal corridor should include canal features like locks, masonry lining, and the like; a district in a sharecropping region should include a number of farms that were historically and thus architecturally interrelated. A historic agricultural district possesses Integrity of Setting if its external surroundings continue to reflect general historic patterns and use.

Materials:
Integrity of Materials refers to the presence of "key exterior materials from the period of significance"[101] Integrity of Materials is well covered for houses elsewhere. For the other buildings of the farmstead, barns and outbuildings often are constructed, or reconstructed, of recycled materials, and integrity of materials is present as long as the recycling can be interpreted as contributing to significance for agriculture. On a farm property, some materials may be organic – such as a fenceline made of rubble, trees, and spontaneous growth. (However, the original vegetative material of crops, or the original fence, does not need to be present.). A historic agricultural district retains Integrity of Materials if its constituent properties possess Integrity of Materials collectively. As well, in districts Integrity of Materials can refer to the presence of key materials across property boundaries, or along shared property boundaries. Remnants of irrigation systems would be an example.

Workmanship:
Integrity of Workmanship refers to the retention of traditional or historic craftsmanship. These include such familiar skills as wood joinery (log, plank, post and beam framing), masonry (stone and brick), but also skills more closely related to agriculture such as fence building, contour plowing, windbreak planting, crop rotation, garden construction, farm pond construction, or farm planning. Workmanship can also refer to the skilled use of technologies that are not necessarily hand-tool derived. For example, the Shawver Truss, a barn framing system popular c. 1900, combined artisan skill with industrial

technologies. Evidence of recycling or reuse may contribute, as long as it is part of a pattern or historic trend. Integrity of Workmanship applies mainly to the farmstead buildings and landscape features. However, collectively Workmanship could conceivably have an impact on the overall appearance of a historic agricultural district in some instances, for example, if in a district a group of farms collectively exhibits particularly adroit arrangement of contour strips.

Feeling:

Integrity of Feeling refers to the "Ability to evoke the aesthetic sense of a particular time and place."[102] This is an intangible quality, which depends to some extent on integrity of design, setting, materials, and workmanship. If the farmstead, farm, historic agricultural district, or the general area continues under agricultural use, integrity of feeling is enhanced. Integrity of Feeling also is present if a property retains a sense of scale characteristic for its period; the interrelationship of the human and natural that is so important in agriculture; if there are many vantage points from which agricultural activity or evidence of agricultural activity are vividly apparent.

Association:

Integrity of Association refers to the "direct link between the property and the… events and persons that shaped it."[103] For significance with respect to agriculture, a farmstead or farm must have contributed to a working farm for its period of significance. The presence of historic landscape features related to agriculture is a key aspect of Integrity of Association. Close attention should be paid to identifying intact or remnant features. For example, are crop field size, scale, shape, and patterns are retained from the pre-contour stripping era? Are there remnants of early woodlots or sugar bushes? Is there evidence of land use such as pasturing? A majority of farms in a historic agricultural district should have a continued association with agriculture for the period of significance. To ensure Integrity of Association, the inevitable "intrusions" should be kept to a minimum. However, a historic agricultural district could conceivably have a high percentage of noncontributing properties relative to an urban district. For example, a concentrated 25-acre subdivision with 50 noncontributing houses might be contained within a 1,000-acre historic agricultural district with fifty contributing farms. Even though technically, the subdivision elevates the percentage of noncontributing properties, it does not reduce Integrity of Association, because it is such a small percentage relative to the continuously farmed (and contributing) acreage in the remainder of the district land area.

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[9] Lemon, *Best Poor Man's Country*, 95; Sharon Salinger, *'To Serve Well and Faithfully': Labor and Indentured Servants in Pennsylvania, 1682-1800* (New York, 1987); Farley Grubb, "Immigrant Servant Labor: Their Occupational and Geographic Distribution in the Late Eighteenth Century Mid Atlantic Economy," *Social Science History* 9 (1985): 249-276; Gary Nash and Jean Soderlund, *Freedom by Degrees: Emancipation in Pennsylvania and its Aftermath* (New York, 1991); Lucy Simler, "Tenancy in Colonial Pennsylvania: the Case of Chester County," *William and Mary Quarterly* 3d ser., 43, No. 4 (October, 1986): 542-569.

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[11] "Threshing with the Flail," in William J. Buck, *Local Sketches and Legends Pertaining to Bucks and Montgomery Counties, Pennsylvania* (Printed for the author, 1887), 234-239. See also Alfred Sharpless, "Ye Olden Times in Chester County," *Proceedings of the Chester County Historical Society* 9th mo. 15th, 1898, 10-14.

[12] Robert Bucher, "Meadow Irrigation in Pennsylvania," *Pennsylvania Folklife* 11 (fall 1960): 24-33.

[13] Elinor F. Oakes, "A Ticklish Business: Dairying in New England and Pennsylvania, 1750-1812." *Pennsylvania History* 1980 47(3): 195-212; Jensen, *Loosening the Bonds*; Kennedy, "Cash for his Turnups," 603-4; Lucy Simler, ""She Came to Work": The Female Labor Force in Chester County, 1750-1820," *Early American Studies, An Interdisciplinary Journal* Vol. 5 Issue 2, (Fall 2007): 427-453. This was a posthumous publication based on work done in the 1980s. See also William Buck, *History of Bucks County*, 1855, 56.

[14] "Craftsmen of Bucks County 1750-1800," *The Historian,* Bucks County Historical Society, 5:8 (Autumn 1969): 66; Ball, "Process of Settlement," 94.

[15] William J. Buck, *Local Sketches and Legends Pertaining to Bucks and Montgomery Counties, Pennsylvania.* Printed for the author, 1887, page 54-56.

[16] "Agriculture of Chester County, Pennsylvania." *The Cultivator* August 1861, 233 (American Periodicals Series online); For another colorful description of the shift, see United States Patent Office Annual Report, Agriculture, 1852, 237-240. See also Pennsylvania State Agricultural Society Transactions, 1853; Joseph S Walton and G.W. Moore, *The History, Geography and Government of Chester and Delaware Counties, for Schools and General Readers*. West Chester, PA, 1893), 45; 100th Anniversary, Chester County's Daily Local News, 1872-1972: Centennial Editions Centennial Edition Volume 2, November 14, 1972 6-9; Llwewllyn A. Moorhouse, *The Management of the Farm.* (London, 1925), 40.

[17] "Agriculture of Chester County, Pennsylvania." *The Cultivator* August 1861, 233 (American Periodicals Series online); Mordecai Larkin, "Pennsylvania Farming," United States Patent Office Annual Report, Agriculture, 1849, 365, describes typical Chester County rotations and how they improved on past practices. See also N. Linton, letter in United States Patent Office Annual Report, Agriculture, 1852, 237-240.

[18] Steven Stoll, *Larding the Lean Earth, Soil and Society in Nineteenth-Century America* (New York, 2002), 82, notes the general trend in the Northern states.

[19] Garner, *Biographical and Portrait Cyclopedia*, 46, 55.

[20] Cheese, on the other hand, was a minor product. Some local histories claim a leadership role for southeastern Pennsylvania, but this is incorrect.
[21] "Farming in Pennsylvania," *The Cultivator* January 1852, 48 (American Periodicals Series Online).
[22] "Agricultural Condition of Pennsylvania," *Farmer's Register* June 30, 1842, 273. (American Periodical Series online); "Interesting Travels in America," *The Port-Folio* October 9, 1802, 314 (American Periodicals Series online); "Grazing in Eastern Pennsylvania," *The Cultivator* February 1846, 63 (American Periodicals Series online); United States Patent Office Annual Reports, Agriculture, 1844, page 337.
N. Linton, letter, United States Patent Office Annual Report, Agriculture, 1853, 17, reported that Chester County feeder cattle cattle came from Ohio, Virginia, and Illinois. See also H. S., "Raising Wheat and Cattle," *The Farmers Cabinet and American Herd Book*, December 15, 1845, 155 (American Periodicals Series online), a description of the Chester County fattening system. Isaac Wayne van Leer, "Lime," *The Farmers Cabinet and American Herd Book*, January 15, 1843, 195 (American Periodicals Series online) further describes grass fed cattle production in Chester County.
[23] See also Albert Hoopes, letter, United States Patent Office Annual Report, Agriculture, 1855, 63.
[24] Solon Robinson, *Facts for Farmers* (New York, 1867), 21; Joseph Harris, *Harris on the Pig* (New York, 1870), 105; A. J. Legg, "The Chester White Hog," *Southern Planter* April 1903, 259 (American Periodicals Series online).
[25] Bennett Nolan, ed. *Southeastern Pennsylvania: A History of the Counties of Berks, Bucks, Chester, Delaware, Montgomery, Philadelphia and Schuylkill* (Philadelphia, 1943), **V**olume I, 440; Garner, Biographical and Portrait Cyclopedia, 92, mentions local prominent nurseries. See also "the Agriculture of Chester County, Pennsylvania – Conclusion," *The Cultivator* September 1861, 265 (American Periodicals Series online).
[26] Apple varieties grown in Chester County are discussed in Thomas P. James's letter, United States Patent Office Annual Report, Agriculture, 1856, 354-9. See also "Butchering Fifty Years Ago," in William J. Buck, *Local Sketches and Legends Pertaining to Bucks and Montgomery Counties, Pennsylvania* (np, 1887), 87-93. For an extensive and detailed description of family subsistence work on a Bucks County farm, see Mary Snyder Taylor, *Annals of a Bucks County family of old Taylorsville, Pennsylvania* (1940).
[27] Sally McMurry, *Transforming Rural Life* (Baltimore, MD, 1995), 197-200.
[28] W. J. Spillman, "Factors Determining the Size of the Farm," in Edwin G. Nourse, *Agricultural Economics* (Chicago, 1916), 337.
[29] "The Agriculture of Chester County, Pennsylvania -- IV," *The Cultivator* August 1861, 254 (American Periodicals Series online)
[30]Jensen, *Loosening the Bonds,* 98-113, has an excellent discussion of butter making in the late 18th and early 19th century.
[31] "The Agriculture of Chester County, Pennsylvania -- IV," *The Cultivator* August 1861, 254 (American Periodicals Series online)
[32] 100th Anniversary, Chester County's Daily Local News, 1872-1972: Centennial Edition Volume 2, November 14, 1972, 132. Robert Ardrey, *American Agricultural Implements* (1894), 78, discusses Jeremiah Bailey's grass cutting mower.
[33] William J. Buck, *Local Sketches and Legends Pertaining to Bucks and Montgomery Counties, Pennsylvania,* (Printed for the author, 1887), 235, mentions horse power

threshing machines in Bucks and says they were not in common use until about 1850. *Report of the Transactions of the Pennsylvania State Agricultural Society*, 1880, 229; *Report of the Transactions of the Pennsylvania State Agricultural Society*, 1857-8, 443; *Boyd's Business Directory...* (Philadelphia, 1860), 82-3; United States Patent Office Annual Report, Agriculture, 1849, 365.

[34] Some local historians use the term "double threshing floor barn" to denote Pennsylvania barns with added threshing floors. Here, the Pennsylvania Barn with extra threshing floors is not considered a separate type.

[35] Levi Huber, "Two Hundred Years of Farming in Lancaster County," *Journal of the Lancaster County Historical Society* 34(1930), 99. See also *New England Farmer* September 25, 1829, 80 (American Periodicals Series online)

[36] For a contemporary description, see "The Agriculture of Chester County, Pennsylvania – III," *The Cultivator* August 1861, 252 (American Periodicals Series online). For a well illustrated HABS example, see the 1810 stone barn in Newtown Township, Bucks County, and the stone barn on Stoopville Road in Bucks County.

[37] Jeffrey L. Marshall and Willis S. Rivinus, *Barns of Bucks County* (2007), 58-9.

[38] Samuel Hotchkin, *The York Road, Old and New* (Philadelphia, 1892).

[39] "The Agriculture of Chester County, Pennsylvania – III," T*he Cultivator* August 1861, 252 (American Periodicals Series online)

[40]"The Agriculture of Chester County, Pennsylvania – IV," T*he Cultivator* August 1861, 254 (American Periodicals Series online)

[41]U. S. Census of Agriculture, 1880, Upper Merion Township, Page 2 line 3. Available online through the Pennsylvania Agricultural History Project website.

[42] William Woys Weaver, *Sauerkraut Yankees* (Mechanicsburg, PA, 20020, 116, 150.

[43] *Lancaster Farmer* April 1884: 63. Lancaster County Historical Society digitizing project.

[44] Lime kilns: Jean Barth Toll and Michael J. Schwager, eds. *Montgomery County: The Second Hundred Years*. 2 vols. (Norristown, PA,1983),14; and many atlases. Bennett Nolan, ed. *Southeastern Pennsylvania,* 678, 184 mentions early lime burning in Montgomery County.

[45] "The Agriculture of Chester County, Pennsylvania – I," *the Cultivator* August 1861, 233 (American Periodicals Series online), describes fences.

[46]George Fiske Johnson, "Agriculture in Pennsylvania: A Study of Trends, County and State, Since 1840." Pennsylvania Department of Agriculture General Bulletin # 484, November 1, 1929.

[47] Henry F. James, *The Agricultural Industry of Southeastern Pennsylvania*: *A Study in Economic Geography.* Phd thesis, University of Pennsylvania, 1928

[48] Emil Rauchenstein and F. P. Weaver, "Types of Farming in Pennsylvania," Pennsylvania Agricultural Experiment Station Bulletin # 305, April 1934, 41. The agricultural extension agent in Bucks County reported in 1937 that "the buying of farms by city folks continued to increase this year."

[49] Theodore W. Bean, ed., *History of Montgomery County, Pennsylvania* (Philadelphia, 1884), 118. Other observers explained the changes in more specific if duller language. In 1878, a Montgomery County correspondent of the state agricultural society reported that "raising hay and grain, making butter and milk for the Philadelphia market, is their chief avocation or livelihood... hogs... are only raised for domestic use..." In 1882, another report from Montgomery added that "Many of the farms are mainly used for

dairying. Some of the farmers retail their milk from their wagons in Philadelphia... others sell to the retailers at the farm, or send by railroad to the city. Others make butter, and sell it in Philadelphia. (*Agriculture of Pennsylvania* 1878, 220; *Agriculture of Pennsylvania* 1882, 372.)

[50] John I. Carter, "Creameries, Co-Operative and Private," *Agriculture of Pennsylvania*, 1884, 133. H. E. Alvord, "cheese, Butter, and Condensed Milk, Factory Product," US Census of Manufactures, 1900: Special Report on Selected Industries, page 435, notes that in 1900 Pennsylvania had 603 establishments where butter only was produced. This number had doubled since 1890. Ezra Michiner, "Breeding and Raising Calves for the Dairy," *Transactions of the Pennsylvania State Agricultural Society*, 1887, 232, says quantity is being stressed. Eastburn Reeder, "The Elements of Success and Failure in Dairying," *Transactions of the Pennsylvania State Agricultural Society*, 1888, 136-148, narrates the shift to creameries in Bucks County between 1880 and 1885. See also Eastburn Reeder, "Report of the Committee on Dairy Products," Annual Report of the State Board of Agriculture, 1883, 22-26.

[51] See Melanie Dupuis, *Nature's Perfect Food: How Milk became America's Drink* (New York, 2002) for an excellent treatment of fluid milk consumption and its relationship to farming.

[52] George F. Johnson, "Agriculture in Pennsylvania: A Study of Trends, County and State, Since 1840," Pennsylvania Department of Agriculture General Bulletin # 484, November 1, 1929, 27.

[53] Annual Report, Pennsylvania Department of Agriculture, 1895, extensive discussion of dairy feeding. Frank Swain, "Passing Events Paper No. 2," (1921) in B.F. Fackenthal, Jr, ed. *A Collection of Papers Read Before the Bucks County Historical Society*. (Easton, PA, nd), 413-414, says the transition occurred in Bucks between 1878 and 1883. Nolan, ed. *Southeastern Pennsylvania,* 440, also puts the transition to the 1880s. Also see E. Brinton, "The Creamery System of Eastern Pennsylvania," Pennsylvania State Board of Agriculture Annual Report 1887, 237-242; *Agriculture of Pennsylvania*, 1883, 30-31.

[54] *Agriculture of Pennsylvania,* 1883, 30-31, notes that southeastern Pennsylvania dairy farmers favored Jersey, Guernsey, "short horn grades," and native cattle. The Montgomery County Agricultural Extension report for 1923, says farmers aren't interested in high grade cattle.

Local interest in purebreds is well documented. Ellwood Roberts, ed**.,** *Biographical annals of Montgomery County, Pennsylvania* (2 vols. New York, 1904), volume 1, 242, mentions a Henry K. Boyer who has some thoroughbred Guernseys. The Montgomery County Agricultural Extension agent report for 1929, boasts of performance by the local Holstein Bull Association. By 1945, the Montgomery County Agricultural Extension agent is helping farmers with Guernsey and Holstein breeding. The Chester County Agricultural Extension agent report for 1921 reported sponsoring Holstein and Ayrshire sales and in 1914 mentioned an independent Holstein breeders' association in the county.

[55] Billings, G. A. "Dairy Farming in Southeastern Pennsylvania," Pennsylvania Agricultural Experiment Station Bulletin # 159 (September, 1919), 16.

[56]*United States Census of Agriculture, 1925. Reports for States, with Statistics for Counties and a Summary for the United States.* Pennsylvania data, pages 271-327. See also *Agriculture of Pennsylvania* 1882, 372.

[57]Emil Rauchenstein and F. P. Weaver, "Types of Farming in Pennsylvania," Pennsylvania Agricultural Experiment Station Bulletin # 305, April 1934, 37;

Transactions of the Pennsylvania State Agricultural Society, 1877, 388; Montgomery County Agricultural Extension agent report, 1920, 1921, 1932; James, *The Agricultural Industry of Southeastern Pennsylvania.* Montgomery County Soil Survey 1905 page 33

[58]G. A. Billings, "Dairy Farming in Southeastern Pennsylvania," Pennsylvania Agricultural Experiment Station Bulletin # 159 (September, 1919), 33; *United States Census of Agriculture, 1925*; Wilder et al, *Soil Survey of Montgomery County*, 132; Roberts, *Biographical Annals of Montgomery County*, page 156; Joyce Clemmer Munro, *Willing Inhabitants: A Short Account of Life in Franconia Township, Montgomery County, Pennsylvania* (Franconia, PA, 1981), 55; Chester County Agricultural Extension Agent Reports, 1926, 1919-1930.

[59] Rauchenstein and Weaver, "Types of Farming," 36; Montgomery County Agricultural Extension agent report, 1936; Billings, "Dairy Farming in Southeastern Pennsylvania." On pasture, the Chester County agricultural extension agent reports for the period give a general picture of the importance of pasture.

[60]*Agriculture of Pennsylvania* 1882, 372; 1895, 394; 1896 part 2, 262; 1895, 355-401.

[61] Bucks County Agricultural Extension report, 1918; Merrill Zimmerman Family Papers, Penn State Special Collections, HCLA, Folder 10.

[62] S. Hersey, *Business Directory and Gazetteer of Bucks County, PA* (Wilmington, Delaware, 1871), 62, 111; *Farm Journal Farm and Business Directory of Bucks County, Pennsylvania* (Philadelphia, 1914), 95; Burke, R.T.A. ed. *Soil Survey, Bucks County Pennsylvania.* USDA (In cooperation with Penn State College – School of Agriculture and Experiment Station), Oct 1946. (Series 1936, No. 25), 11, 78, 79, 2; Bucks County Agricultural Extension agent reports, 1937, 1938.

[63]The nursery and truck farming businesses sometimes overlapped. In 1892, Edwin Satterthwait had a 90 acre nursery near Jenkintown in Montgomery County; "He conducts nursery, fruit and trucking business on a large scale here..."(S. F. Hotchkin, *The York Road, Old and New* , 192).

[64]Roberts, Biographical Annals of Montgomery County,160, 174; Wilder et al, *Soil Survey of Montgomery County,* 133.

[65] Toll and Schwager, eds. *Montgomery County: The Second Hundred Years*, 182, 326, 711. It is interesting to note that some of these products (butter, cheese, "pork products," potato chips) must have been processed on the farm.

[66] Toll and Schwager, eds. *Montgomery County: The Second Hundred Years,* 14; Roberts, *Biographical Annals of Montgomery County*, 273; Toll and Schwager, eds. *Montgomery County: The Second Hundred Years* , 245; Wilder et al, *Soil Survey of Chester County, Pennsylvania,* 173; *Annual Report of the Pennsylvania Department of Agriculture*, 1910, 104; James, *The Agricultural Industry of Southeastern Pennsylvania*, 133-4; Nolan, ed. *Southeastern Pennsylvania*.

[67] James, *The Agricultural Industry of Southeastern Pennsylvania*; 100th Anniversary, Chester County's Daily Local News, 1872-1972: Centennial Edition Volume 2, November 14, 1972; Chester County Agricultural Extension agent report, 1927.

[68] Toll and Schwager, eds. *Montgomery County: The Second Hundred Years,* 228, 1278; Montgomery County Agricultural Extension agent report, 1931.

[69] Wilder et al, *Soil Survey of Montgomery County* , 132; Montgomery County Agricultural Extension agent report , 1915; Toll and Schwager, eds. *Montgomery County: The Second Hundred Years,* 582, 1274.

[70] *Farm Journal Farm and Business Directory of Bucks County, Pennsylvania* 1914 , 17; Roberts, *Biographical Annals of Montgomery County*, 141.
[71] Bucks County Home Economics Extension agent report, 1936; Toll and Schwager, eds. *Montgomery County: The Second Hundred Years,* 193.
[72] Francis Blaise, Jr., *Heebner and Sons Pioneers of Farm Machinery in America 1840-1926* (Hatfield, Pennsylvania, 1984), 44;
Wilder et al, *Soil Survey of Chester County, Pennsylvania*, 168-9; *Farm Journal Farm and Business Directory of Bucks County, Pennsylvania* 1914, 34, 177; Roberts, *Biographical Annals of Montgomery County,* 242; Montgomery County Agricultural Extension agent reports, 1918-19; mention tractor demos and sales. Toll and Schwager, eds. *Montgomery County: The Second Hundred Years,* 690; , says the tractor came in after WWI, but they worked side by side with horses/mules "into the fifties or later." 100th Anniversary, Chester County's Daily Local News, 1872-1972: Centennial Edition Volume 2, November 14, 1972
[73] G. A. Billings, "Dairy Farming in Southeastern Pennsylvania," Pennsylvania Agricultural Experiment Station Bulletin # 159 (September, 1919).
[74] The New York City "Dairy Report Card" is reproduced in I. F. Hall, "An Economic Study of Farm Buildings in New York," Cornell University Agricultural Experiment Station Bulletin #478, 1929, pp. 29-34.
[75] Stevenson W. Fletcher, *Pennsylvania Agriculture and Country Life.* Two volumes. (Harrisburg, 1950–1955), Volume 2, 217-219.
[76] G. A. Billings, "Dairy Farming in Southeastern Pennsylvania," Pennsylvania Agricultural Experiment Station Bulletin # 159 (September, 1919); L. W. Morley, "Building the Farm Dairy House," Pennsylvania State College Agricultural Extension Circular # 107, December 1925.
[77] L. W. Morley, "Building the Farm Dairy House."
[78] S. I. Bechdel, "Suggestions for Selecting and Building a Silo." Pennsylvania State College Agricultural Extension Circular # 72, February 1918.
[79] I.F. Hall, "An Economic Study…" 60.
[80] Creameries on farms are mentioned in *Agriculture of Pennsylvania,* 1896, 688; 1884, 132-7; and Roberts, *Biographical Annals of Montgomery County*, 161, 242.
[81] See a description of Nathan Hellings's ice house near Bristol in Bucks County, *Transactions of the Pennsylvania State Agricultural Society* , 1876, 54.
[82] Chester County Agricultural Extension agent report, 1940; Montgomery County Agricultural Extension agent report, 1938; P. Alston Waring and Walter Magnes Teller, *Roots and Earth: the Small Farmer Looks Ahead,* (New York, 1943), chapter VII.
[83] Toll and Schwager, eds. *Montgomery County: The Second Hundred Years*, 449. For planning reports, see for example the map of "built-up areas" in the Bucks County Planning Commission's Annual Report for 1955, page 9. The Bucks County Agricultural Extension agent report for 1953-4 said "many acres have come out of agricultural production."
[84] Bucks County Agricultural Extension agent report, 1954; Chester County Agricultural Extension agent report, 1955.
[85] Montgomery County Home Economics Extension agent report, 1955 and 1958. The Bucks County Agricultural Extension agent reports for 1951 and 1954 also mention development.
[86] Chester County Agricultural Extension agent report, 1954; US Census of agriculture

[87] Basil Glasford Coley, "Structure and Performance of the Pennsylvania Fruit and Vegetable Processing Industry," MS Thesis, Agricultural Economics, Penn State University, 1962,66; *Montgomery County: A Cultural Picture* (Commissioners of Montgomery County,1959), 5.
[88]*Soil Survey, Bucks County Pennsylvania* , 1946, mentions immigrant labor from nearby truck farms, but also competition for labor with alternative employment. Chester County Agricultural Extension agent reports, 1941-47 mention immigrants, high schoolers, women, POWs. The King Farm strike is documented at the FSA/OWI website.
[89] Bucks County Agricultural Extension agent report, 1944
[90] Toll and Schwager, eds. *Montgomery County: The Second Hundred Years,* 691.
[91] *Farm Journal*, September 1957, 68D.
[92] "Stran-Master" advertisement, *Farm Journal*, May 1959, 66C.
[93] Douglas Fir Plywood Association advertisement, *Farm Journal*, March 1960, np.
[94] Note that while the *buildings* represent an identifiable cultural tradition, the *owners or occupants* may not have necessarily share the same cultural heritage over the entire history of the property. People borrowed, reused, and adapted. For example, an "English" farmer in southeastern Pennsylvania may have built a Sweitzer barn because it best suited the diversified farming of the region.
[95] In some places, only some farmers owned machinery, and it was shared around, so some farms would have lots of machinery buildings and others would have few. This was not true in the regions researched for this context.
[96] NR Bulletin *How to Apply the National Register Criteria for Evaluation*, p 17.
[97] *Historic Farming Resources of Lancaster County*, MPDF, 1994.
[98] In addition see the discussion of the regional architecture of farm buildings in the MPDFs *Farms in Berks County* (1992) and *Historic Farming Resources of Lancaster County* (1994).
[99] "Corridor Improvement Study, Reconnaissance Survey and Historic Contexts Report.. SR 0030, Section S01, East Lampeter, Leacock, Strasburg, Paradise, Salisbury, and Sadsbury Townships, Lancaster County., Pennsylvania." 2 Volumes. Prepared by A.D. Marble Company; 2004, Volume I, page 175. The SR 30 study involved an exhaustive survey of all resources in the multi-township area of Lancaster County and preparation of contexts for agriculture, industry, and several other themes. For agriculture the study identified character-defining features for both English and Plain Sect farms.
[100] "Tilling the Earth: Georgia's Historic Agricultural Heritage, A Context." Prepared for the Georgia Department of Natural Resources, Historic Preservation Division, by Denise P. Messick, J. W. Joseph, and Natalie P. Adams, New South Associates, Inc. 2001. http://hpd.dnr.state.ga.us/assets/documents/tilling_the_earth.pdf
[101] Ibid.
[102] Ibid.
[103] Ibid.