

The Culture of Improvement in the Early Republic: Domestic Livestock, Animal Breeding, and Philadelphia's Urban Gentlemen, 1820–1860

FOR MUCH OF THE NINETEENTH CENTURY, animal breeding was a matter of financial speculation and intellectual curiosity among the growing class of urban gentlemen in the United States. Wealthy people who resided in or near America's burgeoning cities bred livestock to suit the changing markets and diverse climates of an expanding nation of farmers. John Hare Powel (1786–1856) and Peter Browne (1782–1860), both residents of Philadelphia, were among the city-dwellers who promoted the breeding and improvement of cattle and sheep. Although they had several key political and ideological differences, these two Philadelphians were equally emblematic of the culture of improvement that encompassed the efforts of Americans to enhance the quality and productivity of livestock. As Powel wrote to an English cattle breeder in 1825, "There is more excitement in regard to Farm Stock than I had hoped even, to see in America. The first men of the nation are turning their attention to its improvement." Powel sought to increase the dairy producing capabilities of a cattle breed normally known for its beef, the Durham Shorthorn, by personally importing purebreds directly from

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England. Peter Browne, who did not breed farm animals, was nonetheless an armchair enthusiast of sheep breeding and wool production. He put his inheritance and the fees he received as a lawyer toward a variety of geological, scientific, and philanthropic pursuits, including a collection of domesticated and wild sheep's wools from across the globe that he started in the late 1840s. In 1855, he told an audience in Harrisburg that "the enlightened and industrious sovereign people of this great and still growing country should awake to the importance of sheep-breeding and wool growing."¹

As historians Tamara Thornton and Harriet Ritvo have shown, experimentation with breeding animals was a hobby of the upper classes in nineteenth-century America and Great Britain.² Whereas Thornton found status anxiety as the root cause of genteel Bostonians' promotion of an agrarian ideology during the period of industrialization in Massachusetts, and Ritvo argued that animal husbandry was symbolically important to the British landed gentry because the control of lesser animals like cattle and sheep represented social power, the following pages tell a different story about the politics of animal breeding. Rather than being anxious elites, John H. Powel and Peter Browne were self-confident gentlemen. For them, the breeding of livestock was an expression of the American culture of improvement, as well as a demonstration of the increasing economic links between urban areas and agricultural lands. Animal breeding was a forward-looking endeavor, embraced as part of a dynamic domestic economy. Moreover, while these elite Philadelphians were motivated by the social prestige that came with livestock breeding and intellectual pursuits, they also were practical men who were not afraid to make money and promote methods of wealth creation. Powel had a private financial stake in the purchase and sale of purebred animals; Browne supported the prosperity of wool growers and woolen manufacturers through his political rhetoric and promotion of scientific breeding. Above all, Powel and Browne hoped to promulgate scientific ideas about

¹ John H. Powel, Philadelphia, to John Wetherill, Leicestershire, England, [May 1825], Letterbook, 1824–1826, vol. 45, ser. 5a, Powel Family Papers, 1681–1938, Historical Society of Pennsylvania; "An Address of Peter A. Browne, LL.D., (Delivered by Invitation,) September 25, 1855, before the Pennsylvania State Agricultural Society, in the Hall of the House of Representatives of Pennsylvania, at Harrisburg," in *Third Annual Report of the Transactions of the Pennsylvania State Agricultural Society* (Harrisburg, PA, 1856), 86–98.

² Tamara P. Thornton, *Cultivating Gentlemen: The Meaning of Country Life among the Boston Elite, 1785–1860* (New Haven, CT, 1989); Harriet Ritvo, *The Animal Estate: The English and Other Creatures in the Victorian Age* (Cambridge, MA, 1987).

livestock to any and all American citizens who read their essays or listened to their speeches. Their vision of agricultural improvement was based less on the agrarian myth of ancient poetry than on the technological advance of an industrial future.

Powel and Browne were part of a small group of agricultural improvers in Philadelphia who claimed that animal breeding would support the public good of the nation. Powel and Browne made grandiose claims about the economic benefits of the physical modifications they proposed to breed into the typical livestock that dominated the family farms of a nation that was still predominantly rural. This tiny, though socially powerful, cadre of gentleman improvers wished to make American farms as productive as those in Europe while keeping down the cost of labor. Animal breeders also became promoters of transportation links between cities and agricultural hinterlands, geological research, domestic manufacturing, and federal tariff policy. They recognized the connections between agriculture and other areas of often contentious public policy. For example, Powel and Browne disagreed over whether the nation should remain fundamentally agrarian. Still, they both believed that America's freehold farmers had the capacity to manage and control the physical features of domesticated animals. By breeding better domesticated animals, American breeders created more productive farmers and more useful citizens.

Sufficient similarities exist between John H. Powel and Peter Browne that they warrant recognition together. They both subscribed to a view of improvement that depended on the diffusion of useful knowledge, the education of literate men, and the communication of political ideas through civil societies. Powel and Browne were fascinated by the material changes in the economy of Pennsylvania and the nation as a whole. To them, the breeding of improved livestock was akin to building canals, constructing steam locomotives, hollowing out mountains of coal, and erecting woolen factories. The fact that they disagreed over the passage of protective tariffs further illuminates the character of the animal breeding community in urban America.

Thus, the story of Philadelphia's John H. Powel and Peter Browne makes an instructive case study of the link between animal breeding and the culture of improvement during the early nineteenth century. After a brief explication of the ways that the "improvement" of domesticated animals was transferred to early America from Great Britain and Europe,

this article shows that a growing number of urban Americans promoted the practice and intellectual pursuit of animal breeding. Unlike Boston's agrarian Federalists, Philadelphia's farmers were far less anxious about their social status. From positions of social supremacy and cultural confidence, Philadelphia's gentleman farmers promoted agricultural change and technological transformation.

Placing the Breeding of Livestock in the Culture of Improvement

Livestock "improvement" is the genetic modification of the physical character of animals within a relatively small number of generations over a short period of time. Although animal breeding has long been important in human societies, it was not until the beginning of the nineteenth century that agricultural reformers in Great Britain, France, Germany, and other European countries developed new techniques for the "improvement" of domestic animals through repeated and deliberate mating. The new focus on breeding occurred first with the most malleable or ubiquitous of farm livestock—horses, cattle, and sheep. By the 1780s, gentlemen farmers in Britain began to recategorize farm animals isolated by geography and known for centuries by distinctive local features into "breeds." The use of "breed" as a classification, which was interchangeable with "families" and "races" in that pre-Darwinian age, represented a new and universal approach to the organization of the animal world.

The most famous "breeds" indicated a new imperative; they were usually the animals that could produce increased quantities of beef, milk, and wool, all of which were critical to the expansion of cities and mass-produced goods. Leaders of eighteenth-century British agricultural improvement—including Robert Bakewell, Thomas Coke, the dukes of Bedford, Lord Somerville, and the Colling brothers—were pioneers in the breeding of livestock. They became highly relevant to American improvers throughout the first half of the nineteenth century. Americans like Powel acknowledged "the vigilance, and science of some distinguished breeders in England, [who] have shown, in varying the forms, and even in assigning, if the phrase may be used, definite properties, shapes, and even peculiar colours, to whole families of neat cattle and sheep."³

³ *Memoirs of the Pennsylvania Agricultural Society, with Selections from the Most Approved Authors, Adapted to the Use of the Practical Farmers of the United States* (Philadelphia, 1824), 49.

The transformation in breeding practice that gentleman farmers in Britain and Europe spearheaded produced the science and engineering that helped to create the most famous livestock breeds of the mid-nineteenth century. Americans like Powel and Browne derived many of their animals and ideas from foreign sources. For instance, the cattle that John H. Powel owned and bred were Shorthorns. Originally from the area around Durham in northeastern England, these animals quickly emerged as “not only the fashionable speculation of the richest landowners and farmers but the commonplace and essential improved beast of the age of high farming.”⁴ Browne was familiar with the differences between the fineness and texture of the wool of the Southdown, Merino, Rambouillet, and Saxony breeds of sheep—each of which originated as a “breed” in England, Spain, France, and Germany, respectively.

At the beginning of the nineteenth century, Americans were eager to remove many kinds of international trade barriers. It is likely that both Powel and Browne supported excluding from tariffs livestock imported for breeding purposes, a federal policy which had begun in 1793 and was renewed in subsequent legislation through the 1850s.⁵ By comparison, European monarchs and nobles often had been the only people with the privilege to exchange purebred livestock, as when King George III received Merinos from Spain as a gift in the 1770s. Trade barriers erected by European governments ensured the general prohibition against free trade in pure breeds of animals. Powel complained that “the severe penalties imposed by law for any attempt to export breeding Sheep from Great Britain have defeated my efforts,” but he was jubilant in 1825 when export of Southdown and Leicester sheep breeds was finally allowed.⁶

⁴ John H. Powel to John B. Wallace, June 14, 1824, and Powel to W. Smith, Dishley, England, Dec. 24, 1824, Letterbook, 1824–1826, Powel Family Papers; P. J. Perry, “The Shorthorn Comes of Age (1822–1843): Agricultural History from the Herdbook,” *Agricultural History* 56 (1982): 560–66.

⁵ For the 1793 law, see *An Act for Repealing the Several Impost Laws of the United States . . . on Useful Beasts Imported for Breed . . .* [Philadelphia, 1793], broadside, American Antiquarian Society, Worcester, MA; Secretary Alexander Hamilton, *Letter on Importations, Tonnage, Etc.*, Feb. 27, 1793, Ex. Docs. 2nd Cong. 2nd sess., cited in *A Descriptive Catalogue of the Government Publications of the United States, September 5, 1774–March 4, 1881*, comp. Benjamin Perley Poore (Washington, DC, 1885), 27. For 1842 and 1846 tariffs, see *Customs Tariff of 1842 with Senate Debates Thereon Accompanied by Messages of the President, Treasury Reports, and Bills*, 62nd Cong. 1st sess., Senate Doc. 21 (Washington, DC, 1911), 316–18, 388; *Customs Tariff of 1846 with Senate Debates Thereon Accompanied by Messages of the President, Treasury Reports, and Bills*, 62nd Cong. 1st sess., Senate Doc. 71 (Washington, DC, 1911), 27, 271.

⁶ For the British laws, see Lewis F. Allen, *History of the Short-Horn Cattle: Their Origin, Progress and Present Condition* (Buffalo, NY, 1872), 23–24; H. B. Carter, *His Majesty's Spanish*

Once they managed to obtain transatlantic animal shipments, gentlemen farmers across the eastern United States began to breed livestock that was increasingly specialized for production and less shaped by its local environment. Carrying genetic markers with them through deliberate breeding—though the concept of genetics was unknown to the breeders—these new and fashionable “breeds” were disseminated throughout the world in the nineteenth century. As a result of these international agricultural innovations, the “improvement” of domesticated animals in the United States came to be associated mainly with the technical processes of selective breeding.

Particularly important was the practice of inbreeding. Many cattle and sheep breeders began to sanction the mating of close relatives, such as mothers and sons or fathers and daughters. For commercial and economic, as much as aesthetic, reasons, the purity of the breed—captured in the label “purebred”—was a highly sought-after goal among an increasing number of nineteenth-century breeders. As Peter Browne wrote in 1855, “The earnest endeavor of all agricultural societies should be to encourage the selection of pure breeds!” Concomitantly, breeders, zoologists, and taxonomists were fascinated and troubled by the existence of animal “hybrids,” or what were also called “mongrels” at the time. But other breeders worried that inbreeding that occurred too closely between members of the same animal family or that proceeded for too many generations without crosses from outside the gene pool resulted in degeneration. The debate over the primacy of inbreeding simmered among gentleman breeders throughout the nineteenth century.⁷

Notwithstanding the fears associated with inbreeding, breeders in Britain and America collected pedigrees as emblems of transgenerational purity. Pedigrees were rapidly assembled into printed volumes known as “herd books,” the equivalent of animal genealogies. For example, Powel of Philadelphia assembled many pedigrees from his surrogates across the English countryside. Yet even he was skeptical of the value of all pedigrees. On one hand, he asserted that the “records of the Herd and Stud

Flock: Sir Joseph Banks and the Merinos of George III of England (Sydney, Australia, 1964). For Powel’s desire to overcome British sheep exportation barriers, see John H. Powel to unknown recipient, Apr. 29, 1825, Powel to Mr. Patterson, June 4, 1825, Powel to Jonas Whitaker, June 18, 1825, Powel to Stephen Williams, Nov. 22, 1825, and Powel to Samuel Cox, Jan. 23, 1826, all in Letterbook, 1824–1826, Powel Family Papers.

⁷Peter A. Browne, *Trichologia Mammalium; or, A Treatise on the Organization, Properties and Uses of Hair and Wool; Together with an Essay upon the Raising and Breeding of Sheep* (Philadelphia, 1853), 158.

Books” afforded “the most decided evidence of the validity of” improved animal breeding. On the other, “I like pedigree but I want usefulness.”⁸

But pedigrees and herd books served a commercial purpose. By assigning animals on an individual basis to rigid (if not universally accepted) categories like “breeds,” “families,” or “races,” and by printing herd books for each breed, breeders who lived in distant parts of the United States were able to assess, compare, and calculate the monetary value of purebred animals. As historian Margaret Derry notes, public herd books played “an enormous role in the trade of stock that occurred over long distances.” Some fifty thousand Shorthorn bulls would be registered in the Shorthorn herd book between the years 1822 and 1883.⁹

Placing Philadelphia in the Culture of Improvement

The culture and technology of inbreeding as adopted in Britain and Europe shaped the breeding of domesticated livestock in the early United States. Across the country, there was a commonly held belief that nature, as well as mankind, was improvable. By the 1820s, the American nation was awash in the political rhetoric of improvement. The roads, canals, and, later, railroads built during this era were known as “internal improvements,” but agriculture too was deeply tied to internal improvement. For instance, during the 1820s, Powel defined internal improvement “in its largest and most comprehensive sense” as “the cooperation of those, who although humbly employed in delving the earth are most usefully engaged in creating the means of support and augmenting the resources of all.” Two decades later Browne averred that “hair, wool, and fur are objects of great utility in manufactures and the arts” and would “elevate the American farmer and the manufacturer,” which suggested that animal breeding was an aid to the nation’s material progress.¹⁰

⁸ John H. Powel to William Greiner, May 20, 1824, Powel to Michael Ashcroft, Bank Hall, England, Aug. 24, 1824, and Powel to James Worth, Newtown, Bucks County, Feb. 17, 1825, Letterbook, 1824–1826, Powel Family Papers; “On Breeding. . . Its Influence upon the Constitution and Secretions of the Animal,” John H. Powel in reply to Major Rudd, of Marton Lodge, England, in *Hints for American Husbandmen, with Communications to the Pennsylvania Agricultural Society* (Philadelphia, 1827), n.p.

⁹ Margaret Derry, *Bred for Perfection: Shorthorn Cattle, Collies, and Arabian Horses since 1800* (Baltimore, 2003), 8; Perry, “Shorthorn Comes of Age,” 560–66.

¹⁰ John H. Powel to unknown recipient, Apr. 29, 1825, and Powel to John Wetherill, Leicestershire, England, [May 1825], both in Letterbook, 1824–1826, Powel Family Papers; Browne, *Trichologia Mammalium*, 148–49.

Powel and Browne envisioned the improvement of domesticated animals as part of the many political projects that arose in the state and national legislatures beginning in the 1820s. They were among a generation of Philadelphians who initiated major material changes in Pennsylvania—building canals, constructing steam locomotives, clearing forests, hollowing out coal, and creating industrial factories. They knew that the economic development of state and nation were linked; they understood that Pennsylvania and the union rose and fell together. They cared about the improvement of Pennsylvania farms because it fostered the intrastate and interstate development of markets for all manner of goods. Their biggest political challenges were to extend interior markets, spread new transportation networks across the state, diversify the rural economy, and perhaps to encourage domestic manufacturing. As a result, Powel and Browne connected livestock breeding to the issue of “internal improvements.”¹¹

Powel, for example, had social and political connections that brought him within the orbit of the transportation improvers, such as the Pennsylvania Society for the Promotion of Internal Improvement, which was founded by pamphleteer Mathew Carey. When Powel was elected to the Pennsylvania Senate in 1827, he became the chairman of the Committee on Agriculture and Manufactures.¹² Powel spearheaded a plan for a canal between the Schuylkill and Delaware rivers to draw commerce to the city of Philadelphia. Yet, by the early 1830s, when railroads had become a reality in Pennsylvania, Powel promoted the building of tracks by the West Philadelphia Railroad Company over the Schuylkill River Permanent Bridge. He also invested in the newly chartered Pennsylvania Railroad Company.¹³

¹¹ Carter Goodrich, ed., *Canals and American Economic Development* (New York, 1961); John Larson, *Internal Improvement: National Public Works and the Promise of Popular Government in the Early United States* (Chapel Hill, NC, 2001).

¹² John H. Powel to Joseph Lawrence, Aug. 19, 1825, Letterbook, 1824–1826, and Samuel Kneass to Powel, Jan. 16, 1829, box 9, folder 1, Powel Family Papers. For a biography of Kneass, see Bruce Sinclair, *Philadelphia's Philosopher Mechanics: A History of the Franklin Institute, 1824–1865* (Baltimore, 1975), 59n28.

¹³ Eventually, Powel turned this political promotion of transportation to his favor, selling rights-of-way to the Pennsylvania Railroad in the 1840s and allowing the company to slice through a portion of the Powelton estate that had once been a farm pasture for his cattle and sheep. For Powel's resignation from the state Senate, see Correspondence, March–December, box 9, folder 8, Powel Family Papers. For bridge and railroad activity, see John Hare Powel Civic Papers, 1835, box 17, folder 7, Pamphlets, 1822–1837, vol. 75, and Outgoing Correspondence, 1814–1840, box 11, folder 1, Powel Family Papers; John Hare Powel, *Mr. Powel's Remarks on the Termination of the Pennsylvania Rail-Way, March, 1829* ([Philadelphia?], 1829).

Peter Browne, though less financially invested in transportation projects, was equally aware of the benefits and challenges of connecting city and countryside. In 1837, he penned *An Essay on Veterinary Art*, a pamphlet that outlined how improvements to transportation enhanced the trade and treatment of horses and oxen, animals that Pennsylvania's farmers used for ploughing fields, merchants used to haul goods, and carriage companies needed to transport human passengers. During a trip to Europe in the 1830s, Browne visited the famous French veterinary school at Alfort, outside of Paris. He observed that Pennsylvania needed more trained veterinarians—or at least farmers with knowledge of the veterinary arts—because of the changing contours of the technology of animal transportation. He noted, "The more our cities increase in population, and the greater the number of rail roads by which our country is traversed, the more necessary will it become that our cattle [and horses] should be well broke [trained for the plough or harness]." Consequently, Browne proposed the creation of a veterinary college in Pennsylvania. Though such a college was not built in his lifetime, later in the century Philadelphia became the site of the University of Pennsylvania's veterinary school.¹⁴

Complementary to transportation, Philadelphia's improvers were involved in the accumulation of scientific knowledge about Pennsylvania's geology. Geology was an important determinant of the uses of Pennsylvania's soils and rocks in agriculture, home heating, and industry. As a proprietor of coal lands in the Lehigh Valley and an administrator of large tracts of land near Wilkes-Barre in Luzerne County on behalf of the Bingham estate, Powel was certain that until "its forests are subdued," Pennsylvania could not increase its production or export of wheat; it also could not extract its known deposits of coal.¹⁵ In 1828, Browne pushed legislators, including Powel when he was serving a term in the Pennsylvania Senate, to fund a geological survey of the entire state of Pennsylvania. By 1830, Browne proposed the formation of a "Geological Society in Pennsylvania" to cater to all the counties in the state. He mod-

¹⁴ Browne linked the introduction of foreign "races of the domestic animals" to the nationalism of "a young country like the United States." See Peter A. Browne, *An Essay on the Veterinary Art* (Philadelphia, 1837), 1–22.

¹⁵ John H. Powel to unknown recipient, Apr. 29, 1825, and Powel to John Wetherill, Leicestershire, England, [May 1825], both in Letterbook, 1824–1826, Powel Family Papers. For Powel's involvement with coal mines, see the finding aid for the Powel Family Papers (2004), 11–20, Historical Society of Pennsylvania.

eled the effort on the “Cabinets of Natural Science” that were already established in Philadelphia, Chester, Montgomery, and Bucks counties. Browne believed that the Commonwealth of Pennsylvania had a republican duty to educate its citizens. The state legislators, however, appear not to have been convinced, as they decided not to approve money for Browne’s proposed geological survey. Later, in 1837, Browne became a professor of geology and mineralogy at Lafayette College in Easton, Pennsylvania.¹⁶

Animal breeding could be improved through geological research as well. Geological details helped farmers choose the most fecund pastures and the most nutritious kinds of grasses (i.e. timothy or orchard grass) for cattle and sheep. Knowledge of the quality of farm soils was an aid in ascertaining the value of land throughout Pennsylvania. “Soiling cattle,” or placing them in barns to collect manures to spread on tired grain fields, was a favorite rallying cry of improvers, but it also evoked the way that improving gentlemen viewed soils as integral to animal improvement. “Drilling crops” was another redolent description. As Powel noted in 1825, agricultural decisions were “very much affected by the strength of the soil[,] the accuracy and depth of tillage,” all of which could be analyzed geologically. Browne told the Pennsylvania State Agricultural Society in 1855 about matching fine-wool sheep to certain topographical regions. He observed, “The hairy sheep and the woolly sheep prosper best in different districts of county; the fine woolled sheep does not thrive well on an island or near the sea coast of a continent, but delights in an inland, hilly or mountainous country.”¹⁷ Philadelphia’s urban elites contributed to the dialogue about the improvement of agriculture throughout

¹⁶ P. A. Browne, Benjamin Bartholomew, and Joseph Thomas, “Curiosity,” *Philadelphia Inquirer*, copied in *Register of Pennsylvania*, Apr. 24, 1830; Peter A. Browne, *Columbian Star and Christian Index*, Oct. 9, 1830; Peter A. Browne, “Geological Society,” *Register of Pennsylvania*, Oct. 23, 1830; J. B. [sic] Browne, “Singular Impression in Marble,” *American Journal of Science and Arts* 19 (1831): 361; “First Annual Report of the Bucks County Academy of Natural Science,” *Hazard’s Register of Pennsylvania* 8 (1831): 1; Peter A. Browne, “On the Geological Character of the Beds upon which the City of Philadelphia Stands,” *Monthly American Journal of Geology and Natural Science* 1 (1832): 363–68; Peter A. Browne, “Hints to Students of Geology: No. I,” *Southern Literary Messenger* 1 (1834): 162; Peter A. Browne, “Hints to Students of Geology: No. II,” *Southern Literary Messenger* 1 (1835): 300. For Browne’s membership in the Geological Society of Pennsylvania, see *Browne Family in America* (Philadelphia, 1934), 45. For Browne’s promotion of a geological survey in 1828, see box 21, folder 10 (Brooke-Browning), James T. Mitchell Papers, Historical Society of Pennsylvania; Peter A. Browne to John H. Powel, Feb. 12, 1828, ser. 5, box 8, folder 12: Dec. 1828, Powel Family Papers.

¹⁷ “Address of Peter A. Browne, LL.D. . . . 1855,” 86–98.

Pennsylvania and the nation.¹⁸

The promotion of federal protective tariffs was another public policy that commanded the attention of Philadelphia's agricultural improvers. In particular, tariffs on wool and woolens—first applied at a “protective” level in 1816—affected the profitability of, among other farm products, fine-wool sheep husbandry. Though Powel and Browne both believed that the new American nation needed to achieve economic independence from Great Britain by producing agricultural goods for its home markets, they disagreed sharply about the political tools necessary to accomplish that goal. Powel thought that the United States was not prepared to begin constructing large-scale factories of any sort in the 1820s, while Browne promoted protective tariffs to support many kinds of industries, both agricultural and manufacturing. Fighting over means rather than ends, Powel and Browne nevertheless both subscribed to the notion that domestic animals would play an economic role in the future prosperity of Pennsylvania's farmers.

Thus, the promise of improving domestic animals became part of the national culture of improvement. Urban elites in Philadelphia were among the notable genteel livestock breeders in the United States during the 1820s. They included Timothy Pickering in Massachusetts, Nicholas Biddle in Pennsylvania, George Featherstonhaugh and Stephen Van Rensselaer in New York, Mark Cockrill in Tennessee, William R. Dickinson in Ohio, George W. P. Custis in Virginia, John S. Skinner in Maryland, Henry Clay in Kentucky, and Daniel Webster in New Hampshire. These men connected the technical means of altering the physical characteristics of farm animals with the culture of improvement.¹⁹

In Pennsylvania, the improvement of the countryside began in the city of Philadelphia, as Philadelphians took the lead in forming charters for canal and railroad companies, the survey of transportation routes, the erection of navigational aids, and the creation of banking institutions to pay for this infrastructure. The city was also a hotbed of ideas about agriculture and livestock; Philadelphia was a notable place for the creation of

¹⁸ John H. Powel to Robert Smith, Baltimore, June 27, 1825, Letterbook, 1824–1826, Powel Family Papers. For agricultural aspects of geological exploration, see Benjamin Cohen, “Surveying Nature: Environmental Dimensions of Virginia's First Scientific Survey, 1835–1842,” *Environmental History* 11 (2006): 37–69.

¹⁹ George Lemmer, “The Spread of Improved Cattle through the Eastern United States to 1850,” *Agricultural History* 21 (1947): 79–93.

regional and national institutions of agricultural reform.²⁰

Writers in Philadelphia exhorted farmers living across Pennsylvania, in neighboring states, and indeed throughout the nation to make changes to their farm practices and livestock husbandry. For example, the founding of the Philadelphia Society for Promoting Agriculture in 1785, the Society for the Improving of the Breed of Neat Cattle in 1809, the Merino Society of the Middle States a year later, and the Pennsylvania Agricultural Society in 1823 were all evidence of Philadelphia's concerted efforts to encourage agriculture. In 1825, Powel reminded a fellow breeder in Washington County (west of Pittsburgh) that "a metropolis" was the only place for an agricultural journal to originate because of "the excitements of wealth, the inducements of leisure." It took a decade before such a periodical appeared, but Philadelphia eventually became the home of agricultural journals such as the *Farmers' Cabinet*, and *American Herd-Book* (1836–48) and the *Plough, the Loom, and the Anvil* (1848–57). By 1849 the Farmers' Club of Pennsylvania held its meetings in or near the city. The Pennsylvania State Agricultural Society, founded in 1851 in Harrisburg in order to represent all fifty-five of the state's far-flung counties more inclusively, had twenty-eight members from Philadelphia County (second only to the sixty members of Dauphin County) and scheduled agricultural fairs near Philadelphia. Cities were crucial sites for animal breeding and animal breeders.²¹

During the early nineteenth century, Powel and Browne asserted the benefits of improving livestock through the new techniques of inbreeding or pure-breeding. While others focused on soil conditions, crop rotation,

²⁰ Simon Baatz, "Venerate the Plough": *A History of the Philadelphia Society for Promoting Agriculture* (Philadelphia, 1985); Simon Baatz, "Patronage, Science, and Ideology in an American City: Patrician Philadelphia, 1800–1860" (PhD diss., University of Pennsylvania, 1986); Simon Baatz, "Philadelphia Patronage: The Institutional Structure of Natural History in the New Republic, 1800–1833," *Journal of the Early Republic* 8 (1988): 111–38.

²¹ John H. Powel to Alexander Reed, Aug. 19, 1825, Letterbook, 1824–1826, Powel Family Papers; *Minutes of the Farmers' Club of Pennsylvania: A Record of Seventy Years, 1849–1919* (Philadelphia, 1920), 31–32; *Proceedings of the Agricultural Convention Held at Harrisburg, January 21, 1851* [Harrisburg, PA, 1851], Library Company of Philadelphia; *First Annual Report of the Transactions of the Pennsylvania State Agricultural Society* (Harrisburg, PA, 1854), 1–17, 22, 31. For the organization of agricultural societies, see Lawrence Peskin, *Manufacturing Revolution: The Intellectual Origins of Early American Industry* (Baltimore, 2003), 119–87; Margaret Rossiter, "The Organization of Agricultural Improvement in the United States, 1785–1865," in *The Pursuit of Knowledge in the Early American Republic: American Scientific and Learned Societies from Colonial Times to the Civil War*, ed. Alexandra Oleson and Sanborn Brown (Baltimore, 1976), 279–98. For the agricultural press in Philadelphia, see Albert Demaree, *The American Agricultural Press, 1819–1860* (New York, 1941).

and manures, they found animal breeding especially enticing. Perhaps that was because breeding offered visual proof of improvement, as demonstrated by the color, size, and shape of the livestock progeny that emerged, or by the quality of milk, beef, or wool that they produced.²²

The Lives and Livestock of Powel and Browne

Powel's emergence as an animal breeder was mainly built upon his mercantile wealth. Not only did he inherit several houses in Philadelphia and a large fortune from his stepfather, Samuel Powel, a global merchant and the last colonial mayor of Philadelphia, but he also made a large fortune from trade with India. Powel gained further valuable experience in the diplomatic service during the Jefferson administration when he was secretary of legation to Great Britain. He quickly adapted his mercantile background, transatlantic awareness, and British social training to country living. By 1818, he had hired laborers to work a farm estate that he called "Powelton." Located in a still-rural district just west of the Schuylkill River, Powel described it as "a small farm of about 100 acres about my house [that] is devoted exclusively to breeding." To accentuate the connection between his name and the purebred animals he purchased from England, Powel erected an inn called the Durham Ox.²³

Though he maintained other residences in the center of Philadelphia, at Powelton he raised Durham Shorthorn cattle, as well as Tunisian, Southdown, and Leicester sheep, which he imported directly from Europe. Shorthorns were thought to be a special cattle breed in the early nineteenth century because they were symmetrical and stocky, could be raised quickly, and produced good meat. Powel was unique among cattle

²² Ritvo, *Animal Estate*, 45–81.

²³ Born in 1786, Powel began his life as John Powel Hare, the nephew of Elizabeth Willing Powel. She was the wife of Philadelphia's "Patriot Mayor" Samuel Powel. A wealthy landlord of ninety Philadelphia properties, Mayor Powel was active not only in the Philadelphia Society for Promoting Agriculture but also in the American Philosophical Society and the University of Pennsylvania. After Mayor Powel died of yellow fever in 1793, his wife, Elizabeth Willing Powel, adopted the young son of her sister Margaret Willing and Robert Hare. By 1809, at age twenty-three, John Powel Hare legally changed his name to John Hare Powel to reflect the new status he had gained as the adopted son of the Powel family. See Powel Family Papers finding aid. For mercantile activity, see Messrs. John Powel Hare and Aaron Thelley, May 22, 1806, box 8, folder 1, Powel Family Papers. For Powel's appointment as Secretary of the U.S. Legation in London and Bearer of Dispatches, see Henry Simpson, *The Lives of Eminent Philadelphians, Now Deceased* (Philadelphia, 1859), 808–19. For the quote about "exclusively for breeding," see John H. Powel to John Wetherell, Dec. 20, 1824, Letterbook 1824–1826, Powel Family Papers. For Durham Ox inn, see Land Agent Records, Administrative Papers, 1816–1849, Civic Papers 1827–1829, box 17, folder 2.

breeders because he also valued the Shorthorn breed for its milking qualities. In June 1824, he raved that “the best variety of cattle among all those of Europe is the Durham Short Horns which unite the great objects sought by the breeders[,] the propensity to become fat when dry and to afford large quantities of rich milk when required by the young.” By his definition, “the dairy strain” was not “the race which cow keepers desire, but that which is best fitted for the general purposes of the Country, affording about three gallons twice a day of rich milk accompanied by the symmetrical proportions . . . which have established the excellence of Improved Short Horns.” Powel sought “rich milk more than beef.”²⁴

For two decades following 1820, Powel propagated lines of imported “breeds” of cattle and sheep, experimented with inbreeding, recorded animal pedigrees, displayed and sold animals at local and regional fairs near Philadelphia, gave away animals as studs or breeders, and wrote about livestock in America’s most important agricultural periodicals, like the *American Farmer* (Baltimore) and the *New England Farmer* (Boston). At the time, Powel was unusual because he expended so much money to transport bulls and heifers from Great Britain, an expense that remained prohibitive for most Pennsylvania farmers of the 1820s. In June 1824, for instance, Powel mentioned “the great prices I have paid from nearly \$700 for an imported heifer to \$100 for the hire of a bull for a few months.” By December he owned “now twelve imported animals for eight of which I have paid \$2585.” In June 1825, Powel remarked that “some of my cows have cost from \$500 to \$685 each.” By the end of the 1830s, Powel had spent thousands of dollars on Durham cattle. He continually insisted that he had “no view to profit as a Dealer in Live Stock” and that he had “no desire for pecuniary profit—my farming arrangements are merely matters of amusement.”²⁵

While Powel’s Shorthorn cattle were a picturesque addition to his farm at Powelton, they were not simply a wealthy man’s hobby. He believed that they would become a beneficial contribution to Pennsylvania agriculture, but only if he could convince others to purchase

²⁴ John H. Powel to John B. Wallace, June 14, 1824, Powel to Michael Ashcroft, Aug. 17, 1824, and Powel to Jonas Whitaker, July 14, 1825, Letterbook, 1824–1826, Powel Family Papers.

²⁵ John H. Powel to John B. Wallace, June 14, 1824, Powel to Thomas Chase, Dec. 11, 1824, Powel to J. J. Vanderkemp, June 23, 1825, Powel to Joseph Gales Jr., Nov. 17, 1825, and Powel to Mr. Rusby, Feb. 11, 1826, Letterbook, 1824–1826, Powel Family Papers. For Powel’s business acumen, see Judith McGaw, “Specialization and American Agricultural Innovation in the Early Industrial Era: John Hare Powel and Livestock Breeding,” *Business and Economic Review* 13 (1984): 134–49.

his prime bulls or to breed from the offspring of his animals. What Powel called “native” cows—a label that he applied universally and indiscriminately to most of the dairy cattle then dotting the American countryside—would be “improved” through mating with his bulls with Shorthorn blood.

To compensate for the high prices of imported or purebred animals, Powel often subsidized the cattle breeding of other farmers in Pennsylvania. In 1824, he was proud of his patriotic acts of generosity, noting, “I have stationed my bulls in various counties and have never allowed a charge to be made . . . I have given away more animals than I have ever sold and never received pay for a sheep in my life except from a butcher.” Even when he did exchange livestock for money, Powel settled on lower prices, since he did not have “the slightest wish to send any animal which I possess to any man who imagines the price too high. My friends and the farmers in the neighbouring counties are ready to take any animal . . . which I am disposed to part from, and to perfectly satisfy your neighbour that I do not wish to expose him to an expenditure too large for his pocket.” The British cattle breeder and cotton manufacturer Jonas Whitaker, who sold a number of cattle to Powel, reckoned that the measure of success for improved farming was to turn local improvements into national wealth. Whitaker told Powel, “I duly appreciate your laudable efforts to serve your Country, and I wish you could infuse your liberal spirits into the ruling powers to let each nation or individual enjoy the benefit of any local advantage they may possess.”²⁶

Powel counted on the expansion of the market economy in Pennsylvania to create wealth and to add value to his breeding experiments. As Powel said to an Englishman from whom he had purchased prize animals, “I believe that an extensive market will eventually be opened in this Country for Improved Short Horns. You will perceive that when the landholders cultivate their own Estates the temptation to improvement when the fact of superiority shall have been established is very great.” Still, there were economic and social barriers in Pennsylvania that prevented quick adoption of improved livestock by farmers of more middling circumstances or moderate incomes. Powel supposed in 1826 that “the cheapness of land, and consequent low price of provisions make

²⁶ John H. Powel to Thomas Chase, Dec. 11, 1824, Powel to Mr. Smallwood, Jan. 21, 1825, Powel to Henry Watson, Feb. 9, 1826, and Powel to Guy Bigelow, Mar. 9, 1826, all in Letterbook, 1824–1826, Powel Family Papers. “Wye Comet,” *Connecticut Courant*, Sept. 25, 1826. Jonas Whitaker to Powel, Feb. 9, 1826, box 8, folder 8, Powel Family Papers.

the high prices of improved stock the greatest obstacle to their introduction." A home market in domestic animals was the avenue for national success.²⁷

Powel's views about the spread of Shorthorn cattle breeding was linked to his distaste of federal tariffs. His background as a global merchant explains why he maintained the political view that free trade was a force that would liberate America from the grip of European powers and that protective tariffs on finished imported goods would actually hurt American farmers. In December 1824, during a year in which the U.S. Congress passed the most protective tariff yet, Powel wrote, "I am largely concerned in the landed interest of this country and am one of that set of politicians who would rather pay our British kinsmen to file pins and manufacture cloths whilst we clear our forests grow wheat and manufacture hardy children. I am thus arduously employed in all that can effect improvement of farm stock and good husbandry." Again, in 1826, he argued that domestic animals "shall make us independent in fact, of foreign supplies of certain raw materials," which would create a home market and obviate the need for "imposts upon trade, and shackles upon our industry" and allow the United States to "obtain independence of manufacturers from abroad." What is important is not just Powel's view that the nation should remain largely agrarian and avoid the political ills of cities built by factory labor, but that he conceived of a future without federal tariffs sustained by the fruitful produce of livestock, fields, and forests.²⁸

Though Powel stressed his patronage efforts and denied that he was making a profit, it is clear that the improvement of fancy cattle and sheep helped him to compensate for expenditures or even to increase his personal wealth. The ownership of purebred cattle brought him earnings through stud fees and sales of pedigreed stock. Indeed, Powel earned \$500 a year from just one bull's mating at \$8 to \$10 per cow. In the course of one year, he earned \$3,400 from calves he sold to other farmers across Pennsylvania and in the eastern states. He grossed an average of \$320 per Shorthorn when he sold twenty-one of his herd in 1830. Powel's sale of cattle and sheep in 1837 totaled an immense sum of \$14,980.²⁹

Powel's patronage, promotion, and breeding of Shorthorns can be

²⁷ John H. Powel to Charles Champion, Jan. 3, 1825, and Powel to Mr. Rusby, Feb. 11, 1826, Letterbook, 1824–1826, Powel Family Papers.

²⁸ John H. Powel to Jonas Whitaker, Dec. 20, 1824, and Powel to Jonas Whitaker, Jan. 14, 1826, Letterbook, 1824–1826, Powel Family Papers.

tracked through geography as well as the money trail. He sold stud fees or breeding animals to farmers in New York, Kentucky, Virginia, and South Carolina. In the spring of 1826, for example, Powel sold his Shorthorn bull "Wye Comet" to Henry Watson of East Windsor, Connecticut, who offered the bull at a five-dollar stud fee (still quite pricey) to other Connecticut farmers. The backcountry of Maine was also populated with Powel's livestock: "I sent three half bred males into the wilderness of Maine. I placed my bulls for many seasons in different counties, to husband native cows."³⁰ Powel helped to extend the market for Durham Shorthorn bulls as far he could.

Powel shuttled his Shorthorns between northern freehold farmers, middle-state landholders, western speculators, and southern slave planters. He argued that certain breeds could maintain their purity over generations of breeding within a particular environment and be tailored to suit different labor systems. The selection of a particular cattle breed to fit each zone was important. He realized that the "properties, of farm stock" was a "subject . . . more important to . . . the eastern, middle, and western States" than the southern states because livestock there involved "the application of three-fourths of the product of their labours, and of their lands." Still, after the South Carolina Agricultural Society had contacted him about livestock in 1824, Powel assisted in the importation and delivery of Tuscany cattle to South Carolina.³¹

Though Powel conceded that he had "the same feeling about my pets, as that which animates the gentlemen of the South about their turf horses," his advice to southern planters was specific to economic and environmental concerns, not merely those of social status. He told them, "[I do] not recommend pure Short Horns for the climate of Carolina, and I am assured, the Devons are less fitted for the circumstances, in which Neat Cattle in the *Southern Country* must be placed, than many other breeds which I could name." Instead, "[I have in my] possession, an imported Ayrshire cow, as she is called, from which I am endeavouring to obtain a 'variety' mixed with the Short Horns, particularly adapted for the pur-

²⁹ For the figure of Powel's bull earning \$500, see Lemmer, "Spread of Improved Cattle," 79–93, 81. For the \$3,400 figure in 1825, see John H. Powel to J. J. Vanderkemp, June 23, 1825, Letterbook, 1824–1826, Powel Family Papers. For the 1837 sale of cattle and sheep, see "Great Sale of Imported Cattle," *Farmers' Cabinet, and American Herd-Book* 2 (1837): 56, microfilm ed.

³⁰ Quoted in McGaw, "Specialization and American Agricultural Innovation," 143–44.

³¹ John H. Powel to Jonathan Roberts, "On the Importance of Neat Cattle to Our Manufactures and Comfort—Their Various Products, &c.," reprinted in *Memoirs of the Pennsylvania Agricultural Society*, 41–46.

poses of the Southern States uniting great milking properties with vigor & speed for the yoke." Geographically, Powel's position in Philadelphia allowed him to be a middleman in the growing market for purebred cattle.³²

The quantification of the impact of breeding stock on the rest of the cattle population is difficult to assess, but historian Charles Leavitt argues that "although the total number of bulls entered in the [Shorthorn] herd books to May, 1859, was less than 0.4 per cent of the 8,035,695 non-dairy cattle in the eastern and northwestern States in 1860, they were more important than might seem at first glance. . . . [I]f they produced fifteen calves for each of the eight years during which they were available for breeding purposes they would have produced 774,360 one-fourth grade Shorthorn cattle." Amazingly, this historian's calculation is fairly close to the one that Powel estimated in the 1820s. He figured that a thoroughbred Shorthorn bull between eighteen- and thirty-months of age could service "25 cows" in a year. Multiplying over an eight-year period, Powel thought the bull would produce 859,470 animals, or 799,308 animals if one subtracted 7 percent for "accidents and deaths." The mathematical growth of the Shorthorn breed in the United States was numerically significant. By the 1830s and 1840s, Ohio, Kentucky, and many of the western states had large numbers of Shorthorns.³³

Unlike John H. Powel, Peter A. Browne did not own or manage a farm, nor did he personally own domesticated animals, except, possibly, horses for city use. Instead, he came to the culture of improvement and the world of animal breeding through involvement in Philadelphia's many civic societies. Like Powel, Browne had been born in Philadelphia. Browne began practicing law in 1803 and had established himself as a prominent lawyer by 1810. Through his legal practice and a family inheritance, Browne was wealthy enough to support a number of scientific, agricultural, and philanthropic ventures beginning in the 1820s. He was prominent in the Franklin Institute and the Geological Society of Pennsylvania. He was a member of pro-tariff and manufacturing societies. He wrote a long essay on the history of Indian corn as human and animal food that appeared in pamphlet form and serially in *Farmers'*

³² John H. Powel to John S. Skinner, Feb. 7, 1825, Powel to John S. Skinner, Dec. 23, 1825, and Powel to Seth Hunt, New York, Oct. 6, 1825, Letterbook, 1824–1826, Powel Family Papers.

³³ Charles T. Leavitt, "Attempts to Improve Cattle Breeds in the United States, 1790–1860," *Agricultural History* 7 (1933): 51–67; John H. Powel to unknown recipient, Dec. 11, 1824, Letterbook, 1824–1826, Powel Family Papers.

Cabinet, and *American Herd-Book*, the agricultural weekly started in Philadelphia in 1836 that boasted a national audience. As a sign of his growing involvement with agricultural reform, he delivered speeches at fairs and meetings of agricultural organizations outside of Pennsylvania, including the New Castle County (Delaware) Agricultural Society and the Maryland State Agricultural Society. By the 1840s, he was active in the Academy of Natural Sciences, a civil society founded in Philadelphia that had over two hundred genteel members.³⁴

During the late 1840s, Browne embarked on a scientific analysis of wool samples that made him famous among agricultural improvers in Philadelphia and beyond. He claimed that he had invented a “science” and then tried to dignify it with the word “trichology.” Such linguistic creativity and self-confident exuberance were not exceptional during the mid-nineteenth century, when entrepreneurs and amateurs mingled comfortably with more academically trained scientists. Browne hoped that “trichology” would stimulate and refine the practices of farmers who raised sheep for wool in Pennsylvania and across the United States.³⁵

In contrast with Powel’s anti-tariff ideology, lawyer Browne’s strong support of the national tariff policy encouraged him to become enthusiastic about sheep breeding. He favored the highly protective and politically controversial tariff of 1828, which would limit the importation of foreign wools and manufactured woolen products. Indeed, by the 1850s Browne’s study of hair and wool received its greatest publicity from the *Plough, the Loom and the Anvil*, an agricultural newspaper funded by pro-tariff political economist Henry Carey. There Browne reasoned that if “the science of Trichologia can point out . . . the particular breed of sheep that produces un-shrinking fleece, and can show where, in the United States, they may be raised and kept with success,” then it will occupy “a conspicuous place in the study of *political* economy.” Browne was so enamored with the link between sheep husbandry and domestic

³⁴ Browne *Family in America*, 41–51; P. A. Browne, “To the Mechanics, Artizans, and Manufacturers of Pennsylvania,” *Philadelphia Recorder*, Apr. 23, 1825; Sinclair, *Philadelphia’s Philosopher Mechanics*, 32, 35–37, 51–60; “An Essay on Indian Corn, Delivered by Peter A. Browne, Esq. L.L.D., before the Cabinet of Natural Science of Chester County, Pa.,” *Farmers’ Cabinet*, and *American Herd-Book*, Oct. 2, Oct. 17, Dec. 1, Dec. 15, 1837, Jan. 15, 1838; Browne, *Essay on the Veterinary Art*, 1–22. For Browne’s membership in the Academy of Natural Sciences, see Peter A. Browne, “Membership File,” Academy of Natural Sciences, Philadelphia, PA; Patsy Gerstner, “The Academy of Natural Sciences of Philadelphia, 1812–1850,” in *Pursuit of Knowledge in the Early American Republic*, ed. Oleson and Brown, 174–93.

³⁵ Browne, *Trichologia Mammalium*.

manufacturers that he proposed that Virginia planters raise sheep, erect woolen factories, and produce woolen cloth, all as a method of agricultural improvement consistent with a federal protective tariff policy. While Powel insisted that the breeding of Shorthorn cattle ensured “independence of manufacturers from abroad,” Browne argued that the growth of fine-wool sheep and the construction of woolen factories in Pennsylvania would grant farmers and manufacturers economic independence.³⁶

Browne’s major innovation in livestock science was the microscopic examination of wool. First he measured the thinness of wool with a micrometer. One of his thinnest American samples came from Washington County, Pennsylvania, and it was 1/2186 of an inch thick. Next he placed the wool under a high-powered microscope to inspect its scales. Browne also invented a “trichometer,” a small metal tool to test the tenacity and elasticity of wool fibers. In 1849, the Philadelphia Society for Promoting Agriculture applauded this “cheap instrument” as “essential to the manufacture” of wool and useful for farmers “to select the best woolled sheep with much more certainty than can be done by the eye or hand alone, and consequently to improve their flocks by rejecting those of inferior quality.” The *Philadelphia Ledger and Transcript* informed the general public as to how “Mr. Browne’s invention furnishes the wool grower with the certain means of making the selection of breeders best calculated to increase the value of fleece, with scarcely any expense, expenditure of time, or scientific information.”³⁷

³⁶ M. Carey, Wm. Young, B. Chew Jr., “Manufacturers’ Meeting,” *Niles’ Weekly Register*, Mar. 8, 1828; “American System Meeting,” *Atkinson’s Saturday Evening Post*, Oct. 1, 1831; “Tariff Convention,” *Niles’ Weekly Register*, Nov. 5, 1831; Joseph Hemphill et al., “Meeting of the Friends of the Protective System,” *Hazard’s Register of Pennsylvania*, June 2, 1832; “Tariff Meetings. Pennsylvania,” *Niles’ Weekly Register*, June 9, 1832; Browne, *Trichologia Mammalium*, 148–49; Peter A. Browne and Montroville W. Dickeson, *Trichographia Mammalium; or, Descriptions and Drawings of the Hairs of the Mammalia, Made with the Aid of the Microscope* (Philadelphia, 1848), back cover; “Address of Peter A. Browne, LL.D. . . . 1855,” 89. For Henry Carey and Pennsylvania’s strong protectionist strains, see Rodney Morrison, *Henry C. Carey and American Economic Development* (Philadelphia, 1986), 1–2; Arnold W. Green, *Henry Charles Carey: Nineteenth-Century Sociologist* (Philadelphia, 1951), 207; Malcolm Rogers Eiselen, *The Rise of Pennsylvania Protectionism* (Philadelphia, 1932). Browne’s economic nationalism led him to think that American farmers could not only supply American woolen factories, but that they could sell surplus sheep’s wool to foreign nations. In 1853, he sought “to prove that, with no greater labor than is expected in ordinary agricultural or mechanical pursuits,—without interfering with any other branch of agriculture—and to the general improvement of the soil—we can produce, in the United States, fleece enough to supply all our own wants, leaving a large surplus, for exportation.” P. A. Browne, “Sheep Breeding—No. IV,” *Germantown Telegraph*, Jan. 19, 1853.

³⁷ Collections of the Philadelphia Society for Promoting Agriculture, Ms. 92, box 1, folder 24, Van Pelt Library, University of Pennsylvania, Philadelphia, PA; “Scientific Examination,”

Regular sheep farmers in Pennsylvania and elsewhere may have had less cause to need the “trichometer” because they practiced other breeding methods. The tool remained inaccessible because Browne seems not to have patented or marketed it. Moreover, microscopes with high magnification were made in Europe and were not affordable to most American farmers. Nevertheless, Browne’s quest to measure wool microscopically was not wholly impractical. Similar measuring devices are used today to ensure that woolen growers meet industrial standards.³⁸

To disseminate the techniques of microscopy among American farmers, Browne thought it was necessary to amass a collection of wool for testing and comparison. Consequently, in 1848, he called upon the public to send him donations of wool samples from sheep, goats, or other fur-bearing animals. As the collection grew, Browne glued the loose samples of wool into bound volumes. For example, Alonzo L. Bingham of Vermont, who exhibited French Merino rams at the 1851 Pennsylvania State Agricultural Society fair, donated to Browne’s collection. From Colonel Wade Hampton, he obtained samples of the Cashmere and Angora goats (originally from Asia) that Hampton had bred on his farm in South Carolina. He collected wool samples from a Dr. Davis who had exhibited an Angora goat ram at the 1854 Pennsylvania State Agricultural Society fair. The reach of his collection was global. Browne’s volume of “Foreign Sheep” was comprised of Irish sheep, Russian sheep, Cape of Good Hope sheep, Hindostan sheep, and Egyptian sheep. He received samples of Saxony sheep directly from German Silesia and some hairs from a Tibetan goat at the London Zoological Garden.³⁹

Foreign accolades followed on the heels of national acclaim. After Browne placed an “invitation to all owners of fine-wooled sheep” to send him samples for “his collection of hair and wool, from every species of the animal kingdom,” he presented some of these to the industrial exhibition in 1851 at the London Crystal Palace. There he was listed as a wool “pro-

Philadelphia Ledger and Transcript, Mar. 7, 1849, in “Correspondence File,” Browne Pile Collection, Academy of Natural Sciences.

³⁸ In 1880, William McMurtrie, professor of chemistry at Illinois Industrial University, conducted a “scientific examination of the fineness, textile strength, and felting properties” on behalf of an act of the U.S. Congress. See *Report upon an Examination of Wools and Other Animal Fibers . . . Made under the Direction of the Commissioner of Agriculture* (Washington, DC, 1886), 8–10.

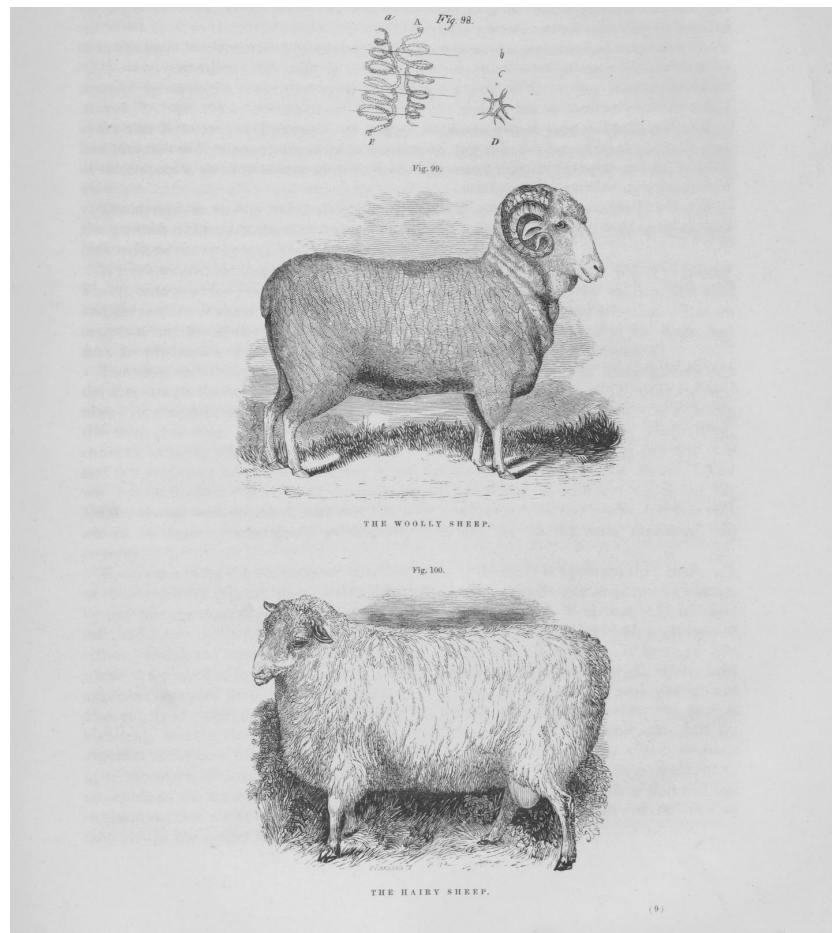
³⁹ Browne and Dickeson, *Trichographia Mammalium*, back cover; P. A. Browne to Hon. Robert R. Reed, Mar. 1, 1850, in “The Wools of Various States and Countries Compared,” *Plough, the Loom, and the Anvil* 2 (1850): 688–91. For Alonzo Bingham’s wool, see William Jessup to Peter A. Browne, Oct. 30, 1851, and Charles B. Trego to Browne, Nov. 1, 1851, in “Correspondence File,” Browne Pile Collection.

ducer” from Philadelphia. After the fair, the British asked Browne to contribute American wool samples to a “universal trade-museum.”⁴⁰

Browne’s collection added a new wrinkle to the global dialogue over nineteenth-century animal breeding. While other sheep breeders in the Euro-American world hitherto had classified sheep breeds by the *length* of their wool (e.g. longwools vs. shortwools), Browne included *fineness* of wool (e.g. hairy vs. woolly) as a classification scheme. Superimposing this new classification on top of preexisting ways to classify sheep, Browne’s taxonomy was essentially based on the idea of pure-breeding. His hairy-woolly sheep division led to a “golden rule” of breeding: “The sheep-breeder should never cross the two species of sheep, viz: the hairy sheep and the woolly sheep.”⁴¹

⁴⁰ For Browne’s collection of hair and wool, see Browne Pile Collection. Browne, *Trichologia Mammalium*, frontispiece. For national attention given to Browne’s collection, see *Minutes of the Farmers’ Club of Pennsylvania*, vol. 1, *A Record of Seventy Years, 1849–1919* (Philadelphia, 1920), 31–32; *First Annual Report of the Transactions of the Pennsylvania State Agricultural Society* (Harrisburg, PA, 1854), 17, 22, 31; “Philadelphia, May 8th, 1850 . . . P. A. Browne”; “State Agricultural Society”; “Sheep Breeding—No. I”; “Sheep Breeding—No. II”; and “Sheep Breeding—No. III,” all in *Germantown Telegraph*, May 15 and Nov. 27, 1850, Dec. 1, Dec. 15, and Dec. 29, 1852; B. P. J., “Fair of the Maryland State Ag. Society,” *Cultivator* 7 (1850): 387–88; [Peter Browne], “Lecture on Hair, Wool and Sheep Breeding,” *Southern Planter* 11 (1851); P. A. Browne, “On Wool-Growing. To the President, Vice-President, and Members of the Wool-Growers’ Association of New-York,” *Plough, the Loom, and the Anvil* 8 (1856): 610–13. For the possibility that Browne visited the U.S. Congress, see “Wool in the United States,” *Scientific American*, Dec. 20, 1851. For Browne’s role in London’s Industrial Exhibition, see *Exhibition of the Works of Industry of All Nations, 1851. Reports by the Juries on the Subjects in the Thirty Classes into Which the Exhibition Was Divided* (London, 1852), 157–59; *Great Exhibition of the Works of Industry of All Nations. Official Descriptive and Illustrated Catalogue*, vol. 3, *Foreign States* (London, 1851), 1431–35; “Exhibition of American Wool at the World’s Exhibition,” *Plough, the Loom, and the Anvil* 3 (1851): 439–40; “American Wool,” *Plough, the Loom, and the Anvil* 6 (1854): 582; “American Wool in England,” *New England Farmer* 7 (1855): 452; “American Wool in England,” *Southern Planter* 15 (1855): 383.

⁴¹ P. A. Browne, “On Sheep Breeding,” in *Report of the Commissioner of Patents for the Year 1851*, part 2, *Agriculture* (Washington, DC, 1852), 75–96; Browne, *Trichologia Mammalium*, 158. The attention to wool fineness, by itself, was not what made Browne’s classification unique; it was actually the link between fineness and *species* differences. Writing before Browne, British veterinarian William Youatt also regarded fineness as a “property” of wool that was “of greater importance than any other,” see *Sheep: Their Breeds, Management, and Diseases* (London, 1837), a book that was republished multiple times in the United States. To compare sheep classification schemes, see John Luccock, *An Essay on Wool, Containing a Particular Account of the English Fleece. With Hints for Its Improvement, Addressed to the Grower, Dealer, and Manufacturer* (London, 1809), 137–92; Robert Bakewell, “On the Influence of Soil and Climate upon Wool,” *Massachusetts Agricultural Repository and Journal* 3 (1815): 224–46; David Low, *On the Domesticated Animals of the British Islands: Comprehending the Natural and Economical History of Species and Varieties; The Description of the Properties of External Form; and Observations on the Principles and Practice of Breeding* (London, 1846), 41–206; Luke A. Morrell, *The American Shepherd: Being a History of the Sheep, with Their Breeds, Management, and Diseases* (New York, 1845).



Woolly and hairy sheep, from Peter A. Browne, *Trichologia Mammalium* (Philadelphia, 1853), following p. 152.

Browne's development of a hairy-woolly sheep taxonomy is significant because American sheep breeders and woolen manufacturers looked to simplify the complex process of supplying woolen factories with raw materials. According to Browne, hairy sheep would give manufacturers fleeces that produced worsted cloth, flannel, hose, blankets, and carpets, while woolly sheep would produce fleeces for felted hats and fine woolen cloth. By 1845, industrialization in the United States had led to the erection of 1,039 woolen factories; many of them were mechanized with carding, spinning, or weaving machines. The kinds of physical tests that

Browne conducted on *all* of his specimens—not just those from “lower animals”—were inspired partly by the new technical practicalities of wool manufacturing. Wool staplers, the skilled manufacturers who already sorted wool according to length, had begun to assign value to wool based on its fineness. When Browne measured his samples’ length with a micrometer, tested them for tenacity, observed them under a microscope, and ascertained their fineness, he did so in relation to wool and woollen producers. Measurements of wool—length, tenacity, number of scales, width of fiber—resonated with wool growers and manufacturers of the 1840s and 1850s.⁴²

Among historians, however, Browne has gained the most notoriety for his contribution to ideas about racial science and the theories of physiological differences that emerged in the nineteenth century. This is no surprise, given that Browne assembled human hair—including the hair of fourteen American presidents, lunatics, albinos, Native Americans, Africans, and Asians from across the globe—into the first ten bound volumes of his collection. Browne’s interest in hair went beyond the barnyard and encompassed ethnological questions about the origin and progress of mankind. In particular, as historian William Stanton depicts in a short biography, Browne theorized that animals and humans could be divided into races based on the “scientific” measurement of their hair. Browne promised that his science would “shed new light upon the ethnological problem of the unity of the human species.” During the 1840s, Browne was an associate of the infamous craniologist Samuel Morton, a member of the Academy of Natural Sciences in Philadelphia and the author of *Crania Americana* (1839). Mimicking Samuel Morton’s use of skulls to speculate about the different origins of blacks and whites, Browne utilized human hair as an anthropometric measurement of racial difference. Morton may have been placed on an academy committee to help Browne perform scientific tests on his hair and wool specimens. Morton also probably approved of the two papers that Browne gave at meetings of the American Ethnological Society.⁴³

⁴² Browne, “On Sheep Breeding,” 75–96; “Woollen Manufactures in the United States,” *Merchants’ Magazine and Commercial Review* 14 (1846): 105; John Goulding, *Statistics of the Woollen Manufactories in the United States. By the Proprietor of the Condensing Cards* (New York, 1845); Arthur H. Cole, *The American Wool Manufacture*, 2 vols. (New York, 1968); Elizabeth Hitz, *A Technical and Business Revolution: American Woolens to 1832* (New York, 1986).

⁴³ For Samuel Morton, see Stephen Jay Gould, *The Mismeasure of Man* (New York, 1996), 62–101. For Morton’s assistance to and praise of Browne’s work, see *Proceedings of the Academy of Natural Sciences of Philadelphia*, vol. 5, 1850–’51 (1852; repr. New York, 1970), 2, 34, 53, 56, 62,

Through his purportedly “scientific” measurement of wool and hair, Browne constructed a polygenetic order with deeply racial implications. By 1853, Browne had arranged human hair into three “species” of mankind based on race—cylindrical hair (Native American), oval hair (Caucasian), and eccentrically elliptical hair (African). His most outrageous claim may have been that Africans had wool, not hair, on their heads. Browne’s theories of race gave fodder to proslavery activists in the 1850s, many of whom were searching for scientific justifications for the enslavement of blacks and seized upon Browne’s characterization of African hair as evidence that Africans were an inferior race. John Campbell, another Philadelphian, reprinted one of Browne’s works, along with a piece of Morton’s writings, in an 1851 book entitled *Negro-Mania: Being an Examination of the Falsely Assumed Equality of the Various Races of Men*. A writer in New York City charged that Browne had created a “new science to sustain slavery.” Josiah Nott of Alabama, the infamous physician who promoted the idea (contrary to the Bible) that human races had been created separately, corresponded with Browne.⁴⁴

Although southern and proslavery advocates of the 1850s gave political traction to Browne’s scientific ideas, Browne seems not necessarily to have pursued fame solely among groups concerned with ethnology. His audiences were more varied than the technical or polemical writers and included northerners and southerners, men and women, wealthy and common people. Moreover, while the lack of Browne’s outgoing correspondence prevents us from knowing exactly what he thought about John

145–46; Morton “Notes on Hybridity, Designed as a Further Supplement . . .,” *Charleston Medical Journal* 6 (1851): 301–8; William Stanton, *The Leopard’s Spots: Scientific Attitudes toward Race in America, 1815–59* (Chicago, 1966), 145–54; Lester Stephens, *Science, Race, and Religion in the American South: John Bachman and the Charleston Circle of Naturalists, 1815–1895* (Chapel Hill, NC, 2000), 190–91. For Browne’s papers at the American Ethnological Society, see “The Hair and Wool of the Different Species of Man,” *United States Magazine and Democratic Review* 27 (1850): 451; “Hair of Different Races of Men,” *Scientific American*, May 3, 1851.

⁴⁴ Browne, *Trichologia Mammalium*, passim; Josiah Nott to Peter A. Browne, Aug. 26, 1849, and Mar. 25, 1850, “Correspondence File,” Browne Pile Collection; Computer Database of Browne Pile Collection; C. Glen Peebles, *A Review (Written about Two Years Ago, Is Here Published) by C. Glen Peebles (of New York,) of a New Science to Sustain Slavery Discovered by Peter A. Browne, LL.D., (of Philadelphia,) and published under the Patronage of the Commonwealth of Pennsylvania* entitled “*Trichologia Mammalium*” ([Philadelphia], 1856); John Campbell, *Negro-Mania: Being an Examination of the Falsely Assumed Equality of the Various Races of Men* (Philadelphia, 1851), 339–64; “Art. V.—Negro-Mania,” *DeBow’s Review of the Southern and Western States. Devoted to Commerce, Agriculture* 2 (May 1852): 507ff; Josiah Nott, “A Summary of the Latest Scientific Facts Bearing upon the Question of Unity or Plurality of Species,” in *The Moral and Intellectual Diversity of Races . . . From the French of Count A. de Gobineau*, trans. H[enry] Hotz (Philadelphia, 1856), 463–512.

Campbell's *Negro-Mania*, William Harned commiserated with Browne about his inclusion in that proslavery tract: "I regret to see that Campbell has dragged you into his service, in his infamous book, entitled, 'Negromania.' I have seldom met with a volume so essentially wicked & inhuman."⁴⁵

The wider point ought to be made, however, that nineteenth-century agricultural reformers frequently utilized words like "mongrels" and concepts such as "amalgamation" in reference to the animal world, regardless of what they thought about the differences between individuals and groups of human beings. American breeders and gentleman farmers existed in a parallel linguistic and social universe that borrowed much from racial theorists of the mid-nineteenth century. For instance, though Powel mainly had a practical interest in breeding, for explanatory purposes he did deploy analogies between the animal kingdom and human societies: "An English breeder of Cattle or any man in America who possesses the pure blood of the Improved Durham Short Horns may calculate with as much precision upon the peculiarities of form and properties to which I have adverted as he could decide that the offspring of natives of Africa would have hair closely curled and sable skin upon his face." Powel also asked, "How are races improved? How are they impaired?"⁴⁶ When Browne chaired the committee that judged sheep at the Pennsylvania State Agricultural Society fair in the 1850s, he expressed disapproval of examples of "amalgamations wool." The emergence of racial science during the eighteenth and nineteenth centuries affected the ways that Europeans and Americans thought about the breeding of domestic animals.⁴⁷

Still, urban agriculturalists and livestock breeders remained distinct in at least one way from the intellectual controversies of natural historians and ethnological investigators. Farmers and breeders were practical men seeking to improve livestock, not simply to categorize them. Browne went further than Powel, arguing that inherent and categorical racial differences could be proven through scientific measurements of the hair of

⁴⁵ William Harned to Peter A. Browne, Mar. 12, 1850, "Correspondence File," Browne Pile Collection.

⁴⁶ John H. Powel to Charles Roberts, Pennsylvania Hospital, July 27, 1824, Letterbook, 1824–1826, Powel Family Papers; John Hare Powel, *Reply to Col. Pickering's Attack upon a Pennsylvania Farmer* (Philadelphia, 1825), 9. For the Victorian interest in "mongrels" and "hybrids," see Harriet Ritvo, *The Platypus and the Mermaid, and Other Figments of the Classifying Imagination* (Cambridge, MA, 1997), esp. 85–120.

⁴⁷ *First Annual Report of the Transactions of the Pennsylvania State Agricultural Society*, 65–66.

humans and animals, but the strong prejudices that both gentlemen held on the differences between human races were parallel to (and not always coterminous with) their views on the distinctions separating the different families and breeds of cattle or sheep. If the new taxonomies created by animal breeders were symbolic representations of a new racial order, then they were also useful technologies to elevate profits of the ordinary farmer and manufacturer. At least for nonslaveholding animal breeders like Powel and Browne, scientific taxonomy was largely promoted as a means to an economic end.

Conclusion

The efforts of John H. Powel and Peter Browne of Philadelphia in the realm of animal breeding were representative of the larger political movement for “internal improvement” that swept Pennsylvania and the American nation beginning in the 1820s. Urban gentlemen placed themselves at the head of the institutions that promoted agricultural improvement. By linking physical changes in livestock with the political levers of economic development, such as transportation, geological investigation, and tariffs, the improving farmers of Philadelphia sought to encourage new methods of animal breeding and new practices in agricultural production.

Animal breeding can shed light on many aspects of the history of Pennsylvania, the United States, and the world. First, animal breeding was transatlantic from start to finish. Beginning with the voyages of Columbus, the movement from Europe to North America of domesticated animals long preceded the conscious and deliberate work of Powel and Browne. The livestock breeding conducted in nineteenth-century Philadelphia was an extension of the globalization of purportedly discrete and distinctive animal breeds that had been shaped by human intentions as well as natural circumstances. Historians have now begun to historicize the movements of animals and plants, as well as humans and ideas, across the globe, though the peculiar characteristics of the movement and evolution of domesticated animals are only recently coming to be addressed. Improvements to agriculture were appealing during the nineteenth century because of the assumption—often a fervently held belief—that animals and plants could be transported to different countries. Rather than being insular farmers, American breeders looked beyond the local hori-

zon, considered markets as abstractions with the power to shape local environments, and asserted that domesticated animals were devices that helped the nation's farmers expand the home and global market.

Second, animal breeding was an object of scientific exploration within the American culture of improvement. In early republican Philadelphia, science was embedded in the larger concept of "useful knowledge." Eminently practical gentlemen, animal breeders sought to acquire the tools or principles that could lead them to analyze the economic risks and benefits involved in reshaping the animal world. The quest for control over the chaotic forces of circumstance or the greater understanding of the mysterious laws of nature was an important part of American improvers' sense of personal, indeed national, identity. As historians of Darwin have long known, animal breeders were keen observers of the so-called "laws" of variation, domestication, climate, and consanguinity, and their efforts paralleled, if not equaled, those of racial theorists. Historians, however, have only recently started to come to terms with the fact that many nineteenth-century breeders claimed that certain breeds of livestock were "manufactured" or "created" instruments of national progress. The blurring of the boundary between nature and technology—animal and machine—has important ramifications for the histories of science and technology.⁴⁸

Lastly, animal breeding reveals the social character of America's culture of improvement. Unlike their counterparts in Boston, Philadelphia's elite farmers were not wary of the future. They were deeply invested in visions of material and economic progress. Thus, Powel and Browne can hardly be classified as social radicals. Their views of the economic benefits of internal improvements and the plasticity of the nature of domesticated animals did not lead them to promote radical changes in the social structure. Neither man wanted to interfere with the existence of slavery as a domestic institution in the United States. The sense of economic dynamism without drastic social change, the confidence in technology to achieve economic prosperity, and the clarity of physical differences in nature appealed to Philadelphia's gentlemen in the nineteenth century.

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⁴⁸ Edmund Russell, "Evolutionary History: Prospectus for a New Field," *Environmental History* 8 (2003): 204–28.