Agricultural Resources of Pennsylvania, c. 1700-1960

Central Limestone Valleys, c. 1830-1960

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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.

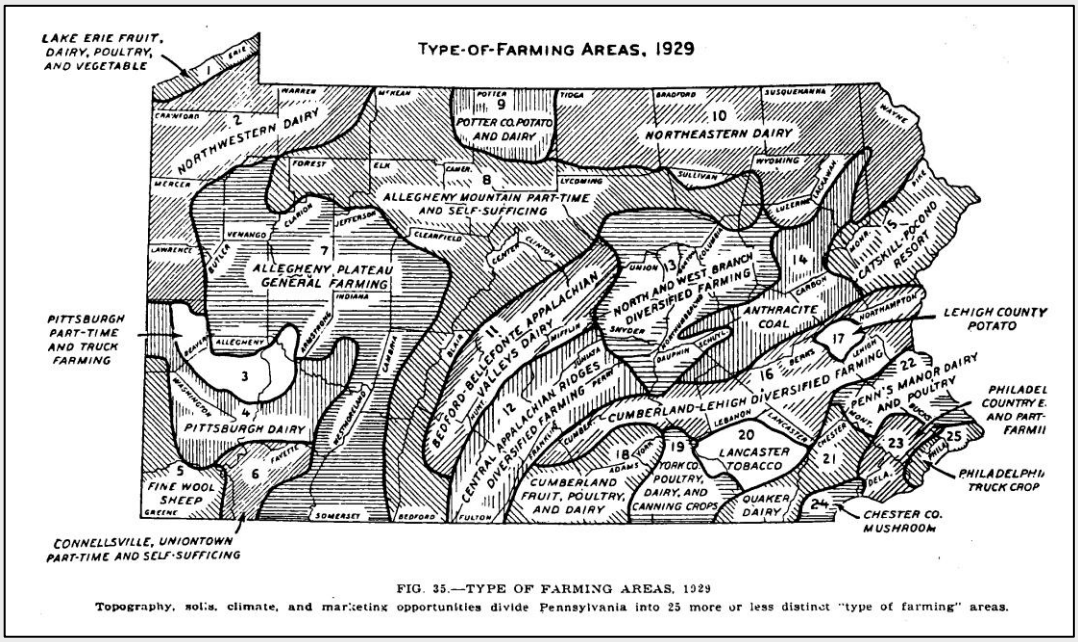
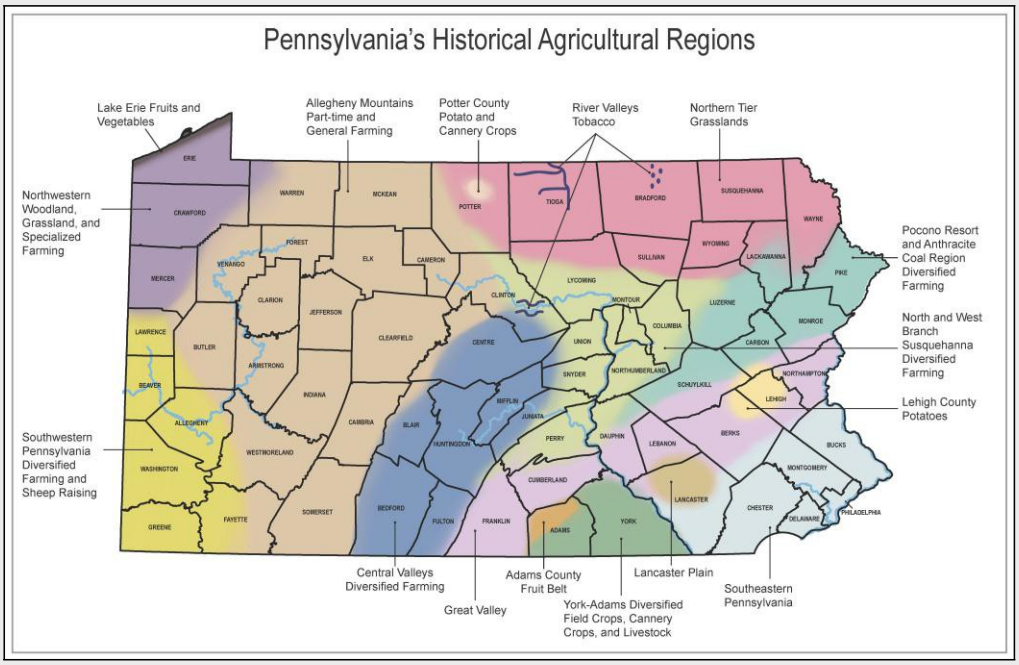


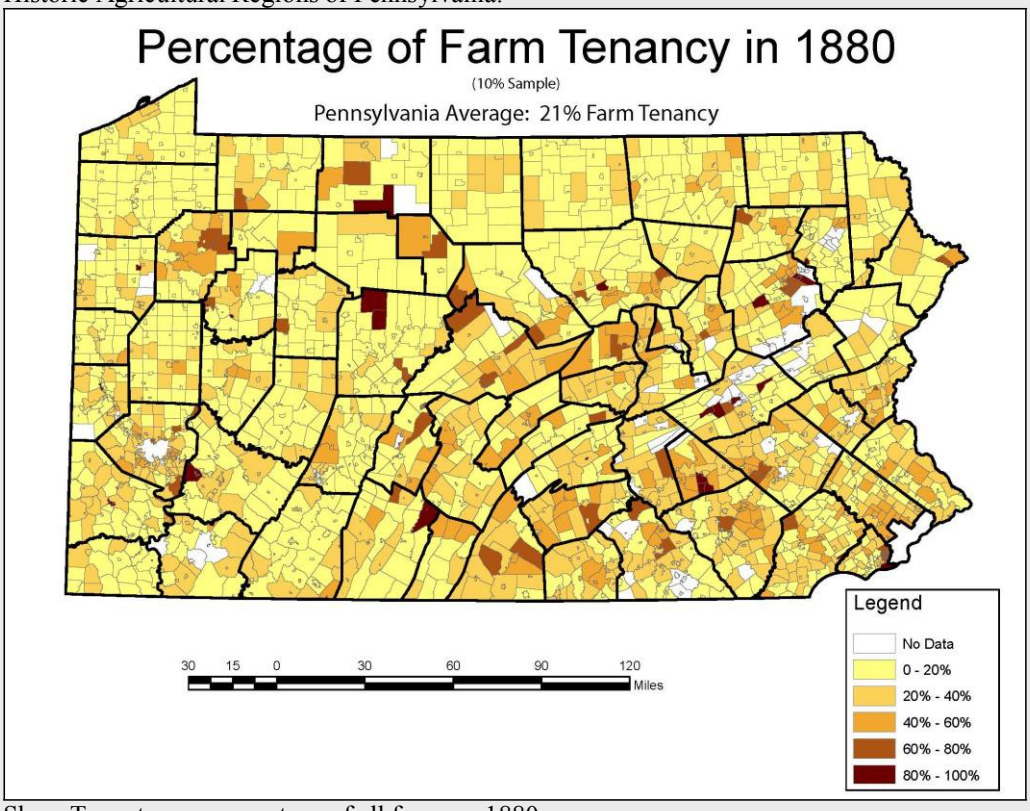
FIG. 35.—TYPE OF FARMING AREAS, 1929

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.
2 Paul I. Wrigley, "Types of Farming in Pennsylvania." Pennsylvania Agricultural Experiment Station Bulletin # 479, May 1946.

Location

The important agricultural activity in this region occurs in the valleys between ridges in the heart of Pennsylvania's ridge- and- valley province. Many of these have historical names such as Mifflin County's Big (Kish) Valley; Clinton's Sugar and Nittany Valleys; Centre's Brush and Penn's Valley, and so on. The region encompasses all of Fulton, Bedford, Blair, Huntingdon, Juniata, and Mifflin Counties; the townships of Centre County south and east of the Allegheny Front; and a few townships in southern Clinton County (Sugar and Nittany Valleys). On the eastern side of this region the boundary with the North and West Branch Susquehanna region is not sharply defined. For example, Limestone Township in Montour County, the Buffalo Valley in Union County, central Snyder County, and the Cocolamus region of eastern Juniata County have some characteristics of both regions.

Climate, Soils, and Topography

The growing season in this region ranges from 140 to 170 days, and elevations range from 400 to 1500 feet.[1] Annual precipitation averages between 35 and 45 inches, with peaks in mid spring and mid summer. Cloud cover is significant.[2] In this district, high-quality limestone alfisol soils occur in fairly level valleys between narrow sandstone ridges. The valleys are long and narrow. The ridges (around 1000 feet from the valley floors) generally stretch in a northeast-to-southwest direction, exerting a decisive influence on settlement patterns and transportation routes even down to the present. Waterways were influenced too, though they also created gaps in the ridges. The Susquehanna River's West Branch skirts the eastern edge of the district.

Historical Farming Systems

The Central Limestone Valleys are set apart from other historic agricultural regions by the combined effects of agricultural choices, cultural influences, and topographic constraints. Within the region mechanization levels varied, with quite high values in some areas. Throughout, tenancy rates were high. Farm families followed a mixed crop and livestock regime with a relatively high ratio of cropland to grassland and the importance of cash grains. Pennsylvania German cultural influence was strong in the region. The landscape influences of the long narrow shape limestone valleys exerted an impact on farm layout and transport patterns.

Settlement Era

Please refer to the separate narrative on "Agriculture in the Settlement Period to about 1840" for this period.

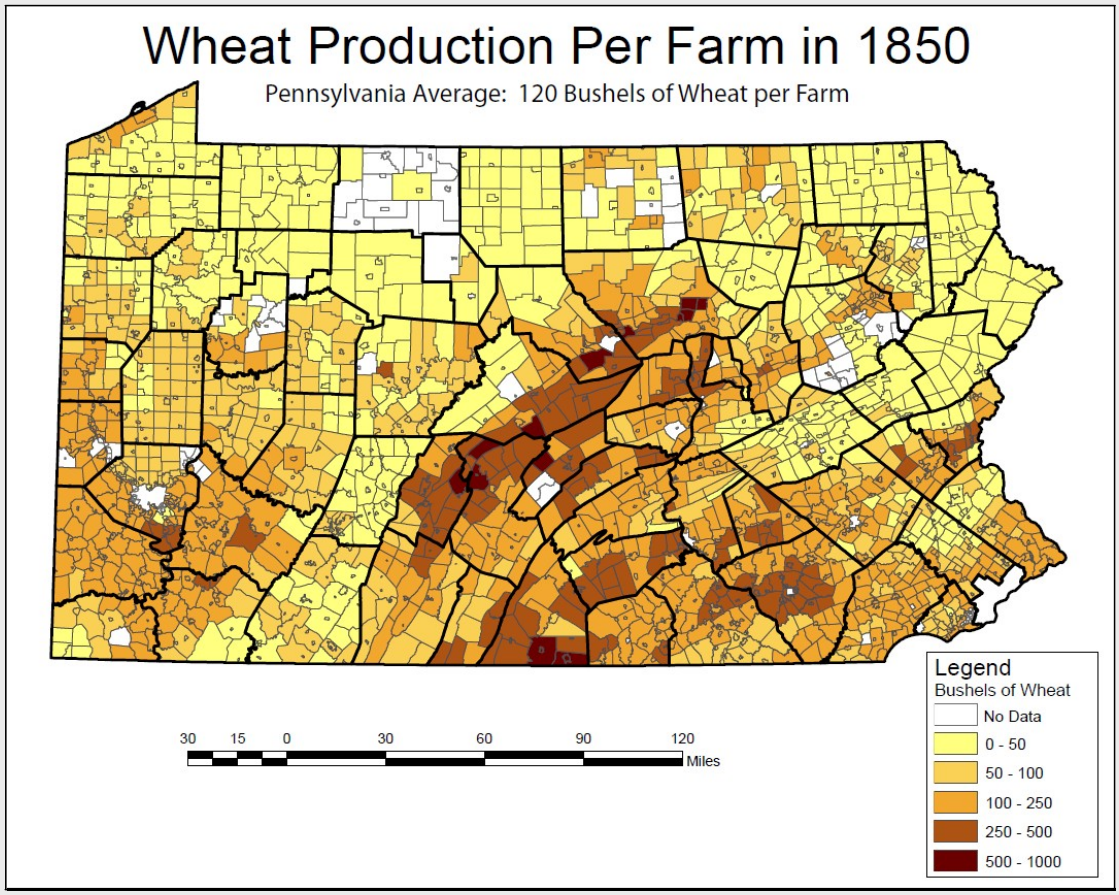
1830 to about 1880: A High-Powered Cash Grain and Livestock Economy

A new era began about 1830 with transportation improvements. In Centre County, this was manifested mostly by road construction. A turnpike company supported links between the valleys and regions to the north and south, especially between Bellefonte and Lewistown, which in turn connected to links further down the Susquehanna Valley. State funding allowed improvement of Samuel Miles's road in Brush Valley (now Route 192) in 1840.[3] Mifflin and Juniata Counties also were linked to the state canal system, and later to the rail system.[4] Bedford and Fulton Counties were traversed by important east-west roads. Not everyone agreed that these links improved farm prices, but they did open more markets, and made it more feasible to ship bulky products.[5] At the same time, home markets also grew, for example as industries (such as charcoal iron) developed and as rural villages grew. The farming system that emerged out of these conditions was distinctive. Its products were diverse, but distributed around a core that emphasized a highly mechanized system of grain and livestock raising. Tenancy was prominent, as was wage labor. Pennsylvania German culture particularly influenced work and production patterns in the Central Limestone Valleys.

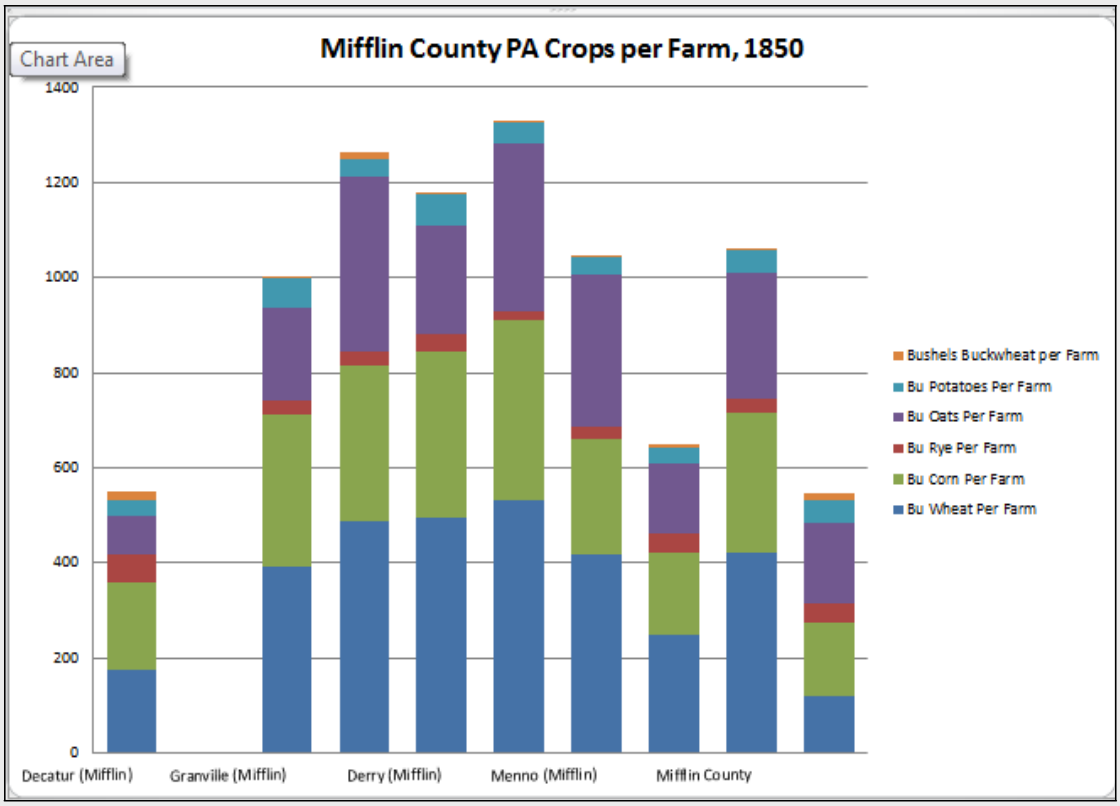
Products, c. 1830-1880

Farming in the region generally can be characterized as an integrated grain and livestock system, because the products that claimed pre-eminence in it were cash and feed grains (wheat, and corn to some extent) and livestock and their products: beef, dairy, and hogs. Cropland not in wheat was geared to producing livestock feed. Throughout the region, between about 1830 and 1880 farms in the region produced more wheat and rye, and less corn, oats, hay, and potatoes than statewide. Overall, the proportion of cropland to meadow or pasture was quite high in contrast to the northern tier grasslands. Wheat was more significant here than anywhere outside the southeast. Rye production -- long a Pennsylvania German staple—was still important at mid-century, but gradually dropped after that, because local distilling no longer was economically competitive. Gradually (at least in some places) it also it ceased to be socially tolerated, but this process took a long

while.[6] Increases in production were accomplished primarily through land clearing, not through more intensive farming. A careful study done in the 1950s argued persuasively that *land* productivity (as opposed to *labor* productivity) did not improve significantly until the twentieth century.[7]



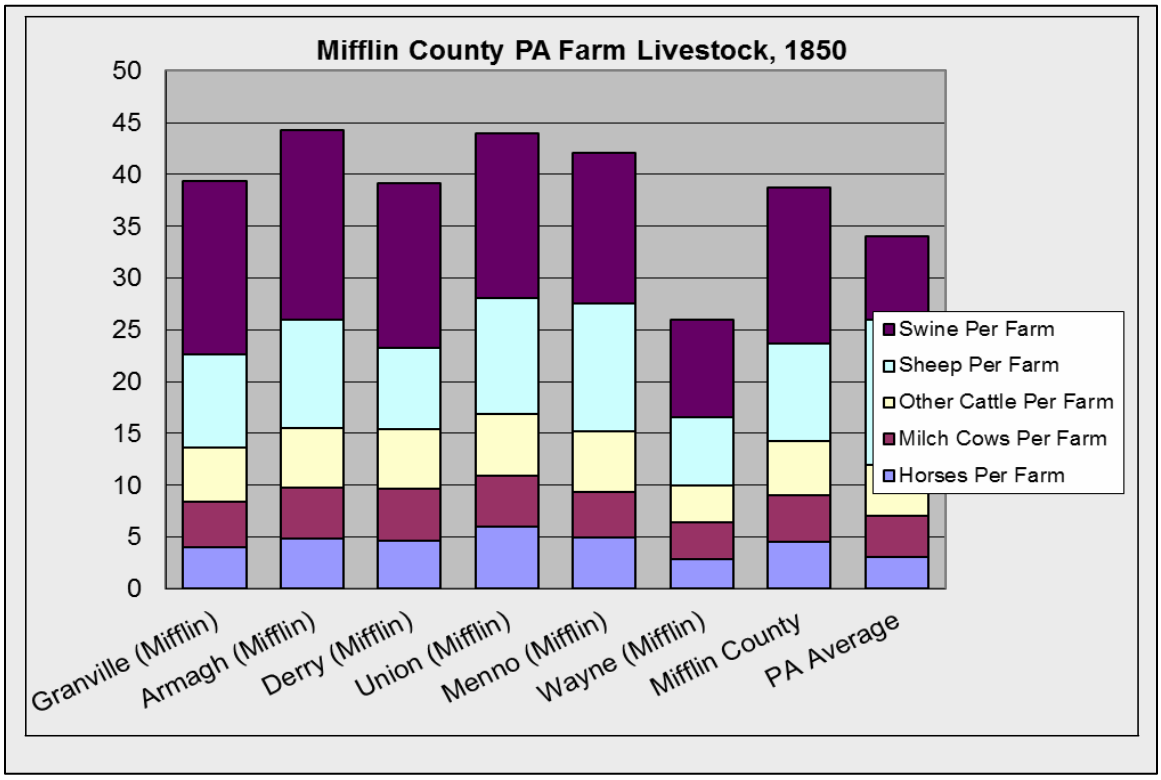
Wheat production per farm, 1850. The Central Limestone Valleys were leaders within the state.



Mifflin County crops per farm, 1850.

While wheat was a cash crop, most other field crops went to livestock feeding. There is evidence of a rising livestock industry. Farms in the region emphasized beef cattle and swine more than dairy cows or sheep. Total production levels varied within the region, but the *proportions* were quite consistent. These choices reflected conditions in the region. Iron furnace works provided markets, but generally there were few urban centers within the region, and transport to distant markets was still being developed. It therefore made sense to pursue a grain and livestock regime, because its products could either be taken to market on the hoof, or had high value in relation to bulk and thus promised a good return even with high shipping costs. Great herds of hogs were driven east to market from Centre County in the 1850s. The average farm in a Central Limestone Valley township had at least half a dozen swine, and the farms of Brush and Penn's Valleys more commonly had three times that number. Quite a few steers were kept for beef.[8] In 1851, a Centre County farmer reported to the United States Patent Office (predecessor of the USDA) that "Our most thrifty farmers buy up a lot of poor bullocks from the West, in the spring, to feed through the winter" and in this way they create from straw plus manure a "rich mine of manure," then they sell the fat beef for high prices in the spring.[9] D. W. Maynard reported in 1877 that beef animals were "fattened and slaughtered for the home trade, [and] a great many are purchased every season by dealers

and driven out of the county."[10] Central Limestone Valleys farms also kept above average numbers of sheep.



As well, farm families engaged in many small-scale activities typical of the era: poultry raising, butter making, maple sugar making, lime burning, tending the apple orchard, cutting cordwood and lumber, and processing food and fiber. Nearly everything produced on the farm could be consumed on the farm, bartered, or sold.[11] The time period witnessed an unprecedented enrichment of the farm family's "competency." Note that the term "competency" was not limited to the so-called subsistence era, but was equally popular in the more market-oriented nineteenth century. It referred not to whether a farm was commercialized or not, but to whether the family secured a comfortable standard of living. Webster's Dictionary defined "competency" thus in its nineteenth-century editions:

> *Primarily*
> Fitness; suitableness; convenience. Hence, 1. Sufficiency; such a quantity as is sufficient; property or means of subsistence sufficient to furnish the necessaries and conveniences of life, without superfluity.[12]

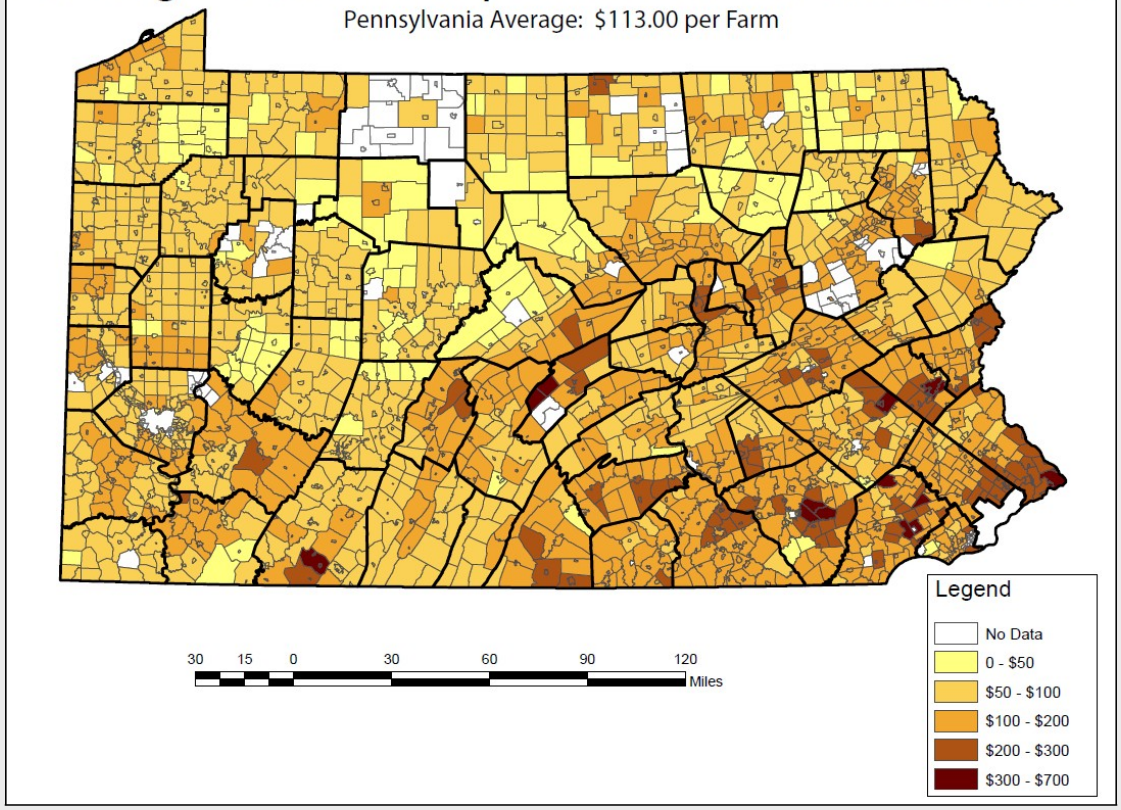
This definition clearly moves beyond mere subsistence, though a more precise definition depended on the individual; one family's competency could be another's poverty, and the reverse could also hold true. It was an elastic term. But in general in the nineteenth century, rural families came to enjoy greater variety of diet and greater comfort (heating, space, probably carpeting and other amenities).[13] At mid-century, Christian Dale's family of twelve in Centre County consumed 200 bushels of apples a year as cider, apple butter, fresh, and dried.[14] They made enough butter for household use, plus an often substantial surplus. They cured, pickled, dried, salted, and otherwise processed many different foodstuffs. Jams, jellies, preserves, sausages, and other delicacies became more common. Garden produce included a multitude of crops: cabbage, carrots, onions, and so on. These were complemented by orchards (especially apples, but also peaches[15] for a time especially in Juniata County), small fruits, and potato patches. An interesting insight about enthusiasm for gardens comes from Christian Dale, in his 1851 report on Centre County farming to the United States Patent Office (responsible for collecting data on agriculture before the USDA was established in 1863). "Seeds – the seeds distributed from the Patent Office generally come under the care of the farmer's wife or daughters. Many new, and some quite superior, vegetables have appeared – some so entirely new and strange that neither as gardener nor cook could the good housewife make out what to do with them."[16] No hints were offered as to what these strange plants were, though.

Labor and Land Tenure, 1830-about 1880

Mechanization levels varied, but in the most fertile and flattest areas, farm implement value was high; farm work was generally more mechanized here than in most of the state. On a per-farm basis, the central limestone valley farms had more horses than average, and a well above average value of implements.[17] Local newspapers contain rich and extensive accounts of the farm machinery that was available in the valleys by the 1850s and 1860s. These included threshing machinery, grain drills, corn fodder cutters, horse rakes, corn shellers, and many more, often produced locally, sometimes with locally available iron.[18] By the 1880s many farms had a full range of agricultural implements. In Union County, implement makers at Lewisburg dramatically increased production of the "Buckeye" and Hussey reapers and the "Valley Chief" reaper/mower.[19] Mifflinburg (in neighboring Union County) was well known for its wagon works. In short, farm labor processes were highly mechanized.

Farm mechanization in the region can be explained by several factors. Their extensive field crops, particularly wheat, were one reason. The processes for mechanizing the

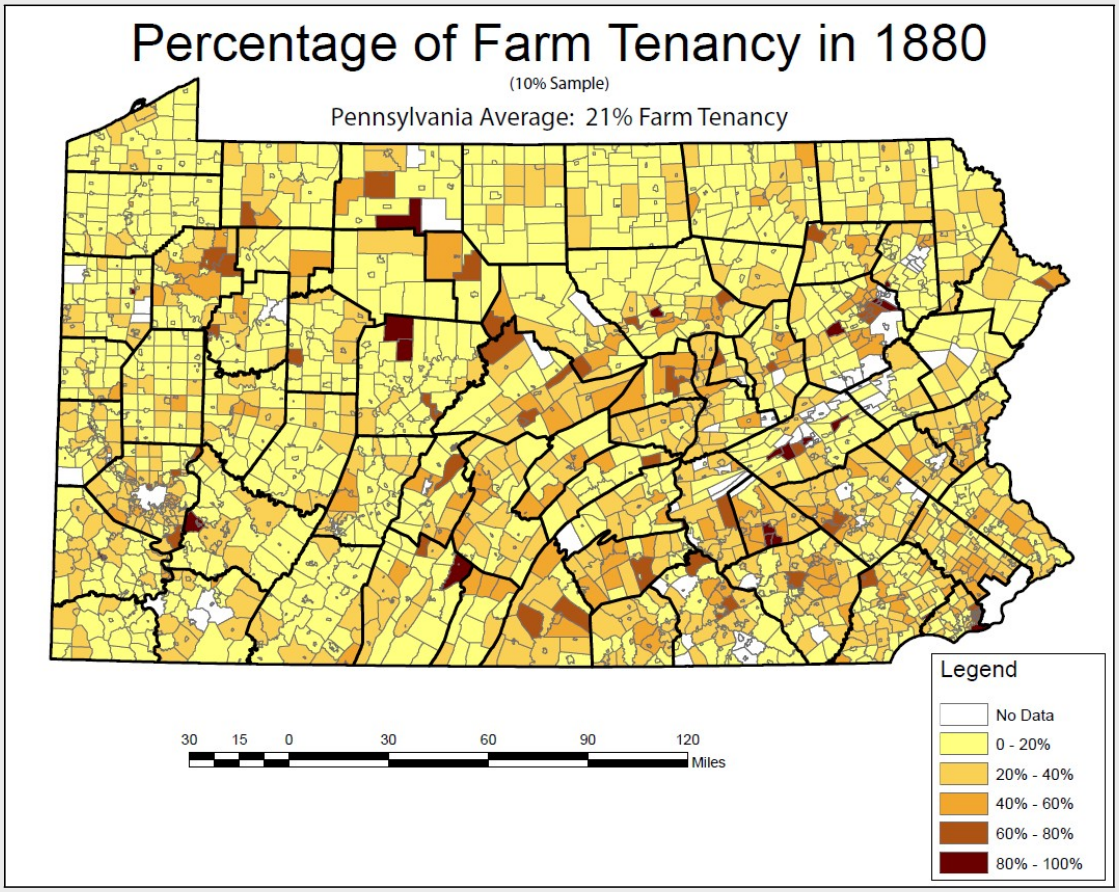
harvesting, threshing, and winnowing wheat attracted a lot of attention, because the labor needs were so acute and time-sensitive, because the crop was so valuable, and because high yields created sufficient return on investment. Another reason may have been the proximity of local ironworks, which meant that implement makers could easily avail themselves of materials. As well, the ironworks may have competed with farms for labor, so perhaps the incentive to acquire farm machines was greater also. The institution of share tenancy seems also to have had a relationship with high levels of mechanization. Tenants typically "found" their own implements. Since they did not have to sink capital into land, they could divert it into machinery. Incomes from tenancy, even share tenancy, apparently could sustain investment in livestock and machinery.



The Central Limestone Valleys region had a higher than average level of farm mechanization.

Farming in the Central Limestone Valleys was characterized by a high rate of tenancy, from 40% to over half in some spots.[20] A Pennsylvania-German cultural custom of "kinship-based share tenancy" prevailed, in which sons, nephews, or sons-in-law rented farms on share from the patriarch. They usually retained a share of wheat and other grains while the landlord received the remainder. Tenants typically paid taxes on the property, were obliged to put up fences, and supplied their own livestock and often

equipment too. Many tenancy agreements were for one year only. The diary of Brush Valley resident Samuel Gramly, for example, shows how his tenants changed every single year.[21] In March or April "flitting time," families all over the valleys changed houses for a new contract year. However, most tenants and landlords were related by blood or marriage. Renting out a farm on shares to a son (or son in law) allowed farm parents to retire. Retirement became a more common practice, and indeed the growth of many country villages in this period (such as Centre Hall) owed much to the in-migration of older adults.[22] Organizations such as the Grange and fraternal societies grew, and villages became active focal points for rural communities.[23]



Farm tenancy was higher than average in the Central Limestone Valleys.

Even though farming was mechanizing, labor was still in demand. Family and neighbors constituted the primary labor supply.[24] Sons and daughters still supplied most of it; and probate records suggest that even after turning 21, many often were not compensated in money. In addition, many farms reported paying wages for at least one or two hired hands. The manuscript population census, tax records, and other primary materials suggest that by midcentury there was a growing proportion of property-less, unskilled young men who would have formed the rural labor pool.[25] For example, in 1860, the

population manuscript census shows that in Haines Township, Centre County, 40% of households were headed by men listing themselves as farmers; 25% were headed by "laborers" and 25% by artisans; and the rest of household heads had other occupations. The census only recorded male wage labor, but women worked on farms for wages, too, doing the same kind of work the farm wife performed unpaid.[26]

Buildings and Landscapes, 1830-about 1880

Houses, 1830-about 1880

During the first part of this period, farm families in the valleys erected more permanent buildings or at least upgraded their older log buildings. In housing, a mix of the emphatically regional (such as the double door house and the locally distinctive brick farmhouses) coexisted with more generic "national" influences as seen in simple center-gable houses, two-story houses in an "L" configuration; and village housing, which often sported Victorianized "skins" over conventional forms. The residential landscape also reflected the pervasiveness of tenancy: modest, largely un-ornamented three-or four-bay, single- or double-pile tenant houses contrasted noticeably with the "mansion" houses, which tended to resemble one another and to be more ostentatious, through construction material (stone or brick), ornamentation (cornice decoration, door transoms for example), and scale.

Building materials were dominated by frame and even log, but many fine brick houses were erected in this period and they survive in disproportionate numbers. The basic formal vocabulary was quite consistent. Houses were three, four, or five bays wide, two stories high, and usually two rooms deep. In Centre County's Brush Valley, the three-bay house with square footprint, sited near springs at the ridge base, was very common. Interior plans varied; at least two houses in Brush Valley had a three-room plan reminiscent of eastern Pennsylvania German forms; but instead of the massive central chimneystack, they had gable-end corner fireplaces.[27] Many "four over four" houses appeared in this period. This term is used to refer to two-story, two-room deep gabled houses that characteristically have four symmetrically placed windows on the second story, placed directly over four openings on the first story. Usually the first-story openings consist of three windows and an off-center door; but sometimes there are two central doors flanked by windows instead. This form is common in Pennsylvania German country.[28]

Four-over-four, two-door house, Potter Township, Centre County, c. 1865. Photo-only site, no site number.

A five bay center door form was also fairly popular. Often the earlier of these buildings were modernized during the prosperous days of the 1860s, usually with either an ell or a gable-end addition.

Center-gable house, Bedford Township, Bedford County, c. 1879-1890. Site 009-BED-001.

House, East Saint Clair Township, Bedford County, c. 1840-1860. Site 009-ESC-003.

Four-over-four, two-door house, East Saint Clair Township, Bedford County, c. 1840-1875. Site 009-ESC-009.

Five-bay, center-door house, Snake Spring Township, Bedford County, mid 19th century, Site 009-SSP-005.

Tenant housing is something to look out for, especially in Union, Centre and Mifflin Counties; probably less so in Juniata. Previous historic sites surveys have seldom documented tenant houses, but the high rate of tenancy suggests that subsidiary housing must be reckoned a significant feature of the farming system. Often, the tenant operation consisted of a separate, tenant farm with its own house and outbuildings. However, in some cases, perhaps, since so many landlords and tenants were members of the same family, we should look for the "*gross dawdi* or *gross mudda*" house for the retired parents, rather than for a separate tenant house. A picture in Charles Snyder's *History of Union County* shows an almost row-house like arrangement in which the two dwellings directly about one another and share a roof and a porch, but have visually distinct sections and separate entrances.

In other cases, there will be a separate tenant house near the "mansion house," (this term is a historic one) and it will likely be more modest than the "mansion house." There may be more than one of them. In Centre County, documented tenant houses tend to be frame (not brick or stone); often just one room deep and three bays wide; less ornamented (or not at all); sometimes with a center gable in the eaves. Look for pairs of "mansion" and "tenant" in the same vicinity.[29] However, tenant farms may have their own barns and outbuildings. Some sources[30] mention laborers' cottages near the main farm where they had "their own gardens, potato patches, cows, pigs and chickens." Nothing is known about this type of housing. Further east and much earlier, a similar type of arrangement was common[31]; but nothing is known about the actual architectural implications for either period.

Tenant house, Bedford Township, Bedford County, mid to late 19th century. Site 009-BED-004.

Barns, 1830-about 1880

The Pennsylvania Barn was very common in the central limestone valleys. This form was evolving in southeastern Pennsylvania just as emigrants were beginning to fill up the central limestone valleys – in the late 18th and early 19th centuries. It rapidly became the dominant type. Though it originated in the Swiss Pratigau region and was developed in the New World by people of Germanic stock, it was such a successful form that people of many ethnic backgrounds adopted it. Nevertheless, it is historically associated first and foremost with the Pennsylvania Germans.

The Pennsylvania Barn's main diagnostic feature is the projecting forebay, or overshoot. The barn is set into a bank, and organized such that the upper level consists of central threshing floor(s), flanked by mows, and complemented by a granary (sometimes in the forebay, sometimes next to a mow on the bank side). Occasionally a granary "outshoot" would extend back from the bank side. Hay and straw were stored in the mows, and grain or feed in the granary and in a loft area (*overden*) above the threshing floor. Opposite the bankside entrance, threshing doors in the forebay could be opened to provide cross ventilation during the processes of threshing and winnowing. This second level is accessible from a ramp leading from the bank. On the ground level, there were stables. In early Pennsylvania barns, these were arranged crosswise to the roof ridge, and accommodated horses, milch cows, other cattle, and sometimes other animals such as sheep. A series of doors beneath the projecting forebay led to and from animal pens and feed alleys. The forebay side usually faced south, and often a stone or wood fence

enclosed the barnyard on the forebay side. The whole thing was efficiently organized to take advantage of gravity power (hay or feed could be thrown down to the animals, and sometimes water was piped downward too). It also served well a diversified, mechanized grain and livestock system, and aided in the capturing of manures. It represented an intensification of husbandry relative to the early days of free roaming livestock and light, seasonal feeding patterns.

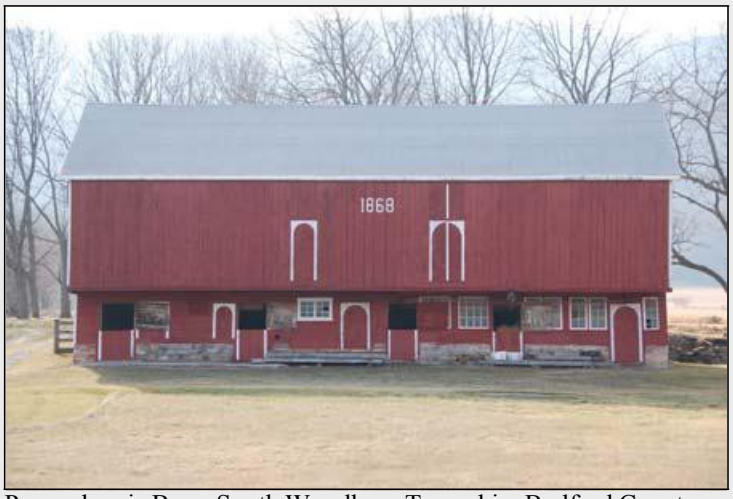
The flexible Pennsylvania barn form could be manipulated rather easily. Tiny structures served small farms. Others stretched to a hundred feet or more through incremental gable-end additions. Some had multiple threshing "floors". Over time, other common additions might include an open bay for machinery; a corncrib; a "horse power" addition (usually on the bankside) for a power sweep. In general, barns got bigger in the mid and late 19th century. This increase in size is normally taken to reflect larger herd size. However, farm size was dropping (as large parcels were divided among heirs) and so was herd size. Rather, larger barns probably reflect a) simply more acreage in production (not higher yields); b) increased motivation to shelter and feed animals better, to make them more productive; c) the need to accommodate more machines; and d) in this area, quite possibly the institution of share tenancy. The McWilliams barn in Brush Valley, for example, had two separate granaries.[32]

Forebay barn, Potter Township, Centre County, c.1845. Photo-only site, no site number.

Stone end barn, Potter Township, Centre County, c. 1840. Photo-only site, no site number.

Pennsylvania Barn, Harris Township, Centre County, c. 1850-80. Photo-only site, no site number.

Pennsylvania Barn with machinery bay, Colerain Township, Bedford County, mid to late 19th century. Site 009-CLR-007.



Pennsylvania Barn, South Woodbury Township, Bedford County, dated 1868. Site 009-SWD-007.

Basement or extended-forebay barn, Napier Township, Bedford County, 19th century. Site 009-NAP-001.

Basement or extended forebay barn, East Saint Clair Township, Bedford County, 19th century. Site 009-ESC-007.

Another barn type that appears frequently in the region resembles the Pennsylvania Barn in that it is banked on one eaves side. However, it differs from the Pennsylvania Barn in other important respects: the lower level is a full story, there is no forebay, and there are often multiple gable-end entries. Two barn types share these exterior characteristics: the "Basement barn," that is, a three-bay English barn atop a full lower story, and the "Extended-Forebay variant" of the Pennsylvania Barn. Without access to a barn interior to see if there was originally a forebay, it is often not possible to tell the two apart. However, the available documentary and field evidence suggests that the extended-forebay Pennsylvania barn and the Basement Barn both had lower levels with basically similar layout and function. For example, in the extended-forebay barn, the extended forebay is often called a "storm shed" and it corresponds to a wide lengthwise aisle in the lower level of the basement barn. Both types organized animal quarters along a lengthwise axis rather than crosswise front-to-back as was typical in 19th-century Pennsylvania forebay Barns. So perhaps we can detect a convergence here, reflecting the widespread imperative to shelter animals better and possibly also to devote the barn to fewer kinds of animals.

Spring House, 1830-about 1880

The spring house was a key site for dairy work. It was constructed over a spring or over a running stream, and it was often banked. Spring houses could be a single story but often had a second story that served for storage, dairy processing, or sometimes even residential quarters. The point of the springhouse was to provide a cool space and fresh water. Stone-lined channels or tanks were carefully engineered to take full advantage of running or spring water. These would enable the dairywoman to cool milk and other perishable food items. Shelves were arranged so that milk pans could be set on them, and cream could rise. Churning, salting, working of butter could also take place in or near the spring house. Their location is often given away by willow trees. In general, in the region springhouses served family needs and were small, unlike the more commercial scale ones found in southeastern Pennsylvania.

Springhouse, West Saint Clair Township, Bedford County, 19th century. Site 009-WSC-008.

Summer Kitchen, 1830-about 1880

The separate kitchen was present on some farmsteads even in the early period (1798, 1796 records).[33] This would be a small, one or two story structure sited near the main house. Of course it always had a cooking fireplace, (also sometimes a bake oven) or later a stove. The standard assumption about these buildings is that they functioned to remove heat and especially messy tasks from the main house. While this explanation is logical, it is mostly untested. In Somerset County, for example, detached kitchens appeared in two periods and seem to have served two different purposes. Early ones (c 1790-1820) appeared most often on the properties of artisans and tavern keepers, suggesting a function related to those occupations; while a later wave in the late 19th and early 20th century removed heavy food processing (but not always everyday cooking) from the main house. The later wave coincided with the elaboration of the farm family's "competency." The very term "summer kitchen" did not seem to come into common use until the mid 19th century.[34] It is quite possible that the timing of its appearance can be related to the adoption of the stove for both cooking and heating. Here's why: the wood-burning cook stove, popularized from the mid 19th century onward, did create considerable heat and took up space in the middle of a room, unlike its open-hearth

predecessor. Simultaneously, heating stoves permitted greater architectural flexibility, because a building didn't need to be designed around heavy, structurally complex hearths and flue systems. The result was that cooking was increasingly isolated within the house, and the extreme expression of this was the summer kitchen. There is also evidence that people actually moved the cook stove into the main house for the winter, and into the summer kitchen for the summer.[35] The summer kitchen should also be interpreted as a reflection of the increasingly complex subsistence work, done mostly by women, in this period.[36] Overall, most summer kitchens are likely to date to the very end of this period (i.e. around 1880) onward. Architectural characteristics of the later summer kitchen include: frame construction, often of a higher level of finish than would be found in rougher outbuildings; stove or set-kettle; tables; windows. Some historians suggest that families actually ate meals in the summer kitchen in summertime.[37]

Summer kitchen, Snake Spring Township, Bedford County, late 19th century. Site 009-SSP-007.

Summer kitchen, Brush Creek Township, Fulton County, late 19th-early 20th century. Site 057-BRC-009.

Smoke House, 1830-about 1880

This is another structure that, in the central limestone valleys, was tied to Pennsylvania German foodways.[38] The smoke house, then, can be interpreted as an expression of both ethnicity and production strategies. While no systematic survey has been undertaken, it seems possible that smokehouses are more common where foodways emphasize pork – i.e. in Germanic Pennsylvania or the American South. The smokehouse is a small structure, often with a square footprint, of frame or masonry, windowless, with facilities inside for smoking meat. These facilities usually consist of a hearth, and hooks or laths from which the smoking meats could be suspended. The smoke house was usually near the main house. Hams and bacon were smoked here in the late fall. Smoke houses should be considered a mixed-gender, community workspace, as most often neighborhood men and women cooperated at butchering time.

Smoke house, Colerain Township, Bedford County, c. 1860-80. Site 009-CLR-003.

Machine Shed, 1830-about 1880

As farms added more and more machinery, more storage for it appeared. Barns sometimes incorporated bays for machinery, and also separate sheds were erected. The 1911 Houghton thesis on College Township in Centre County mentions a "tool shed" more than once; one is a combination tool house, corncrib/machinery storage.

Machine shed, Potter Township, Centre County, late 19th-early 20th century. Photo-only site, no site number.

Root Cellar, 1830-about 1880

A root cellar consists of an excavated underground area, lined with masonry and sometimes shelves, and having an entrance. It's usually between the house and barn. Sometimes its roof is barrel shaped. Its purpose is to exploit the year-round constant temperature that prevails below frost level (around 50-55 degrees) to preserve such items as potatoes, carrots, cabbages and other cole crops (crops in the cabbage and kale families), and turnips, and other root crops. Some houses further east had root cellars adjoining the main house and accessible via a tunnel, but none has been identified in the Central Limestone Valleys.

Root Cellar, West St. Clair Township, Bedford County, date unknown. Site 009-WSC-002.

Corncrib, 1830-about 1880

Generally speaking this building became more important in the central limestone valleys as the importance of field corn rose, late in this period. The corncrib was needed to store field corn in the ear. Its features would include slats (usually horizontal wooden ones) and/or wire netting for ventilation; doors in the ends for accessibility; anti-rodent provisions (elevating it off the ground level, tight flooring). The earliest corncribs were made of log; it's doubtful that any of these survive in the study area. "Keystone" shaped cribs, flaring from bottom to top, were designed to prevent settling and shed water. Once machine-milled beveled boards became available, designs tended to feature straight sides rather than flared ones. "Cribbing" boards came in several different profiles: slats on wedges, triangular slats cut from two by fours; and beveled cribbing. The last of these could be spaced an inch or so apart, thus providing ventilation; other types overlapped.

Most corncribs had wire mesh inside to protect from vermin. Double cribs are not uncommon; these usually consisted of two single cribs, roofed over with a sheltered space between for husking or machinery storage. Sometimes the interior side of the crib would be vertical and the exterior sides slanted. (and sometimes there would be a shed with a single corncrib.) Corncribs could stand alone, or be incorporated into a barn assembly, either as an integral feature or (probably more frequently) as a shed roof extension.

Combination machine shed and corn crib, Potter Township, Centre County, late 19th century. Photo-only site, no site number.

Hog House, 1830-about 1880

The hog pen (*schwein-stall*) occupied an important place on the Pennsylvania German farmstead. Located on the forebay side of the barn, or between house and barn, it was south facing, well drained; and sometimes shaded. The hog pen's location reflects its significance as a mixed-gender workspace. Kitchen scraps and skim milk or whey were fed to the hogs. The hog pen sometimes had hens' quarters above; since women and children were in charge of both, it served as a multipurpose workspace. Hogs were a cornerstone of family subsistence and Pennsylvania German foodways – from them came hams, sausages, scrapple, and other Pennsylvania German delicacies. Hog pens had a

shed roof or sometimes a gable roof; a door in the gable end or side. Early hog pens[39] had some ventilation but few if any windows; later ones[40] might have a window for each stall, but often located high up. The hog pen was designed to ensure warmth and dryness; these had to be balanced with ventilation. Shelter for pigs did not generally become a priority until the practice of letting them roam was curtailed, whether because of market considerations or regulations. The hog pen and corn barn were natural complements. In 1850, the average farm in the Central Limestone Valleys had at least half a dozen and frequently two or three dozen pigs. Hogs were fed dairy products[41] so there may also be a relationship of hog pen to barn and/or spring house.

There is a strong possibility that hog houses and/or smoke houses possessed not only productive but ethnic significance. This is because hogs and their products were emphasized more in the heavily German townships than elsewhere, and because Pennsylvania German foodways have a documented, strong link to pork products: scrapple, hog belly, and sausages, to name a few. Not every hog house or smoke house will be associated with Pennsylvania Germans, and hog houses and smoke houses will be found in all regions; but in the aggregate, they will tend to appear where there are high populations of Pennsylvania Germans. Notably, fieldwork in the "Yankee" Northern Tier did not positively identify any hog houses or smoke houses.

This Juniata County building, from an undated photo, may be a hog house. The evidence: scale, linear arrangement with respect to yard, windowless lower level, fenced in area. Juniata County Gen Web site.

Hog house, Potter Township, Centre County, date unknown. The building has the trademark features of asymmetrical gable roof and gable-end human entryway leading to feed aisle.

Ice house, 1830-about 1880

The ice house served an important purpose in the days before refrigeration. Ice was harvested from ponds or rivers in wintertime, and stored in these tight, well-insulated, carefully ventilated buildings. Characteristics of ice houses include blank walls, roof ventilator, insulation in the walls, drains built into the floor, and sometimes a small, adjoining workroom. No ice houses firmly dating to this period were found in fieldwork, but see below for examples of later ones.

Combo Structures, 1830-about 1880

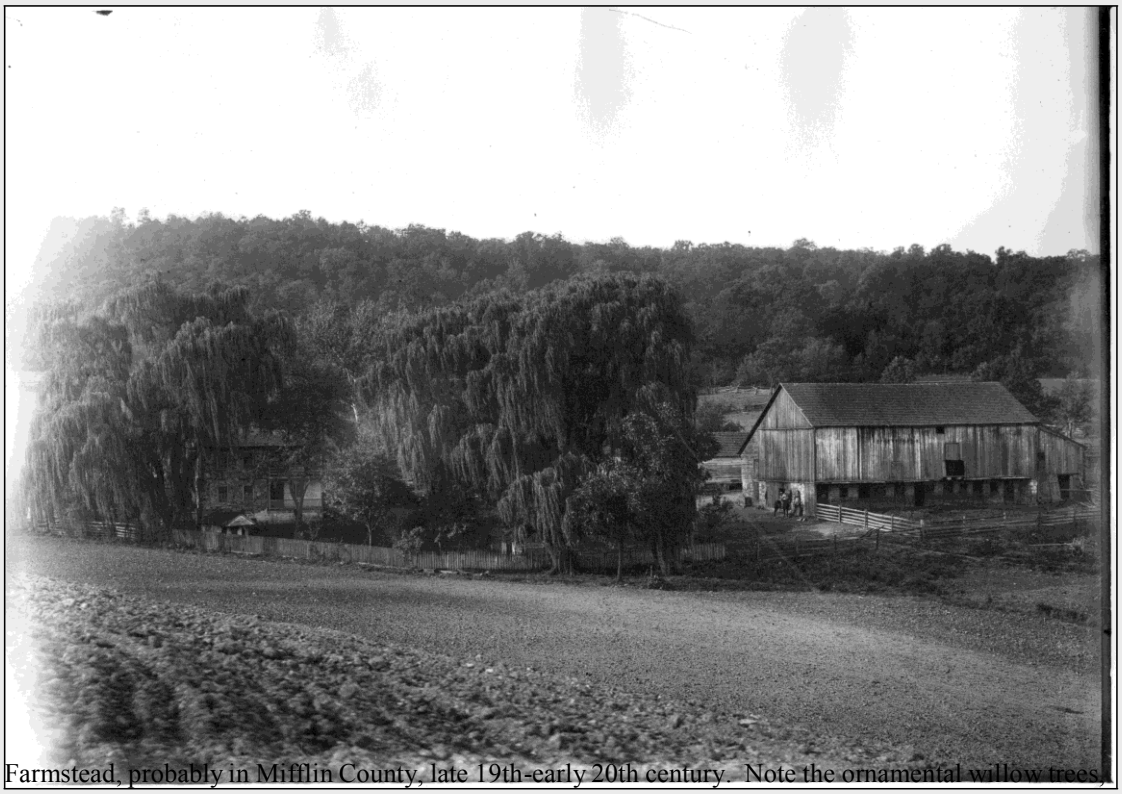
Many outbuildings of this period combined functions: corn crib/machine shed; summer kitchen/bake house; hog house/chicken house; and so on.

Landscape, 1830-about 1880

Landscaping around the farmstead became more sophisticated. House, barn, and outbuildings shared a tight visual, functional, and spatial relationship. Visually, (on well to do farms especially), house and barn often partook of a common architectural vocabulary, in terms of form, scale, the rhythm of openings, banked construction, etc.[42] In turn, outbuildings also shared the language of construction, proportion, and relationship to the house.[43] Site plans show that usually, the entire farmstead was located on the same side of the road. Farm building arrangement varied considerably, with linear layouts, loose "courtyard" arrangements, and "L" layouts among the more common ones. Farmsteads often were located back from the road, at the base of the ridges where springs were abundant. Sometimes roads were then built which connected these farmsteads to the main roads running parallel to the ridges. Tenant farms were connected to the "mansion house" farm by pathways.

View of farmstead, Potter Township, Centre County. Note the willow tree over the spring, large deciduous specimen trees near the house, and evergreen windbreak.

This early 20th century photo from Juniata County shows several types of fences; a field divided by treelines; a Pennsylvania barn; a probable abandoned field in the foreground; and many dwellings that are probably four-over four types. Juniata County Historical Society site http://www.rootsweb.com/~pajchs/East_Salem2.jpg accessed July 10, 2006



Farmstead, probably in Mifflin County, late 19th-early 20th century. Note the ornamental willow trees, picket fence around the house, board fence around the barn yard, and Pennsylvania forebay barn. Francis Cooper Collection, Pennsylvania State Archives MG 464 Box 1, photo #FC164.

Field Patterns

Fields remained small. In Centre County, reformer John Hamilton complained in the 1870s about the surfeit of small fields and fences, and the acreage of each crop (and therefore field size) changed little between 1850 and 1930. In the central limestone valleys, cropland was much more important than meadow (for hay) or pasture (for grazing). William Waring reported from Centre County in 1851: "Of 100 acres of clear land, 40 acres are usually in wheat; 30 in corn; 10 in oats, rye, potatoes, and sometimes barley; 10 acres of mowing ground and 10 of pasture; 12 to 15 acres of good timber are required for such a farm, but the mountains supply much timber to the valleys." Other sources corroborate that probably only a tenth of the improved land was in pasture; contrast this to the pattern in the Northern Tier, where grasslands could take up half or more of the improved acreage. The central limestone valleys historic rural landscape therefore looked quite different from the Northern Tier. Variegated monocrop fields probably even had different coloring than the palette of green shades in the northern tier. As more acreage was cleared and fenced, fields became more regularly shaped, usually square but still relatively small. Later they were enlarged (often by lengthening) in order to accommodate machinery.

Woodlot

Virtually every farm had a woodlot. Typically a woodlot would be on sloping land; in the Central Limestone Valleys this would mean at the base of the ridge or on the ridge slope. Often a woodlot would be an entirely separate piece of property; the tax records commonly list low-valued "mountain land" along with farm-sized acreages.

Orchards

Nearly every farm had an apple orchard at least. Centre County apple orchards averaged around 30 trees.[44] In the late 19th century, Juniata County had 3,000 peach trees. While orchard sites remain from the 19th century, orchard trees will be much younger.

Fences

One very notable visual difference between 19th century field patterns and their modern counterparts would be in the amount of fencing. Nineteenth-century and early twentieth-century farms were much more heavily fenced and subdivided than they are today. Types

of fencing ranged from the traditional "worm" fence, to post-and-rail fencing, to picket fencing closer in to the house. As late as 1875 the state agricultural society estimated that two-thirds of the farm fencing in the state was the traditional worm type.[45] A report in 1876 about Centre County farms stated that "the plan most generally pursued by Centre County farmers to-day consists in the subdividing of farms into a number of fields containing from eight to ten, or twenty acres, and in raising upon these fields certain different crops, succeeding each other in a rotation occupying from four to seven years… the plan further consists… in a system of pasturing stock upon the fields, which necessitates the separation of these divisions by means of interior fences to protect certain growing crops from the encroachments of the cattle." This particular critic (John Hamilton of Pennsylvania State College) detested the fencing system, saying that Centre County farms if viewed from the mountain would show "the vast net-work of fences that covers the surface, dividing into all imaginable shapes and sizes, the territory that lies before us… [farmers' lands] are not only separated by fences from the property adjoining, but are themselves divided by interior partitions, until in some instances the homes are so shut in from the highways by gates and bars and barricades, and cut off from neighbors by fields and lots and pens and yards, and similar enclosures, as to remind one of the Labyrinths of Ancient Crete."[46]

Treelines and Boundaries

Most trees from this period will not have survived, but in some areas the present treelines mark the original property boundaries as laid out in early land divisions.[47]

1880-c1920: A High-Powered Feed Grain and Livestock Economy

During this period, agricultural competition intensified. By this point, the Midwest had achieved dominance in wheat production, so eastern farm families found it more and more difficult to grow wheat unless their circumstances were exceptional. They responded by adjusting, and particularly by finding new markets close by. In Pennsylvania, the burgeoning industrial areas provided these markets, made accessible by rail through most of the state. Farm families in the Central Limestone Valleys found themselves able to ship their products to the coalfields and the cities. They kept the basic elements of the grain and livestock economy, but instead of selling wheat, and feeding animals and driving them out on the hoof, they increasingly fed animals right on the farm (steers, milk cows, chickens, hogs) and marketed them nearby via the rail network. The

list of farm products remained highly varied, and neighborhood exchange networks continued to function.

Products, 1880-c1920

The total number of farms reached a peak sometime between 1910 and 1920, while the average farm acreage dipped to about 100 acres. During this period, an important shift took place in production patterns. The production proportions of wheat and corn flip-flopped. By 1880, feed corn had overtaken and surpassed wheat as the major grain crop. Rye dropped out of sight. Oats remained about the same in terms of importance. Hay commanded much more importance as a cash crop, now that it was easier to move.[48] Milk cows gained in relative importance, but steers remained popular. In general, Central Limestone Valleys farms still raised large amounts of crops and livestock compared with the rest of the state, especially when we consider that farms were smaller.

This new economy was described by the early county agricultural extension agents. In 1917 the Mifflin County agent reported that "One end of a big limestone valley in the County is especially adapted to steer feeding. There is no pasture land here. All the land being tillable, and to pasture on this heavy limestone soil is a bad practice, consequently dairying is not especially adapted. Also it is a very good corn growing locality which is a most necessary requirement where steers are fed. The farmers her [sic] are dutch and a class of people who are interested in cattle feeding."[49] He also noted that in the county as a whole, "Most farmers keep from six to eight cows and as a rule make butter." Creameries appeared in some localities, for central processing of butter, but farm made butter still predominated. Where local markets permitted, truck gardening also was practiced.[50]

Labor and Land Tenure, 1880-1920

Patterns of farm labor and land tenure did not change in their essentials from the previous period. The Central Limestone Valleys continued to have a high tenancy rate, and farms continued to be far more highly mechanized than the average Pennsylvania farm. Both family and wage labor were common.[51] Many agricultural observers believed that Pennsylvania's rapid industrialization created a labor supply problem on the farm.[52] By the turn of the century a full-blown horse- and steam-power agriculture was the norm. Henry Meyers's 1892 estate proceedings mention (besides plows and cultivators and wagons) a fanning mill, straw cutter, hay rope and pulley, spring harrow, corn planters, cultivators, hay rake, Osborne self-rake, mower, wheat binder, and steam thresher. A

Blair County farmer reported in 1887 that "more than fifty self-binders sold in this valley during the season."[53]

Buildings and Landscapes, 1880-1920

There was a great deal of continuity from the previous period, especially with regard to houses and most outbuildings. So, for housing and outbuildings not expressly mentioned in this section of the narrative, please refer to the descriptions in the previous section. However, several important shifts occurred which had implications for buildings and landscapes, and so these changes are described below.

Barns, 1880-1920

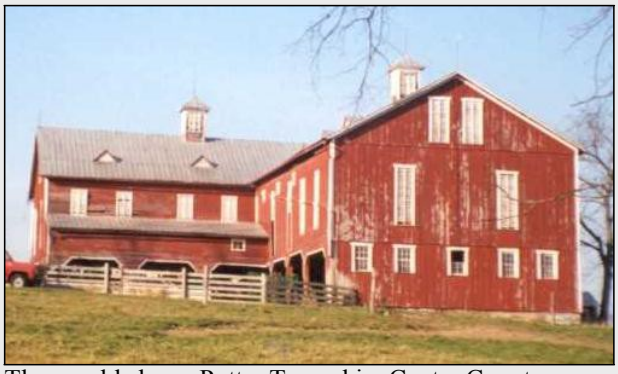
Late in the 19th century and early in the 20th century, farmers in the central limestone valleys began to add large wings onto existing Pennsylvania Barns, and even to build new barns in an "L" shape.[54] These barns sometimes forced interior adaptations to the conventional Pennsylvania barn plan. On the upper (bank) level, the threshing floor often faces the extra gable, so if the barn is "L" shaped, the floor would be on the extreme right or left rather than in the center as in the standard Pennsylvania barn. The haymows and machinery storage are displaced accordingly. In the new "ell", on the upper level there's the straw storage place and the granary (which in the Pennsylvania Barn used to be in the forebay or sometimes on the bankside). Like their predecessors, three-gable barns could have multiple granaries, floors, and mows.

Geographer Alan Noble interprets these as "raised three-gable barns."[55] He argues that when machine threshing made it possible to process all the grain at once, (rather than in dribs and drabs throughout the winter), there was no longer any need for threshing doors, so a large wing at right angles to the main barn accommodated the huge piles of straw, which now were carefully sheltered instead of being stacked in the yard. The loft was used for hay, the basement for livestock or manure.

The evidence for Noble's explanation for the emergence of the three-gable barn is mixed. It is true that steam-power threshing and winnowing could produce large straw stacks quickly, and thus make a straw shed useful.[56] However, on the other hand, per-farm census figures actually show *decreases* in the number of steers and in wheat production, and historic photos and accounts suggest that straw stacks in the yard were still very common.[57] (Of course, average figures may obscure patterns that held for larger-scale operations.)

The rise of straw sheds makes more sense if we take other factors into account. Chief among these is the more competitive and capitalistic economic environment that developed during this period. Sheltering animals made a bigger difference to the bottom line than had been the case earlier. So, it seems likely that the raised three-gable barn represents a shift in the livestock feeding economy. Straw for bedding was critical to animals' comfort and productivity, so providing shelter for straw in sheds suggests a more systematic approach to feeding and housing animals. In southwestern Pennsylvania, storm sheds also appeared even as per-farm herd size stagnated or decreased, and there too, the explanation for greater investment in shelter seems to be that farm families sought to increase their animals' productivity through protection and feeding. Thus we should trace the rise of the storm shed not to increasing herd size, but to the drive to increasing herd productivity.

Three-gable barn, Potter Township, Centre County, c. 1880-1900. Photo-only site, no site number.



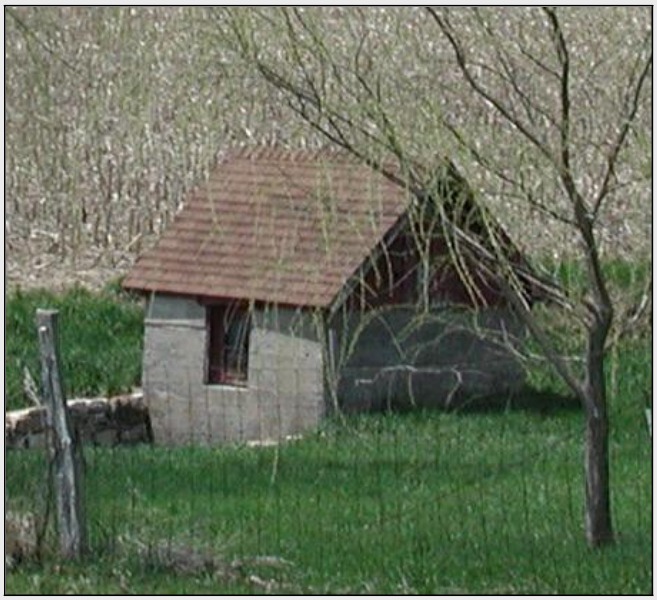
Three-gable barn, Potter Township, Centre County, c. 1880-1900. Photo-only site, no site number.

Three-gable barn, Gregg Township, Centre County, c. 1880-1900. Photo-only site, no site number.

Three-gable barn interior, Potter Township, Centre County, c. 1880-1900. Photo-only site, no site number.

Spring House, 1880-1920

The spring house's function remained the same, but materials might change. Concrete block became more popular.



Concrete block spring house, Harris Township, Centre County, early 20th century. Photo-only site, no site number.

Corncrib, 1880-1920

The classic long, shed-roof corncrib became a familiar sight during this period.

Corncrib, Potter Township, Centre County, c. 1900-1925. Photo-only site, no site number.

Ice House, 1880-1920

The function of the ice house remained the same. The examples found in fieldwork date from the late nineteenth and early twentieth century.

Ice house, Harris Township, Centre County, c. 1915. Photo-only site, no site number.

Landscape Features, 1880-1920

Many landscape features (siting, farmstead layout, fencing, woodlots, field patterns, ornamental plantings, treelines) continued from the previous period. It is likely that windbreaks and some ornamental plantings became more common during this period, as Progressive Era proponents recommended them.

Postcards of Penn's Valley, Centre County, early 20th century. Centre County Historical Society.

Shelter Plantings

In the late nineteenth and early twentieth century, there was increasing interest in tree plantings as a means of providing protection and profit. Windbreaks were popular. They consisted usually of close-planted evergreens with a straight narrow habit.

Evergreen windbreak, Potter Township, Centre County, early 20th century. Photo-only site, no site number.

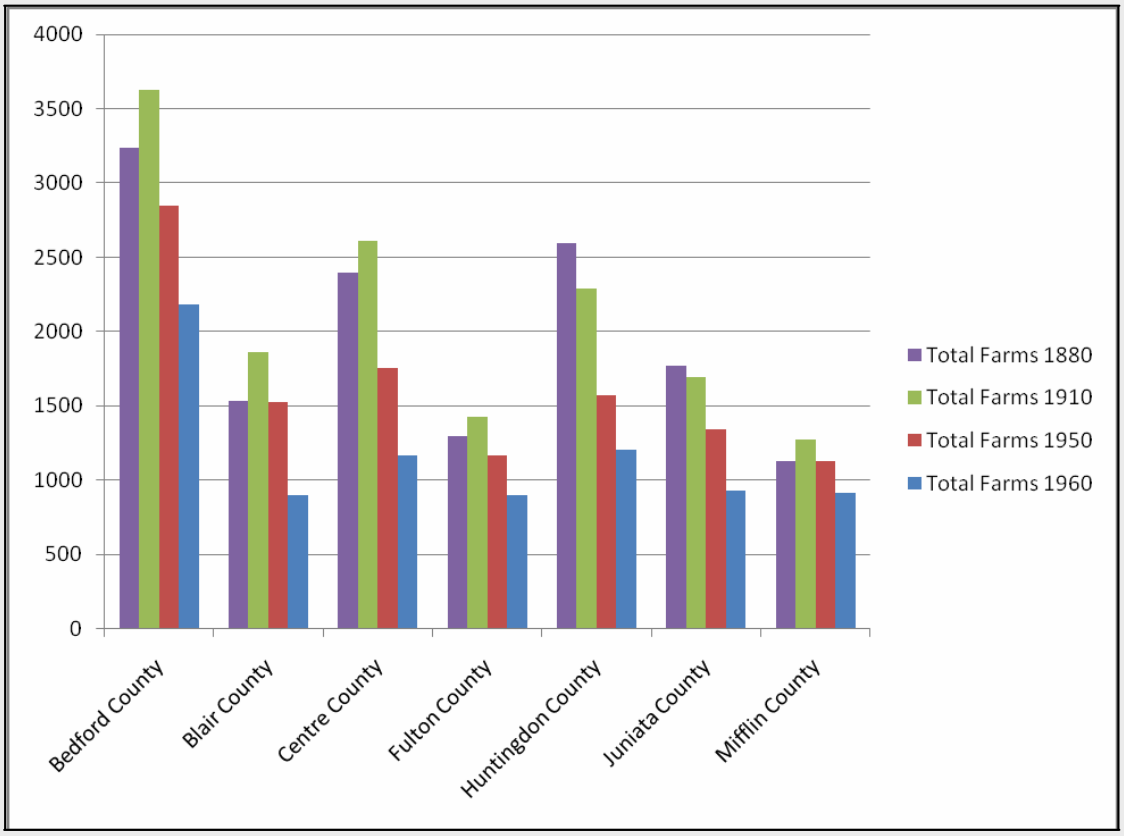
Fencing

Wood fencing gave way to barbed wire by the 20th century, and then barbed wire was supplanted by woven wire.

Centre County photograph, Edwin Rosskam, 1941. "Wheat Field Near State College, PA." Farm Security Administration photo. Digital ID fsa 8b14632. This shows woven wire fencing with a single strand of barbed wire at the top; a grain field; large shade trees marking the house site; and a three-gable barn.

1920-1960: Continued Reorientation of the Livestock Economy

In this period many areas within the Central Limestone Valleys region became "captured" into the eastern urban milksheds. This prompted a shift within the local agricultural economy. General farming continued, but many if not most farms began to produce some fluid milk for outside markets. The same urban areas furnished markets for poultry, eggs, and meat. While some farms became "specialized" in their commercial operations, most did not; and they generally retained a varied subsistence base right up to the mid 20th century. The changes occurred against a backdrop of sharply diminishing farm numbers.



Farm numbers, Central Limestone Valleys counties, 1880-1960.

Products, 1920-1960

Though the global agricultural depression had plagued farm families since 1920, the opening of fluid milk markets represented a new opportunity in the Central Limestone Valleys. The advent of refrigeration, the road system and the trucks that plied it, the widespread acceptance of milk as a good food, the expansion of urban markets, the consolidation of the market economy, the need to shift production as Western competition reduced the viability of the east's grain and livestock economy, the loss of

hay markets with the gasoline powered revolution in transportation and work power – all of these factors pushed farm families all along the East Coast to increase their attention to fluid milk production and poultry raising.

By about 1930, most of the Central Limestone Valleys were incorporated into urban milksheds. As the milksheds extended, farm families increased their production of fluid milk, at least in proportion to other livestock enterprises such as stall feeding for beef. Typical dairy herds averaged seven to twelve cows. The number of dairy cows in the region increased about 25% between 1890 and 1930. In 1923, for example, the Mifflin County agricultural extension agent reported that now "practically every farmer has a small herd of cows that he considers one of his main sources of income." The milk went to new milk plants recently established in the vicinity. Centre County entered the New York City milkshed in the mid-1920s, when dairy plants were opened in the county. Similar timing affected dairy areas of Bedford, Fulton, and Huntingdon Counties. However, it took quite a while before farm families began to switch over to dairying in large numbers.[58]

In the Central Limestone Valleys, levels of specialization were far from extreme.[59] So, in 1929 Pennsylvania State College agricultural economists reported that the "rich limestone valleys" supported a "wide variety of crops," and that while "this area is a recognized part of the Philadelphia milk shed," … "general farming is the second most predominant type."[60] Overall farm production was still quite diversified in comparison with what came later. So – farm families received an ever-increasing proportion of income from dairy and poultry as time went on; but throughout this period they still also sold a variety of items (including fruit, hay, potatoes, cannery crops, hogs, etc.) to round out sales. By 1946, the Central Limestone Valleys were characterized (again by PSU agricultural economists) as falling within the "Dairy and General Farming Section." They sent milk to the New York and Philadelphia markets, but also showed a strong diversification.[61] For example, in 1945 the Snyder County extension agent reported that "Snyder County ranks third in the state ... in acreage and production of black raspberries."[62] Especially during the Depression, farmwomen substituted labor for purchases, thus the work of canning, pickling, drying, gardening, etc. still took a prominent place. The farm garden assumed a critical role. The Centre County extension agent reported in 1936 on a garden project, in which participants tried new varieties of broccoli, Brussels sprouts, cabbage, and others; a photo at Mrs. Yearick's showed men, women, and children in attendance.[63]

Poultry and Poultry products: Particularly during the Depression, when milk prices sank to unprofitable levels, farm families engaged more seriously in the poultry business. They raised poultry for eggs; for meat; and some raised chicks in hatcheries, to be sold to farms. The Centre County agent reported in 1934 that poultry was the second most important source of farm income: "the poultry business has developed to a great extent through the encouragement of local hatcheries to the farmers in the county to go into poultry as a cash crop. These hatcheries pay a premium from 5 cents to 8 cents a dozen for hatching eggs, starting usually around the first of February and during the spring months until June. This practice in addition to the higher fall egg price makes it possible for poultry to pay some profit. During the past year with extremely low feed costs poultry has perhaps paid more profit than any other agricultural industry in the county. The marketing situation is fairly well taken care of through the hatcheries and outside buyers."[64] By 1943, the agent noted that most flocks numbered between 200 and 500. Snyder County farm families also sold eggs to local hatcheries in the 1930s.[65] By 1950 in Centre County, many farmers were raising hatching eggs to sell to a Delaware company that picked up twice a week. Turkeys were another poultry enterprise. The Union County agricultural extension agent reported: "Five years ago it was almost impossible to find turkeys on farms in Union County. During the year 1932, flocks varying from 5 to 500 birds were raised." Poultry raising increased in Fulton, Bedford, Blair, and Huntingdon Counties as well.

Truck farming was practiced near population centers throughout the region, but it became unusually well developed in Blair County and in Morrison Cove, northern Bedford County. It catered mainly to the railroad city of Altoona, a major population center with good markets. Jesse Sell noted in 1911 that "... the majority of the farmers [in Blair County] plant from a fraction of an acre to several acres of truck, which is either marketed by the farmer or sold to hucksters. Tomatoes, cabbage, beets, rhubarb, turnips, onions and squash are produced, the first three predominating. Among the small fruits the strawberry is the most profitable." Many of these farmers, Sell reported, had hot houses. Biographical sketches in Sell's volume illustrated how local farmers were exploiting the nearby markets. L.L. Book, of Eldorado, grew vegetables with aid of six greenhouses. "Lettuce growing has been his specialty and in former years he shipped to Philadelphia and other cities, but now deals exclusively with the wholesale houses of Altoona, and has two or sometimes three wagons make the haul to the market three times a week." William Henry McGarvey, of Logan Township, "has always made a specialty of gardening and fruit growing, including a variety of vegetables, celery, cherries, plums, apples, peaches and grapes. He both wholesales and retails his produce, making two trips

a week and often daily trips to Altoona, where he finds a ready market for his goods." John F. Nelson, of Antis Township, owned 183 acres; "he devotes between 80 and 90 acres to fruit growing, having about 5,000 apple trees, and altogether has between nine and ten thousand fruit trees. His first crop is rhubarb, the second, strawberries, and the third, raspberries, is followed by plums, pears, peaches, grapes and apples. He is thus engaged in marketing about eight months of the year, and runs one and two wagons daily. In connection with his fruit growing he also runs an hydraulic cider press, which is operated by steam." [66] While some farmers were their own hucksters, others took up the trade full time and collected goods from a wide area to take to market.[67]

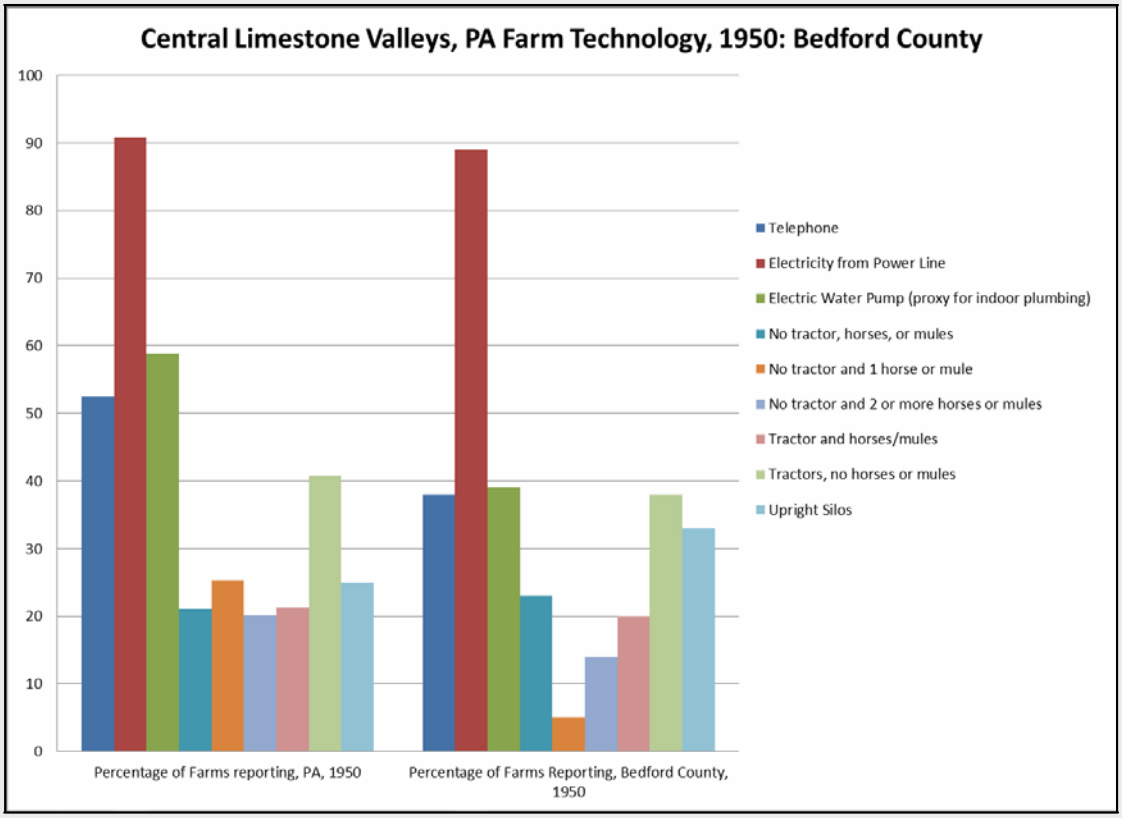
Labor and Land Tenure, 1920-1960

It seems as if the increased capitalization requirements and trend to dairying probably made wage labor more important. Work patterns were less seasonal, especially in dairying, which became more of a year-round activity. There were important shifts in women's labor as farm buttermaking diminished (but did not entirely disappear until late in the period). With the rising activity in poultry raising, men entered into this work – both male extension agents (poultry raising was considered part of agricultural extension, not home economics) and farm men. The gendered assumptions of the extension agent are notable: he wrote in 1921 that attendance at poultry demonstration had doubled, and 'we were interested to note the much greater proportion of men attending indicating increased interest in poultry" -- as if "interest" only counted if it came from men. But photos show that women's interest and participation were strong.

Farm tenancy continued in importance, with the proportion remaining about the same or even rising slightly. In areas that shifted to dairy production, leases became a problem. The Mifflin County agent reported in 1926: "One third of our farms are tenanted. The antiquated one half share of crop lease is the universal contract. It has outgrown its usefulness as every landlord and tenant knows or should know. Grain farming alone no longer pays. Livestock farming combined with grain farming is where money is to be made. Under the present contract the landlord is still trying to make ends meet from the grain farming which cannot be done, and the tenant has found he can make a little money with livestock if his landlord will let him, which he won't in most cases."[68] Penn State workers drafted and publicized new lease forms that provided for payment of rent based on the milk check, rather than on shares of grain.[69]

Levels of mechanization continued to be high. The most significant development of this period was the rise of gasoline power. This had profound effects. Of course (in most of the valleys, with the possible exception of the Big Valley Plain sect minorities) this meant the gradual disappearance of horses and their replacement with gas powered tractors. In turn, that meant the reduction of oats in crop rotations, thus freeing up acreage for other field crops or hay. This process was quite drawn out, only really ending well after World War II; there was a long period of overlap. There were shifts in gender patterns of labor, for example, women did more driving on errands. However, the auto enabled rural people to engage in more social contacts, and it often led to shifts in the definition and pattern of rural neighborhoods. Some rural crossroads stagnated, while rural villages become retail centers. On the farm, some formerly communal or shared labor disappeared, but other types appeared, for example silo filling.

Other new forms of technology appeared in rural American during this period, including electrification, telephones, etc. Electrification was primarily used for lighting in this period; this applied to the home, and also often to the barn, thus easing milking during the short days. The 1927 census shows that these were rare on all Centre County farms. Only with the REA and the wartime economic boom did these amenities reach rural areas in the limestone valleys. Possible impacts on landscape would include utility poles and lines; increasing size of dairy herds and shift in gender division of labor due to availability of milking machines and barn lighting; and the decline of outbuildings such as the summer kitchen and spring house, as electrical refrigeration became more widely available.



These charts show the uneven pace of technological change on the farm.

Buildings and Landscapes, 1920-1960

Farmstead, Potter Township, Centre County. This picture illustrates some of the key changes of the 20th century: poured concrete and concrete stave silos; three gable barn altered for dairy (note the windows cut into the lower level); pole barn (post war); foursquare house.

Houses, 1920-1960

New housing in this period was relatively rare, owing to the severity of the farm depression. What few new houses were erected on farms tended to draw from nationally popular forms such as the foursquare. This represents a shift away from the regionalism that had been so predominant earlier.

Foursquare house, Napier Township, Bedford County, c. 1920-40. Site 009-NAP-005.

Barns, 1920-1960

The most important story here is the erection of new barns, and conversion of the old barn, for dairy purposes. This occurred in response to sanitation requirements imposed by the markets to which fluid milk was sent.

In areas where serviceable Pennsylvania or Basement barns were already in use, remodeling took place to satisfy requirements. The process was not instantaneous; it took at least 10-15 years. For example, in 1938 (a dozen years after the Philadelphia milkshed reached there) the Mifflin County agent reported: "most farmers are remodeling their dairy stables…. they are required to do this if they sell to fluid milk dealers." "The old bank barns are being made into modern dairy barns" and plans are distributed.[70] In Centre County, renovations were still being made as late as 1948: "there was more remodeling of dairy barns where the entire inside of the barn had to be torn out and a modern stable built. In many cases, the overshot of the barn was eliminated and a new

wall built flush with the barn so that the stable could be wide enough to stanchion two rows of cows. The construction of many new milk houses is evident to a person driving through the county. Advice on remodeling problems was given to 32 people."[71]

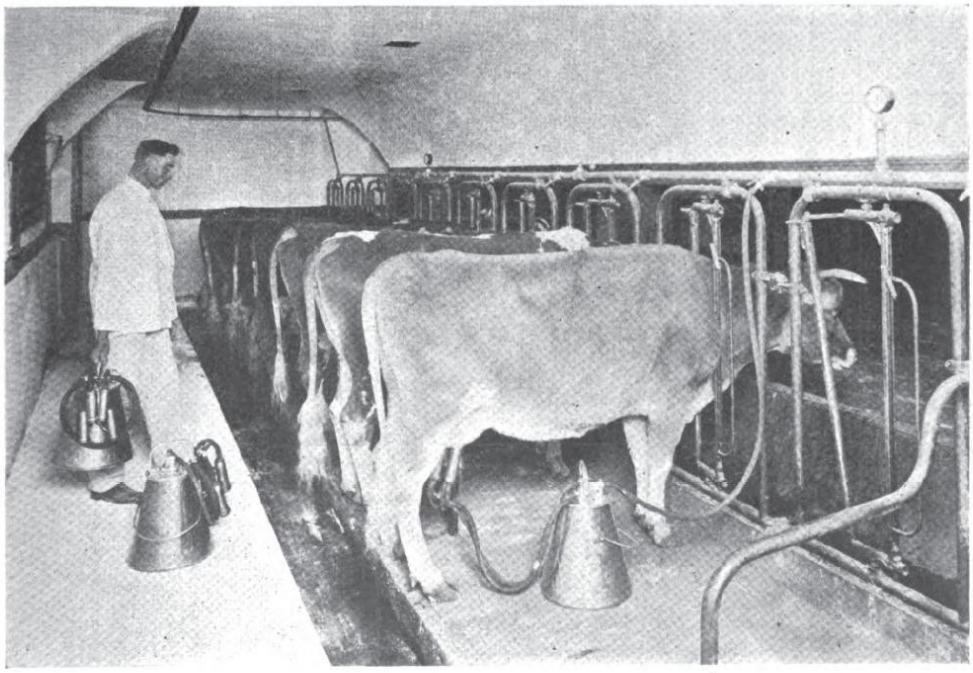
These renovations may include any or all of the following:

On the stable level:

- concrete floors replace dirt,
- metal stanchions of various types replace wooden restraining systems,
- feed and litter alleys are reoriented: Usually lengthwise arrangement of dairy stanchions substitutes for crosswise arrangement of box stalls,
- addition of windows, possibly through excavation of bank, or enclosure of forebay,
- enlargement of existing windows,
- extension of stable space,
- omission of space for horses (some markets banned housing horses and cows together),
- evidence of whitewashing,
- evidence of ventilation shafts,
- litter carrier systems; installation of electricity (artificial light, later milking machinery, fans),
- relocation and closing of hay chute,
- and placement of stalls near light source.

On the mow level:

- re-framing to accommodate hay track and other loading devices (though after the late 19th century, many barns were built with hay tracks already installed),
- re-location of hay chute,
- addition of access from silo,
- holes cut in the gable end doors to load hay,
- and, the elimination of drive floor use as machinery storage in favor of more hay storage. In general, the upper level is less altered than stable level.[72]



Interior of Cow Barn, Dr. George Russell, Willoughby, Ohio, Purebred Guernseys.

"Milking Machines in successful Use," Farm Mechanics, May 1919, page 53. This image shows the ideal renovated barn basement interior with concreted floor, manure gutter, and metal stanchions.

Stable Barn and milk house, Napier Township, Bedford County, c. 1940-60. Site 009-NAP-005.

A new type, the stable barn, also became popular for dairying. A stable barn is a type of 20th century barn whose essential characteristics consist of ground-level stabling, usually in the form of stanchions for dairy cattle, accessed by a gable end opening and separated by a lengthwise aisle, and served by ample hay upper-level storage space created by a round or "Gothic" roof, or a gambrel roof. The barns are well-lighted with rows of windows along each eaves side. Usually they are built with 20th century materials; rock face concrete block, cement block, and balloon framing are especially common. The original flooring is usually concrete as well. They were popularized through the national agricultural press, agricultural extension publications, and even commercial catalogues from companies like Sears, Roebuck and the James Manufacturing Company in Wisconsin. These barns, notably the bigger examples, reflect large scale dairy production, and a break from traditional forms and materials. The larger examples accommodated not only bigger herds, but larger Holstein cows and the huge amounts of feed they required. The 20th century stable barn also represent a response to stepped-up state regulation of the dairy industry, which mandated (among other things) ample light, easily cleaned surfaces, no manure basement, and ventilation for dairy cows.

Stable Barn, South Woodbury Township, Bedford County, mid 20th century. Site 009-SWD-005.

Stable barn, Belfast Township, Fulton County, c. 1945. Site 057-BLF-001

In the post World War II period, the *pen barn* or free stall barn became more highly recommended by agricultural engineers. A ten-year research project at the University of Wisconsin confirmed that cows actually did not need heated quarters; as long as they were protected from winds, they did as well as cows in more conventional barns, and often they did better. The pen system was recommended to replace the stall-and-stanchion type of arrangement. The advantages of the pen system involved saving on labor and construction costs. When not being milked, cows roamed freely in a large open space with dirt floor and ready access to hay or silage. At milking time, the cows were trained to walk into a separate milking parlor, where they ate feed concentrates while being milked, then proceeded straight ahead back into the pen or pasture. This saved on labor costs in feeding (the animals fed themselves in the pen, and were fed concentrates simultaneously with milking) and stable cleaning, and it saved construction costs because the pen barn lacked expensive stanchions and full concrete floors, and was less well insulated. Cows had fewer injuries from missteps in the concrete stanchion area. The pen barn system incorporated milking parlor, and often the milk house then adjoined the parlor.[73] Sometimes, the pen barn was made of pole construction, also an innovation in the postwar period.[74]

Extended forebay or basement Barn with free-stall gambrel roof extension, Colerain Township, Bedford County, late 19th-early 20th century.

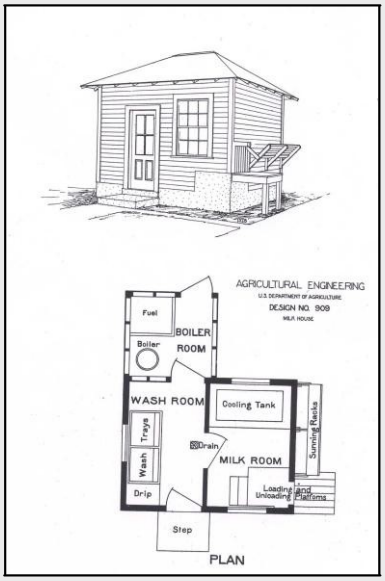
Bank barn with later stable barn ell, Bedford Township, Bedford County, c. 1890 with c. 1940 ell. Site 009-BED-002.

Milk House, 1920-1960

In 1923, the county agent reported, "one of the most important developments in the dairy industry in Mifflin County this year was the program of Sanitary Regulations instituted by the Philadelphia Dairy Council through the Inter-State Milk Producers Association under which organization the producers here are organized. These regulations require the milk producer to put into effect some simple, practical measures such as keeping the milk in a modern milk house, covered milk pails and sanitary stables. By 1926, a "special milk market has been opened up to the producers already in two townships that have been [tuberculin] tested and cleaned up. Grade A TB tested milk is now being shipped out of

this community to Philadelphia and pays a bonus of 20 cents per hundred to the producers."

The milk house was a major new form on the twentieth-century dairy farm. It wasn't a big building, but is an important reminder of the new role of the state and the agricultural establishment in agriculture. The state (meaning the government at any level) influenced the construction of milk houses in the first place, because during the Progressive and New Deal eras, legislatures and municipalities passed sanitary codes that required inspection not only of milk, but of dairy herds and milk production facilities.[75] These regulations were a facet of the assault that was launched on bovine tuberculosis and other diseases in this period, aiming at ensuring a fresh, uncontaminated milk supply. In order to market milk, increasingly farm producers had to comply with regulations that required them to install easily cleaned surfaces (like concrete) in barns, remove milk storage areas from dirt and odors (by building milk houses), cool milk, and the like. In the central limestone valleys, these structures did not appear until the valleys joined the urban milksheds, until the mid 1920s at the earliest, and later in most places.[76] The milk house's form and construction were influenced significantly by the agricultural establishment (meaning the complex that included state departments of agriculture, the land-grant university and extension apparatus, and agribusinesses).



Sample plan for a milk house. From Farm Building and Equipment Plans and Information Series, USDA, 1929. Bound typescript, not paginated.

Milk houses provided a place to store and cool fluid milk before it was transported to market; to store milk cans not in use; and to wash containers and other equipment like separators). Plans offered by the USDA for farm milk houses typically gave dimensions ranging about 10 x 13 feet up to around 12 x 20 feet. Interior plans for a 10 x 13 milk house with ell (# 909, "capacity 20 to 30 head market milk") show a two-room plan with door leading to a wash room; milk room to one side, which contained a cooling tank and led to raised loading/unloading platforms and sunning racks, mounted on the outside. The ell contained a boiler room with its fuel supply, and back door. Larger milk houses had the same basic three spaces, only larger, and sometimes equipped with testers for butterfat and separators. One (#1337) had a churn, butter worker, ripening vat, and refrigerator, and another (#1339) had quarters for workers. Another small, 12 x 14, one-room milk house (#1341 see illustration) was designed for "butter making by hand" for 20 cows. It contained the same basic spaces, but not divided. The very smallest, at 7 x 9, had a concrete foundation with a sunken vat for cooling cans of milk. All of these plans had sloping floors with drains, and provision for ventilation and light. Actual milk houses on farms tend toward the smaller end of this range. Though the USDA models were frame, most farm milk houses observed in the Central Limestone Valleys were constructed of masonry. Rock face concrete was popular before about 1930, and then hollow concrete block became the norm.

Rockface concrete block milkhouse, Potter Township, Centre County, c. 1935. Photo-only site, no site number.

Milk house, Snake Spring Township, Bedford County, c. 1930-50. Site 009-SSP-002.

Milk house, Snake Spring Township, Bedford County, c. 1930-50. Site 009-SSP-003.

Milk House, Snake Spring Township, Bedford County, c. 1930-50. Site 009-SSP-005.

Location

The milk house, Allen Noble reports, was usually quite near the barn; though other locations have been observed between the house and barn, or near the road.[77] On some farms, ice was used for cooling, in which case the milk house and ice house would often adjoin.

Machine shed, 1920-1960

As barns filled up with livestock, hay, and straw, machines got pushed out into separate structures. The Pennsylvania State College Agricultural Experiment Station reported in 1929 that in Centre County 88% of farmers housed all their machinery; 81% owned a machine shed and 47% owned a repair shop. (This is only of selected surveyed farms, so actual percentages of total farms were probably lower.)[78]

Machine shed, Napier Township, Bedford county, c. 1940. Site 009-NAP-003.

Wagon Shed, Bedford Township, Bedford County, c. 1910. Site 009-BED-002.

Garage, 1920-1960

As cars and then trucks gained a foothold in the countryside, garages appeared too. Farm families acquired cars and trucks quite rapidly and so early garages were made of rock face concrete, concrete block, or frame construction.

Garage, Harris Township, Centre County, c. 1940. Photo-only site, no site number.

Silo, 1920-1960

A silo is an airtight structure that holds fresh organic matter (moisture content 50-65 percent) destined for winter animal feed. It is filled with shredded or chopped grass, corn, or sometimes other plant material, which ferments into a highly nutritious feed. Silage feed resulted in significant productivity increases for dairy cows, and also permitted marginal farms to carry more animals. Ensilage was first publicized in the late 19th century when the results of experiments in Europe became known in the United States. However, it did not become widespread until dairying was taken up more seriously. Since the Central Limestone Valleys turned to dairying relatively slowly, silos were not as common there as they were in the more specialized dairy regions. Early types such as wood stave silos are rare in the Central Limestone Valleys.[79]

Silos can be constructed horizontally, in pits, or vertically. Today, horizontal, plastic-covered silos are very common in the Central Limestone Valleys. But most silos of the first half of the twentieth century were vertical. Early silos were sometimes placed inside the barn, rectangular in shape, and of wood construction.[80] These were quickly supplanted by round vertical silos located outside the barn, usually in a spot that would permit efficient filling (usually from holes in the roof) and unloading (either from a tier of successive doors from which silage was thrown down an exterior chute, which contained a ladder for access to the doors, or from the bottom). The land-grant establishment published many "how-to" brochures aimed at helping farmers build their

own silos of wood or concrete. Because masonry is more durable, cheaper, and cleaner, it became the norm. Commercial organizations marketed many types of silos too. Some sold special curved brick; others made tiles;[81] still others advertised systems depending on interlocking rings of poured concrete. Cement staves became popular after about 1910. See the example in the farmstead photo at the beginning of this section. Galvanized iron was mentioned by Hall, 60, 1929.[82] The literature on silos from the 1920s shows all of these types, so it is difficult to date silos based on type. But the concrete stave type endured into the 1970s while the other types fell into disuse after the 1940s. Geographer Alan Noble discusses various roof types, and argues for a sequence from gable to cone to hip to dome to hemisphere.

Tile silo, Bedford Township, Bedford County, c. 1935. Site 009-BED-004.

Poultry Housing, 1920-1960

General Developments in Poultry Housing

In general, poultry housing in the twentieth century responded more and more to developments initiated by the agricultural establishment, whether the extension system, agricultural research universities, or agribusinesses marketing mass-produced equipment. For example, home-scale incubators and "brooder stoves" were advertised and illustrated in the farm press in the 1920s. The incubators were heated box like affairs mounted on legs. The brooder stoves had a central heat source (sometimes an oil burner), which warmed a protective, usually conical hood under which the chicks could huddle. It is not

clear where these devices would be set up, but advertisements usually featured women making testimonials, which suggests that this equipment might be set up near or possibly even within the farmhouse.[83]

By the 1930s, "battery" brooders were appearing where larger numbers (over 500) of chicks were raised. These consisted of stacked cages with "wire-mesh floors with dropping-pans underneath and water- and feed-hoppers on the outside."[84] Proponents claimed many advantages over the traditional brooder house, especially lower cost of building, the ability to keep many more birds in a smaller space, and lower labor costs.[85] Notably, one author pointed out that "battery brooding will produce good birds without much experience on the part of the operator…"[86] The shift to less-skilled labor probably occurred as men took over poultry raising, and also as sheer numbers rose. The buildings in which batteries were housed often were indistinguishable from other types of poultry houses; but some purpose-built battery houses were built which were characterized by high windows around the perimeter walls. These permitted batteries to be ranged along the walls, and light to enter from above. No field examples of this type were encountered in this study.

The "battery" philosophy soon extended beyond chicks to adult birds. Articles began to appear advocating batteries not only for brooders and layers, but also for broilers. By the 1930s, the free range philosophy was in decline among the agricultural establishment (i.e. in the farm press, among extension agents, and with agribusiness), though on many a farm range practices continued. *Farm Journal* poultry editor D. C. Kennard wrote in 1932 that "Today the pendulum is swinging toward confinement."[87] Agricultural experiment station testing in Ohio and other states established that confined birds actually did better than those who were raised partly or wholly on free range. An important nutritional discovery -- that cod-liver oil added to the birds' diet helped chicks thrive indoors -- spurred a "revolution in hen-coops." With yards no longer emphasized and numbers of birds rising, multi story laying houses began to appear, and the new philosophy also encouraged renovations to large barns for poultry.[88] These barn renovations did not necessarily always contain battery cages, but they did illustrate the abandonment of free-range practices.

By the 1950s, the battery technique was modified, because cages stacked above one another had resulted in ventilation and disease problems. Among large producers, cages were retained, but in single rows suspended above a concrete floor, often in a long, low

building. Waste pits reduced disease and cleanup problems. Novel construction techniques such as trussed rafters and sheet-metal construction minimized the number of posts and thus created an open, flexible space. Farm magazines also advertised manufactured poultry housing, including conventional shed- or gable-roof structures, but also pointed-arch houses. Prefabricated poultry houses were also discussed in the farm press.[89] However, many farmers continued on a more modest scale and their buildings were correspondingly modest.

Poultry Housing in the Central Limestone Valleys

The poultry business became more important during this time period. Dairy and poultry were the twin mainstays of farm income. Poultry saved many a farm during the Depression when milk prices hit bottom. In the Central Limestone Valleys, poultry production for eggs and meat, and hatcheries for chick production, were common in this period. However, though poultry raising expanded everywhere in the region, it was more intensive in some places than in others. The Penn's and Brush Valley areas in Centre County had one large hatchery, but otherwise production was on a relatively small scale. Juniata County, however, was a larger-scale poultry center and more poultry-related buildings remain there, especially in areas such as the Cocolamus. Today, the area continues this tradition in a new form as one of the largest kosher poultry producing regions on the east coast. This region is on the border between the Central Limestone Valleys and the North and West Branch Susquehanna regions.

Barn converted for poultry, Juniata County, conversions c. 1950. Photo-only site, no site number.

Large-Scale Hatcheries

Juniata County supposedly had half of the state's hatcheries in the 1930sand Centre Hall also had an enormous one (Kerlin, in Centre Hall, distributed nationwide via rail in the early 20th century). [90] Little information has been located about them architecturally and very little agriculturally.

Graybill hatchery, Juniata County, date unknown. Photo-only site, no site number.

Brooder Houses (individual farm scale)

Brooder houses provided a warm, safe environment for newly hatched chicks. They can be identified by a stovepipe protruding from the roof, usually had windows as light was also important for chicks. On the interior, they would have water trough, feed boxes, and stove.[91]

Laying Houses

The laying house provided nests, perches, feed and water for laying hens. Some purpose-built laying houses were constructed in this period. The Clinton County 1950 agricultural extension report noted: "plans were provided for two 30 by 60 foot two story laying houses. … formerly long, narrow houses were used on these farms." The two story houses cut labor time in half. The old houses "are to be discarded." However, many farm families chose to modify existing buildings, especially during the financially strapped Depression era. Centre County's 1934 report stated: "poultrymen throughout the county have had considerable success in remodeling old buildings for the use of

poultry. In many cases a part of straw sheds or hay mows have been closed in, windows cut, and have made satisfactory laying quarters."[92] This was far cheaper than new building.

Poultry house, South Woodbury Township, Bedford County, c. 1930. Site 009-SWD-005.

Broiler Houses

In most cases, it is difficult to distinguish a broiler house from a layer house from the outside. Inside, the broiler houses do not have nests, so they could accommodate many more birds than the layer houses. This description is from Clinton County agricultural extension agent's report for 1950: "Broiler production is increasing in this area. Two new broiler-producing houses were constructed this past year which will care for 16,000 additional birds. The producers who dressed birds for the local markets were assisted the past year with plans for construction of killing, dressing, and storage plants. Both of these were built in such a way that all the killing would be in one unit, dressing and storage in another unit, with provision for retailing at the farm. These units were built of concrete blocks with cold storage space for at le**a**st 500 birds. Provision was made in the construction for installation of a freezer in the future…"[93]

Free Range Pullet Housing

Pullets (young hens under a year old, before they begin to lay) were sometimes reared on open range pasture, and sheltered in movable roost like affairs. These needed to be movable because the birds had to be on "clean" ground so that they didn't pick up diseases left behind by the last bunch of birds. These houses would often be mounted on skids. Fieldwork did not document any remaining free range housing from the period.

Corncrib, 1920-1960

Manufactured corn cribs were produced in the early twentieth century, but disappeared during the metal shortages of World War II. They became popular again in the post-World War II period. Historian Keith Roe[94] says that metal cribs were adopted because wood and labor prices rose, and also because the metal cribs were study and required little maintenance. Corncribs became less common after the mid-1950s, when harvest technology changed in several ways: combines made it possible to shell corn in the field; and artificial dryers eliminated the need for a long drying period in the crib. In any case, the importance of field corn in Pennsylvania declined relative to the Midwestern corn and hog belt.

Royer Farm, Williamsburg, Blair County, showing stone end barn and metal corn bin.
HABS photo, digital ID http://hdl.loc.gov/loc.pnp/hhh.pa3045

Privy, Bedford Township, Bedford County, c. 1940. Site 009-BED-006.

Other Outbuildings, 1920-1960

Few or no new summer kitchens, spring house, smoke houses, butcher houses, root cellars were built. However, some did continue in use. Some were likely recycled.

Landscape Features, 1920-1960

Relationship of House, Barn, and Outbuildings

The visual and spatial relationships of farm buildings continued to be strong in this period. The most pronounced visual change was the introduction of architectural vocabulary that was generic, industrial, state-sponsored, national as opposed to individual, hand built, folk-derived, local/regional. So, the new structures that appeared – silo, milk house, poultry house, dwelling – contrasted with the earlier buildings in terms of texture and form; but they fit with the earlier assemblage in terms of scale, siting, and often finish.

Farm Gardens, 1920-1960

Well into the twentieth century, the farm garden was an important component of the household economy. Tended mostly by the women and children, it supplied fresh food, and of course vegetables for canning, drying, and otherwise preserving for winter use. It was usually sited near the house.

Garden Demonstration, Photo in Centre County Agricultural Extension Agent Report for 1939.

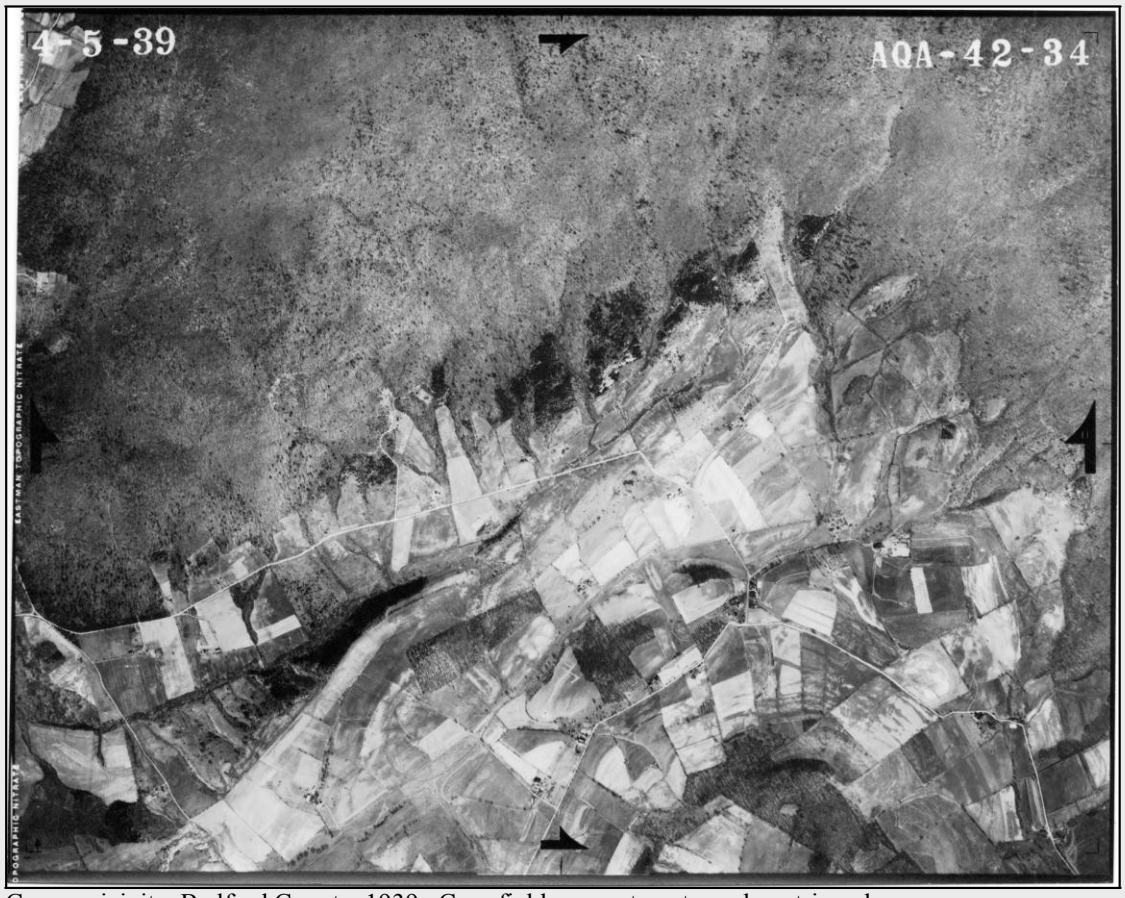
Field Patterns, 1920-1960

Agricultural extension agents often wished to use the gas power revolution in farm mechanization to consolidate fields so that the tractor could march uninterrupted up and down long expanses. Fields could also be larger because oats were no longer needed for horse feed. There must have been patches where consolidation was taking place, but these would appear among farms that retained their earlier appearance. For example, the Pennsylvania State College Bulletin 237, "Farm Machinery Survey in Pennsylvania," 1936, found that the average size of fields in Centre was 15 acres and the average crop acreage was 87, so from this we can deduce that a farm would have 5-6 fields in crops.[95] This conforms to descriptions reaching all the way back to Thomas Burrowes in 1846 that "farms are generally divided into about six fields…" Probably the six fields of 1936 may have been larger than the six fields of 1846 (because of clearing, not farm size), but there is evidence for a significant level of continuity. In 1943 the Centre County extension agent reported that "the farm of Dave Hosterman in Spring Mills has been completed with the exception of a few fences to be relocated in order to eliminate objectionable corners, and rearrange some of the pasture area." Yet the agent also expressed frustration with the typical area farmer: "Centre County farmers have followed

the system of farming in square fields for generations so that they are slow to revolutionize their farm layout, which is necessary to conform with a good erosion control program." He opined that "means rearranging the fields, eliminating fences, and establishing strips."[96]

The combination of tractor power and dairy specialization sometimes resulted in an erosion problem. So, the larger fields needed to be cropped in a different way, and this meant contour plowing and strip cropping. The evidence suggests that this development did not affect the region uniformly. Much of the land was flat and thus did not present the erosion hazard that severe slopes would bring. Contour plowing arranges furrows along contours of slopes, thus reducing runoff. The *Farm Journal* in August 1935[97] defined strip cropping as "a form of contour farming in which strips of densely-growing, erosion-resistant crops, such as alfalfa, lespedeza, sweet clover, Sudan grass, timothy, and the small grains, are alternated across the slope with strips of cultivated row crops. The strips of erosion-resistant crops check the speed of the runoff, filter out the soil being carried by the water, and cause the land to absorb moisture." The article also noted that strips demanded less labor than square fields and "permit more efficient use of machinery." They also fit well with terraces.

A comparison between aerial photographs of the late 20th century and the 1930s reveals that eventually, large areas of the Central Limestone Valleys did undergo strip cropping and contour plowing. It is difficult to date these, but most would likely have taken place in the 1950s and 1960s. A patchwork of small, square-ish fields has in many places given way to larger fields cropped in long, sharply contrasting strips. Quite a few treelines and "loafing" trees have been eliminated, as animals were increasingly fed in the barn rather than being pastured. Many if not most earlier boundaries of lots and fields remain, and perhaps twenty percent of fields retain their 1930s size, shape, and treeline.



Cessna vicinity, Bedford County, 1939. Crop fields are not contoured or stripped.

Cessna vicinity, Bedford County, 1958. Within two decades contour farming and strip cropping had been widely adopted.

Farm Ponds

Farm ponds were a popular new feature in the post World War II period. The Centre County agent reported in 1948 that many new ponds had been built and the archives contain photos of both ponds and fence line removal.

Woodlots

The Progressive and New Deal era conservation ethic stressed capitalistic, rationalized forest management. This concept spilled over into agriculture with programs for revitalizing farm woodlots, using woodland for soil conservation, and planting unproductive pasture back into trees. In general, though, woodlots became less important

as use of wood for fuel declined. Still, in 1951, the average Centre County farm had 47 acres in woodlots.[98]

Dynamited Drainage Ditches

Dynamiting was one of the most dramatic – and popular – agricultural extension demonstrations of this period. Local people would flock to farms where a ditch was to be blown. In Centre County in 1945, the extension agent reported that 2,000 feet of dynamite ditching was done at J. M. Miller's in Madisonburg.[99] Paul Thompson in Millheim and Charles Smith near Woodward did it too. By 1949, the agent was reporting that "since our original demonstrations, bulldozers have been working continually in different parts of the county on fence row removal, the widening of stream beds, and the removal of rock piles and other obstacles in the fields." He continued: "three magazines are now handling dynamite so that farmers can get it at any time for ditching purposes." These activities could have a potentially enormous impact on a single farm's landscape, though it is not clear if there was enough dynamiting to alter the landscape of the entire region.

Shocks and Stacks

Period photographs all throughout this era show shocks of grain and corn. See *Soil Survey of Union County* 1940, Plate 5 for an example. Of course, these are gone today except for the Plain Sect areas.

Fencing

If the documentary record is to be believed, this period saw the removal of a great deal of fencing. What remained would have been new forms of barbed wire, woven wire, and electric fencing. It is not clear whether ornamental fencing around the farmhouse remained.

Utility Lines

Rural electrification came into the valleys during this period, so utility poles appeared along the roadside. Probably not until well after World War II did the entire region have access to electricity in all its remote reaches.

Property Types and Registration Requirements – Criterion A, Agriculture

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

Farmstead

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

Farm

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

Historic Agricultural District

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

A. Criterion A, Agriculture

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

General Considerations for Pennsylvania as a Whole

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

Historic Patterns of Agricultural Production

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

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

-AND-

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

Social Organization of Agricultural Practice

Historic production patterns are necessary but not sufficient to determine eligibility. Social organization of agricultural practice had a profound influence on the landscape that must be recognized. Labor, land tenure, mechanization, and cultural practice should be considered. For example, in the Central Limestone Valleys, share tenancy was an important and enduring practice that significantly influenced the architecture and landscape of farmsteads, farms, and farm districts. In the Northern Tier, conversely, high rates of owner-occupation lent a different appearance to the landscape. The level of mechanization was related to labor practices, and also shaped the landscape through field patterns and architectural accommodation (or lack thereof) for machinery storage. Insofar as cultural factors influenced agricultural production or practice, they should be taken into account in determining the eligibility of farmsteads, farms, and farm districts. For example, Pennsylvania German food ways may have influenced agricultural production patterns and hence architectural forms; Yankee/Yorker families brought with them the English barn (which, because of its organization, shaped farming practice) and the penchant for classical revival styling.[100]

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.[101] 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 specific to the Central Limestone Valleys Region

To represent the period 1830 to about 1880 ("A High-Powered Cash-Grain and Livestock Economy"):

A **farmstead** should possess a dwelling that dates to and is typical of the period; a Pennsylvania Barn; and at least two outbuildings relating to the cash-grain and livestock economy and illustrating shared family labor, mechanization, and/or tenancy; and at least traces of landscape features related to the historic system of the period, such as yards, ornamental plantings, and the like. A **farm** should have, in addition, at least remnants of landscape features characteristic of the period such as paths, roadways, treelines, small fields, woodlots, etc. A **historic agricultural district** should have a preponderance of farms dating to and characteristic of this period; plus remnants of historic transportation corridors, pathways between farms, etc. It should include contiguous or clearly connected farmsteads that share visual, landscape, and architectural characteristics that date to and are typical of the period. Since tenancy was such an important part of the region's agricultural history, there should be evidence of tenancy as detailed in the narrative. Other social and cultural patterns of labor, especially family labor and gender patterns, should be clearly visible on the landscape.

To represent the period 1880 to 1920 ("A High-Powered Feed Grain and Livestock Economy"):

A **farmstead** should possess a dwelling that dates to the period or earlier (perhaps modernized during this period) and is typical for the region; a Pennsylvania Barn, Extended forebay or Basement Barn, or Three-Gable Barn; at least two outbuildings relating to the feed-grain and livestock economy and illustrating shared family labor, mechanization, and/or tenancy; and at least remnants of landscape features such as windbreaks, sentinel trees, yards. A **farm** should have in addition, small fields, woodlots, paths, roadways, treelines, and the like. A **historic agricultural district** should have a preponderance of farms dating to and characteristic of this period; plus remnants of historic transportation corridors, pathways between farms, etc. It should include contiguous or clearly connected farmsteads that share visual, landscape, and architectural characteristics that date to and are typical of the period. Since tenancy was such an important part of the region's agricultural history, there should be evidence of tenancy as detailed in the narrative. Other social and cultural patterns of labor, especially family labor and gender patterns, should be clearly visible on the landscape.

To represent the period 1920-1960 ("Continued Reorientation of the Livestock Economy"):

A **farmstead** should have a house that dates to and is characteristic of the period, or an earlier house modernized during the period; a barn that either dates to the period or contains alterations typical of the period; and at least two outbuildings or structures that illustrating the shifts in production mix and methods (as described above, and including shifts in the gender distribution of work—for example, milk house, silo, poultry house). A **farm** should add landscape features characteristic of the period (farm pond, drainage ditches, contour stripping, longer narrow fields, utility poles, etc). A **historic agricultural district** should include contiguous or clearly connected farmsteads that share visual, landscape, and architectural characteristics that date to and are typical of the period. Since tenancy was such an important part of the region's agricultural history, there should be evidence of tenancy as detailed in the narrative.

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

Properties may offer a strong illustration of change over time. Most rural historic properties have evolved over time; therefore most are likely to fit into this category. In general, to qualify for significance under this rubric, a property ought to illustrate the changes in production, farming methods, and labor systems (including gender patterns and farm tenancy) outlined in the narrative above. The possibilities are quite varied and no list can encompass them all. It should be noted that in illustrating change over time, a farmstead, farm, or historic agricultural district may contain resources from the period of settlement. Please note that the settlement era (to c1830) has been treated for the entire study area in a single document. Please refer to that document to determine the nature of resources from this period. Rather than list all the many ways in which change over time could be illustrated, below are some examples.

A **farmstead** might have an early farmhouse; a Pennsylvania Barn with straw shed addition; a 19th century smokehouse, a 20th century poultry house, milk house, and silo; and 20th century landscape features such as a windbreak or pond. This assemblage would show the transition from low-intensity farming, to cash-grain and livestock farming combined with ethnic foodways and attention to "competency;" to a more standardized emphasis on poultry and dairy. OR, a farmstead could have a mid-19th century "four over four" house, springhouse, corn crib, and smokehouse; a 19th century Pennsylvania Barn with lower-level dairy alterations made c. 1930; a silo; a milk house; and a poultry house.

This assemblage would show changes from about 1850 to 1960. A **farm** might have buildings as described above, plus a fenceline along an original boundary; one or two fields of about ten acres that retains a square shape; a woodlot; and contour fields. A **historic agricultural district** could have a mix of early settled farms and later ones; tenant farms and landowner properties; historic pathways between farms, especially between tenant and landlord farms; and so on.

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

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

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

These requirements apply to properties in all regions. Typical examples are encouraged to satisfy Criterion A for agriculture, but average or ordinary examples are not likely to qualify under Criterion C for Design and Construction. A farm or farmstead will not be eligible under Criterion C simply because it has farm buildings that retain integrity. Under Criterion C, to be eligible as property must exhibit the "distinctive characteristics of a type, period, or method of construction or that represent the work of a master, of that possess high artistic values, or, as a rural historic district, that represent a significant and distinguishable entity whose components lack individual distinction".[102]

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 ...".[103] 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.[104] This section lays out some considerations for how to assess architectural significance for farm buildings and structures based on their engineering and design characteristics related to agriculture.

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

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

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

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

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

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

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

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

Examples

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

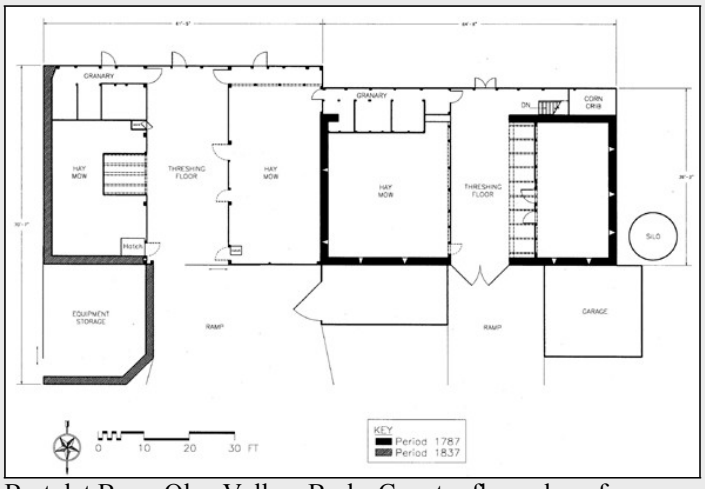
Ornament on Hodge Barn, Centre County

Hodge Barn, Centre County, struts under forebay

Hodge Barn, Centre County, struts under forebay

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

Bertolet Barn, Oley Valley, 1787 and 1839.



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

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

Plank Barn, Cumberland County, 1853

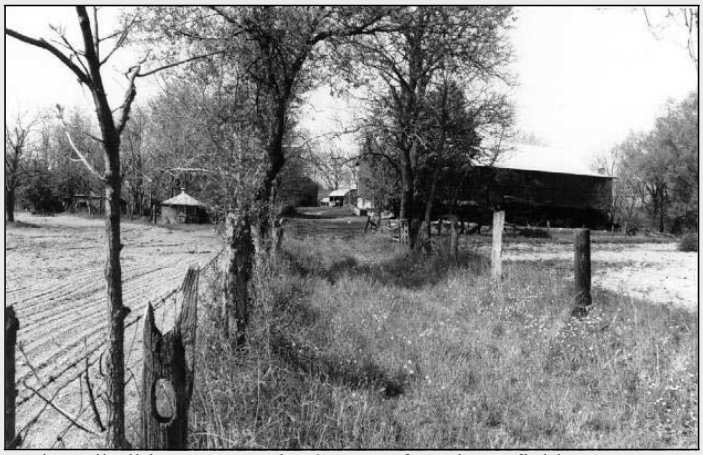
Example 4. Smokehouse, Tulpehocken Manor, Lebanon County, late 18th century. Most examples of architectural significance will likely be larger buildings such as barns, but this smokehouse (in Lebanon County) is an example of a smaller building which might qualify because of its masonry (which qualifies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

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

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

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

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



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

Property Types and Registration Requirements – Criterion D, Archaeology

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

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

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

should have discrete deposits that can be directly associated with different time periods. The above are only two general examples to guide assessments of integrity.

Change Over Time

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

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

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

Agricultural Production

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

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

Labor and Land Tenure

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

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

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

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

more important role than ethnicity in the rank of tenant farmers. Investigations in Pennsylvania could test this model across regional lines.

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

Cultural Patterns

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

Archaeology can also provide important information about cultural patterns, as manifested in religion and religious practice. For example, in Arkansas, archaeology, in conjunction with the documentary record, was able to document the degree to which one family maintained its Jewish heritage, despite being isolated from any large Jewish

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

Faunal Studies

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

Conclusion

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

archaeological record of a particular region, as well as the research questions and the unit of analysis.

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Statement of Integrity

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

Location:

Integrity of Location refers to the requirement that buildings and landscape elements remain in their original location. Normally, a building loses eligibility if it has been moved. However, where a farmstead is concerned, farm buildings present a challenge to the normally straightforward rule. Historically it has been very common to move and reuse farm buildings. Some, like poultry houses, were actually designed to be easily moved. Other types of smaller farm buildings were frequently rearranged. The New England Connected Farm complex, for example, resulted from moving buildings. Therefore, if an agricultural building has been moved, and the change in location can be interpreted as a reflection of changing agricultural patterns, integrity of location has not been compromised. If a farm building has been moved or reused after the period it is supposed to represent, integrity of location is not present.

Integrity of Location for a farm is well defined by the SR 30 context, which says "an agricultural property must be located either where it was constructed or where important trends or patterns in agriculture occurred…. Siting with respect to natural features and topography, use of local and indigenous materials, relationship to roadways, the presence of native species… and other responses to the natural environment all add to integrity of location."[105]

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."[106]

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

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

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

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

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

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

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

Setting:

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

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

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

Materials:
Integrity of Materials refers to the presence of "key exterior materials from the period of significance"[107] 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."[108] 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."[109] For significance with respect to agriculture, a farmstead or farm must have contributed to a working farm for its period of significance. The presence of historic landscape features related to agriculture is a key aspect of Integrity of Association. Close attention should be paid to identifying intact or remnant features. For example, are crop field size, scale, shape, and patterns are retained from the pre-contour stripping era? Are there remnants of early woodlots or sugar bushes? Is there evidence of land use such as pasturing? A majority of farms in a historic agricultural district should have a continued association with agriculture for the period of significance. To ensure Integrity of Association, the inevitable "intrusions" should be kept to a minimum. However, a historic agricultural district could conceivably have a high percentage of noncontributing properties relative to an urban district. For example, a concentrated 25-acre subdivision with 50 noncontributing houses might be contained within a 1,000-acre historic agricultural district with fifty contributing farms. Even though technically, the subdivision elevates the percentage of noncontributing properties, it does not reduce Integrity of Association, because it is such a small percentage relative to the continuously farmed (and contributing) acreage in the remainder of the district land area.

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[2] E. Willard Miller, et al, *A Geography of Pennsylvania* (University Park, Pennsylvania: PSU Press, 1995), 50-51.
[3] C. Macneal, "Two Brush Valley Barns," *Centre County Heritage* 27 (Spring 1990), 5.
[4] See the transportation maps in Edward Muller et al, *Concise Historical Atlas of Pennsylvania* (Philadelphia: Temple University Press, 1989), 96-97.
[5] For example, *Hazard's Register of Pennsylvania* reported in December 1834, p. 405, that a Union County farmer made more money by carrying his hogs live to the city on a canal boat and having them slaughtered at the point of consumption, than by butchering them first.
[6] D. W. Maynard, *Industries and Institutions of Centre County* (Bellefonte, PA: Republican Job Printing House, 1877), says rye gave way to wheat in the 1840s.
[7] Chen, Kuan-I. "Agricultural Production in Pennsylvania, 1840 to 1950," Ph. D. Thesis, The Pennsylvania State University, Department of Agricultural Economics, 1954.
[8] *Bellefonte Democratic Watchman*, December 19, 1855 and March 16, 1856.
[9] United States Patent Office Annual Report, 1851, 241
[10] Maynard, *Industries and Institutions*, 215; US Census published returns, 1850, 1860, 1870; Jerome Pasto and K. I. Chen, "Facts on a Century of Agriculture, 1839-1950," Pennsylvania Agricultural Extension Bulletin # 587, January 1955. George F. Johnson, "Agriculture in Pennsylvania: A Study of Trends, County and State, Since 1840." Pennsylvania Department of Agriculture General Bulletin # 484, November 1, 1929; US Patent Office Reports, 1851, Mifflin County correspondence.
[11] 1850 census comparisons show that Bedford, Fulton, and Huntingdon produced smaller overall crops than Centre, but with similar proportions, i.e. raising more wheat and rye, but less corn, oats, hay, and potatoes than statewide. Mifflin and Blair closely followed Centre. Centre was the most mechanized and had more livestock. Juniata townships were overall less productive. Thomas Burrowes, *The State-Book of Pennsylvania.* (Philadelphia, 1846), 200-201, noted that early Mifflin County products included grain, cattle, pork, and "iron in large quantities." Charles Trego, *A Geography of Pennsylvania*… (Philadelphia, 1843), 297, noted that much maple sugar was made in Bedford County. See also Ben F. Van Horn, Sr., *Bible, Axe, and Plowman History of the Northern Bedford County School District Area, Including the Municipalities of—Bloomfield Township, Hopewell Borough, Hopewell Township, South Woodbury Township, Woodbury Borough, Woodbury Township, Bedford County, Pennsylvania* (Apollo, Pa.,1986), 11, 153, 161, 164, 184-191; William P. Schell, *The Annals of Bedford County, Pennsylvania* (Bedford, 1907), 51-59; Paul Kurtz, *Blair, Main Line: A History of the Tuckahoe Valley*. Published in connection with the Bicentennial of the Bellwood Antis Area, July 1976 (Bellwood, PA, 1976), 67, 104, 113; *Hazard's Register* November 1834, 331 (American Periodicals Series Online).
[12] *Webster's Dictionary,* editions of 1828, 1852, and 1904. Daniel Vickers, "Competency and Competition: Economic Culture in Early America," *William and Mary Quarterly* 3rd Ser. Vol. 47 No. 1 (January 1990): 3-29.
[13] Richard Bushman, *The Refinement of America: Persons, Houses, Cities.* New York:

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[14] United States Patent Office Annual Report, 1851, p. 241
[15] George C. Butz, "The Peach Industry in Pennsylvania." Pennsylvania State College Agricultural Experiment Station Bulletin # 37, November 1896.
[16] United States Patent Office Annual Report, 1851, p. 241.
[17] Manuscript Agriculture Census for Centre County/Potter Township, 1850, 1860, 1870
[18] *Bellefonte Democratic Watchman*, August 13, 1857; October 8, 1857; *Bellefonte Central Press*, February 9, 1866. The US Patent Office Report, 1849, 201, notes that threshing machines were in common use in Union County.
[19] Charles McCool Snyder, *Union County Pennsylvania*: *A Celebration of History* (Lewisburg, Pennsylvania: Union County Historical Society, 2000), 41.
[20] Glenn Houghton, "A Survey of the Agricultural Conditions as Found in College Twp, Centre County, PA in the Fall of 1911." Thesis (no degree indicated), Department of Dairy Husbandry, Pennsylvania State College, 1912.
[21] Samuel Gramly Diary, PSU Special Collections; Snyder, *Union County Pennsylvania*, 43; Sally McMurry, "The Pennsylvania Barn as a Collective Resource," *Buildings and Landscapes* 16:1 (Spring 2009): 9-29.
[22] See Snyder, *Union County,* p 44; Ralph Illingworth, *a Passing Glance at Penn's Valley*, (Milton, PA: Milton Publishing Co., 1896), p 6.
[23] Community Program Study of Centre Hall, PSU Special Collections, AX2521. These studies were done through the Agricultural Economics and Rural Sociology departments in the 1930s through the 1950s.
[24] *History of Bedford, Somerset, and Fulton Counties, Pennsylvania, With Illustrations and Biographical Sketches of some of its Pioneers and Prominent Men* (Chicago, 1884), 195, 274.
[25] Simon Harper diary, *Centre County Heritage* 2004.
[26] *Letters to Carson Long* (New Bloomfield, Pennsylvania: The Carson Long Institute, 1931), 58, 69, 89; Theodore K. Long, *Tales of the Cocolamus* (New Bloomfield, Pennsylvania: The Carson Long Institute, 1936).
[27] Douglas Macneal, "Rebersburg, 1861," *Centre County Heritage* volume 38 (2002), see especially Appendix 5, "Modernizing an Old Farmhouse."
[28] Richard Pillsbury, "The Pennsylvania Culture Area Reappraised," *North American Culture* 1987: 37-54, differentiates between what he calls the "Continental" four over four, which is a the four-bay house supposedly derived from the "Continental" three-room house; and the "Pennsylvanian four-over-four," which is a five bay house with central door and central hall, and four rooms on each floor. Barry Rauhauser, on the other hand, in "The Development of the Pennsylvania Farmhouse Type in Manchester Township, York County, Pennsylvania," MA. Thesis, University of Delaware, 2002, uses the term "four over four" to refer to the number of exterior bays. Henry Glassie, "18th-century Cultural Process in Delaware Valley Folk Building," *Winterthur Portfolio*, 1971: 29-57, discusses the appearance of the "Pennsylvania farmhouse." See also Dennis Domer, "Genesis Theories of the German-American Two-Door House," *Material Culture* 26 (1994): 1-35.
[29] There are also other ways of finding possible locations of tenant properties:

- In the county landownership maps or atlases, the appearance of the same name in different places suggests that this person is a landlord. For example, in Centre County's 1874 atlas, Moses Thompson's name appears

next to many different properties. In his case, we know where he resided, so we can reasonably assume that the others are tenant properties. Note that this means that in areas where tenancy has a significant presence, one shouldn't assume that the name next to a property denotes the *resident* on the property. Another way in which landownership maps indicate tenancy is through the use (inconsistently) of designations such as "res" (residence) and "oc" (occupant). In Centre County, J. H. McCormick (check) is an "occupant" of land actually owned by someone else; by contrast, where several properties bear the name "Neff," one notes "J. Neff (res)."

- The 1880 agricultural census manuscripts clearly state whether the farmer is a tenant or owner, and whether he rents for cash or shares.
- In the case of Centre County, tax records from 1850 onward clearly separate "owners of real estate," "tenants," and "single freemen," and they indicate how landlords and tenants are connected, i.e. they list the name of the landlord along with the names of his tenants. One caveat is that these records are most clear when landlord and tenant reside in the same township.
- Family or corporate papers often contain "articles of agreement" or leases which spell out terms of tenancy. They are usually filed with financial and legal papers.
- Daybooks and farm account books often give clues as to tenancy, for example when they list receipt of crop rent.
- Probate records of landlords often contain evidence about tenancy, for example in the form of receipts for "rent grain," or items in a will which dictate how to dispose of tenanted property, probate records which contain receipts for construction work on tenant farms, etc.
- Reports of observers (for example in the transactions of the state agricultural society or the reports to the U. S. Patent Office, before the USDA was a separate department) often describe tenancy arrangements.
- Agricultural extension bulletins, for the later period, contain useful information on tenancy. In Centre County, for example, local agricultural extension workers were concerned that old-style contracts did not work for dairy farmers, and they published alternative sample contracts.
- Local newspapers (in this case, the *Centre Reporter* published in Centre Hall) often mentioned tenants in their local columns.

[30] Theodore K. Long, *Letters to Carson Long*, p 90.

[31] Lucy Simler, "Tenancy in Colonial Pennsylvania: The Case of Chester County." *William and Mary Quarterly* 3d ser., 43, No. 4 (October, 1986): 542-569.

[32] Additional historic images can be found in Nancy Shedd and Jean Harshbarger, *1887-1987, Second Century: a Huntingdon County Bicentennial Album* (Huntingdon, 1987); James O. Smith, ed. *Stone Valley Remembered*. Huntingdon, Pa: McAlevy's Fort, 1989; and HABs documentation for the Walker Farm and Dorfgrange Farm in Huntingdon County.

[33] List A of the 1798 Direct Tax for Bald Eagle and Patton Townships, Mifflin County, included areas presently in Spring, Benner, and College Townships, Centre County. Of the 38 properties listed, 31% had separate kitchens. That same tax record for "Potters Township" noted 16 houses, seven of which had separate kitchens (Information from

conversation with Jerry Clouse.)
[34] Eli Bowen mentions a "summer dining kitchen" in his *Pictorial Sketch-Book of Pennsylvania* (Philadelphia: W. P. Hazard, 1852).
[35] Brewer, Priscilla, *From Fireplace to Cookstove: Technology and the Domestic Ideal in America.* Syracuse: Syracuse University Press, 2000. More evidence for seasonal use of summer house is in Houghton thesis about College Township, where he says that milk is stored in the cellar during the summer and in the summer house during winter.
[36]For mention of a wagon shed, see *Centre Reporter* Feb. 15, 1900.
[37] Families in Cumberland County did eat their meals in the summer kitchen – Jerry Clouse conversation with Author.
[38] Of course it is not purely an ethnic type; smokehouses are very common in the American South, too.
[39] See Winslow Fegley, *Farming Always Farming: A Photographic Essay of Rural Pennsylvania German Land and Life* (Birdsboro, Pennsylvania: Pennsylvania German Society, 1987), 33, 36, 43
[40] Amos Long, *The Pennsylvania German Family Farm: A Regional, Architectural, and Folk Cultural Study of an American Agricultural Community* (Breinigsville, Pennsylvania: The Pennsylvania German Society, 1972).
[41] Maynard, *Industries and Institutions,* 215. It is not clear if the position of hog house changed with the arrival of the milk house.
[42] Plate 5 in the 1940 Soil Survey of Union County shows a pairing very nicely.
[43] Christopher Macneal, "Two Brush Valley Barns," argues that by mid-century, farmstead layout had shifted to a more linear organization, and more often oriented to the road, thus symbolizing greater attention to commercial ventures. It is not clear that this was a pervasive trend. Many improved farms were located well off the road, and others (above for example) integrated "improved" forms into older arrangements. Macneal sees in the linear arrangement a greater withdrawal of women from harvest etc, but there is ample evidence that women remained central to farm labor and production.
[44] Houghton, 17
[45] Cited in Fletcher vol. 2 p. 72. Architectural historian Jerry Clouse notes: An article titled, "Statistics of Fences in the United States" in the 1871 *Department of Agriculture Report* noted that of the type of fences reported in 30 PA counties, two-thirds were the zigzag "Virginia" style worm fence, one-sixth were post and rail, one-eighth were boards, and the remainder stone wall, osage-hedge, stump, pole, or other kinds. Historic views indicate that different types of fencing were used for particular areas of the farm. For example, a picket fence may enclose the house and garden, a post and rail fence enclose the barnyard, and a worm fence the farm fields." These figures were recapitulated in the First Annual Report of the Pennsylvania State Board of Agriculture, 1877, 238.
[46] John Hamilton, "Fences," 1876 Transactions of the Pennsylvania State Board of Agriculture.
[47] Douglas Macneal, "Introducing Edward Heary's Connected Warrants Map of Centre County," *Centre County Heritage* volume 31:1 (1995); Macneal, "The Potter Landscapes," *Centre County Heritage* volume 34: 1 and 2.
[48] See the following for indications of hay as a cash crop: *Centre Reporter* July 19, 1900, Jan. 26, 1905, March 16, 1905, November 24, 1910; for home dairying, see *Centre Reporter* March 1, 1900 (want ad for dairy workers).
[49] Penn State Agricultural Extension Archives, Mifflin County, 1917 Annual Report.

PSU Special Collections. The *National Stockman and Farmer*, January 17, 1889, 779, noted many Blair County farmers fattened beef animals. See also *National Stockman and Farmer* July 2, 1891, 259; November 23, 1893, 767.

[50]*National Stockman and Farmer*, September 17, 1903*; National Stockman and Farmer*, January 17, 1889, 779, mentions selling truck to Altoona.

[51] See for example, the Theodore Christ Papers, Book 131, p. 102, April 2, 1894, entry for hiring a laborer for $16 per month, house rent; wood for one stove; cow pasture for one cow; and one load corn fodder. PSU Special Collections.

[52] *National Stockman and Farmer*, July 14, 1887, 250; May 31, 1888, 137.

[53]Henry Meyers estate papers, Centre County Historical Library, Bellefonte, Pennsylvania. *National Stockman and Farmer*, July 4, 1887, 250. *National Stockman and Farmer*, October 29, 1903.

[54] The *Centre Reporter* in the early 1900s frequently reported that local farmers were adding large extensions to their barns, whereas in earlier years there was little or no mention of such activities (even though other agricultural activities were well noted). See January 26, 1905; June 1, 1905; January 27, 1910.

[55] Conversation with Allen Noble.

[56] Threshing machinery was available in the valleys in the mid-nineteenth century, but it was horse-powered and not always with winnowing capabilities. Separate winnowing machinery was available, but it worked on a small scale. It's likely that the change in barns was prompted not by horse power threshing but by the later, faster and more productive steam power that not only threshed (that is, separated the grain from the stalk) but also winnowed (separated grain from the chaff), thus eliminating the need for the cross ventilation that earlier facilitated wind-power winnowing.

[57] Note also that the Houghton thesis, 1911, mentions in most cases a straw stack in the barnyard; but he had an agenda, too.

[58] Mifflin County Agricultural Extension Agent's Report, 1923, p. 3, p. 9; 1926, p. 10; Centre County Agricultural Extension Agent's Report, 1929.

[59] Union County Soil Survey of 1946 estimates that 200 farms specialized in field crops, 391 in dairy, 80 in poultry, 24 in livestock, and 289 "farms on which the products are used by farm households"

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

[61] Paul I. Wrigley, "Types of Farming in Pennsylvania." Pennsylvania Agricultural Experiment Station Bulletin # 479, May 1946. This report says that poultry is comparatively less important than the state average, yet the map shows at least some townships with both dairy and poultry as specializations; plus it seems as if there was a lot of poultry in the postwar period.

[62] Snyder County Agricultural Extension Agent's Report, 1945, 6.

[63] See also Juniata County Agricultural Extension Agent's Report, 1938.

[64] George Burton McIntire, "Management and Practices on 281 Farms in Centre County, Pennsylvania." MS Thesis, The Pennsylvania State University, 1941,reported that there were large hatcheries selling to hucksters from NY and NJ and that the hatcheries eliminated a lot of home work.

[65] Centre County Agricultural Extension Agent's Report, 1934, 1948.

[66] Jesse C. Sell, *Twentieth Century History of Altoona and Blair County Pennsylvania and Representative Citizens* (Chicago, 1911), 25, 139, 731, 851, 884; J.O. Veatch, Harry

P. Young, and H.P. Cooper, USDA Field Operations of the Bureau of Soils, *Soil survey of Blair County, Pennsylvania*, 1915. H. K. Anders, "Agriculture in Blair County," Chapter 20 in George A. Wolf, editor in chief, *Blair County's First Hundred Years 1846-1946*. A symposium prepared by the Blair County Historical Society in commemoration of the one hundredth anniversary of the establishment of Blair County, Pennsylvania. Altoona, Pa, 1945.

[67] Kurtz, *Blair, Main Line,* 168.

[68] See also Centre County, in 1933 Ag Extension Agent's Report, on the same lease problem

[69] Union County Soil Survey, 1946, stated that most farms were rented on a "50-50 crop basis"

[70] Mifflin County Agricultural Extension Agent's Report, 1938, 19, 30. In Clinton County they didn't begin mentioning health regulations until the mid 1940s.

[71] See also detailed descriptions in the Clinton County Agricultural Extension Agent's Report for 1947.

[72] "Suggestions for the Improvement of Old Bank Dairy Barns," USDA Farmer's Circular # 166, June, 1931.

[73] H. J. Barre and L. L. Sammet, *Farm Structures* (New York: Wiley, 1950), Chapter on "Dairy Buildings."

[74] Roger A. Grout, "Construction of Pole-Type Buildings," Penn State Agricultural Extension Circular # 437, November 1954; William Gilman, "A Barn They Drive Miles to See," *Farm Journal* July 1952: 32-33 (this describes a New York State open stall dairy barn setup).

[75] E. Melanie Dupuis, *Nature's Perfect Food: How Milk Became America's Drink* (New York: NYU Press, 2002; Kendra Smith-Howard, "Perfecting Nature's Food: A Cultural and Environmental History of Milk in the United States, 1900-1970," Ph. D dissertation, University of Wisconsin, 2007. The New York City "Dairy Report Card" is reproduced in I. F. Hall, "An Economic Study of Farm Buildings in New York," Cornell University Agricultural Experiment Station Bulletin #478, 1929, 29-34.

[76] Centre County 1924 Agricultural Extension Agent's Report: "the Sheffield Farms Milk Company recently opened a milk plant at Howard and also purchased the Western Maryland plant at Bellefonte. This milk in order to be sold on the NY market as grade "B" must meet certain standards. This has necessitated several changes in the barns in this territory as well as some system of cooling which has resulted in a number of milk houses being built."

[77] Noble, conversation with author; Hall, "Economic Study of Farm Buildings," 1929, 62-3, argued for a location near the stable entrance but with no "direct opening to the stable." He says the house should have running water and a tank sufficiently sized to cool two milkings' worth, below floor level. He recommends a roof ventilator.

[78] Josephson, H. B., et al. "A Farm Machinery Survey of Selected Districts in Pennsylvania," Pennsylvania Agricultural Experiment Station Bulletin # 237, 1929, 5.

[79] Norman Dale, "Agriculture in Susquehanna County, Pennsylvania," MS Thesis, 1932, 9. Figures for 1924: 12% of Centre County farms had silos; 9% for Clinton County; 6% for Juniata and Mifflin; 5% in Snyder; and 14% in Union County. Statewide the average was 13 percent.

[80] Houghton notes that of the 25 farms surveyed only 5 had silos, and these were wooden

staves, 8.
[81] Clinton County Agricultural Extension Agent's Report reveals that in the 1930s tile silos were built in the county by the owners of tiles produced locally; in the 1940s, brick ones were more popular.
[82] I.F. Hall, "Economic Study of Farm Buildings," 69.
[83] For illustrations, see advertisements, *Farm Journal*, March 1922 and January 1922.
[84] C. S. Platt, "Battery Brooding," *Farm Journal*, January 1930, 22.
[85] Kennard, "A New Deal for Chickens," *Farm Journal*, July 1933, 5.
[86] Platt, "Battery Brooding."
[87] Kennard,"New Deal for Chickens," 5.
[88] C. S. Platt, "Four Weeks in Batteries," *Farm Journal*, December 1930, 11; on continuation of free range practice, see ads in *Farm Journal*, September 1951, 92; D. C. Kennard, "Revolution in Hen-Coops," *Farm Journal*, March 1932, 14; Nathan Koenig, "Henhouses from Left-Overs," *Farm Journal*, June 1930, 31-32.
[89] On new construction techniques, almost any issue of *Farm Journal* for 1958 and 1959 contains ads illustrating them. See also "New pre-fab poultry houses," Buildings column, *Farm Journal*, May 1957.
[90] *Juniata: A County for All Seasons,* written and compiled for the Juniata County Historical Society 1981, 90, asserts that the county had fifty hatcheries in 1930, which accounted for half the state's total. The Department of Commerce records, Record Group 31, photo # 1422, shows hatchery interiors about 1940. For the Kerlin hatchery, see *A Century of Centre Hall in Pictures,* 1942, 201; Community Study of Centre Hall, 1923-1971, Pennsylvania State University, Dept. of Agricultural Economics and Rural Sociology, Item 02494. The Sanborn maps for Centre Hall, starting in 1911, show a "Chicken Ranch" near the railroad depot. (PSU Special Collection)
[91] See Seltzer/Rishel Farm, Potter Township, CCCTS Report 2002.
[92] Clinton County Agricultural Extension Agent's Report, 1950; Centre County Agricultural Extension Agent's Report, 1934, 16.
[93] Clinton County Agricultural Extension Agent's Report, 1950.
[94] Keith E. Roe, *Corncribs in History, Folklife, and Architecture* (Ames: Iowa State University Press, 1988), 64.
[95] Josephson, "Farm Machinery Survey."
[96] Centre County Agricultural Extension Agent's Report, 1943, 5.
[97] Ivy M. Howard, "Crazy Patch Fields," *Farm* Journal, August 1935, 26.
[98] William Carl Keller, "A Survey of Volume and Condition of Farm Woodlands in Centre County, Pennsylvania," Penn State University Master of Forestry Thesis, 1951.
[99] Centre County Agricultural Extension Agent's Report, 1946, 10.
[100] Note that while the *buildings* represent an identifiable cultural tradition, the *owners or occupants* may not have necessarily share the same cultural heritage over the entire history of the property. People borrowed, reused, and adapted. For example, an "English" farmer in southeastern Pennsylvania may have built a Sweitzer barn because it best suited the diversified farming of the region.
[101] 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.
[102] National Register Bulletin 15, *How to Apply the National Register Criteria for Evaluation*, (2002), 2.

[103] *Historic Farming Resources of Lancaster County*, MPDF, 1994.
[104] 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).
[105] "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.
[106] "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
[107] Ibid.
[108] Ibid.
[109] Ibid.