Agricultural Resources of Pennsylvania, c 1700-1960

Lehigh County Potatoes Historic Agricultural Region, 1850-1960

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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.

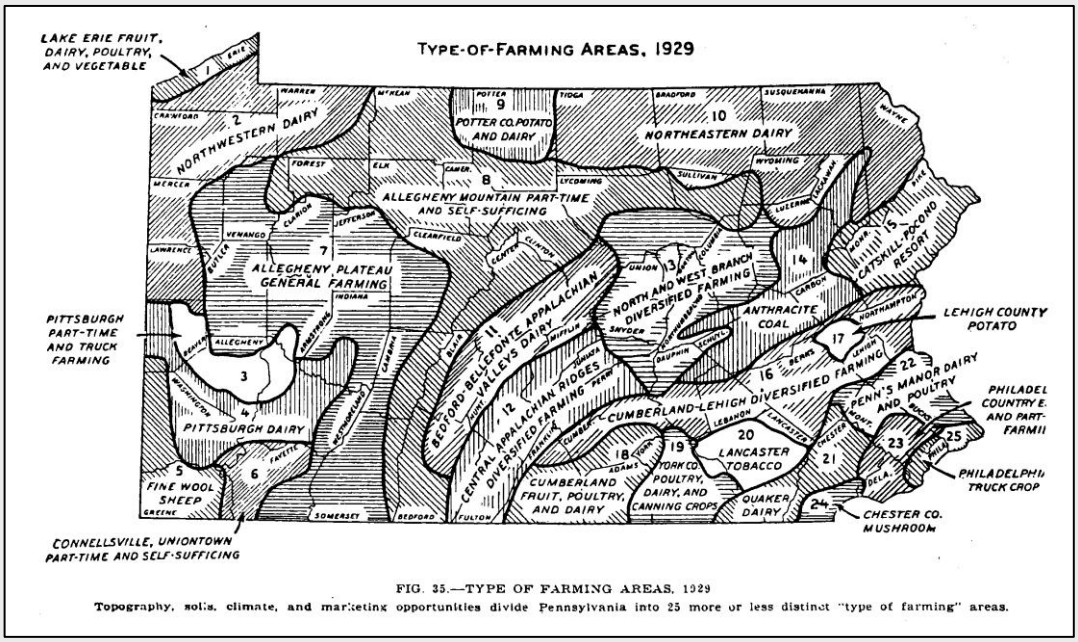
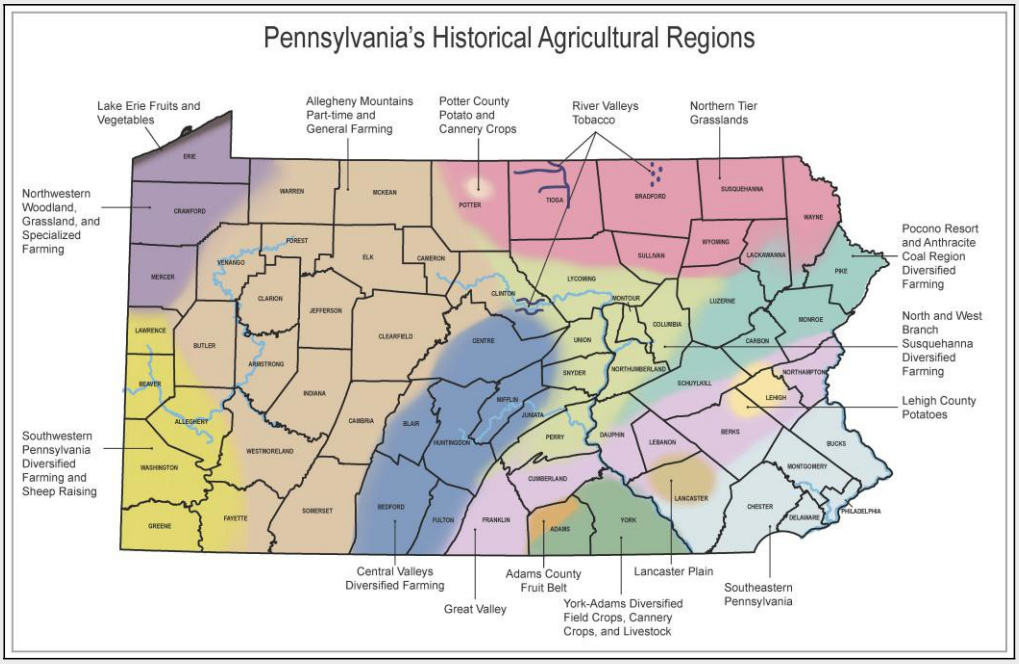


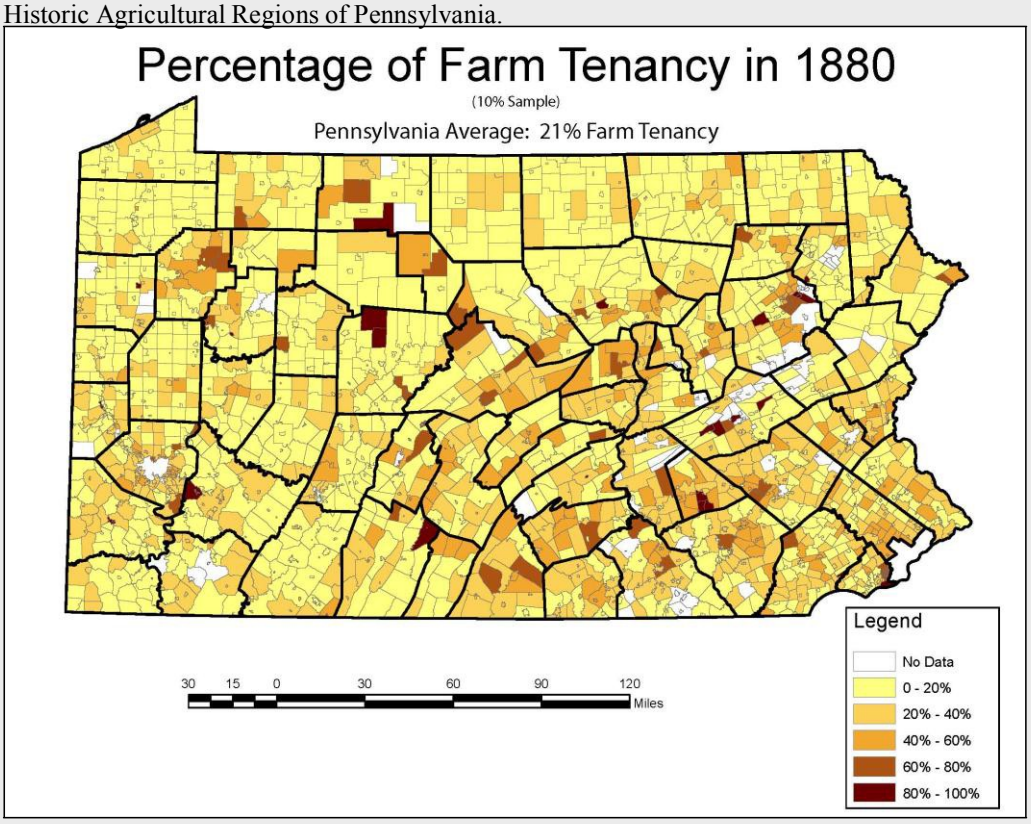
FIG. 35.—TYPE OF FARMING AREAS, 1929

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.

Location

The Lehigh County Potato Historic Agricultural Region consists of several townships in northwestern Lehigh County, plus Albany Township in northeastern Berks County. The Lehigh County townships are Heidelberg, Lowhill, Lynn, North Whitehall, and Weisenberg. They extend from the southern edge of the Blue Mountain on the north, southward approximately to where the Great Valley becomes less hilly and the conurbation of Allentown:Bethlehem:Easton lies. Albany Township is just west of Lynn Township; it is bordered within a "V" formed where the Blue Mountain bends around to the east.

Lehigh County Potato Region. The heavy slanted hatching roughly in the center of the image is northwestern Lehigh County. Albany Township in Berks County is immediately across the county line to the southwest. It is not hatched because potatoes were its second most prominent type of farming. (Emil Rauchenstein and F. P. Weaver, "Types of Farming in Pennsylvania," Pennsylvania State College Agricultural Experiment Station Bulletin # 305, 1934, page 46.)

Climate, Soils, and Topography

Lehigh County falls within the climate region designated as "southeast" by Penn State geographer Brent Yarnal. Average temperatures are around 32° F in January to 77° F in July. The region has relatively hot summers and warmer winters than elsewhere in the state. Annual precipitation averages about 40 – 45 inches. The frost-free season is about 150 days.[1]

Soils in this area tend to belong to the Trexler association. According to the 1959 county soil survey, these are moderately deep to deep, and well drained. The parent rock is mostly shale.[2]

The region is hilly, with moderate to steep slopes. A number of creeks drain the area. The main ones are the Jordan, Ontelaunee, Mill, Kistler, Switzer, and Pine Creeks, and Stony Run. They drain to the Lehigh River eastward, and to the Schuylkill River southward.

Historical Farming System

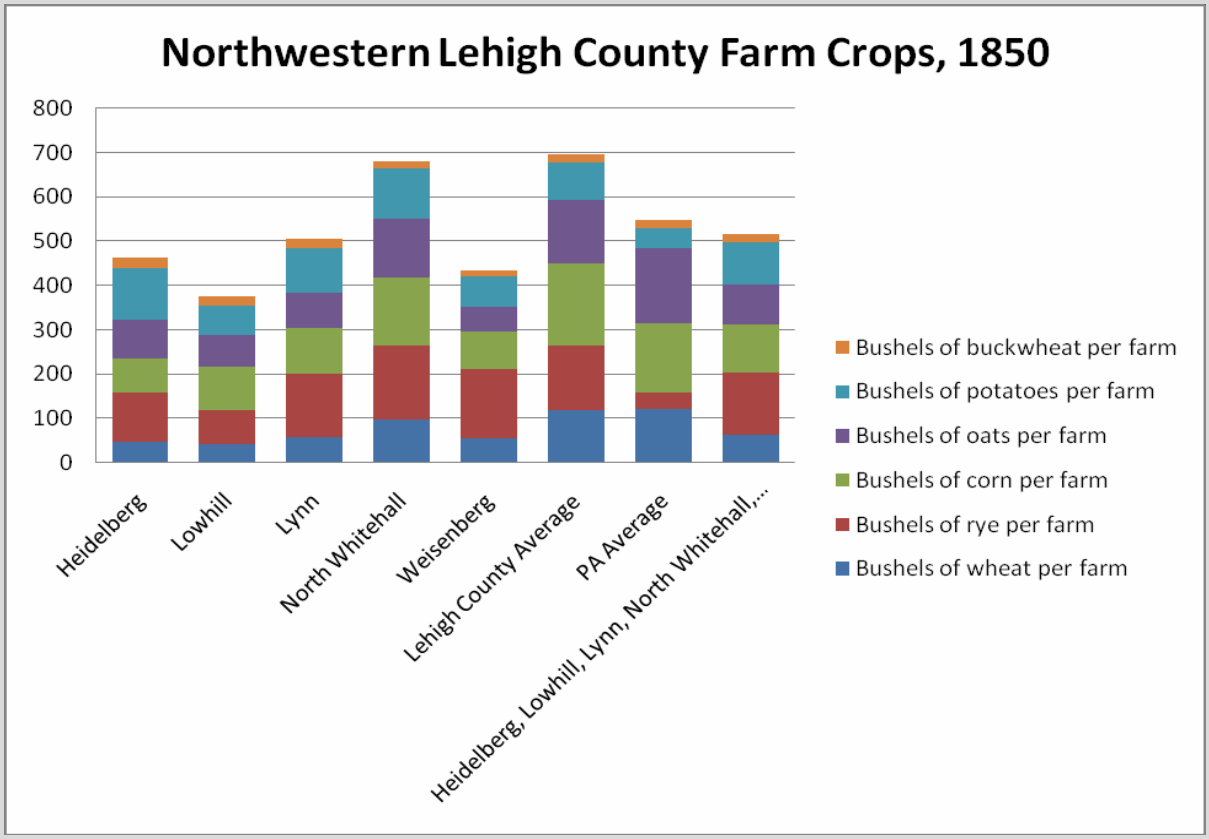
1850-1910: Potatoes as One Component of a Diversified Farming System

Products, 1850-1910

Background: By the mid-nineteenth century, farms in northwestern Lehigh County averaged about ninety acres – among the smallest in the state, and well below the state average of 117 acres. Even so, farms in the region had more improved acres than statewide – 70 acres, as opposed to 55. Lehigh County's percentage of improved acres was thus high – nearly 80 percent, as opposed to 47 percent statewide. By 1880, overall land use patterns in the region had changed little; the percentage of tilled land had edged up to about 83 percent, while woodland took up only 12 percent of farm land and pasture even less. The average Pennsylvania farm now had more improved acres than a typical Lehigh County farm, but still a smaller percentage of total acreage improved. Overall, the biggest change by 1880 was that Lehigh County farm size had decreased to just 53 acres, fourth smallest in

the state. In just one generation, Lehigh County farm size shrank twice as fast as elsewhere in Pennsylvania. Farm families here were rapidly dividing up their farms and tinkering with their farming systems to make them work on smaller acreages. Though the farm values were around state averages, falling populations in Heidelberg and Lowhill Townships suggest that even subdividing farms couldn't prevent outmigration.[3]

There were several essential characteristics of Lehigh County farming during this period. Northwestern Lehigh County farm families raised the usual field crops – corn, oats, wheat, rye, potatoes, buckwheat, and hay. A first point to make is that on these small farms, total crop production was comparable to that on the average-sized Pennsylvania farm of 117 acres. Second, the particular crop and product mix was distinctive: rye and potatoes were proportionally more important than were the other crops, while wheat and corn were less important than elsewhere. Mid-century Lehigh County farms produced about 150 bushels of rye (statewide, the average farm reported only 38). By the late nineteenth century, rye production was diminishing everywhere, but Lehigh County still exceeded statewide averages. Meanwhile, potato raising became more popular everywhere, but moreso in Lehigh County. In both 1850 and 1880, northwestern Lehigh County farms significantly exceeded the rest of the state in per-farm potato production. While the average Pennsylvania farm produced 47 bushels in 1850, for example, Lynn Township farms averaged 100 bushels. By 1880, even though farm size had dropped significantly, potato production was up: Lynn Township's farms now averaged 185 bushels of potatoes, and Heidelberg's nearly 200, still significantly above state averages. These numbers are small compared with later achievements, but for the period they stand out. Moreover, a few individuals were already experimenting with significantly larger acreages.[4]



Lehigh County Potatoes region farm crops, 1850.

This emphasis reflected distinctive circumstances. One was the region's ethnic makeup. Lehigh County was (and remains) one of the most "German" in Pennsylvania. One historian estimated that three-quarters of the county population was Pennsylvania German. And, northwestern Lehigh County is arguably even more "German" than the rest of the county.[5] The Allentown *Morning Call* ran a popular dialect column for many years and local cultural pride is strong. Rye was related to Pennsylvania German cultural practices. Some rye went to distilleries, and rye was also useful as a cover crop. But the main use for rye was probably rye bread, which remained important to Pennsylvania German foodways for a long time. An 1835 report from the county noted: "we produce a great quantity of rye for sale and home consumption, for man and beast; for be it remembered that we eat rye bread in preference, even when we have both sorts on the table." These preferences persisted; a family of eccentric bachelor brothers in Albany Township was reported in 1891 to have raised "mostly rye" on their 155-acre farm, threshing it entirely with flails.[6]

Soils and topography also help explain the increased interest in rye and potatoes. The land in northwestern Lehigh County is hilly and the soils are not quite as productive as are the

limestone-based soils nearby. Already in the mid 1840s a local historian noted that Heidelberg Township's gravelly soils produced "an abundant crop of rye."[7] As time went on, northwestern Lehigh County farm families recognized both the strengths and limitations of their soils, and adjusted accordingly to crops that were suited to conditions. Potatoes thrived in the well-drained, shaly soils here. Local residents also cut ample hay crops, between 10 and 13 tons on the average farm. Some observers believed that the incorporation of lime had helped substantially to preserve fertility and crop yields. Of Lowhill township, for example, atlas maker F. A. Davis remarked in 1876: "the soil is not naturally fertile, being chiefly white gravel; but the skill and industry of many of its farmers have rendered their lands quite productive. The application of lime has been found to be highly beneficial, resulting in generous harvests; while the use of different composts has amply repaid the intelligent cultivators of the Low Hill farms."[8] It is not clear what Davis meant by "composts," but these could have been manure and straw mixes or cover crops.

Improving road and especially rail connections made it possible to send crops to the rapidly growing towns in the Lehigh River Valley and up into the developing coal country in the opposite direction. Some were even exported.[9] It is notable that Lynn and Heidelberg Townships' potato and hay production were higher than even other townships in northwestern Lehigh County in 1880; rail connections ran right through the center of these two townships and connected to the Lehigh Valley Railroad, which led south to Philadelphia and north to the anthracite region.

Clover seed was a valuable product on some northwestern Lehigh County farms. In 1850 the average Pennsylvania farm listed one bushel, while in northwestern Lehigh County the typical farm produced 1.8 bushels. Lynn Township had two clover mills in the mid-1840s to serve local demand for processing seed.[10] The figures suggest that Lehigh County farm practices were progressive; clover was a key contributor in crop rotations as a nitrogen fixer. Demand in southeastern Pennsylvania markets was brisk, so clover seed was another cash crop.

Except for wheat, field crops and hay were fed to animals. On northwestern Lehigh County farms in the mid- to late nineteenth century, livestock enterprises also varied slightly in proportions from typical profiles for the rest of the state, most conspicuously in that virtually no sheep were kept. Otherwise, Lehigh County farms nearly kept pace with the state in numbers of horses, swine, chickens, and dairy cattle per farm, and had fewer than average beef cattle than the average Pennsylvania farm. These numbers might suggest that Lehigh County farming was much more intensive than in the rest of the state, since the animals were kept and the crops were raised on smaller farms; but these small farms had just as much improved farmland as the average, larger farm in the state. In other words, Lehigh County farm families were able to keep average number of livestock on below-average sized farms because they had more land cleared, not because they were farming more intensively acre for acre.

The animals on the typical northwestern Lehigh County farm served both household and commercial purposes. Horses worked in the fields, powered stationary machinery, and hauled wagons and passenger carriages. Swine provided meat for the family; in Pennsylvania German cuisine, pork still predominated, and lard was highly valued too. Most families probably also traded or sold some hogs. Poultry weren't counted until the 1880 census, by which time the average flock in Lehigh County (three or four dozen birds) provided for family needs and some exchange in the local markets. Dairying became relatively more important over time. In northwestern Lehigh County, home buttermaking (not fluid milk dairying) took precedence. On the average northwestern Lehigh County farm at mid-century, buttermaking just sufficed for household use, but by the late nineteenth century, farm women were making modest surpluses.

The farm orchard was another central element in the agricultural economy. It supported important Pennsylvania German foodways by supplying apples for cider, vinegar, applejack, schnitz (sliced dried apples), and apple butter. Samuel Reitz, for example, advertised his farm in the 1876 *New Illustrated Atlas of Lehigh County*; he mentioned an "apple distillery" among his farm buildings.[11] By the late nineteenth century, Heidelberg, Lynn, and Weisenberg Townships had substantially more apple trees than the average Pennsylvania farm. Like potatoes, fresh apples must have found an outlet to market along the rail lines.

The farm garden was ample, and from it came vegetables to supply the family. A typical Pennsylvania German garden yielded cabbage (for fresh consumption, slaw, and sauerkraut); turnips; parsnips; carrots; beets; onions; tomatoes; peppers; cucumbers; sweet corn; beans (dry and green); radishes; corn; peas; rhubarb; asparagus; lettuces; squashes; and various herbs and seasonings. The garden work was mainly done by women and children. Traditional Pennsylvania German garden design often divided the site into squares, separated by wood-plank walkways.

Cordwood, nuts, and logs from woodlots were other farm "products." They were important for keeping the family warm and sometimes could provide food or income. For example, Charles Fritz bought six logs from a walnut tree in 1896 for $5.50 and sold the sawn lumber for $132.00.[12] Woodlots were small in Lehigh County, so this resource was limited but lucrative.

Some farmers in the region combined farming with other occupations, often using resources on their lands. For example, the Hermany brothers of Jacksonville (Lynn Township) advertised a farm and saw and bone-milling business, declaring themselves "Manufacturers of bone-dust and dealers in Lumber." George M. Schellhammer had a tannery on his farm. Joseph Mosser had a farm and slate quarry.[13] Like farming families elsewhere in the state, northwestern Lehigh County farm people pursued more than one occupation and developed non-farm resources on their land.

Reviewing this catalogue of farm products, we see that the Lehigh County potato region was beginning to take shape; farmers there gave potatoes a significant position in their cropping schemes, and correspondingly less to other field crops, particularly wheat and corn. Yet potatoes were still just one component, on a more or less equal footing with others in a complex, highly diversified crop and livestock system. Northwestern Lehigh County farms were not notably valuable or profitable; but neither were they hardscrabble affairs.

Labor and Land Tenure, 1850-1910

Family and neighborhood labor predominated in northwestern Lehigh County during this period. Evocative images made by turn of the century photographers give valuable clues. At least where potato harvest was concerned, everybody turned out, from grandparents on down.[14] Wage workers were hired at peak seasons, such as haying time, but the census figures show that most farms around 1880 only hired labor for about 22 weeks each year.

Potato harvest on the William Hoffman farm, Lehigh County, about 1900. Assuming most of these people were working on the harvest, we may conclude that the labor force was mixed by both gender and age. Whelan, Frank, et al. *Looking Back: A Pictorial History of the Lehigh Valley and Surrounding Counties, 1850 to 1920* (Allentown, PA: The Morning Call, 1998), 85.

The William Mantz family at potato harvest time. Whelan, Frank, et al. *Looking Back: A Pictorial History of the Lehigh Valley and Surrounding Counties, 1850 to 1920* (Allentown, PA: The Morning Call, 1998), 84.

Farm work was divided very loosely along lines according to age and gender. As the potato harvest scenes above show, though, these lines were seldom hard and fast. Generally, men worked in the fields, planting, plowing, cultivating, and harvesting. Animal feeding was done by men, women, or children; poultry keeping was usually associated with women and children. Women and men milked cows. Women made butter and soft cheese. Butchering involved entire neighborhoods, with families visiting each others' farms to do the work in turns. The same was true when it came time to make cider and applebutter and sauerkraut. At haying time also, everyone pitched in, and women also prepared meals for harvest workers. During this period, itinerant threshers replaced large threshing crews, so labor patterns in grain harvesting changed. Threshing day was still busy, but the whole process took much less time and fewer workers.

Farm tenancy rates were about the same in Lehigh County as across the state generally; about 80 percent of farms were owner occupied. Lowhill Township had a lower owner occupancy rate in 1880, but the other townships were at or above state averages. Most tenancy arrangements probably involved share cropping and were made between relatives.

Seasonality marked labor patterns here, as everywhere in nineteenth century rural Pennsylvania. Winter was a relatively quiet time, when people visited, attended Farmers' Institutes, church and school events, and did indoor work. Of course, animals still had to be fed, but cows were not yet milked year-round and hens were less productive too. The pace accelerated when spring arrived. Milk production resumed when cows calved, and plowing and planting took place. Early and mid-summer brought haying and harvesting of other grains like oats. Fall probably had the most intense work pace, because the potato harvest, garden harvest, and orchard crop processing all took place then, followed soon after by butchering.

Not all farm work was done by hand. In 1850, farms in Lehigh County and the northwestern townships were significantly more mechanized than average. It seems likely that the region at least kept up with the rest of the state in the late 19th century. It is not clear why these relatively small farms should be so highly mechanized, unless there was competition for labor with industries in the vicinity.

Buildings and Landscapes, 1850-1910

Introduction: Northwestern Lehigh County agricultural building forms during this period were types that are found elsewhere in the state, such as the Pennsylvania forebay bank barn, springhouse, summer kitchen, and so forth. To some extent, construction materials and methods make the architectural patterns in northwestern Lehigh County distinctive. Most notably, slate roofs are very common, even on the smallest of outbuildings like corn cribs, milk houses, and even privies. This is because the Lehigh County "slate belt" directly adjoined the potato region, in some cases intruded right into it. Thus this durable, handsome, and long lasting roofing material was inexpensive and practical to use. Skilled workmen were available to install and maintain it. Second, traditional construction methods persisted longer than elsewhere. Machine sheds from the early twentieth century not uncommonly are constructed with heavy posts and beams, pegged or mortised and

tenoned. Finally, where houses are concerned, local people retained a preference for older styles and forms well after they had become old-fashioned elsewhere.

Houses, 1850-1910

In nineteenth-century rural Lehigh County, well-off farm families seem to have preferred the five-bay, double-pile house with central door on the eaves side. Except for one three-bay house and one four-over-four house, all the mid-nineteenth century houses documented in field survey were five-bay center-door houses. [15] In Lynn Township, for example, a fine five-bay stone house dates to the mid-nineteenth century. It was modernized in the twentieth century, but its cornice moulding, gable returns, rubblestone masonry, end chimneys, and paneled shutters remain.

Five bay center door house, Lynn Township, Lehigh County, c. 1840-60. Site 077-LY-003.

The form remained popular well after it was fashionable elsewhere. In 1870, for example, a Heidelberg Township family erected a five bay house in brick. Pennsylvania German families were conservative; they stuck with cultural forms a long time.

Five bay center door house, Heidelberg Township, Lehigh County, c. 1870. Site 077-HE-012.

Four-over-four house, Lynn Township, Lehigh County, c. 1875. Site 077-LY-007.

Barns, 1850-1910

Lehigh County barns from this period represented just one type: the classic Pennsylvania barn. This famous type was by now well developed. The barn was built with its long side into a bank, and the diagnostic forebay (overshoot) projected out on the opposite eaves side. On the upper level, mows, threshing floors, and usually a granary provided for grain and hay storage. On the lower level, stalls and stables housed horses, cattle, and sometimes pigs. The Pennsylvania barn was very efficient and flexible, and that is why it was so popular. Though it was adopted by farm families from many cultural backgrounds, it was primarily associated with Pennsylvania Germans.

The Pennsylvania barn suited the diversified farming system very well. Its upper-level spaces provided flexible storage areas for hay, straw, and grain. Hay was usually piled loose in the outer mows, at the gable wall ends. Then, straw could be put in the next mow in from the end. Or, unthreshed grain in sheaves would be carefully stacked inside so it could stay dry while it awaited threshing. Threshing floors still were needed even in the machine threshing era; some grains did not withstand machine threshing well, so they continued to be threshed by hand. Later, as machinery improved, the floors were used for machinery storage. A tightly sealed granary, usually in the forebay, contained bins where threshed grain was stored. Hay and grains could then be dropped down to animals in the lower level through openings in the floor. Below, cattle and horses were housed. Humans and animals were kept separate by doors and aisles, yet feeding could be accomplished efficiently. Thus the Pennsylvania Barn ideally suited the typical nineteenth century Lehigh County farm operation.

Pennsylvania Barn, Heidelberg Township, Lehigh County, c. 1875-90. Site 077-HE-004.

Barn bankside, Heidelberg Township, Lehigh County, c. 1875. Site 077-HE-006.

Pennsylvania Barn, Heidelberg Township, Lehigh County, c. 1875-1900. Site 077-HE-007.

Interior, upper level of the barn depicted above. It features traditional post and beam construction, and a canted queen-post design to permit a hay track to move unimpeded across the gable peak. The double horizontals are often seen on Pennsylvania German barns. This barn is rather late but still shows a preference for traditional construction methods; the posts and beams are a little smaller than would be found in earlier barns, and they are more regular, but they are organized the same way they would have been earlier. Site 077-HE-007.

Stone and frame barn, Lynn Township, Lehigh County c. 1840-60. Site 077-LY-004. The barn has fine workmanship in its masonry gable wall with decorative brick ventilators. Though the "hex signs" on the forebay are not original, they do represent a form of barn decoration that was very common in this region.

Corn Cribs, 1850- 1910

One early corncrib was documented in field study. This c. 1850 example at site 077-HE-007 has a heavy pegged timber frame, vertical slats, and steeply canted sides. Its form was popular throughout the nineteenth century, but survivals with heavy framing are rare.

Corncrib, Heidelberg Township, Lehigh County, c. 1850. Site 077-HE-007.

Butcher Houses, 1850-1910

In Lehigh County, the term "butcher house" is often used for a freestanding building with interior set-kettle or heavy cooking hearth. It is not just a synonym for a summer kitchen; some properties have both a summer kitchen and a butcher house. As its name implies, the butcher house served for the heavy work at butchering time. The carcass might be set out on a long plank inside to cool. Scrapple was made by boiling cut-up pieces from a hog carcass and adding corn meal and spices. Sausages too were made at butchering time. Likely soap was made and other heavy work performed in the butcher house as well. By contrast, the summer kitchen's equipment was lighter—a free standing, portable stove—and designed more for everyday cooking. Lehigh County butcher houses tend to be made of frame; gabled; have ample windows for light; and have either a masonry set-kettle or a manufactured one of iron. In either case the set-kettle has at least one and usually more openings in which to set the kettle. Butcher houses are usually sited near the house, and sometimes are combined with summer kitchens or other buildings.[16]

Butcher house with shed roof concrete block addition, Heidelberg Township, Lehigh County, c. 1880-1940. Site 077-HE-002.

Butcher house, Heidelberg Township, Lehigh County, c. 1910. Site 077-HE-005. This site has a separate summer kitchen, just visible at left.

Butcher house, Heidelberg Township, Lehigh County, c.1910. Site 077-HE-007. This site also has a separate summer kitchen.

Interior set kettle in the butcher house depicted above. Site 077-HE-007.

Root Cellars, 1850-1910

Root cellars were serious business in Lehigh County. Not only were they important for family subsistence, but in potato country they could also serve to house the cash crop. Extant examples studied in field survey work tended to be relatively large and deep, and to be located near the house and summer kitchen. Stone steps led down to the cool interior, which often had a stone floor. Here, vegetables, potatoes, and dairy products could be kept at a constant temperature around 50-55 degrees F. After canning became popular, some farm women also stored their jars of chutney, jam, canned fruit, vegetables, and meat in the root cellar as well.

Root cellar, Heidelberg Township, Lehigh County, c. 1880. Site 077-HE-007. The entryway has been rebuilt.

Root cellar, Heidelberg Township, Lehigh County, c. 1900. Site 077-HE-005.

Summer Kitchens, 1850-1910

Detached kitchens had existed in the eighteenth century, but the phrase "summer kitchen" and the particular form appeared much later and reached a peak around 1900. Lehigh County summer kitchens follow this trend. Most date from the late nineteenth to the mid-twentieth century. The summer kitchen, as its name implies, came into popular use in the modern cookstove era. Cookstoves generated a lot of heat, so the summer kitchen helped keep the house cool. Perhaps as importantly, this period witnessed a great expansion in the rural family's subsistence activities. Canning and sugar-based food preservation (jams, preserves, etc) joined the traditional pickling, smoking, and salting. A summer kitchen provided a specialized space in which these activities could take place.

Lehigh County summer kitchens generally are located very near the house. They are usually gabled structures, made of wood frame, with ample windows, a high level of finish, and chimney or stove vent.

Summer kitchen, Heidelberg Township, Lehigh County, c. 1900. Site 077-HE-005.

Smoke houses, 1850-1910

Where Pennsylvania German customs were so strong, the smoke house was central to foodways. A few farm families still utilized an attic *rauchkammer*, but most properties also had a smoke house, either free standing or combined with another outbuilding.[17] Smoke houses have a small, square-ish footprint; no windows; minimal vents if any; exterior access for ash removal; charred interiors; and hooks, bars, or pegs for hanging meats. The smoke house is usually in the house's orbit, but on the periphery.

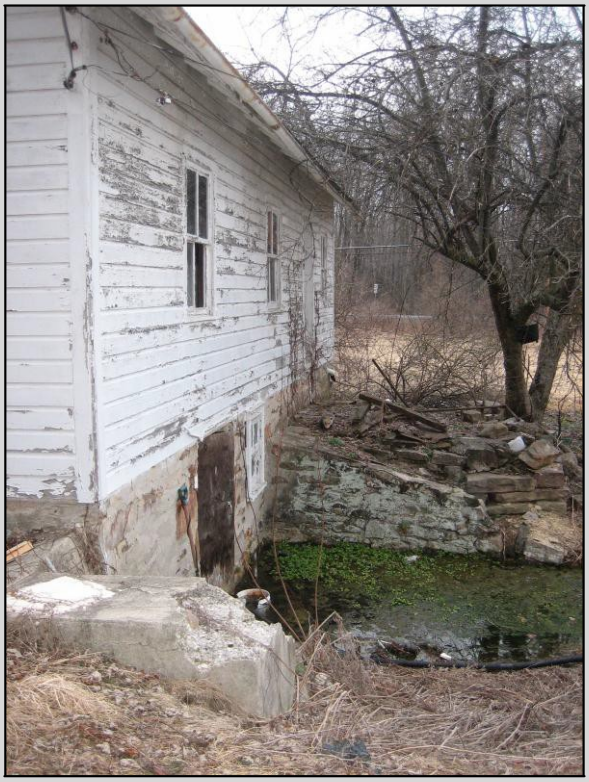
Smoke house added to summer kitchen, Lynn Township, Lehigh County, c. 1915. Site 077-LY-003.

Spring Houses, 1850-1910

In the pre-refrigeration era, spring houses were important means of keeping perishables cool. Documented spring houses in Lehigh County were typically small, gabled structures built of stone and frame. The spring's location determined the spring house's siting, of course; but usually the spring house would not be too far from the house. Butter

production was not high in Lehigh County, and the small size of spring houses there reflect production mainly for household use.

Spring house, Lynn Township, Lehigh County, c. 1850, rebuilt in the twentieth century. Site 077-LY-001.



Spring house with walled spring, Heidelberg Township, Lehigh County c. 1860-75.
Site 077-HE-003.

Pigsties, 1850-1910

In a county such as Lehigh where pigs were so important to the farm economy, pigsties were common landscape expressions. A pigsty is typically located at right angles to the barn, on the perimeter of the barnyard. It is gabled with a human door in one gable end, usually off center, indicating the location of an interior feed aisle. Small stalls line one side and lead out into the barnyard via narrow openings. [18]

Pigsty, Heidelberg Township, Lehigh County, c. 1900. Site 077-HE-004. This building has been altered but clearly has the form and siting of a pigsty.

Pigsty, Lynn Township, Lehigh County, c. 1900-1930. This gable end view shows the typical human door leading to the feeding alley.

Landscape Features, 1850-1910

The Lehigh County potato region did not yet display landscape features specifically connected to potato culture. Farming had, however, combined with natural landscape features to give the overall farming region a distinctive look. Particularly in Lynn and Heidelberg Townships, the Blue Mountain running

Barn enclosure, Lynn Township, Lehigh County, c. 1900. Site 077-LY-003.

along the northern border formed an imposing backdrop. The farms by now had a rather wide-open character because so much land had been cleared. The photos of potato harvest suggest how wide the views were. Fields were small and form a patchwork of irregular shapes, demarcated by treelines, or not by any physical boundary. There would have been more fencing than now, but less than elsewhere at the same time, since this was not especially a livestock country. One prominent type of fence that has survived in places was the stone barnyard enclosure. These walls express the grain-and-livestock system well; they kept cattle confined so their manure could be collected and used. Farm orchards were very common. Available oral-history and aerial photographic evidence (from a later period, but still applicable since orchards are long-lived) suggests that they were usually situated close to the farmstead, rather than among the outer crop fields. Only remnants survive.

Barn enclosure, Lynn Township, Lehigh County, c. 1890. Site 077-LY-001.

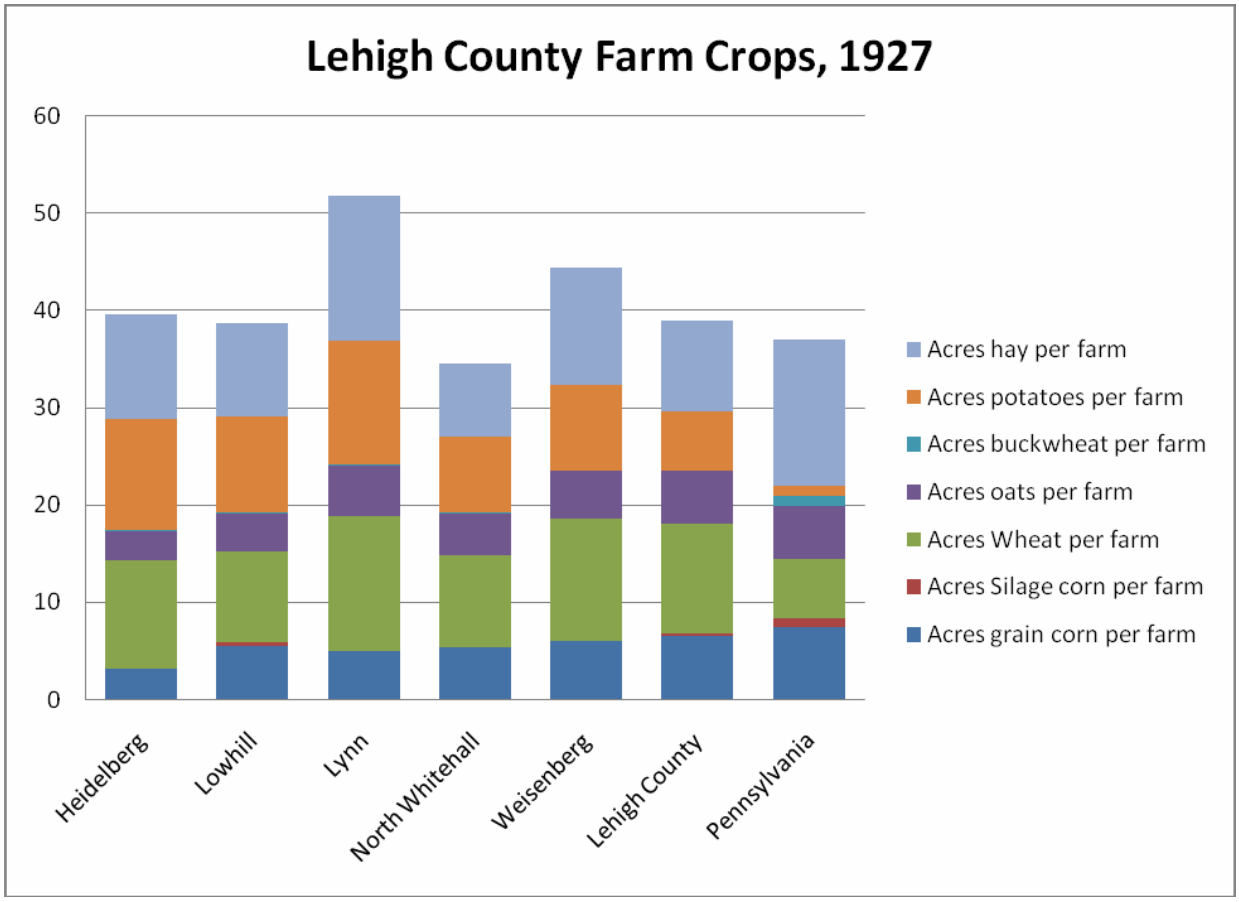
1910-1960: Potatoes as a Primary Cash Crop with Diversified Complements

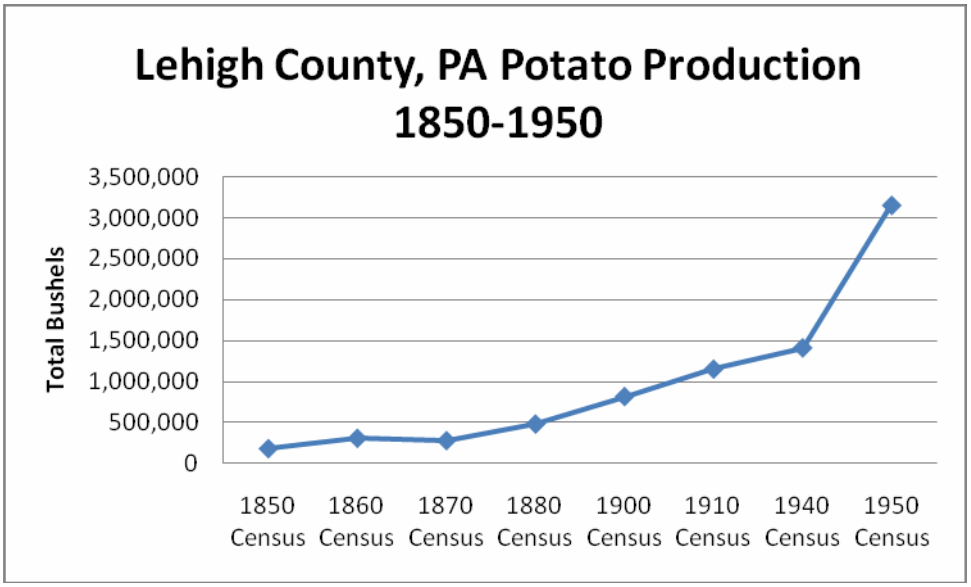
Products, 1910-1960

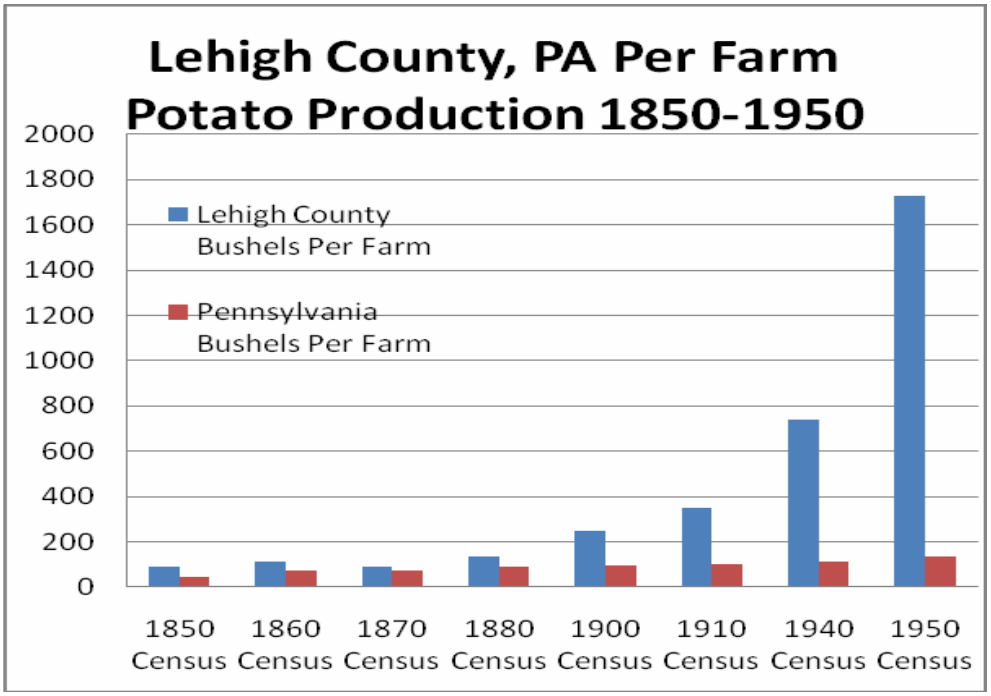
By 1927 Lehigh County farm size had risen to 62 acres after its late nineteenth-century low. Northwestern Lehigh County was now attracting notice as a potato growing region. In September 1913 the *Kutztown Patriot* ran a story with the headline "Berks and Lehigh Farmers in Potato Belt Harvesting Crop Exceeding One Million Bushels." It described a "great potato belt" which "extends from Albany, Berks County, to Best station, Lehigh county, [sic] a distance of about 18 miles." The article went on to note that at a string of stations along the Berks and Lehigh Railroad there were "shippers who make it a business to ship the potatoes and take the risk of quality and shrinkage..." Some farmers were harvesting two and three thousand bushels. The *Patriot* photographer snapped a photo of

A. S. Greenawalt's harvest crew: "Mrs. Mahlon Loy, Minerva Miller, Helen Boyer, Mrs. Austin Stump, Mrs. James Berk, Mrs. John Miller, Mrs. Ed. Bachman, Miss Alma Bailey, Neda Berk, Effie Rauch, Oscar Lenhart and Amandus Bachman. Henry Berk is in charge of the team and Will. L. Reber, foreman is operating the potato digger." A list of prominent growers gave their acreages, which ranged from 15 acres all the way up to 55. The reporter mentioned that many potatoes were shipped immediately after harvest, but the article also noted that "many farmers... have built ground cellars and store them there till late winter and then they sell them at advanced prices."[19]

Lehigh County had become the pre-eminent potato county in the state, and production was concentrated in these northwestern townships. Production topped out (during our period at least) at 3.2 million bushels in 1949. Lehigh had far more acres in potatoes – over 12,000 – than any other county. Lehigh was not the state leader in yield, but nonetheless a striking statistic is the county's increase in yields between 1940 and 1950, from just 118 bushels per acre to 258.







Several factors combined to spur development in the potato belt. Local historian Ann Bartholomew credits the invention of an effective horse-drawn potato planter and rising use of Bordeaux and other insect control measures. As well, she mentions that Dr. David D. Fritch of Macungie, the "Potato King of Lehigh," used his control over the Keystone Roller Mill to promote rotations (potatoes/wheat/ clover hay), use of certified Michigan seed potatoes, and use of commercial fertilizer.[20] A decade or two later, the Agricultural

Extension agent took credit for improvements. However, without ready markets in the booming Lehigh Valley and anthracite regions, few farmers would have bothered to develop potato culture. Between 1880 and 1910, for example, Lackawanna and Luzerne Counties nearly tripled in population, and Philadelphia and Lehigh County nearly doubled. Other potential markets were rapidly developing in neighboring New York State and New Jersey. The heavily immigrant and working class populations in these industrial communities needed inexpensive food supplies; potatoes suited the demand well. There was incentive aplenty for innovation and expansion in potato culture.

Most potatoes grown in the early twentieth century were “table” potatoes, destined to be baked, boiled, or otherwise prepared at home. (Today, most US grown potatoes are processed into fries and chips.) Potato varieties grown in Lehigh County included Russets, Bilboa, Irish Cobbler, White Smooth, Blanc, Vulcan, and Mercer.[21] Renowned potato expert E. L. Nixon mentioned the Cobbler as “the most widely distributed, early potato grown,” and the Rural Russet as the overall favorite. Stevenson Fletcher saw a shift from "local sorts" to Russet, White Rural, and Cobbler, which in 1934 he estimated made up "over 90 percent of the potato crop of Pennsylvania." The Lehigh County agricultural extension agent report for 1931 mentioned the Green Mountain, New York State Cobbler, and Rural Russet, with the latter being the local favorite. In 1937 the home economics agent reported that her cooking demonstration participants voted the Chippewa and the White Rurals the best. General works on potato culture from the period list varieties by the dozen, giving the impression of great diversity. However, even this large list apparently had limited genetic diversity; and in any case only a few potato varieties achieved commercial importance. In the East, these were the ones already mentioned plus the Burbank and Green Mountain. The main division among potato varieties at this time was whether they were harvested early or late. Few sources specific to Lehigh County discuss varieties at any length. This suggests that variety was relatively unimportant, or that variety choice was settled and unremarked. In any case, we don’t find the kind of impassioned debates (at least not in printed sources) about potato varieties that, for instance, Adams County apple growers were having about the merits of their favorites.[22]

Around 1932 the USDA released an important new variety, the Katahdin. Within a few years this became the favorite in Lehigh County. Already in 1937 the extension agent

thought it was the most popular, and by 1944 he estimated that sixty percent of the county's potato acres were planted with Katahdins. The Katahdin was a good keeper with dependable productivity. Another popular variety, the Kennebec, was introduced in 1948. Its thin skin made it vulnerable to bruising but if handled carefully it stored well. The significance of these two varieties lies partly in their development by government sponsored researchers; the earlier varieties had been developed privately and through informal channels. The impact of the agricultural establishment was increasing. It is also important to note the traits for which the Katahdin was known: keeping quality and resistance to stresses such as drought. As potatoes became a larger scale enterprise in Lehigh County, storage became more important. Farmers wanted to be able to hold their crop and sell it over a long period, to benefit from rising prices in the winter months. Doubtless the Katahdin's hardiness also recommended it now that growers were expanding their acreage.[23]

At about the same time, the agricultural extension agent began to promote certified seed potatoes as a means of reducing problems from the myriad diseases that attack the potato. Certified seed potatoes were guaranteed free of certain diseases. They were generally grown in other Pennsylvania counties (especially Somerset and Potter) or in other states, notably Maine and Michigan. Certified seed potatoes did contribute to higher yield and quality, but they also changed the traditional means of obtaining seed, which had always been to keep back some of the previous year's harvest (some sources estimate one-seventh) for next year's seed. Certified seed potatoes created a regular cash expenditure and increased growers' dependence on outside sources. The county extension agent reported a rapid adoption of certified seed potatoes in the 1930s and 40s. However, potato guru E. L. Nixon also noted that many growers did not purchase certified seed potatoes every single year. In this respect, at least in the early twentieth century, certified seed potatoes probably didn't have the same impact on the farm economy as did hybrid corn in other places.[24]

Potato growing in the early twentieth century involved complex processes. For example, rotations were very important. In the 1920s the agricultural extension agent thought that rotations were being shortened to just two years, alternating clover and potatoes. More typically rotations were three years and alternated wheat, clover or alfalfa hay, and potatoes. In the 1930s Penn State agricultural economist Emil Rauchenstein noted that in

Lehigh County, "much less corn is grown than in other sections, as potatoes take the place of corn in the rotation."[25] The 1927 census figures seem to reflect this practice. Hay, potatoes, and wheat took up roughly equal acreage (nine to fifteen each, depending on the township), with corn and oats occupying markedly fewer acres (three to six). According to 2010 county agricultural extension agent Robert Leiby, these rotations would begin with winter wheat sown in the fall after the potato harvest. The wheat was overseeded with clover or other legumes, which later could be harvested as hay. The wheat was mainly sold as grain, but straw could be valuable too.

The rotations were important because of the particular requirements posed by the potato, which was both a demanding and susceptible plant; a high maintenance crop, so to speak. Arthur W. Gilbert, author of a 1917 treatise on *The Potato*, explained that rotations helped to avoid disease, they promoted economic diversity, they helped with weed and pest control, and they replaced organic matter. Potato growers could vary their methods for restoring organic matter. They could use livestock manure; but they also had the option to use green manure, cover crops, catch crops, lime, and artificial fertilizer in varying combinations. Nixon wryly remarked that "potato growers, generally, are pretty well sold on the idea of commercial fertilizer, and with the sales forces of many companies working at top speed they are likely to stay sold." Among Pennsylvania's elite "400 bushel club" members, most used all of these methods. In other words, the most successful growers combined liming, crop rotations, manure, and artificial fertilizer to maintain soil fertility and provide optimum growing conditions.[26]

Because blight and insect infestations were so damaging, spraying became a common practice as Lehigh County shifted its focus toward potatoes. The most often mentioned spray mix in the early twentieth century was Bordeaux, which was a mixture of copper sulphate, hydrated lime, and water. Paris Green, a "toxic double salt of copper arsenate and copper acetate," was another potent anti-insect spray.[27] 400- bushel club members averaged seven spray applications in 1923, and twelve in 1929.[28] After World War II, new petroleum-based sprays and fertilizers helped to boost productivity dramatically.

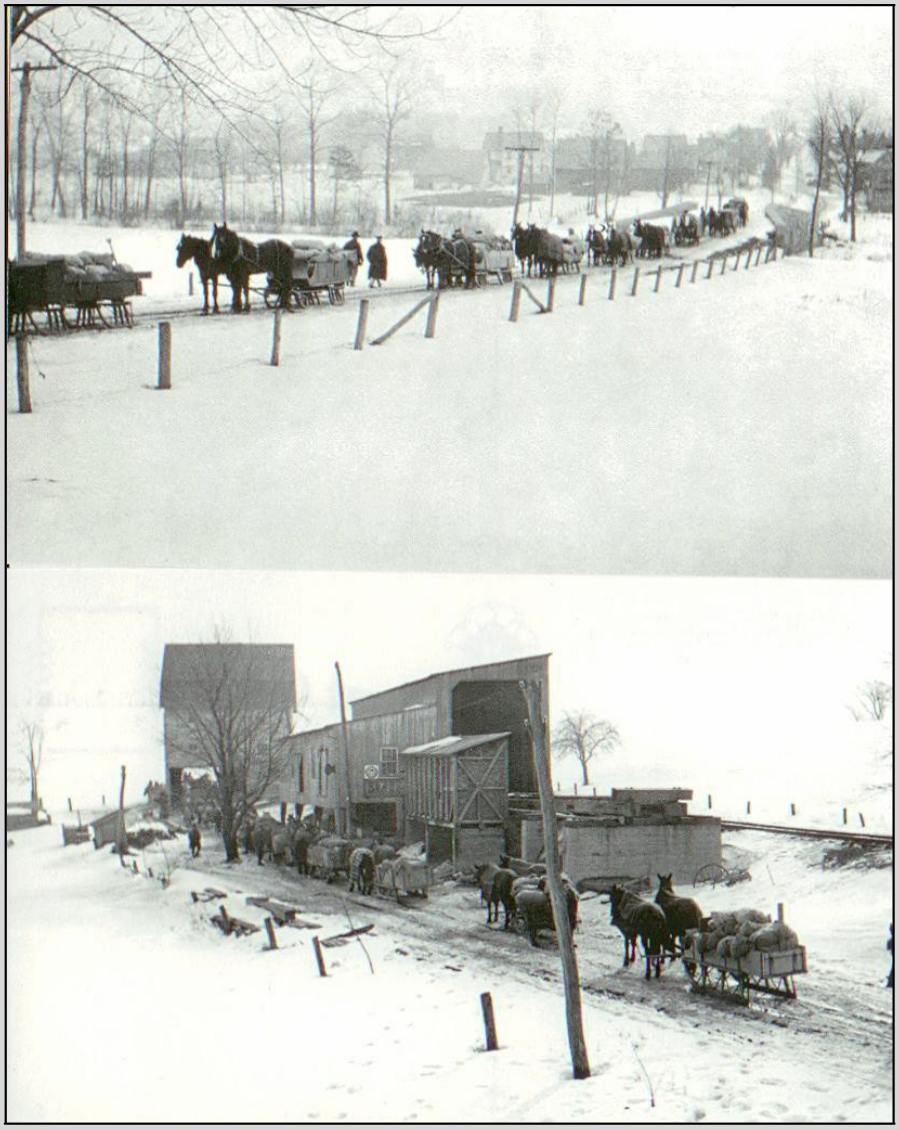
Lehigh County potato growers increasingly operated within a wider context of declining consumption and increasing competition. United States per-capita consumption was 3.8

bushels in 1913 and only 2.8 bushels in 1934. J. B. R. Dickey offered this colorful explanation for the trend:

> … it was not so long ago that potatoes appeared on the farmer's and working man's table nearly, if not quite, three times a day. After the season for home-grown vegetables was past potatoes were about the only thing of the kind available. Since then habits of diet have changed to a certain extent (no doubt for the better so far as health is concerned) in nearly all households. The cereal breakfast food has helped to crowd the fried potatoes off the breakfast table. Southern grown vegetables are now available nearly all winter in every town of any size, and at rather reasonable prices. They are being bought and eaten by nearly all classes, and since we eat only about so much we are cutting down on something else, with potatoes probably taking the largest share of the cut…. Another factor has been the female fear of superfluous flesh, and the universal placing of white potatoes in the class of the most fattening of foods…[29]

To these factors, Dickey added the general trend toward more sedentary occupations and the rise of the canning industry.

Yet despite national trends, Lehigh County farmers seemed to do reasonably well in marketing their wares. According to a 1932 study of "Potato Marketing in Pennsylvania," seventy percent of the Lehigh County crop was sold at the farm and hauled away by the buyer, and that "many" potatoes were "shipped to market each year by rail."[30] This report was based on survey data. Historic photographs taken at places like Kempton, Wanamakers, and Lynnport show farmers with wagonloads of potatoes waiting to offload at the local railhead. Quite a few potato farmers "huckstered," or drove a wagon to market produce straight to the consumer, door to door. Machine grading, packaging in smaller quantities, and roguing to improve quality were marketing strategies designed to improve the product and its image.[31]



Farmers with loaded potato wagons waiting at the rail siding at the Lehigh Exchange in Germansville, 1918. Heidelberg Township Environmental Advisory Council reproduction post card, 2002.

Another important marketing strategy was to hold potatoes back, and not take them to market straight from the field when supplies were greatest and thus prices lowest. To pursue this strategy, farmers needed storage and so many potato cellars and other storage spaces appeared during this period. They are discussed under "Buildings and Landscapes."

Potatoes were the main source of income and "mortgage lifter" in Lehigh County. Yet even during this era, when Lehigh County potato growing expanded both in absolute and relative terms, potatoes still took their place within an overall farming system. As we have

seen, the other crops in the typical rotation were legumes (usually clover) and wheat. Smaller quantities of corn and oats rounded out the crop mix. Rye, formerly important, had fallen into insignificance. Where livestock were concerned, swine and poultry appeared more prominently than on the average Pennsylvania farm, while cattle were less important. Fruit trees still provided for family needs and the occasional surplus.

Several factors likely account for the nature of the Lehigh County potato farming system. In some ways it was similar to Lancaster County, where a high-value, high intensity money crop is grown along with other crops and livestock. But while Lancaster County farmers stall-fed beef animals as a way to generate fertilizer for their tobacco crop, Lehigh County farmers stressed crop rotations and commercial fertilizer for the potato crop. Their soils were probably less adapted to the main feed crops for beef animals. Poultry worked well because they could be sold at the same local markets where Lehigh County farmers huckstered other produce. Labor demands also enter the picture; dairy farming brought high labor demands, and these didn't mesh well with potato culture. Swine were important to local markets and foodways, and their care could be fitted in more easily with the potato growing routine.

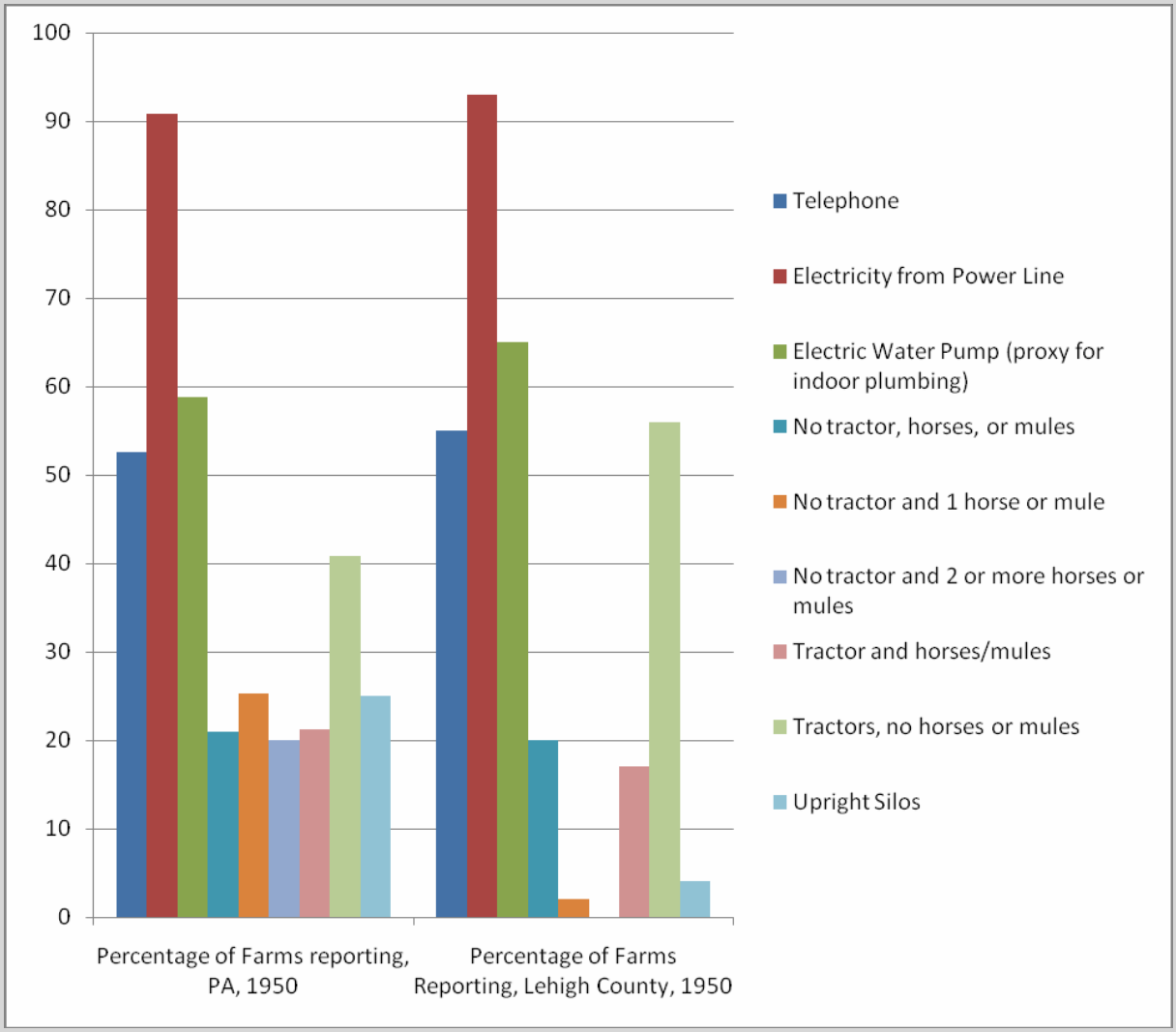
Garden crops, fruit, and family meat preparation were very important components of the Lehigh County farm system, even when families in other places were beginning to scale down their subsistence activities in favor of purchased food. Even today, Pennsylvania German cultural practices are still deep rooted in northwestern Lehigh County, and the Pennsylvania German dialect is still spoken. Local people still prepare favorite seasonal foods such as Fastnacht donuts at the beginning of Lent; in early spring, churches hold fundraiser dinners serving such culturally significant dishes as ham and dandelions, or pig stomach. Sauerkraut, scrapple, pickles, handmade noodles – the list of home-processed traditional foods is long. Canning merely added to the variety. So the typical northwestern Lehigh County garden was large, and produced cabbages, tomatoes, sweet corn, beans, cucumbers, and many other vegetables that went into these traditional dishes.

Labor and Land Tenure, 1910-1960

As before, labor for farming in the potato region came primarily from family and neighbors. Farms might have a hired hand during part or all of the year, usually a local

man. For laboring families, the Depression years were very stressful; people found scattered jobs husking corn, working on road projects, selling strawberries and raspberries, shoveling snow, and working for the WPA. Mary Stump Snyder, born in Albany Township (Berks County) in 1915, remembered hand mowing hay in areas too wet to take a machine mower; picking potatoes; chopping, husking, and threshing grain for wages. Children were assigned jobs like feeding chickens and pigs, helping out in the garden, blacking stoves, washing kerosene chimneys, and weeding wheat fields. At potato harvest time, schools were let out so students could help pick potatoes. The list of pickers quoted in the opening to this section shows that women comprised a good portion of pickers. By the 1960s, a few growers hired migrant workers from Puerto Rico.[32]

Lehigh County farms continued to be well equipped with machinery. They had more tractors than the average Pennsylvania farm in 1927. Even so, far fewer than half the farms had them. But the range of horse-powered equipment was expanding. In the potato region, spray rigs, potato digging equipment, planters, hay rakes and forks, seed potato cutters, potato graders, and plows were much used. Farmers here seemed to have a marked penchant for creative improvisation. If their equipment was inadequate, they invented new machines. For example, Albany Township, Berks County inventor Albert E. Trexler invented a commercially successful seed potato cutter.[33] Rather than spend money for equipment, some would make their own. Donald Lichtenwalner, for example, improvised a ventilation and chute system for his potato storage cellar.[34] These talents extended also to building techniques. Traditional and new construction methods often are blended seamlessly in local buildings. For example, at one site a gambrel roof was constructed using both mortise and tenon joints and iron straps. In general, post and beam construction persisted far longer here than elsewhere, and farm people stuck with older architectural styles long after they had passed from favor elsewhere. Their traditionalism was not merely reflexive; it seems to have been rooted in a deep cultural pride and a conviction that Pennsylvania German lifeways were worth preserving.



Lehigh County farm technology, 1950. This data covers the entire county, but it is safe to say that the Lehigh potato area's heavy mechanization and less dairy-oriented agriculture is reflected in the graph.

Farm tenancy in Lehigh County was not far from statewide averages. A 1939 report shows that in the potato townships, the percentage of land rented ranged from under ten to around forty.[35] As before, share tenancy probably dominated. Overall, in the potato regions tenancy was not a major factor shaping the landscape.

Buildings and Landscapes, 1910-1960

Houses, 1910-1960

Few new houses appeared during this period on northwestern Lehigh County farms. This followed patterns common in most of the state, as farm families invested in the farm side of their building plant, if they had resources to invest. Two houses documented from the period show different approaches to house building. One continued an older form, even adding ornament that was old-fashioned for the day. The other, a "foursquare" house, showed that newer popular forms were reaching into Lehigh County.

One feature peculiar to farmhouses in the region was cellar storage of potatoes. Potato harvests were getting so big that farm people squirreled the tubers away in any dark, cool spot they could find. An oral history published in the *Albany Township Historical Society Newsletter* was accompanied by a photograph of a nineteenth-century stone house that was renovated in the 1930s, adding a sleeping porch and enclosed potato cellar across the front eaves.[36] Field survey workers did not obtain access to any house cellars historically linked to potato storage, but in interviews Mr. Stanley Billig, Mr. Carl Wertman, and Mr. Robert Leiby all mentioned that their families had at one time or another used house cellars for potato storage. Mr. Wertman and Mr. Billig mentioned equipment or specially built facilities for getting potatoes in and out of the cellar. At Site 077-LY-004 there is an earth mound outside the cellar bulkhead, built up when dirt was shaken from potatoes before putting them into the cellar. (This was difficult to capture on film so no image is included here.) Extra large cellar bulkheads may indicate that potatoes were stored in a house cellar.

House, Heidelberg Township, Lehigh County, c. 1910-1925. Site 077-HE-008. The hipped roof, dormers, and porch draw from "foursquare" form and styling popular in the period.

House, Lynn Township, Lehigh County, about 1915. Site 077-LY-002. This house is documented to about 1915, yet its form and style recall late nineteenth century fashions.

Barns, 1910-1960

Few new barns were built during this period, but significant alterations to existing barns were made as farming changed. The traditional Pennsylvania forebay barn was frequently adapted to accommodate potatoes and sometimes also poultry.

Pennsylvania barn adaptations for potatoes were frequent and carried definite architectural markers. The lower level of the Pennsylvania bank barn could be altered to serve as potato storage. Field evidence of such alterations is ample and flows from the potato's requirements. First, potatoes require dark conditions to inhibit sprouting. A lower-level bay altered for potato storage, therefore, will have any windows or other openings closed up. Second, potatoes require high humidity to minimize shrinkage; but they spoil if the moisture condenses. Therefore, the spaces are closed tight, but the crosswise walls in the former stable area are often lined with boards spaced an inch or two from the masonry, to provide air space and prevent condensation. Burlap-covered walls and openings are another clue that an area was adapted for potatoes. Occasionally ceiling-mounted fans help keep proper humidity conditions as well. Third, to facilitate loading and unloading, small Dutch doors give way to large hinged doors that admitted machinery and wagons. Fourth, sometimes potatoes were loaded from above, so hatches were cut into the upper level floor and removable chutes inserted. Fifth, sometimes bins were installed, to keep varieties separate or for ease of handling. Sixth, potato cellars (unlike livestock areas) will have no traces of whitewashing. Potato bays documented in field study often were interior bays; animals in end bays on either side helped to keep the potatoes from freezing during the winter.

Pennsylvania barn forebay area showing potato door and boarded window opening, Heidelberg Township, Lehigh County, built c. 1880-1910, altered c. 1930-50. Site 077-HE-004.

Pennsylvania barn with potato alterations: sealed off lower level bay, and shed roof extension for a large potato wagon, Heidelberg Township, Lehigh County, c. 1900, altered c. 1950. Site 077-HE-007.

Potato bay converted from barn machinery bay. This is opposite side from the photo above.

Barn forebay with potato alterations, Heidelberg Township, Lehigh County, original date c. 1870, alterations c. 1940. Site 077-HE-008.

This the same barn. Its gable end was extended and a potato cellar added below; it is identifiable not only by the large doors but also by the mounded earth around the wall.

Interior appearance:

This is a lower level Pennsylvania forebay barn bay, altered for potato storage with burlap covered boards along the wall, Lynn Township, Lehigh County, c. 1935-50. Site 077-LY-004.

Pennsylvania barns were sometimes also altered for poultry housing during this period. Commonly these changes involved inserting multiple windows in a wall.

Pennsylvania barn with windows inserted for poultry housing, Lynn Township, Lehigh County, originally built c. 1870, gambrel roof addition late 1930s. Site 077-LY-007.

Potato Cellars, 1910-1960

Lehigh County farm families built many specialized potato cellars during these years. The defining marks of a purpose-built potato cellar are several. These cellars have a lower story of masonry, usually concrete block but sometimes stone. The lower story is usually encased in earth or built into earth. Some of the cellars only have a roof above ground, but others have a full story above ground, usually built of wood frame. These two-story cellars have two-level access; a ramp leads to a door on the upper level, while the lower level entry doors open to ground level. In the two-story cellars, the upper level is used for machine storage. Its floor is pierced with numerous small hatches, which would be opened at harvest time. The lower level often would be divided into bins, and it would have large access doors and wood lined block walls. Later potato cellars often have electric powered ventilation systems and occasionally heaters as well.

Potato barn, Heidelberg Township, Lehigh County, c. 1940-60. Site 077-HE-002.

Potato barn, Heidelberg Township, Lehigh County, c. 1935-50. Site 077-HE-005. It has windows over the door, but on closer inspection they were found to have been covered with burlap.

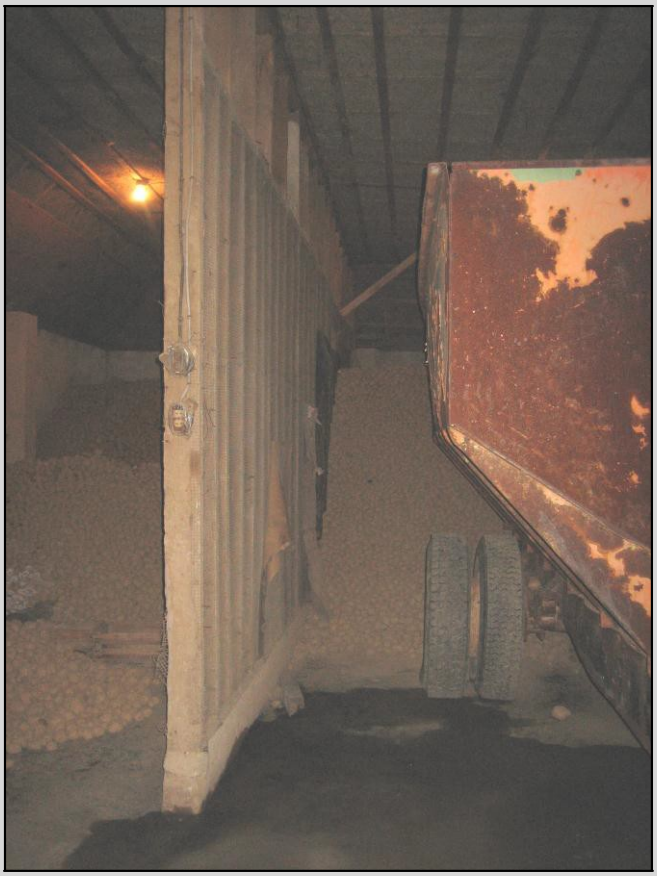
Potato barn, Heidelberg Township, Lehigh County, c. 1936. Site 077-HE-011. This fine cellar is built of rock-face concrete block and has access on the upper level gable and eaves. Reportedly the earth fill for the bank was obtained when the road was widened in the 1930s by a New Deal public works project.

Potato barn, Lynn Township, Lehigh County, c. 1940. Site 077-LY-001. This is one of the most architecturally elegant examples found in field study to date. Little is known about its designers.

Potato barn lower-level interior with bins, Lynn Township, Lehigh County, c. 1935-50. Site 077-LY-004. Note the potato basket.

Potato barn lower level interior showing wood slats attached to masonry walls, Lynn Township, Lehigh County, c. 1935-50. Site 077-LY-004.

Hatch in upper level floor of a potato barn, Lynn Township, Lehigh County, c. 1935-50. Site 077-LY-004.



Potato cellar bins with potatoes, Heidelberg Township, Lehigh County, c. 1950. Site 077-HE-002.

Potato barn, Lynn Township, Lehigh County, c. 1935-50. Site 077-LY-004.

Potato storage, Heidelberg Township, Lehigh County, c. 1950. Site 077-HE-007. This is actually a garage that was adapted for potatoes. The telltale clue is the curtain cloth over the windows and hung from the ceiling.

Huckster Truck Garages, 1910-1960

Occasionally a specialized building housed the huckster truck. One was documented in field survey work, and another was described to field workers, but not visited. The building documented has many features of a garage. However, it had a full second story with entrance door to the upper level in the banked eaves side directly opening to the farm field. It also was situated directly on the roadway rather than at the end of a driveway near the house. Mr. Donald Breininger remembers that the upper story was used for farm implement storage. Currently there is a relatively small door. This door may have replaced a larger one. It is possible also that loading of farm goods was facilitated by bringing in potatoes from the second level and loading them down into the wagon or truck bed.

Huckster truck garage, Weisenberg Township, Lehigh County, c. 1925. Site 077-WE-001.

Upper level entry, Huckster truck garage, Weisenberg Township, Lehigh County, c. 1925. Site 077-WE-001.

Mr. Breininger wrote: "When auto travel became popular this building was erected to house the auto and huckster truck. The 2nd floor was farm implement storage. Originally there were two sliding doors to the road, at that time a dirt road. The one door was closed completely and the other replaced with the current door. The side door was added much later because of the increased traffic. The windows were also added. The similar building on our farm in the same neighborhood was built in 1919."[37]

Corn Cribs, 1910-1960

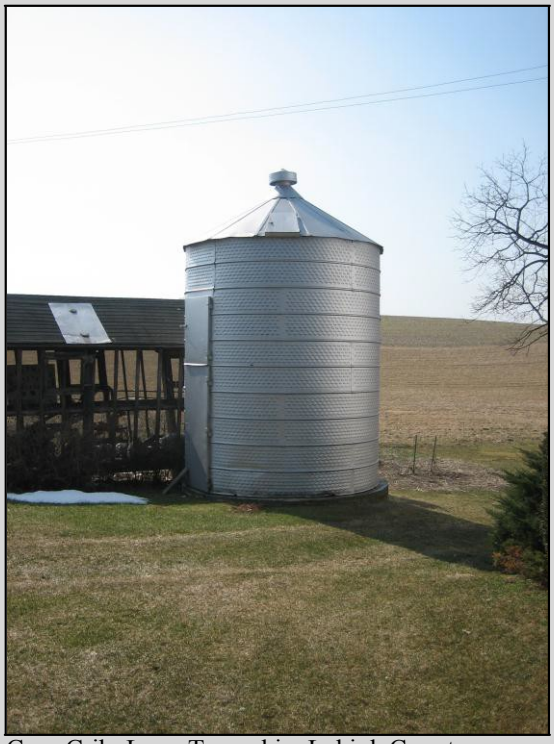
Though corn was a minor crop, it still needed to be stored. Corn cribs in the area often had canted sides, even those built quite late.

Corn Crib and bins, Heidelberg Township, Lehigh County, both c. 1960. Site 077-HE-001.

Corn crib, Heidelberg Township, Lehigh County c. 1940. Site 077-HE-003.

Cylindrical corncrib, Heidelberg Township, Lehigh County c. 1950-60. Site 077-HE-003. By about 1950 or 1960, newer storage for corn in the ear often took the form of wire mesh cylinders with conical metal roofs.

Corn bin for loose corn, Heidelberg Township, Lehigh County c. 1960-80. Site 077-HE-003. These bins stored not ear corn but corn in the kernel.



Corn Crib, Lynn Township, Lehigh County, c. 1965. Site 077-LY-002.

Corn Crib, Lynn Township, Lehigh County, c. 1950. Site 077-LY-002. This crib has the older style canted sides, but is built of modern materials including light wood frame and woven wire mesh sides. It is up on concrete blocks.

Corn crib, Lynn Township, Lehigh County, c. 1950. Site 077-LY-004. Another small crib made with industrially produced metal components.

Butcher Houses, 1910-1960

Some new butcher houses were built during this period, and existing ones were still used frequently. One butcher house from the twentieth century was incorporated into a machine shed.

Machine shed-butcher house, Lynn Township, Lehigh County, c. 1925-40. Site 077-LY-006. This interesting building, c. 1925-40, is a machine shed combined with a lower-level butcher house.

Concrete block butcher house with interior smoke house, Heidelberg Township, Lehigh County, c. 1950-60. Site 077-HE-002.

Root Cellars, 1910-1960

It is difficult to date root cellars with any accuracy. Whether or not they were built during the period, root cellars continued in active use throughout this period.

Summer Kitchens, 1910-1960

Most summer kitchens documented in field survey predated 1910, but as with butcher houses and root cellars, they continued in use.

Smoke Houses, 1910-1960

Rural people in northwestern Lehigh County continued to build new smoke houses well into the twentieth century. Several oral history informants now in their seventies and eighties recalled smoking meats when they were children and young adults.

Smoke house interior and exterior, Heidelberg Township, Lehigh County, c. 1920-30. Site 077-HE-007.

Smoke house showing exterior door for ash removal, Lynn Township, Lehigh County, c. 1920-1940. Site 077-LY-004.

Granaries, 1910-1960

An interesting appearance in the mid-twentieth century was the freestanding granary. This was unexpected, because so many Pennsylvania bank barns have interior granaries. The freestanding granaries were mainly built after about 1930. They were sited on a road or farm lane. They were usually gabled, made of tight boarded wood frame, elevated on concrete blocks, and contained interior bins. Field workers questioned local farmers and the county extension agent about why freestanding granaries would appear in this time and place, but no consensus emerged. It seems possible that their appearance may have had something to do with the disappearance of horse farming (thus it was no longer necessarily efficient to put grain in the barn), and/or with innovations in threshing technology or even marketing practices. It does not seem likely that grain was pushed out of the barn by potatoes, since grain would always have been stored on the upper level.

Granary and corn crib, Heidelberg Township, Lehigh County, c. 1955-65. Site 077-HE-002.

Granary bins, Heidelberg Township, Lehigh County, c. 1950. Site 077-HE-002.

Granary, Lynn Township, Lehigh County, c. 1930. Site 077-LY-002.

Granary, Lynn Township, Lehigh County, c. 1940. Site 077-LY-006.

Garages, 1910-1960

With the arrival of the auto, the garage also appeared. Close to ninety percent of farm families in the Lehigh County potato belt owned autos in 1927, and Lowhill and Lynn Township families averaged more than one. Garages were usually simple gabled structures.

Garage, Lynn Township, Lehigh County, c. 1920. Site 077-LY-006.

Milk Houses, 1910-1960

Though dairying was relatively unimportant in northwestern Lehigh County, many farms had six or a dozen cows. Even small dairies would be required to have a milk house. Field survey documented several milk houses on Lehigh County potato farms. A milk house is a small structure used expressly for the purpose of isolating fresh milk from the smells, dust, and microbes of the barn environment. The milk house is a twentieth century phenomenon. It would be sited conveniently near the roadside or on a farm lane for easy pickup of goods. The milk house was a small (typically ten or twelve feet on a side)

structure with a square or rectangular footprint. Construction materials were often masonry, including concrete block or rock face concrete, but sometimes frame. Most milk houses have gabled roofs, but some have a shed roof or pyramid roof. 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 and dry containers (and sometimes other equipment like separators). The milk houses should be interpreted as a symbol of the expanded role of the state farming system. By the early twentieth century, municipalities had begun to regulate in the name of public health. The milk house also represents a shift in the work of dairying from women to men.[38]

Milk house, Heidelberg Township, Lehigh County, c. 1950. Site 077-HE-002.

Rock face concrete block milk house, Lynn Township, Lehigh County, c. 1835. Site 077-LY-003.

Poultry Houses, 1910-1960

As poultry became more important on northwestern Lehigh County farms, separate poultry housing appeared. The poultry houses documented in field work tended to be relatively small; one or two stories; built of frame; and usually sited near the house, reflecting that women and children still were deeply involved in poultry work. Some poultry buildings had brooder facilities and normally also housed laying hens. A few buildings survive with interior nest boxes, roosts, and even feeder apparatus still intact. The poultry buildings were well lighted and had small entry holes near the base.

Poultry house, Heidelberg Township, Lehigh County, c. 1960. Site 077-HE-002. This building had a brooder house inside it with chimney for the stove pipe that heated the brooder area.

Poultry houses, Heidelberg Township, Lehigh County, c. 1930-35. Site 077-HE-008.

Poultry house, Heidelberg Township, Lehigh County, c. 1940. Site 077-HE-002.

Poultry house interior showing extant roosting area, nest boxes, and feed/water container suspended from the ceiling, Lynn Township, Lehigh County, c. 1940-50. Site 077-LY-004.

Machine Sheds, 1910-1960

With advancing mechanization, machine sheds became more common. Lehigh County machine sheds resembled similar buildings in other regions. That is, they were frame gabled buildings with large openings to admit machinery and sometimes integral corn cribs. Heavy mortise and tenon framing continued in Lehigh County well after other regions had switched to lighter balloon style frames.

Machine shed, Heidelberg Township, Lehigh County, c. 1940. Site 077-HE-003.

Machine shed, Heidelberg Township, Lehigh County, c. 1940-50. Site 077-HE-007.

Machine shed with gable end corn crib, Heidelberg Township, Lehigh County, c. 1920.
Site 077-HE-011.

Privies, 1910-1960

Though of course the privy was a standard on all Pennsylvania farms prior to 1910, most surviving privies date to the twentieth century. Lehigh County is no exception.

Privy, Heidelberg Township, Lehigh County, c. 1940. Site 077-HE-007.

Spray Sheds, 1910-1960

A spray shed is a small building where crop sprays and sometimes equipment are stored. It is often near water, or a cistern. In Lehigh County spraying was very important. Local farmers recall mixing sprays near ponds or at a creekside. The one building tentatively identified as a spray shed was located next to a farm pond.

Spray shed, Heidelberg Township, Lehigh County, c. 1950. Site 077-HE-008.

Silos, 1910-1960

Northwestern Lehigh County farms did not emphasize dairying to any great extent, but a few farms had silos. A silo is an airtight facility (usually vertical, but sometimes in a pit) which receives green material which then ferments in the anerobic interior, providing year-round nutriment for dairy cows.

Silo, Lynn Township, Lehigh County, c. 1950-60. Site 077-LY-002.

Silo, Lynn Township, Lehigh County, about 1937. Site 077-LY-007. The hollow tile is stamped "CRANE INC KOROK SILO."

Combination Buildings, 1910-1960

As elsewhere, many farm buildings served multiple purposes. Here is just one example.

Combination structure, Lynn Township, Lehigh County, c. 1940. Site 077-LY-004. It was anchored at one end by a milk house; a poultry house extended beyond it, and at the far end was a two-hole privy.

Cold Frames, 1910-1960

Cold frames were found at several sites. The cold frame is not technically a building, but it is included in this section because documented cold frames were always associated with a building. Home gardeners used them to get a head start with cool-weather crops like lettuce, or possibly to start warm-weather vegetable plants from seed. Usually they would be built onto a building wall, facing south if possible, to get additional warmth from masonry and the sun respectively.

Cold frame, Lynn Township, Lehigh County, c. 1940-60. Site 077-LY-005. The frame would originally have been entirely covered with glass, which could probably be tilted partially open to admit cool air.

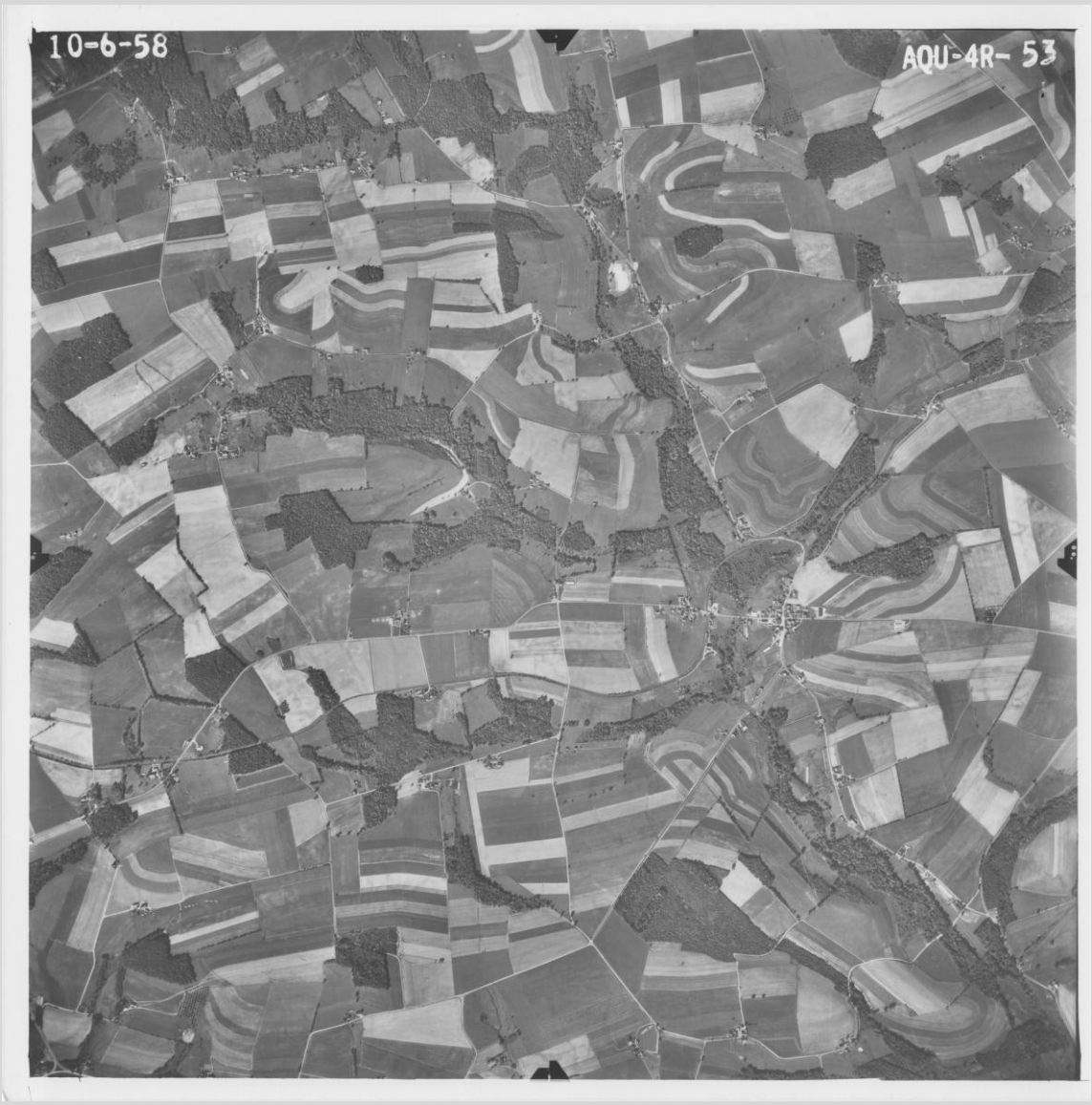
Landscape Features, 1910-1960

The most notable new agricultural landscape features to appear during this period was the farm pond. Oral histories and aerial photographs confirm that the main pond-building phase occurred after World War II. Farm ponds were widely popular in postwar Pennsylvania. Earth moving equipment was more effective and more accessible. Insurance companies reduced rates for farms with ponds. Interest rose in recreational uses such as fishing and swimming. And, in some regions, specialty crops involved high water use for irrigation or spraying. This was true, for example, in the Adams County fruit belt, and it was also true in northwestern Lehigh County. Irrigation was mentioned by several oral-history informants as becoming really important in the dry years of the 1960s.[39] Water was often needed to mix sprays, and several local farmers mentioned using pond water for this purpose.

Farm pond, Heidelberg Township, Lehigh County, c. 1950-60. Site 077-HE-002.

Another important landscape change was contour plowing and strip cropping. These erosion-control measures were stressed by the agricultural extension agent. In the potato regions, alternate strips of potatoes and alfalfa were recommended. Compare the 1938 aerial to the one just twenty years later to see the impact of contour plowing and strip cropping.

Aerial photo, Germansville vicinity, 1938. Germansville is to the right, just above the center. Penn Pilot.



Aerial photo, Germansville vicinity, 1958: Germansville is in the right center. Penn Pilot. Sometimes the new planting practices created new field boundaries, but more often the old boundaries were retained, and the interior appearance of the fields changed. It is not clear how crop rotation practices affected the landscape. A patchwork of small, irregularly shaped fields was common throughout the state. Permanent landscape changes, it seems, were not involved; but the color, texture, and height of crops in the rotation may have shaped a locally distinctive look, with fields of dark green, bushy potato or alfalfa plants low to the ground, while taller corn occupied less acreage than elsewhere.

Property Types and Registration Requirements – Criterion A, Pennsylvania

This statement outlines considerations for Pennsylvania as a whole.

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 s 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.[40]

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.[41] 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, this illustrates changes in gender patterns better than a farmstead that has 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.

Property Types and Registration Requirements —

Criterion A, Agriculture: Registration Requirements for the Lehigh County Potatoes Region

A. Properties may possess a strong representation of typical buildings and landscape features from one chronological phase of the region's agricultural history:

> A property 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 mechanization and tenancy, and labor patterns, and 4) if,

in instances where a farm has a strong, documented connection to a particular ethnic group or land tenure system, its architecture and landscape shows show evidence of that connection.

To be considered significant under Criterion A for "Potatoes as one component in a diversified farming system, 1850-1910," a farmstead should contain a representative house dating to the period or earlier; a Pennsylvania bank barn; and at least two outbuildings related to this phase, such as a corn crib, root cellar, smoke house, pigsty, butcher house, spring house, or summer kitchen. A farm should have these buildings plus cropland with some evidence of historic field and property boundaries. A historic agricultural district should have a more or less contiguous collection of farms representing these features.

To be considered significant under Criterion A for "Potatoes as a primary cash crop with diversified complements, 1910-1960," a farmstead should have a representative house dating from this period or earlier; evidence of potato growing and storage as demonstrated by at least one of the following: A Pennsylvania barn altered as discussed in the narrative; a potato cellar; evidence for home cellar potato storage; at least other three outbuildings related to this period's farming system, such as a butcher house, summer kitchen, granary, milk house, poultry house, combination building, or others named in the narrative for the period. A farm should have the buildings plus cropland and a pond or evidence of contour plowing or strip cropping. A historic agricultural district should have a more or less contiguous collection of farms representing these features.

B. Properties may possess a range of buildings and landscape features that illustrate change over time in the region's agricultural history**:**

There are many ways in which a farmstead, farm, and historic agricultural district can illustrate the key changes over time in the Lehigh County potato region's agricultural history. Key agricultural changes should be represented architecturally and by landscape features, so there should be plentiful subsistence buildings, architectural evidence of potato storage, and Pennsylvania bank barns.

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

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

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".[42]

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 ...".[43] 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.[44] 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 Revivalized 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).

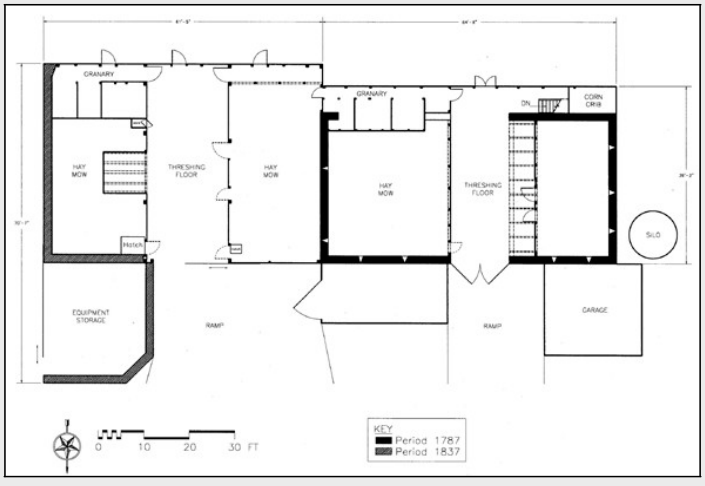
Ornament on Hodge Barn, Centre County.

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.

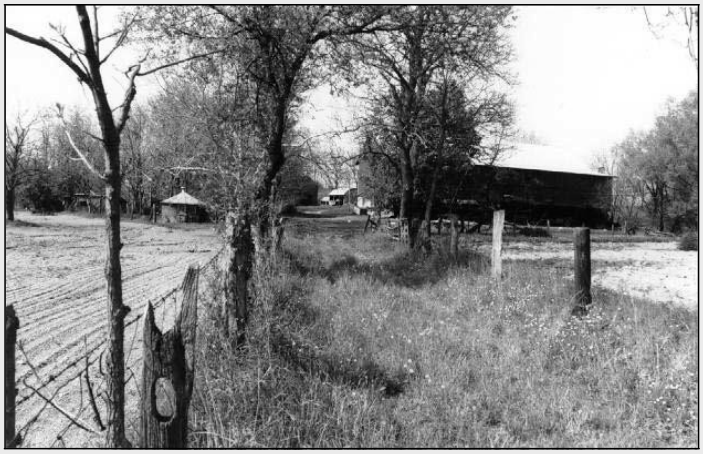
Example 4. Smokehouse, Tulpehocken Manor, Lebanon County, late 18th century. Most examples of architectural significance will likely be larger buildings such as barns, but this smokehouse (in Lebanon County) is an example of a smaller building which might qualify because of its masonry (which qualifies 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

Property Types and Registration Requirements – Criterion D, Archaeology

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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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.

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."[45]

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."[46]

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 sigificance, 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 consituent 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"[47] 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."[48] 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."[49] 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.

Notes

1. Brent Yarnal, "Climate," in E. Willard Miller, ed., *A Geography of Pennsylvania* (University Park, PA, 1995).
2. U.S. Dept. of Agriculture, *Series 1959, N0. 31, Soil Survey, Lehigh County Pennsylvania* (Washington, D. C: U. S. Government Printing Office, 1963).
3. Crop and farm size information is from the US Census of Agriculture. Population information is from F. A. Davis, *New Illustrated Atlas of Lehigh County, Pennsylvania….* (Reading, PA, 1876), 9-10.
4. Pennsylvania State Agricultural Society *Annual Report*, 1882, 370-371.
5. Alfred Matthews and Austin Hungerford, *History of the Counties of Lehigh and Carbon...* (Philadelphia, 1884), 23; Lehigh Valley Planning Commission, *History of the Lehigh Valley Region...* (no publication information given, 1976), 43-44.
6. Ann Bartholomew, "Agriculture in Lehigh County to 1920," *Proceedings of the Lehigh County Historical Society* 32 (Allentown, 1978), 79; Lehigh Valley Planning Commission, *History of the Lehigh Valley Region...* (no publication place, 1963), 99; "Liming in Lehigh," *Farmer's Register* September 1835; Peggy Light, "The Kunkel Brothers, Albany Township's Bachelor Farmers," Albany Township Historical Society Newsletter, volume 13 # 1, Winter 2010.
7. I. Daniel Rupp, *History of Northampton, Lehigh.... Counties* (Harrisburg: 1845), 127.
8. F. A. Davis, *New Illustrated Atlas of Lehigh County, Pennsylvania….* (Reading, PA, 1876), 9.
9. Ann Bartholomew, "Agriculture in Lehigh County to 1920," 81, 94-5.
10. I. Daniel Rupp, *History of Northampton, Lehigh.... Counties* (Harrisburg: 1845), 134.
11. F. A. Davis, *New Illustrated Atlas of Lehigh County* (Reading, PA: 1876), ii.
12. "The Journal of Charles Fritz," republished in the *Weisenberg/Lowhill Historical Society News*, Issue 31 (January 1910), np.
13. F. A. Davis, *New Illustrated Atlas of Lehigh County* (Reading, PA: 1876), ii.
14. See more photographs in H. Winslow Fegley, *Farming, Always Farming*, Figures 211 through 216.
15. These were at sites 077-HE-002, 077-HE-003, 077-HE-011,077-HE-012, 077-LY-003, and 077-LY-005. At 077-HE-006, an earlier five-bay house was Victorianized in the late 19th century. At 077-HE-004, the proprietors built a five-bay house in the late nineteenth century.
16. In the North and West Branch Susquehanna region, field study noted butcher houses too. It would seem logical that these butcher houses would have the same function as the ones further east, since people migrated to the Susquehanna Valley from places like Lehigh County. However, some buildings called butcher houses in the North and West Branch region lack set-kettles or even a stove of any type. But in either case, the buildings were traditionally associated with butchering and accommodated a smaller or wider range of the butchering process. Where set-kettles were not present, the cooking may have been done in a kitchen or a temporary outdoor facility.
17. In a March 2010 email to Sally McMurry, agricultural extension agent Robert Leiby mentioned a house in Lynn Township which went up for sale after its elderly owners passed away, around 2002. When the house was readied for sale, its attic *rauchkammer* was found to have a dozen hams estimated at fifty years old.

18. Ann Bartholomew, "Agriculture in Lehigh County to 1920," 91, offers a very good explanation of a pig sty interior layout and function.
19. "Berks and Lehigh Farmers in Potato Belt Harvesting Crop Exceeding One Million Bushels." *Kutztown Patriot*, September 20, 1913. Reprinted verbatim in the Albany Township Historical Society Newsletter, Volume 3, Number 4 (Winter 2000-2001).
20. Ann Bartholomew, "Agriculture in Lehigh County to 1920," 95-97.
21. Ann Bartholomew, "Agriculture in Lehigh County to 1920," 94; "Berks and Lehigh Farmers in Potato Belt Harvesting Crop Exceeding One Million Bushels." *Kutztown Patriot*, September 20, 1913. Reprinted verbatim in the Albany Township Historical Society Newsletter, Volume 3, Number 4 (Winter 2000-2001), n. p.
22. E. L. Nixon, *The Principles of Potato Production* (New York, 1931), 46; E. L. Nixon, "A History of Potato Growing in Pennsylvania," *Pennsylvania Farmer* November 10, 1934; Stevenson Fletcher, "Spuds and Research," *Pennsylvania Farmer* September 1, 1934; Agricultural Extension Archives, County Agent Report, 1931; Agricultural Extension Archives, Home Economics Agent Report, 1937; J. B. R. Dickey, "Methods and Trends in 400 Bushel Production in Pennsylvania," *The American Potato Journal*, 12:4 (April 1935): 82-85; D. R. Glendinning, "Potato Introductions and Breeding up to the Early Twentieth Century," *New Phytologist,* 94:3 (July 1983): 479.
23. Agricultural Extension Archives, County Agent Report, 1937, 1944; Willard Kistler interview, March 2010; Cornell University "Vegetable Varieties for Gardeners," website at http://vegvariety.cce.cornell.edu/mainSearch/showAll.php?ID=42&sortBy=overallrating&order=DESC&searchIn=1, accessed May 19, 2010; Robert Leiby interview, March 2010.
24. Arthur Gilbert, et al, *The Potato* (New York, 1917), 238; Dickey, "400 Bushel Club."
25. Ann Bartholomew, "Agriculture in Lehigh County to 1920," 95-7; Emil Rauchenstein and F. P. Weaver, "Types of Farming in Pennsylvania," Pennsylvania Agricultural Experiment Station Bulletion # 305 (April 1934), 57; E. L. Nixon, *Principles of Potato Production*, 89-90. In March 2010 the Lehigh County agricultural extension agent, Robert Leiby, noted that current philosophies held that three year rotations are best.
26. Gilbert, *The Potato*, 102-105; Nixon, "A History of Potato Growing in Pennsylvania," *Pennsylvania Farmer* November 10, 1934; Nixon, *Principles of Potato Production*, 107; Dickey, "400 Bushel Club."
27. (http://www.google.com/search?hl=en&client=firefox-a&hs=Zhz&rls=org.mozilla:en-US:official&channel=s&defl=en&q=define:paris+green&ei=QOvpS63fBoKC8gaMwpnlDg&sa=X&oi=glossary_definition&ct=title&ved=0CBIQkAE accessed May 11, 2010
28. Dickey, "400 Bushel Club."
29. J. B. R. Dickey, "Potato Consumption in the United States," *American Journal of Potato Research* volume 10 # 6 (June 1933): 114-118.
30. F. F. Lininger, "Potato Marketing in Pennsylvania," Pennsylvania State College Agricultural Experiment Station Bulletin # 278, May 1932, 5-9.
31. See for example, Lehigh County Agricultural Extension Archives, Agent Report, 1918.
32. "Two Good Meals and a Dollar a Day," Albany Township Historical Society Newsletter volume 3 # 1, Spring 2000; Robert Leiby interview; Peggy Light, "A Woman's Work, Mary Stump Snyder 1915-2006," Albany Township Historical Society Newsletter Volume 12 # 3, Fall 2009.

33. Charles W. Ettinger, "The Roving Reporter," article on the Trexler Power Seed Potato Cutter, Allentown Morning Call, May 10, 1946; reprinted in the Albany Township Historical Society Newsletter volume 2 # 4, Winter 2000, not paginated.
34. Lichtenwalner interview, March 2010.
35. Paul I. Wrigley, "Farm Tenancy in Pennsylvania," Pennsylvania State College Agricultural Experiment Station Bulletin # 383, September 1939, 4.
36. Albany Township Historical Society Newsletter, Spring 2011, not paginated.
37. Donald Breininger, Weisenberg-Lowhill Township Historical Association, email to Sally McMurry June 7, 2010.
38. This text is taken from the "Milk House" entry in the field guide on the Pennsylvania Agricultural History Project website.
39. Robert Leiby interview; the Lehigh County Agricultural Extension Archives, Agent Report, 1946 mentions 25 new farm ponds built that year.
40. Note that while the *buildings* represent an identifiable cultural tradition, the *owners or occupants* may not have necessarily shared 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.
41. 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.
42. NR Bulletin *How to Apply the National Register Criteria for Evaluation*, 17.
43. *Historic Farming Resources of Lancaster County*. MPDF, 1994.
44. 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).
45. "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.
46. "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
47. Ibid.
48. Ibid.
49. Ibid.

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