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The Mule in Southern Agriculture: A Requiem

MARTIN A. GARRETT, JR.

Inquiries into the question of why the use of mules historically dominated that of horses in southern agricultural production have essentially concluded that the southerner preferred the mule while the northerner did not. This notion probably stems from the work of Robert Lamb, whose primary purpose was to document the extent to which the mule was used in the South between 1850 and 1950.¹ From the simple observation that the mule was used more extensively in the South, Lamb concluded: "The use of the mule in the South, eventually to the virtual exclusion of all other draft animals, is an example of cultural preference . . . another cultural trait that reinforced the identity of the South."² Eugene Genovese argued that the antebellum use of the mule and ox instead of the faster horse was another example of retarding technological change in southern agriculture and occurred because they could withstand harsh treatment by slaves better than horses.³ More recently Jack Kirby stated, "[it is] a wonderful, generations-long mules-versus-horses debate, which reveals so much of southerners' old rural culture and their powerful affection for mules."⁴

Many southerners did have a strong affection for the mule, but it was not this or a cultural trait that resulted in the choice of the mule. A better argument might be that the lack of mules in the North was attributable to the preponderance of farmers from Scandinavian countries who showed a marked preference for the horse.⁵ Robert Jones went further in stating that most of the people north of southern portions of Illinois, Indiana, and Ohio had "a contempt for mules as profound as it was unreasoning."⁶

The purpose here is to demonstrate that the use of the mule has an economic explanation resulting from its superior draft abilities in the production of row crops in the South, especially cotton. The formal test of the hypothesis is accomplished with cross-section regression analysis using county data for 19 selected nonsouthern and southern states.

I. DRAFT ABILITIES OF THE HORSE AND MULE: A COMPARISON

Two characteristics of the mule often alluded to—its longevity relative to the horse and its ability to live and work on smaller rations—probably have been overrated. Experiments in Ohio and Illinois demonstrated that under comparable work loads mules

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¹ Robert B. Lamb, *The Mule in Southern Agriculture* (Berkeley, 1963).

² *Ibid.*, pp. 26, 83.

³ Eugene Genovese, *The Political Economy of Slavery: Studies in the Economy and Society of the Slave South* (New York, 1963), p. 107.

⁴ Jack T. Kirby, *Rural Worlds Lost: the American South, 1920–1960* (Baton Rouge, 1987), p. 198.

⁵ See, for example, Fred A. Shannon, *The Farmers Last Frontier: Agriculture, 1860–1897* (New York, 1945), pp. 48–50; and Robert W. Howard, *The Horse in America* (Chicago, 1965), p. 218.

⁶ Robert L. Jones, "The Horse and Mule Industry in Ohio to 1865," *Mississippi Valley Historical Review*, 33 (June 1946), p. 83.

and horses need feed in proportion to their weight.⁷ It has been stated the mule possesses an "appetite which anything satisfies" and can work with coarser, less expensive rations.⁸ However, as G. E. Wentworth rightly observed: "It is probably true that the mule is more cheaply maintained but the mule has not been consulted."⁹

The notion of the longevity of the mule pervades the literature. As editor of *American Farmer*, John Skinner maintained that the probable work life of a mule was 30 years while James Hood suggested that "the life of the mule is twice the life of the horse which is twelve years."¹⁰ Examples of mules living beyond 25 to 30 years have long been reported.¹¹ D. W. Chittenden reported the average work life of the horse to be roughly 12 to 15 years, while John Moore reported it to be 12 years and that of the mule to be 18 years.¹²

The virtues of horses and mules as draft animals can, however, be enumerated. The horse, always somewhat larger, can pull a heavier load in a short burst, while the mule is agile and its gait more steady in the draft. Although under comparable work conditions the horse and the mule require feed in proportion to their weight, the mule will eat and drink only what it considers necessary. Conversely, the horse will eat and drink until it becomes sick; hence, it must be rationed for continued work. The mule is hardier, less prone to disease, and withstands warm climates better.¹³ It takes longer to tire and when fatigued will recover more quickly.¹⁴ It is also less nervous and not as excitable as the horse, hence using less energy under stress and unkind or unskilled handling.¹⁵ The mule is more easily trained to respond to voice commands, making it easier to maneuver in draft work, especially in maintaining the line in row crops. The innate characteristic of the mule to resent injury is a major virtue, although it is probably also responsible for cantankerous acts and may explain the mule's inclination to set the

⁷ J. A. Burkhart, "The Reluctant Mule," *Farm Quarterly*, 5 (Sept. 1950), pp. 30–33; and William Johnson, "How to Cope with Mules," *Country Gentlemen*, 87 (Dec. 16, 1922), p. 9.

⁸ Alfred G. Smith, "Our Migratory Mules," *Country Gentlemen*, 88 (Feb. 17, 1923), p. 9.

⁹ G. E. Wentworth, *Breeders Gazette*, 73 (May 9, 1918), p. 977.

¹⁰ John Skinner, "Address to the Agricultural Society of Maryland," *American Farmer*, 2 (Oct. 20, 1820), p. 239; and James Hood, "The Mule," *American Farmer*, 12 (Apr. 16, 1830), p. 33, quoted in Lamb, *The Mule in Southern Agriculture*, p. 27.

¹¹ J. L. Jones, "The Mule," U.S. Bureau of Animal Industry, *Annual Report, 8th and 9th, 1891–1892* (Washington, DC, 1893), quoted in "In Praise of Mules," *Living Age*, 291 (Dec. 1916), p. 429.

¹² D. W. Chittenden, "Horses and Mules for Farm Power," *Breeders Gazette*, 84 (June 17, 1923), p. 725; and John H. Moore, *The Emergence of the Cotton Kingdom in the Old Southwest* (Baton Rouge, 1988), pp. 51–52. While the average work life of the mule may have exceeded that of the horse, it has been reported that under a heavy work regime in the Mississippi Delta around the turn of the century, mules worked from six to eight years. Smith, "Our Migratory Mules," p. 9. I am not aware of data on the horse under a heavy work regime.

¹³ Although there are no data on the relative incidence of disease between horses and mules in southern agriculture, during World War I the ratio of illness in horses to mules was six to one. See Alexander G. Fraser, "The Draft Mule in the Field in Mexico," *American Veterinary Medical Association Journal*, 52 (Dec. 1917), pp. 357–61. For a discussion of working mule behavior on warm days, see "Marvin Wolfe-Mules," *Loblolly*, 5 (Winter 1977), pp. 49–51. Both of these notions are corroborated by Moore, *The Emergence of the Cotton Kingdom*, pp. 51–52; and John F. Olson, "The Occupational Structure of Plantation Slave Labor in the Late Antebellum Era" (Ph.D. diss., University of Rochester, 1983), p. 70.

¹⁴ Olson, "The Occupational Structure," p. 70.

¹⁵ It may be this characteristic that has led several commentators to conclude that mules were preferred to horses in the slave South because horses could not bear the treatment they received from slaves. There are many similar statements in southern literature. For example, see Frederick Law Olmsted, *A Journey in the Seaboard Slave States in the Years 1853–54, with Remarks on Their Economy* (New York, 1904), p. 51; and Lewis C. Gray, *History of Agriculture in the United States to 1860* (Gloucester, 1958), pp. 851–52.

work pace despite encouragement from the driver.¹⁶ This characteristic becomes especially important in warm climates where the horse will work itself to death for the driver, whereas the mule will slow the work pace during warm days.¹⁷

There are, however, certain advantages to the horse for draft power. First, it is slightly less expensive to rear. Although the adult mule is less prone to disease, during infancy the mule colt is more susceptible to injury and sickness than the horse, and the mating of the mare and the jack produces a lower fertility rate than does the mare and the stallion. Another advantage is that teamsters showed a marked preference for the horse, which may have been attributable to the belief that the feet of the horse withstood the pounding on the stone pavements of city streets better than the mule's did or that the horse was better suited to stops and starts with heavy loads.¹⁸ It thus provided the northern farmer with a market for the horse.¹⁹

All things considered, it would appear that the patience, endurance, and work habits of the mule compared with the horse would have made it the preferred draft animal for farm work. The predominant use of the mule in the South was attributable to its virtues in the production of row crops, primarily cotton and tobacco, rather than to a southern cultural preference.

II. EMPIRICAL EVIDENCE

Between 1850 and 1910 mules increased in the border states from 229,000 to 1,042,000, reflecting a 3.5-fold increase, while in the cotton South they increased from 278,000 to 2,242,000, a sevenfold increase.²⁰ By 1910 horses exceeded mules in all southern states by a ratio of 1.3 to one, but in the states of the cotton South mules exceeded horses by the same ratio.²¹ By comparison, in the four midwestern states

¹⁶ J. T. Warder, "Mule Raising," in U.S. Patent Office, *Report of the Commissioner of Agriculture for the Year 1863*, 38th Cong., 1st sess., H. Ex. Doc. 91, serial no. 1196 (Washington, DC, 1864), p. 185; and G. K. Renner, "The Mule in Southern Agriculture 1821-1950," *Missouri Historical Review*, 74 (July 1980), p. 443.

¹⁷ There is an additional economic factor suggesting the mule's superior ability to perform draft work compared with the horse. Although there was some fluctuation over time, the price of a mule was always 10 to 15 percent higher than that of a draft horse in both the North and South. Not unexpectedly, the price of mules varied with cotton prices. John Moore reported that in 1849 plow horses from Kentucky and Tennessee cost \$100 while the price of a mule ranged from \$120 to \$150. Moore, *The Emergence of the Cotton Kingdom*, pp. 51-52. For a comparison of the price of mules from 1860 to 1920, see Gavin Wright, *Old South, New South: Revolutions in the Southern Economy Since the Civil War* (New York, 1986), p. 120; and for a comparison of the price of mules with horses and cotton from 1870 to 1940, see Lamb, *The Mule in Southern Agriculture*, p. 24.

¹⁸ Thomas N. Carver, *Principles of Rural Economics* (Boston, 1932), p. 275.

¹⁹ In southern cities horses outnumbered mules approximately four to one. See U.S. Bureau of the Census, *Thirteenth Census of the United States, 1910*, vols. 6-7, *Agriculture* (Washington, DC, 1912-1914).

²⁰ Lamb, *The Mule in Southern Agriculture*, tables 2, 3, 4.

²¹ Data on the stock of draft animals are available from the *Census of Agriculture, 1910*. This census is especially appropriate: it precedes the introduction of mechanized draft power, and the crop year was typical of southern agricultural production for over a century. Data were obtained for the following states: the cotton South of Alabama, Arkansas, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas; and the southern border states of Florida, Kentucky, West Virginia, and Virginia. Missouri is also included because of its importance as a mule-raising state. In addition, data were obtained for four agricultural midwestern states including Illinois, Indiana, Iowa, and Kansas. These states are included in order to have a basis of comparison for the ratio of mules to horses on farms for nonsouthern states. The data included all counties within each state with the exception of those that produced less than \$250,000 in agricultural output and those with more mules in cities than on farms. The data include 88

horses on farms exceeded mules by a ratio of nine to one. Mules, however, were not uniformly used as draft animals throughout the South. For example, in counties in Florida and Virginia where cotton or tobacco was not an important crop, horses far exceeded mules. Throughout West Virginia, a state that produced no cotton and only a small quantity of tobacco, in 1910 there were only 8,602 mules compared with 167,117 horses. The draft characteristics of the mule were obviously known to Missouri farmers, yet mules exceeded horses in only four counties in 1910.²² In two of these, Dunklin and Pemiscot, the value of cotton exceeded that of all other farm products, and a significant amount of cotton was produced in a third, New Madrid County. For the state as a whole, horses on farms exceeded mules three to one.

Throughout the South, however, wherever cotton was the dominant crop, mules on farms usually exceeded horses, suggesting a strong relationship between the use of mules and cotton production.²³ It is also known that mules were used widely in tobacco production, and understandably so. The agility of the mule made it less prone to step on young plants, and since it was easier to train to voice commands, it was easier to keep in line. Moreover, the efficiency of the mule in row cultivation was more important in the production of cotton and tobacco, especially cotton. Cotton was a less land-intensive crop than many other row crops. Prior to the introduction of hybrid corn seed, for example, it was necessary to plant corn rows four feet apart in order for corn ears to fully mature. Cotton rows were only two and one-half to three and one-half feet apart, hence the agility of the mule took on greater significance.²⁴ These characteristics, especially when combined with the ability of the mule to perform better in warm climates, would cause the mule to be the preferred draft animal in row crop production in the South.

In addition, the ratio of mules to horses should depend upon the ratio of tenant farms to owner-operated farms. Share contracts varied significantly among tenants, but one common element was that the landowner normally furnished the draft power.²⁵ Since the landowner wanted the tenant to maximize the output of the row crops, it is reasonable to assume that he supplied the most efficient draft animal for that purpose.

percent of all counties in the 19 states, and approximately one-half of those excluded are Texas counties that produced less than \$250,000 in agricultural output.

²² By 1890 the mule-raising industry was concentrated in Missouri. Yet, even in the 10 counties in the state that raised the largest number of mules, horses outnumbered mules two to one. It is thus apparent that most Missouri farmers raised mules for cash income, not for draft work. Renner, in "The Mule in Missouri Agriculture 1821-1950," p. 448, estimated that 40 percent of Missouri farmers raised mules solely for cash income.

²³ Although cotton was a major cash crop in the South, the proportion of improved acres devoted to cotton was never very large. For example, in 1910 in the cotton states alone, only 27 percent of the 114.8 million acres of improved farm land was devoted to cotton. Regression analysis, however, clearly suggests the influence of cotton and the ratio of share tenants on the use of mules in the South. John Moore and John Olson have noted the relationship between mules and cotton, and Robert Lamb has demonstrated a correlation between mules and cotton and mules and sharecroppers, although the correlation did not strike him as being important. See Moore, *The Emergence of the Cotton Kingdom*, pp. 51-52; Olson, "The Occupational Structure," pp. 72-73; and Lamb, *The Mule in Southern Agriculture*, pp. 79-80.

²⁴ It is interesting to note that after the passage of the Agriculture Adjustment Act in the spring of 1933 and farmers were required to plow up a portion of their crop, "It was said that where single-mule plows were used, farmers had a difficult time getting the animals to walk on the row. A *New York Times* editor wrote that mules were being punished 'for refusing to trample down the stalks' which they had been 'taught to revere'." Gilbert C. Fite, *Cotton Fields No More: Southern Agriculture 1865-1980* (Lexington, 1984), p. 130.

²⁵ For examples of the variety of contracts between landowners and share tenants, see Joseph D. Reid Jr., "Sharecropping As An Undesirable Market Response: The Post-Bellum South," this JOURNAL, 33 (Mar. 1973), pp. 106-30.

If the mule were more efficient in cotton and tobacco production, it would have been the dominant draft animal used on tenant farms. Owner-operated farms also employed mules for draft work but also used horses for transportation and as a consumption good, so they would have a lower ratio of mules to horses. Thus, the lower the share of tenant farms in a county, the lower would be the average ratio of mules to horses.²⁶

These hypotheses can be statistically tested using county-level data on the ratio of mules to horses on farms as the dependent variable and as the independent variables: the cotton share of improved farm acres, the tobacco share of improved farm acres, improved acres per farm, and the ratio of share tenants to owner-operated farms. Improved acres per farm is included, in absolute values, to determine the existence of economies of scale. Virtually identical results are obtained if this variable is omitted.

The results presented in Table 1 in log form are for the states normally included in the definition of the South plus Missouri, Oklahoma, and Texas.²⁷ Missouri was the major mule-raising state in 1910 and cotton was produced in three counties, while Oklahoma and Texas produced significant amounts of cotton.²⁸ For all southern states plus Missouri, the coefficient for the cotton share of improved acres is positive and highly significant and indicates that a 1 percent increase in the cotton share is associated with a 0.73 percent increase in the ratio of mules to horses. The coefficient for the ratio of tenants to owner-operated farms is also highly significant.²⁹ In a regression that includes only the cotton states, the coefficient of the cotton acreage share variable is 0.81 while that for the tenant variable is 0.21, and both are highly significant.³⁰ The results of this analysis are thus consistent with the hypothesis that the two most important factors in determining the use of the mule throughout the South as a draft animal were the proportion of cotton acres per county relative to improved farm land acres and the ratio of tenants to owner-operated farms.³¹

It might be argued that these significantly positive coefficients simply reflect a southern preference for the mule, since cotton and tobacco are predominantly southern

²⁶ There is an interesting anomaly in the use of the mule by nonsoutherners. By the time of the American Revolution, the Pennsylvania Germans had developed the Conestoga, the only widely known native draft horse produced in America. The breed died out around 1850, which is interesting and of great regret because in some ways it was superior to any of the imported draft animals. See James Westfall Thompson, "A History of Livestock Raising in the U.S.: 1607-1860," U.S. Bureau of Agricultural Economics, *Agricultural History Series*, no. 5 (Nov. 1942), p. 51. It is also interesting that the Amish-Mennonites who developed the breed in eastern Pennsylvania replaced the Conestoga with the mule. By 1910 the proportion of mules to horses on farms in the southeastern Pennsylvania counties with relatively large populations of Amish-Mennonite families ranged between 19 and 33 percent, while in abutting counties with small numbers of families of German descent the proportion ranged from 2.5 to 6.5 percent. Moreover, crop mix within the region could not account for the disparity in the ratios. See John A. Hostetler, *Amish Society* (Baltimore, 1980), p. 131.

²⁷ The inclusion of all 19 states produces larger coefficients and each coefficient is significant at the 0.0001 level with the correct sign.

²⁸ The exclusion of these three states from the regression produces almost identical results.

²⁹ Examination of the regression's residuals indicated the possibility of heteroskedasticity associated with only one variable, the ratio of share tenants to owner-operated farms. Application of generalized least squares to adjust for this yielded results that were essentially the same.

³⁰ The adjusted R^2 equals 0.6269 with N equal to 1,204. The omitted state dummy is Missouri.

³¹ Although it is known that the mule was used widely in tobacco production, the regression analysis does not substantiate the hypothesis. The most probable explanation is that tobacco acreage was always a very small proportion of cultivated acreage on farms, and because horses were used for transportation as well as a consumption good, the proportion of mules to horses on tobacco farms will not be large enough to have a significant sign. In addition, Olson, in "The Occupational Structure," p. 107, found that smaller farming units were less likely to have mules and had fewer mules than horses on average.

TABLE I
REGRESSION RESULTS

Variable	Coefficient	T-Ratio	Probability Value
Intercept	0.0587	0.481	0.6309
Ratio of Share Tenants to Owner-Operated Farms	0.2333	7.354	0.0001
Improved Acres Per Farm	0.0508	1.914	0.0559
Cotton Share of Improved Farm Acres	0.7365	7.366	0.0001
Tobacco Share of Improved Farm Acres	-0.4119	-0.701	0.4834
STATE DUMMY VARIABLES			
Alabama	0.0612	10.213	0.0001
Arkansas	0.0202	3.716	0.0002
Florida	0.0157	2.129	0.0334
Georgia	0.0789	15.521	0.0001
Kentucky	0.1197	2.607	0.0092
Louisiana	0.0963	1.651	0.0991
Mississippi	0.1467	2.512	0.0121
North Carolina	0.4126	7.925	0.0001
Oklahoma	-0.1787	-3.681	0.0002
South Carolina	0.5936	9.007	0.0001
Tennessee	0.2797	5.881	0.0001
Texas	-0.1039	-2.134	0.0331
Virginia	-0.1003	-2.146	0.0320
West Virginia	-0.2453	-4.238	0.0001

Source: U.S. Bureau of the Census, *Thirteenth Census of the United States, 1910*, vols. 6-7, *Agriculture* (Washington, DC, 1912-1914).

crops. That is, they may reflect a spurious correlation between cotton and tobacco production and the use of the mule. Yet, the direction of causality seems clear. Each of the independent variables is exogenous with respect to the ratio of mules to horses on farms. The use of mules did not cause cotton or tobacco to be produced. These crops would have been produced with substitute draft power.