Cattle and Sheep from Old to New Spain: Historical Antecedents

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Abstract. The transfer of cattle and sheep from Spain to Mexico during the sixteenth century raises questions about regional evolution and variability of livestock economies in the source area, the regional and socioeconomic roots of the emigrants, and the ecological and economic integration of specific animals, management methods, and related products within New Spain. Such issues of diffusion, cultural adaptation and transformation must be disentangled before interpretation is attempted, and this paper focuses on the Old World antecedents. Traditional nineteenth-century patterns of livestock herd in different regions of the Iberian Peninsula were already established in Roman times and changed but little during the Islamic period. Long-distance sheep transhumance is verified prior to the Christian reconquest and was greatly amplified thereafter. Yet late Medieval Spain was not a great ranching frontier, but an agrosystem in which farming and livestock raising always formed a complementary but interlinked economy. This duality was expressed in different forms of land ownership: cultivated land was intricately subdivided and carried clear title, while pasture zones remained to some degree in the public domain. Sheep raising, both within the mixed, Mediterranean economy and in the form of long-distance transhumance (the Mesta), was broadly familiar throughout Castile and was reflected in similar counterparts on the Mexican plateau. But cattle raising was small-scale and of subordinate importance in Spain, except in the estuarine marshland below Seville. Whereas the early cattle owners in Mexico came from all over Spain, their highly extensive management style appears to derive from the Marismas of Seville. This evidence may be explained by the interplay of cattle owners and cattle herders as they adjusted to a new ecology in the tropical lowlands.

Key Words: agrosystem, diffusion, Mesta, Mexico, Spain, ranching, transhumance.

Cultural and historical geographers working in eastern North America have until recently focused almost exclusively on European-derived culture spheres, viewing native American contributions as minor or peripheral. By comparison, Latin Americanists, both geographers and anthropologists, have concentrated their attention on indigenous roots, paying only nominal attention to Iberian components. Latin Americanists, in their perception of Spain as seen from Hispanic America, have tended to assume a monolithic, common cultural hearth, even though sixteenth-century Spain consisted of a dozen or so culturally distinctive regions (Foster 1980). On the other hand, North Americanist geographers have sought to disentangle the multiple strands of European elements intertwined in the different culture spheres that emerged between the St. Lawrence River and the Georgia seaboard. They have also been explicitly interested in what Harris (1977) has called "the simplification of Europe overseas," i.e., the process whereby the great cultural variety encompassed by the North European immigrants was reduced to a much simpler and relatively homogeneous American and Canadian cultural repertoire.

These different preoccupations of research-
ers working north and south of the Rio Grande are, of course, reasonable in the context of their study areas. In Texas, situated on the border between the North and Latin American cultures, it is possible to see the benefits of complementarity between the two approaches. There are several ranching traditions in Texas, ultimately derived from different European roots (Jordan 1981; Jackson 1986). Iberian antecedents appear to have had considerable impact directly, via Florida and the Carolinas, as well as indirectly, via Mexico, in regard to basic stock, management strategies, and the details of associated material culture and social customs. But such features did not come directly from Spain, but from the West Indies and the Gulf lowlands of Mexico (Doolittle and Jordan 1987). Doolittle and Jackson (1981) noted that cattle raising was first adapted to new economic and ecological conditions and significantly transformed in the course of a century or two.

An analogy is provided by the mission irrigation systems of San Antonio, the origins of which are equally complex. That irrigation served and was at least maintained by Texas Indians, although the missions were founded by Franciscans and possibly craftsmen from central Mexico (Habig 1976), with the technology and water laws subsequently modified by settlers from the Canary Islands (Glick 1972). But Mexican and Southwestern irrigation derives from both indigenous and Iberian roots (Meyer 1984). So how exactly does one distinguish Indian and Spanish irrigation? Equally perplexing, was Canary Island water management different from earlier Spanish contributions to hydraulic systems in central Mexico?

Such questions are not purely academic. They are fundamental to understanding how Old World information and technology were selected, modified, and transformed in the Americas to create new agrarian systems that have proven to be more successful than those of Europe. It is in Colonial Mexico or America that we can hope to learn how that searching and sorting-out process worked, how cultural elements were accepted, rejected, combined, or transformed. This is a process that continues in the modern world, where we impatiently contemplate the seemingly erratic development of Third World nations. The Colonial era on either side of the Rio Grande has much to tell us about how technology is diffused and adapted and how societies acculturate or crystallize into new configurations.

This study is the result of comparative work on Hispanic livestock raising in Spain and Mexico that began with William Doolittle and Terry Jordan's suggestion that cattle raising in the Guadalquivir estuary of Spain and in the Pánuco estuary of Mexico may have had close historical and ecological linkages. A productive collaboration between Doolittle, Terry Jordan, and myself followed, in which each of us sought to unravel the broader problem from different vantage points and experiences. From my own perspective, one of the central questions is the matter of regional roots in the Iberian Peninsula for key elements of agrotechnology introduced to Mexico by Spanish settlers. A second question concerns patterns of stock-raising and use of animal products in these specific Spanish source areas during the fifteenth and sixteenth centuries. A third question concerns the ecological suitability of specific animals, management methods, and their products—components of an integrated economy in different environments and culture complexes of Colonial Mexico.

It bears emphasis that specific culture traits are not simply drawn from a variety of source areas in one country and reassembled in another:

1. Historical accident and cultural selection drew different segments of society from different regions, introducing a range of alternative socioeconomic components from Spain.

2. Whatever the pull factors, these selected strands of emigration were drawn in different proportions to different colonies of destination in the Americas.

3. Within any one new colony, the emigrants found a different range of potential opportunities to which they were able to adapt with variable levels of success, depending on their backgrounds.

4. The activities of the immigrants in a particular colony were channelled or restricted by administrative, religious, social, class, and political policies, and the regional strategies of and interference by the missionary orders, as well as market opportunities.

5. Collectively, the several selection and adaptive processes operating in the New World led to a fundamental recombination of the Spanish socioeconomic components, favoring the crystallization of new, fully transformed, sociocultural and ecological-economic modes.

This argument implies that Old World antecedents and New World transformation should each be examined in their own right before broader generalizations are attempted. The present analysis attempts to take that first step by focusing on the historical evolution and adaptation of livestock raising on the Mexican Peninsula during the sixteenth century. A parallel study of the development of sheep transhumance in north-central Mexico, following an abortive attempt at pioneer cattle raising in the Bajio, has been initiated and served to sharpen the focus of the present paper.

Regional Roots

It is necessary to identify the background of the early Spanish herd owners in Mexico. Fortunately, the archival data for legal migration to the New World have been meticulously analyzed by Boyd-Bowman (1973, 1976a). For the sixteenth century, they include source areas in Andalucia with 7,700 emigrants to New Spain. The great majority came from the western half of Castile, with Lower Andalucia and Extremadura accounting for just under 50 percent (see Figs. 1 and 2). For our purposes, such aggregate data can be misleading, however, since 46 percent of the sixteenth-century emigrants to all destinations apparently came from urban areas (Boyd-Bowman 1976a). A detailed study of the 1900 emigrants of 1595-98 gives a modal picture of a poverty-stricken, urban Andalucian male, aged 27, unmarried and unskilled, probably semi-literate, and engaged as a "servant" to someone who paid his passage (Boyd-Bowman 1976b).

Equally misleading is the nature of the sample. The records of legal migration to the Americas total only 35,000, of an estimated 240,000 emigrants derived from the numbers of vessels leaving Sevilla for the Indies during the sixteenth century (Mörner 1976). Based on the size of the ships, their complement of sailors, and the number of vessels remaining in the New World, about one-third of this much larger number were migrants signed on as sailors (Mörner 1976). They would have come overwhelmingly from the areas of Sevilla and Palos, so that the contribution of Lower Andalucia will have been substantially greater than suggested by Boyd-Bowman.

The lack of information on emigrant farmers is particularly frustrating. Farmers were not allowed to emigrate legally. But many rural emigrants escaped identification as soldiers, as the retainers or servants of prominent men, or as once-only sailors who had no intention of returning with their ships. But even so, we cannot know to what degree Spanish agrotechnology was implanted in the New World through the process of spontaneous migration. It is equally plausible to see the early transfer of livestock to New Spain as the collective result of decisions by individual colonizers, of the disproportional influence of aristocratic settlers with agricultural backgrounds, of royal edicts or policy, and of the missionaries who were so influential in transforming rural economies.

Another shortcoming of the emigration data is that the emigration details at present are limited to the sixteenth century. Emigration peaked during 1601—25, when an annual average of 4450 persons sailed for the New World (Mörner 1976). During the years 1528—91, the population of southwestern Spain was increasing dramatically. The average annual growth rate was 0.6 percent in Extremadura and 0.57 percent in Lower Andalucia (Molíneu-Bertrand 1983). In at least some areas this population explosion had begun almost a century earlier, and for some communities in the hinterland of Sevilla the growth rate in the years 1532—85 was 0.78 percent per year (Ponsot 1980). But a strategic sample of parish registers shows that the number of rural births in Andalucia plummeted 25 percent from 1580—1620, only recovering their former level after 1700; in Extremadura there was a 39 percent decline from 1599—1659, with full recovery delayed until 1725 (For¬tese 1981, 77—78; Nadal 1984, Table 10). It is by contrast, birth rates in Galicia and the Basque Country increased slowly but fairly steadily throughout the seventeenth and eighteenth centuries.

It can therefore be expected that first-generation colonists involved in later agricultural settlement on the Northern Frontier of Mexico often came from parts of Spain different from those who had developed the first haciendas around Puebla and Mexico City dur-
Supplying more than 200 verified emigrants by 1600 (Boyd-Bowman 1976a). Studies of agrotechnology from Spain to Mexico considerably since (mainly from Andalusia), and the northern migration of agriculturalists from Old Castile and León, of central Mexico (mainly from Andalusia), the northern mining districts of Mexico (Extremadura and New Castile, with a strong minority of Basques) (Boyd-Bowman 1973, 1976b). Distinctions must also be drawn between settlement by new immigrants versus internal migrants in fashioning the expanding frontiers of New Spain. Diffusion studies of agrotechnology from Spain to Mexico must therefore deal with specific regional and historical contexts.

Given these perspectives and caveats, it is now possible to examine the roots of the emigrants more closely. Boyd-Bowman (1976a) lists 152 cities and towns as the chief urban component to colonization of the Americas. Examination of these centers reveals that their degree of urbanism varied greatly. Only 21 bore the title ciudad (a city with special privileges), seven had the title villa (in effect, "other" cities), and four were undistinguished lugares (small towns). Even the ciudades varied in size, from only 765 to 10,977 households or vecinos in 1528, numbers commonly multiplied by 4.5 to obtain an approximate number of inhabitants. The censuses of 1528, 1561 and 1591 (Molina-Bertrand 1983) have been used to derive median populations for the 15 smallest places of this list in mid-century (about 1560); these average 1,333 households or about 6,000 inhabitants. They were small market, craft and administrative centers, in which the bulk of the population was directly engaged in agriculture (see, for example, Phillips 1979).

Together with Sevilia, Salamanca, and Madrid, these 15 towns also provided a disproportional share of their population to the list of documented emigrants (Table 1). Considering no more than one-quarter or one-third of the actual emigrants are documented, these 18 centers could only have maintained their strong, sixteenth-century growth rates (median 1.31 percent per year, 1528–61, but less than 0.10 percent from 1561–91) through persistent in-migration and high local birth rates. This increase implies that a substantial part of the growing "urban" populations were first-generation farmers recently derived from smaller towns. This expansion began almost a century earlier in the city of Sevilla, where the annual growth rate averaged 0.70 percent from 1455–1528 (Ponsot 1980), accelerating to 1.14 percent thereafter. Thus the influx of farmers, or of their second and third sons, was a prominent and continuous phenomenon (Borrego 1983, 167–71) that will have given the population of even that highly urban center a strong agricultural flavor. These demographic features, combined with the small-town origin of many of the "urban" emigrants, imply that the overwhelming majority of the New World colonists had rural backgrounds. To this evidence must be added two facts: (1) the established urban oligarchies to a surprising extent represented vecinos-ganaderos, citizens owning large herds of cattle or sheep (Bishko 1978; González Jiménez 1983); and (2) the middle classes of the wealthier Spanish cities preferentially invested their money in the agricultural sector (Vasberg 1964, 147).

It can therefore be argued that the spatio-
Table 1. Sixteenth Century Colonist Centers with High Emigration Ratios

<table>
<thead>
<tr>
<th>Place (province)</th>
<th>Number documented emigrants</th>
<th>Median number to vecinos c. 1560</th>
<th>Proportion emigrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sevilla (Sevilla) C</td>
<td>10,638</td>
<td>17,750</td>
<td>59.9</td>
</tr>
<tr>
<td>Trujillo (Cáceres) V</td>
<td>913</td>
<td>1,350</td>
<td>67.6</td>
</tr>
<tr>
<td>Salamanca (Salamanca) C</td>
<td>900</td>
<td>4,000</td>
<td>22.5</td>
</tr>
<tr>
<td>Madrid (Madrid) V</td>
<td>846</td>
<td>5,500</td>
<td>15.4</td>
</tr>
<tr>
<td>Palos-Moguer (Huelva) L</td>
<td>605</td>
<td>1,350</td>
<td>44.8</td>
</tr>
<tr>
<td>Talavera (Toledo) V</td>
<td>524</td>
<td>1,650</td>
<td>31.6</td>
</tr>
<tr>
<td>Zafra (Badajoz) V</td>
<td>474</td>
<td>1,050</td>
<td>45.4</td>
</tr>
<tr>
<td>Cáceres (Cáceres) C</td>
<td>439</td>
<td>1,300</td>
<td>33.6</td>
</tr>
<tr>
<td>Medellín (Badajoz) V</td>
<td>418</td>
<td>1,150</td>
<td>36.3</td>
</tr>
<tr>
<td>Guadalajara (Sevilla) L</td>
<td>390</td>
<td>1,150</td>
<td>33.9</td>
</tr>
<tr>
<td>Ciudad Real (C. Real) C</td>
<td>328</td>
<td>1,700</td>
<td>93.3</td>
</tr>
<tr>
<td>Mérida (Badajoz) C</td>
<td>286</td>
<td>1,000</td>
<td>30.6</td>
</tr>
<tr>
<td>Plasencia (Cáceres) C</td>
<td>284</td>
<td>1,550</td>
<td>18.3</td>
</tr>
<tr>
<td>Llerena (Badajoz) L</td>
<td>273</td>
<td>1,450</td>
<td>18.3</td>
</tr>
<tr>
<td>Sanlúcar Barrameda (Cádiz) V</td>
<td>270</td>
<td>1,250</td>
<td>21.6</td>
</tr>
<tr>
<td>Guadalajara (Guadalajara) C</td>
<td>252</td>
<td>1,150</td>
<td>21.9</td>
</tr>
<tr>
<td>Fregenal Sierra (Badajoz) L</td>
<td>249</td>
<td>1,400</td>
<td>17.6</td>
</tr>
<tr>
<td>Almodóvar Campo (C. Real) V</td>
<td>204</td>
<td>1,250</td>
<td>16.3</td>
</tr>
</tbody>
</table>

* Data from Boyd-Bowman (1976a).  
* Median number of vecinos investigated in 1526, 1561, and 1591; data from Mollio-Bertrand (1985), figures rounded off.

Cattle and Sheep in Spain

Spain, on the other, without careful historical examination.

Prehistoric and Roman Stockraising

Domesticated animals are verified in prehistoric sites of the western Mediterranean even before the introduction of Neolithic pottery and agriculture (Leventhal 1986). Studied Neolithic and Chalcolithic faunas are dominated by sheep and goat; such sites were essentially restricted to the peripheries of the peninsula, and hunting-gathering remained important components of the economy. Only with the Bronze Age (after 2400 B.C., in calibrated years) did cattle and pig assume greater importance, and settlement of the interior plains become more systematic (Butzer 1958). Pollen cores from the oak-pine woodland near Palos show a stable pattern of moderate vegetation disturbance, with considerable grass but few weedy plants, established about 1900 B.C. and remaining in place until 3000 A.D. (see Menéndez and Florschütz 1964; Stevenson 1985). Extensive cattle grazing and relatively standardized land-use patterns are implied, but sheep and goats are unlikely in view of the absence of weed "explosions" in the profiles. Despite abundant general information about protohistoric and Roman Spain, very few faunal collections have been excavated and studied, leaving animal sculptures or mosaics as a major but unsatisfactory source of economic inference. But preferences to livestock are given by the second-hand geographical accounts of Strabo (c. 20 B.C.) and Pliny (c. 75 A.D.), the miscellaneous first-hand comments of Martial (c. 100 A.D.), and occasional remarks by other authors (see Blázquez 1978). The qualified and incomplete picture so obtained is best com-
pared with the basic ecozonation of the peninsula (Fig. 4), taking into account tribal boundaries and characteristic tribal economies.

1. The humid mountains of Galicia and the northern coast were notable for goatmeat, cattle and butter (used for cooking in place of oil), and pigs. Cured hams came from the Pyrenean foothills of Navarra and Aragón (Strabo 1942, 3.3.7, 3.4.11). Two breeds of swift horses were notable in Galicia and Asturias.

2. Iberian archaeological sites from Valencia and Roman sites from Cataluña indicate goat and sheep farming, together with pigs and horses; cows were used for milk and calves for veal, while wool was spun locally (for example, Pla 1983).

3. The central Duero plains were wheat country, but stockraising was prominent around the margins. One town delivered 10,000 pieces of wool cloth, and the inhabitants of another region provided the Roman army with 3000 cochides and 800 horses in 140 B.C.; the soldiers engaged in the campaign trekked because of a meat diet with too little bread. Innumerable crude fences of cattle and pigs are found in the area between southern Galicia and southern Léon (Malluquer and Taracena 1954, 101 ff., 167 ff.). They are linked with the intrusive Hallstatt culture, representing early Celts and dated about 900–450 B.C. Overall, this suggests sheep on the northern Duero plains, cattle and pigs in the rougher, extensively wooded country to the south and west. The presence of wild horses in this part of Spain gives a tantalizing clue for uncontrolled herding in protohistoric times.

4. Cattle, horses, pigs, and sheep, in that order, are mentioned from modern Portugal (Strabo 1942, 3.3.5; Pliny 1940, 8.191).

5. Between the Guadiana and Guadalquivir there were black-fleeced sheep and cattle of all kinds (Strabo 1942, 3.2.6), while the oak forests north of Córdoba probably provided the hams of that city (Martial 1968, 3.77). Cattle herding was prominent in the upper basins of both rivers.

6. The high plains south of the Guadalquivir provided good pasture (Strabo 1942, 3.2.3) for golden-fleeced sheep (Martial 1968, 3.27, 8.28, 9.61, 12.63); and woolmaking was important in three regional cities (Blázquez 1978).

7. The tidal marshes of the Guadalquivir's estuarine delta (Strabo 1942, 3.1.9, 3.5.7) can be identified with legendary Erytheia and the lost entrop of Tartessus, where the fine pastures reputedly produced fat cows and milk so rich that it yielded no whey (Strabo 1942, 3.2.11, 3.5.4). In his day, Strabo (1942, 3.2.4) relates that:

   The castle which cross over to the islands ... have at times actually been engulfed by the speed of the tide and ebb-tides at other times they have merely been cut off ... But the cows, they say, ... wait for the retirement of the sea, and then make off for the mainland.

The protohistoric and Roman data are sketchy but valuable in that they suggest regional livestock patterns similar to those of the "traditional" economy of the eighteenth century (see Figs. 3 and 4). They imply special regional horse breeds in the northwest and improved breeds of sheep in the south. They fill in a major lacuna in the Arabic sources, namely the importance of pigs. They serve to indicate a close link between regional ecologies and livestock patterns. They also provide no evidence for long-distance (or "inverse") transhumance of sheep in the style of the Medieval Mesta.

The Visigothic legal code of the seventh century provides a "conventional" source for livestock ownership, implying mobile herdsmen of the Moorish period. Agriculture dominated the coastal provinces from Sevilla eastward to Valencia, while livestock herding was characteristic of most of the interior and west (Fig. 5). Specific livestock are cited by several authors as characteristic of particular regions, and Dubler (1943) provides lists of those centers that produced wool or rugs, or were noted for their tanneries.

The patterns in Figure 5 suggest that thinly settled, secondary grassland and matoral (degraded woodland) were used for cattle or sheep grazing, that low-lying or relatively level woodlands and scrub vegetation provided extensive range for cattle, and that wooded or degraded mountain country was primarily utilized for goat pastoralism. Cattle and sheep appear to have been characteristic of the country between the Duero and Tajo, as well as in the Ebro basin. Sheep were dominant in eastern La Mancha and southern Aragón, while cattle were typical between the Guadiana and Guadalquivir, in Portugal, and south of the Guadalquivir mouth. These general impressions become more concrete on the basis of the available local or regional descriptions.
north and west of Toledo, Idrīsī (completed in
1154) and al-Hīmyārī (completed in 1461, but
based on Idrīsī and eleventh-century sources) tell us that they supported great herds of cattle and sheep, which the livestock merchants of Toledo bought up to expedite as meat sheep (car­ neros) to distant parts of the peninsula. Since
cattle and sheep are not raised in rugged
mountain country, and since the southern flanks
of the Sierra were dotted by a string of villages
practicing irrigation, these herds were proba­
bly concentrated in the thinly settled frontier
zone between the Sierras and the Duero.
Transshipping through Toledo implies consid­
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erable mobility, so that one can speculate about
the possibility of sheep transhumance across the
mountain passes down to the Tajo and Gua­
diana.
To what extent were the stockowners or
herders Christians or Muslims? Until the early
1100s, there is no evidence for large flocks of
sheep in the Christian lands north of the Cen­
tral Sierras, and the key livestock were plow
oxen, milk cows, and pigs (Pastor 1970). This
implies that the livestock trade of Toledo (prior
to 1085), first described by Idrīsī, was a Muslim
enterprise in all its phases. However, this pic­
ture changed radically by the mid-1100s, when
sheep herding in Old Castile and León in­
creased exponentially (Pastor 1970). Docu­
ments of 1169, 1173, 1179, and 1193 verify that
the military Orders of Calatava and Santiago
were regularly driving sheep herds from New
Castile into the Muslim sectors of La Mancha
and western Murcia, or across the mountains
into the Guadalquivir valley, as had been the
case “in Saracen times” (Julio González 1960,
docs. 116, 176, 616; 1975, 338, 341; González
Jiménez 1985) (Fig. 5). This information is sig­
nificant for several reasons: it shows that long­
distance transhumance was a standard feature
of Islamic Spain, that the Christians had as­
sumed this transhumant role by the late twelfth
century, and that transhumance crossed polit­
cal boundaries.
At this time, long-distance transhumance had
also been established in northern Spain, be­
tween the northern mountains and the Duero
river or even the Tajo (González 1960, docs. 550 and
739, dated 1190 and 1203). Defined cañadas or
transhumant sheep routes across the Central
Sierra were first specified in royal privileges of
1207–08 (Julio González 1960, docs. 815, 820–
30). These facts are the basis for the transhu­
mance patterns shown in Figure 5.
Cross-border transhumance is also verified
between Catalunya and France during the 1320s
(see Le Roy Ladurie 1960). Documents from Va­
encia dating to the thirteenth century, im­
mEDIATELY after the Reconquista, indicate both
interregional transhumance, with Christian
herders from Aragón moving down into the
Muslim-settled lower country in winter, as well
as intraregional transhumance between the
coastal plain and the hill country by Muslim
herders (Butzer et al. 1986). The fact that these
patterns were confirmed by the king of Aragón,
as traditional rights, indicates that they too an­
tedated the Reconquista.
Cattle in some areas of Muslim Spain were
raised for their milk as well as meat. Al-Razi
(died 955) and al-Hīmyārī note that the tem­
perate climate of La Mancha was ideal for cattle
raising and that the cows gave milk in abun­
dance. Since the milk was naturally sour it was
beaten in wineskins which purportedly re­
moved the acidity; La Mancha is still noted for its
cheeses. The Saló valley of Portugal, men­
tioned by Strabo (3.3.1) as a key estearine set­
ting and by al-Hīmyārī as a watershed of pine
forests, produced beef and dairy products such
as butter. Along the length of the coastline
of Portugal and southwestern Spain, the estearine
zones appear to have been centers of cattle
raising. Idrīsī and al-Hīmyārī note the cattle of
the lower Mondego River, and al-Razi points
out that the seasonal lakes of the lower Barbat
were good for both grain farming and livestock
raising.
The most famous cattle and dairy zone was
centered on the marshland or Marismas of the
lower Guadalquivir, already described by Stra­
ob. Al-Razi informs us that
milk; if all the herds of Spain were brought together
there they would find sufficient pasture.
Details on cattle use are provided in the legal
prescripts of Ibn Abdūn of Sevilla, writing in
about A.D. 1100. Most relate to dairying. The
cottage cheese of the Marismas—al-Madaʾīn—
was not to be sold, because it was foul; other
cheese was only to be stored in leather bottles
that had to be washed regularly; milk was not
to be placed in containers with remains of curds,
and only glazed pots or wooden vessels were
to be used because of the toxicity of unlined
copper; finally, milk was only to be sold by
reputable dealers who would not dilute it with
water. One of the favorite uses of cheese was
in the form of almajíbanas, small balls of fat
cheese, lightly battered in flour and then fried
in oil by the street vendors; Jérez de la Frontera
is still noted for such cheese fritters.
Cattle, as Ibn Abdūn continues, were to be
brought to the meat market—el sūq al-daʾābīb
or zoqaqūfīr—live, so that an official could
certify their own animals on the basis of brands.
After a price was agreed upon, the cattle were
there slaughtered in large vats, so that the
blood and entrails could be removed, but cattle
good for plowing or cows of reproductive age
could not be killed for meat. Cowhides were
important and the tanners were urged to use
bird guano in their preparation. At the market,
meat of different qualities was not to be mixed.
At the next level, street ven­
sors sold prepared meats. These included
jerky—only to be made from unspoiled meats;
sausages—made of minced beef, fat, spices,
garlic, and salt; and small balls of carne picuda.
The meat market of Sevilla also dealt in mutton,
sold together with its entrails, and goat meat.
In overview, the Islamic sources, amplified
by early Medieval Christian documents, serve
to identify regions of sheep versus cattle raising
and to distinguish between areas with beef cat­
tle and dairying. They also provide consider­
able detail on the processing of meat and dairy
products, especially in Sevilla and the nearby
marshlands of the Guadalquivir estuary.
This picture is compatible with but enhances the
sketchy information from the Roman period.
It also implies that the small Berber and Arab
minatory entities on the peninsula after 711 did not
fundamentally change the regional patterns of
livestock raising, but it does appear to have
introduced long-distance sheep transhumance.
from North Africa, together with the Merino sheep (Lopez 1953). Urban expansion and agricultural intensification in Islamic times (Butzer et al. 1985) will have affected the relative role of herding and the specific market needs for livestock or animal products in quantitative terms. But overall the Islamic data suggest more continuity than change. In effect, these early Medieval sources provide a longer perspective on the evolution of livestock raising on the peninsula that emphasizes persistence since late prehistoric times, a characteristic that must be attributed to ecological factors.

Sheep Transhumance during the Later Middle Ages

Between about 1050 and 1300 the balance of power between Christian and Islamic Spain shifted abruptly, and the areas controlled by the Christian principalities increased by almost 150 percent, leaving the Muslims only in control of the kingdom of Granada. The population of the Muslim-controlled areas declined steadily after the mid-eleventh century as Christian armies regularly pillaged the countryside, probing deep into Andalusia and progressively weakening the economy. As the Reconquista, in each province terminated with the capture of the key fortresses and cities, the small residual Muslim populations generally preferred to emigrate, rather than accept the promising terms offered for staying on. The remaining Muslim population in the lands of Castile and Portugal probably numbered much less than 50,000. In the lands of Aragon and Murcia, on the other hand, intercultural relationships were more positive and some 250,000-300,000 Muslims stayed behind.

Castile lacked the demographic resources to repopulate the vast regions of the center and south, and the only population nucleus was the body of Arabic-speaking Christians (Mozarabs) on the upper Tagus drainage. Even the prime lands of Seville in the 1250s managed to attract only 4000 families of Christian colonists (González 1951, 316), and their numbers did not increase substantially until well into the fourteenth century (González Jiménez 1975).

The settlement map of Spain continues to reflect these historical circumstances, namely the widespread abandonment of Muslim villages during the insecurity of the decades preceding the Reconquista, and the incapacity of the Christians to immediately repopulate the vast areas conquered rapidly after about 1100 A.D. In roughly the southern half of the country the rural population is aggregated in a limited number of fairly large towns, whereas in the north it is spread over a much larger range of hamlets, small towns and large ones (Fig. 6). At least initially the agricultural perimeter of the southern towns did not intersect with that of other communities, from which they were frequently separated by large areas of pasture. Land grants in the rapidly conquered southern regions also were uncharacteristically large, forming the nucleus of large estates or latifundia, many of which consisted primarily of grazing lands. The high costs in time of traveling to fields located more than 5 or 6 km outside of an agricultural town were responsible for a major lag in the expansion of agriculture in southern Spain, and left large areas uncultivated until the nineteenth century.

The lands between the Tajo and Guadalquivir were then initially underpopulated and reverted to extensive grazing. The pollen profile near Hurren (Manzán and Flosch 1964) shows that woodland increased steadily from 1000-1550 A.D., oak forests recovering to a degree that they had not since the onset of the Bronze Age. This was a quasi-abandoned landscape of the southern interior that constituted the Mesta, the organized, long-distance sheep transhumance of the classic work of Klein (1920).

As described by Klein (1920), great herds of sheep from the northern mountains and plateaus began to be driven hundreds of miles south to winter pastures in Extremadura, La Mancha, and Andalusia. This differed in degree from earlier, Islamic transhumance in that the herds now moved not just across the northern or southern halves of the peninsula, but across the whole of Spain. According to Klein, the herd owners were mainly of small or intermediate status, and not part of the mobile sheep economy. Transhumant wool sheep in the kingdom of Aragon included only a few herds of Merinos and the Castilian Mesta officials prevented the export of Merinos to Mexico and the New World.

Land. Already in 1190 there was a case of a royal interdiction against the expansion of cultivation into range land (González 1960, doc. 555), and by 1500 this allegedly misguided policy seriously impeded economic growth in the interior. The numbers of sheep involved in long-distance drives increased from about 1.5 million around 1400 (Ladero 1978, 77) to reach a peak of almost 3.2 million head in 1519 (Le Flem 1972), and still numbered 1.5 million in 1865 (JGE 1868), long after the royal privileges had been revoked. Klein's basic argument remains more or less valid (Bishko 1981) but a more complex picture emerges from subsequent research.

(a) In 1865 only 14 percent of the sheep of Spain were involved in transhumance on any scale (see JGE 1868), and of these only a half were in any way linked to the old Mesta routes. Without minimizing the importance of Merino wool for the Spanish economy of the sixteenth century, this observation clarifies a neglected fact that local sheep almost always greatly outnumbered migrant sheep in any one region. Large-scale transhumance was limited to wool sheep which, in the kingdom of Castile, were Merinos. Twice a year they were driven over distances of 250 to 700 km at rates averaging 15 km per day (Klein 1920, 23-24, 26-29). Sheep raised for meat (carneros) or for combinations of meat, milk and wool were of different breeds and not part of the mobile sheep economy. Transhumant wool sheep in the kingdom of Aragon included only a few herds of Merinos and the Castilian Mesta officials prevented the export of Merinos to Mexico and the New World.

(b) The majority of the Merinos had their home pastures in León, Old Castile, and northeastern La Mancha, in a zone divided into four sectors (quadrillas)—León, Segovia, Soria and Cuenca (Fig. 6) (Le Flem 1972). The proportion

Figure 6. Sheep transhumance on the Iberian Peninsula during the fifteenth and sixteenth centuries at the height of the Mesta. Data from Le Flem (1972); Klein (1920); Aitken (1945); Silbert (1966); and Lemeunier (1977).
of Merinos driven south in any one year depended on the spring rainfall received in the northern parts of the Peninsula. In the years of periodic disease and the highly fluctuating price of pasture south of the Tajo (Le Flem 1972). From 1512 to 1540 the number of transhumants averaged 2.6 to 2.8 million (5-year averaging means), but declined thereafter to a new equilibrium level of 1.8 million head by 1620 (Le Flem 1972). This decline did not represent a diminution of the Merino herds, but simply a reduction in long-range transhumance, judged by a parallel increase in pasture fee income within the jurisdiction of the four quadrillas. The reasons for this decline probably reflect rising pasture fees for migratory sheep in south-central Spain, as a growing population required more cultivated land and ensured the landholders a higher income from rents and tithes on agricultural productivity. At the same time, the non-migratory herds of the regional cities expanded and came into increasing competition with transhumant flocks, as in the case of cordoba (Edwards 1977; Bishko 1976).

(c) Klein (1920, 19) produced a map with a half dozen north-south arterial routes, based more on inference than the surviving Mesta records. Instead, these documents indicate a much more diffuse pattern of movement (Aitken 1945), and my own reconstruction of cattle trails (Salamanca 1987). In the first edition of the 150,000 topographic maps the local livestock economy in the heartland of the Mesta pastures, with the net value of cattle and pigs together roughly equal to that of sheep. Further, the total income from these new resources was 369,000 maravedis in these same communities, compared with 309,500 from grazing rights on private pastures (dehesa), which would include the better land and assured the landholders a higher income from rents and tithes on agricultural productivity. By 1429 this number was changed to 2000 head; in 1479 (Gerbet 1982, Table 4): these beef cattle, appears to have been moved in extended, transhumant drives (1.4 percent of Spanish cattle in 1665 [IGE 1868], with a maximum of 11.2 percent in Avila). More typical appears to have been the documented case of some 1000 cattle grazed by the monastery of Guadalupe on the Guadaira (floodplain) near Medellin in 1479 (Gerbet 1982, Table 4): these beef and breeding cattle were tended by 25 vaqueros, i.e., a ratio of 76 to 1, compared with 173 sheep to one shepherd on the monastery's pastures near Trujillo. The great majority of Spanish cattle have always served for labor (56 percent in 1665 [IGE 1868], and this proportion will have been even greater prior to the widespread shift from oxen- to mule-plowing during the sixteenth century (Yassberg 1984, 138).

In conclusion, a dual economy, of cultivation and livestock, was always characterized of the Spanish interior. "Traditional historiography has stressed the conflict between farming and herding, but it is better understood as a mutually profitable, if contentious, partnership" (Phillips 1987, 135). The role of stockraising, and especially of the Mesta, has been identified as a minor component of a regional economy stretching from expansion rather than seriously threatened by transhumance. The economy was closely correlated with the practice of Christian raiding deep into the Islamic south, the spoils of which were immense herds of animals (see above). One bustling expedition in 1514 (archival data from Extremadura in 1466 show that cattle and pigs together were as important as sheep. Of the tithes on newborn animals collected in seven towns, 52.5 percent came from sheep, 33 percent from calves, and 14.2 percent from pigs (Ladero 1970). These data demonstrate a diversified, local livestock economy in the heartland of the Mesta pastures, with the net value of cattle and pigs together roughly equal to that of sheep. Further, the total income from these new resources was 369,000 maravedis in these same communities, compared with 309,500 from grazing rights on private pastures (dehesa), which would include the better land and assured the landholders a higher income from rents and tithes on agricultural productivity. By 1429 this number was changed to 2000 head; in 1479 (Gerbet 1982, Table 4): these beef cattle, appears to have been moved in extended, transhumant drives (1.4 percent of Spanish cattle in 1665 [IGE 1868], with a maximum of 11.2 percent in Avila). More typical appears to have been the documented case of some 1000 cattle grazed by the monastery of Guadalupe on the Guadaira (floodplain) near Medellin in 1479 (Gerbet 1982, Table 4): these beef and breeding cattle were tended by 25 vaqueros, i.e., a ratio of 76 to 1, compared with 173 sheep to one shepherd on the monastery's pastures near Trujillo. The great majority of Spanish cattle have always served for labor (56 percent in 1665 [IGE 1868], and this proportion will have been even greater prior to the widespread shift from oxen- to mule-plowing during the sixteenth century (Yassberg 1984, 138). Finally, there is evidence for a notable decline in the number of beef cattle during the late medieval period. In 1351 Cafetrava received the royal privilege to graze 15,000 cattle and 8000 sheep free of all charges on crown land; in 1429 this number was changed to 2000 cattle and 12,000 sheep, presumably to reflect a fundamental shift in grazing strategies (Solano 1978). There is little evidence to support Bishop’s (1961) suggestion of large-scale, extensive cattle herding—at least not after 1200.

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arable land or cultivos (Latin, ager) and (b) unimproved land or "waste," known as baldíos (Latin, saltus). Cultivated land was held by rights conferred through royal privilege to individuals, institutions, or corporate communities (municipios) or, less securely, by right of occupation, conditional upon continuing cultivation (squatter's rights or presas [Vassberg 1984, 10–13]). Unimproved land remained in the royal domain (reajeno), but was often attached to municipios, as commonage for the benefit of all, or awarded to monasteries or aristocrats by special privilege. The unassigned baldíos were initially vast, in the wake of the Reconquest, and free passage and access for pasture was generously granted (especially in the years 1150–1250) to prestigious monasteries and city councils. But over the centuries, an incremental political system of royal awards and unresolved usurpation, primarily by the nobility, created an extensive intermediate sphere of assigned or restricted land use by citizens, sometimes referred to as municipios. A citizen's local herds were large or municipal pastures inadequately, stock was driven to the dehesas or montes of other municipios; this short or medium-distance movement, mainly within the same region or province, was called transmigrante. Seed crops in southern Spain were planted in October–November or, at latest, in February, and harvested between May and July. Local stubble or fallow pasturage (rasojo) was therefore optimal in summer and autumn, so that any drives to pastures in other municipalities took place in autumn or early winter (invernaderos). This cycle was delayed up to three months with respect to the invernaderos from northern Spain, which arrived in the south during November and began the return trip in April. Summer transhumance (agostadero) was much less common, in periodic response to unusual drought, or in the special case of towns and monasteries without adequate access to stubble or fallow.

Although the concept of commonage—communal grazing lands such as the ejidos—was found throughout western Europe, the persistence of vast areas of open-range grazing, long after the passing of the frontier, was unique to the Iberian Peninsula. Broad access to montes and even dehesas, at a price, represented a duality of the cultivated and pastoral spheres, governed by different rules related to fundamentally different claims of ownership. Such use was integral to the circumscribed-management system, originally codified in Roman law, and differed from the principles of Germanic law applied in the British colonies in North America. This duality, incorporating in the more flexible Iberian concept of commonwealth, favored the rapid development of mobile forms of extensive stock-raising in the Indies, and sanctioned their survival in large, underutilized parts of Latin America until at least the end of the nineteenth century (see Daffontaines 1965). It also provides a vital rationale to explain the evolution of open-range grazing or transhumant herding in colonial Mexico (see Chevalier 1963; Dussenbery 1963; Schell 1986, 19–34).

Iberian stock-raising was highly diversified, especially if goats and pigs are included in the discussion. Spanish emigrants were, on the whole, familiar with a wide range of stock options. But more importantly, perhaps, they were also familiar with the many forms of access to private or public land. Their choices, given specific opportunities in the New World, were probably dictated more by local, ecological op-
Cattle and Sheep in Spain

Furthermore, salinity levels in the estuarine marsh are sufficiently high to kill off the subaerial vegetation in mid-summer, while even the soils of the freshwater equivalent are slightly saline (Vanney 1970, 43-73; Drain et al. 1971, 72-79). But, although partly submerged between mid-winter and early May, the freshwater marsh provided prime, seasonal pastures.

The Isla Mayor and Isla Menor were first awarded in 1253 to the City Council of Sevilla (González 1951, II, 155, 316) as communal pasture land. But in 1272 the king revoked this privilege, recognizing the islands, plus part of the lower Guadarrama wetlands, to 200 new settlers who were to reoccupy Puebla del Río with their wives and children (González 1951, II, 359-351). This venture apparently failed and control of Marismas, with the income of their pasture taxes, reverted to the Council. In 1291 (Ladero Ordenanzas, 28 verso). Originally, only the citizens of Sevilla had free access to the marsh pastures, but in 1377 the Council granted the vecinos of Puebla del Río, Coria, and Alcalá del Río free use of the islands. Aguijón (probably on the lower Guadarrama), Vera, and la marisma (the Marismas Gallegas), while the herds of Alcalá de Guadaira, Utrera, Lebría, and Cabezas de San Juan were given access to Vera (Carande 1972, 159-60). The city of Niebla, which shared a reciprocal pasture agreement with Sevilla since 1269 (González 1951, I, 452, II, 348), was allowed to graze 800 cattle and 30 mares in Aguijón and Vera. In regard to Mesta privileges, the 1377 statute specifies sheep and pigs from Sevilla and its adjacent towns. By 1484 Aznalcázar was included in this arrangement and certain other towns of the Aljarafe were conceded the privilege to pasture plow-oxen in the marsh in 1503 (Borrego 1983, 95-96, 104-5). Other towns and the owners of transhumant sheep continued to pay a standard but unspecified fee for each animal.

Also relevant to the Marismas is that in 1284 the floodplain immediately south of Sevilla was designated as pasture for the fattening of animals to be brought into the city (González 1951, I, 452, II, 362). The vaqueros and shepherds of the province were allowed to assemble their herds for local ferias on June 24, August 15, and September 29 (González 1951, I, 452, II, 347)—presumably market fairs, similar to those implied in the writings of Ibn Abdón about 1100. In contrast to the basic integrity of the pasture realm, the arable lands were intensely subdivided by the repartimiento of 1250-54. Small grants, to common soldiers and the like, ranged from 1 to 3 hectares of olive groves and vineyards, and 32 to 64 hectares of wheat land. Clerics and more important retainers of the king received 4 to 8 hectares of olive groves and 64 to 256 of wheat country. The largest individual grants were about 25 hectares of olives or up to 1,250 hectares of wheat land. Institutional grants of olive groves and vineyards ranged from 200 to 1,000 hectares, and the king retained even larger areas. In the Aljarafe the number of land recipients exceeded 15,000, but González's (1951, I, 446) tally of total acreage awarded is greater than the actual area of the municipios in question, even when the large areas of monte are included (see Drain 1977, Table 48: Bernal and Drain 1975, 16-17, 60-61). Thus the repartimiento was overly generous in its definition of land quality and the true areas involved were much smaller.

Since only 4,800 vecinos can be verified for the region of Sevilla during the late thirteenth century, it appears that a very small fraction of the original grants stayed on the. The other lands were presumably sold and converted into cash before the soldiers returned home. Even those settlements actively colonized by soldiers with families did not do well. Some hamlets are never mentioned again; others were derelict by the early 1300s and had to be "repopulated," only to fail again a century or so later (González Jiménez 1975); even some of the larger, surviving towns had been abandoned during the early fourteenth century and had to be relabeled. Of some 85 settlements of the Aljarafe mentioned in the repartimiento, only 36 can be verified between 1528-34 (Colón; Ponsot 1980; Borrego 1983, Tables 1, 4). Other towns and the owners of transhumant sheep continued to pay a standard but unspecified fee for each animal.

In addition to depopulation, "disintensification" of agriculture is apparent. For the twelve Aljarafe communities for which we can compare the original land grants with fourteenth or fifteenth century documents, olive groves were downgraded to vineyards in four cases, and to dry-farming in five (see González 1951 versus González Jiménez 1975, 1977). After a century of population growth at an annual rate of 0.53 percent, the total number of vecinos was only 5,043. Converting families to inhabitants by a rough factor of four, the population on some 750 km² of arable land was only about 20,000 in 1528, i.e., 27 per square kilometer, varying from 23 to 29 in the four districts. Such a density is compatible with agricultural intensification, and probably approached population levels during the Islamic eleventh century. But an annual growth rate of 0.53 percent inferes a density of only 13.5 about 130 years earlier in 1400. Such a figure is marginal for "intensification" and helps to understand the earlier trend to settlement abandonment and downgrading of land use. Yet Lower Andalucía by 1463 had outstripped all other Castilian regions.

Figure 7. Reconstruction of land use in the area of Sevilla about 1500 A.D. For sources, see text. AZ Aznalcázar, BG Burguillos, PR Puebla del Río, SLB Sanlúcar Barrameda, SLM Sanlúcar Mayor.

farming, essentially wheat, much of it on droughty land [475-525 mm precipitation], allowing cultivation only every other year on the higher ground towards the mountains. The Marismas were omitted from the individual land grants of the 1250s because they were unsuitable for agriculture with the available technology. Regular tidal flooding in the estuarian marshland was complemented by seasonal flooding in the freshwater marsh zone.
of comparable size in terms of its contributions to the royal exchequer (MacKay 1981), arguing that this area was already comparatively well-developed. This suggests that the prime lands of Castile were the areas to regain the productivity of the Islamic Middle Ages until well into the sixteenth century. The reasons for this faltering population growth and implicitly manpower shortage in the Aljarafe during the first two centuries after the Reconquest must have included a lack of start-up capital, the stiff fixed rents and tithe, and the consolidation of the large estates (see also Borrero 1983, 139–45). Most of the old landed families of Sevilla established their control over multiple latifundia between the 1270s and 1330s (Collantes 1976; González Jiménez 1976), and it is improbable that small freeholders could compete with them indefinitely. Such farmers probably sold out and either drifted to the city or accepted employment as day laborers on the olive or grape-growing haciendas or as tenants or sharecroppers on the wheat-growing cortes. This is implied by the eventual conversion, in some cases to the smaller number of larger towns (Borrero 1983, 202–6). Recent examples have shown great landlords to be disinclined to invest in intensification (Mayer 1960, chap. 3, 92–96) which may explain the inability of the food supply to grow sufficiently rapidly during the fifteenth century to feed the expanding population of the cities; as a result there were repeated and severe food shortages between 1486 and 1522 (Ladero and González Jiménez 1979; González Jiménez 1976). The three-field system of improved crop rotation had been introduced to northern Castile during the mid-fifteenth century (García 1973), but it was only adopted in Andalucía during the eighteenth. Another impediment to cultivation was that agriculture could not be expanded onto adjacent grazing lands. These were sacrosanct, and the pasture concessions repeatedly appealed to the principle of royal protection against agricultural usurpation of dehesas and cañadas, so around Tejada and along the margins of the Marismas after the 1450s (González Jiménez 1976; Ladero 1976). A reasonably accurate reconstruction of land use patterns in the Aljarafe and Ribera in the early 1500s can be made on the basis of a major geographical project implemented 1517–23 by Fernando Colón, the second son of Christpher Columbus. Colón described the areas between almost every town and village by multiple itineraries, given in semiquantitative units, according to a classification of landform and land use types. This database is massive and was compared in detail with the first edition of the 1:50,000 topographic maps (surveyed in the early 1900s) which confirmed its remarkable accuracy as to topography and land quality. Differences in land use are significant in some areas, but always compatible with the partial, contemporaneous historical documentation (González Jiménez 1975, 1977; Borrero 1983). The results are shown in Figure 7, which demonstrates that pastoral land use was much more widespread than during the twentieth century. Characteristics of stock raising economies are also shown in Figure 7, as derived from Colón (3370, 3380, 3391–92, 3399, 6587, 6596), Borrero (1983, Table 11) for the Aljarafe and Ribera, González Jiménez (1983) for Carmona, Franco (1974, Table 6) for Alcalá de Guadaira, and Bishko (1978) for Jerez and Sevilla proper. The results show that the large herds (over 11,000 cattle; 35 percent of them plow animals) and 13,200 sheep, excluding the larger herds belonging to vecinos of Sevilla and grazed in the area (Ordenanzas 28 verso). The vecinos of Carmona owned 5,000 cattle and 16,600 sheep, those of Alcalá 3,077 cattle and 4245 sheep, and those of Jerez 17,660 cattle and 29,600 sheep.

The size of the herds owned by the vecinos of Sevilla are unknown. Many of the sheep were regularly driven along the cañada northwest of the city to Tejada, Niebla and the region further west (Borrero 1983, 96–98). But cattle raisers appear to have dominated the local Mesta, the confinatory of stock raisers in that city (see Ordenanzas, 115 verso–124 verso). In 1450 herd size in the Marismas was set at 500 sheep with no more than two shepherds, and 300 cattle with up to four vaqueros (Ordenanzas 29 verso), although we do not know how many herds of each category were pastured there. That there were many can be inferred from the fact that traveling groups of prostitutes could go with the “ruffian” caretakers of any one herd for only 24 hours (Ordenanzas, 123 verso). The herdsmen were forbidden to carry arms in order to avoid deadly rumbles, were only permitted a knife and a pointed herding pole (garrocha), used from horseback (Ordenanzas, 121 verso). Ear-marking was mandatory within two weeks of an animal’s birth, while annual round-ups and branding were standard practice in the month of May, and representatives of all the communities that utilized the Marismas (including the sierra of modern Huelva province) had to identify their brands at the annual concordia (Ordenanzas, 116 verso–118 verso, 119 verso). By comparison with the size of cattle herds elsewhere in late medieval Spain, those of the Marismas appear to have been unusually large and handled in an exceptionally extensive manner, supporting the eighteenth-century image of semi-feudal animals, of poor quality stock, belonging to the traditional Andalucian red-brown breed (retinto) (Drain 1977, 115–16).

Stockraising was an important economic component of the Sevilla area in 1500, judging by the great expanse of pasture and by the activity of local Mestas in Sevilla, Carmona, and Jerez (see Borrero 1983, 29 verso), collaborating in the hinterland between Utrera and Lebrija, Jerez de la Frontera, and Niebla (primarily sheep and pigs) (Bishko 1978; González Jiménez 1983; Ladero and Gallán 1984). But tying one or the other of these livestock traditions to those emerging in Mexico is difficult. The effect of the transition to New Spain before 1540 is shown in Figure 7 (see Boyd-Bowman 1964–68; 710 came from the city of Sevilla and its suburb Triana (3.9 percent hidalgos), including seven verified Mexican cattlemen, six sheepmen, and one other stockman; 150 came from all the other towns combined (6.0 percent hidalgos), including four verified Mexican stockmen coming from Jerez and one each from Utrera and Carmona.

Among the subsequent herd owners from Sevilla were two knights of the Order of Santiago: the daughter of a lacemaker; a noble lady, who married the viceroy’s son in Mexico, and became a powerful rancher in her own right; an hidalgos who was Cortes’s brother-in-law; and an hidalgos who became mayor of Mexico City. Seven were undistinguished vecinos of Sevilla, Jerez or Utrera who acquired encomiendas and cattle estancias in the Pánico as a result of their services. It is a motley group and there are no obvious patterns. The other emigrants from outside the city of Sevilla also seem uninformative since very few are identified by profession; the latter group included several soldiers, mariners, and merchants, three missionaries, a carpenter, a blacksmith, and a muleteer. More suggestive is Alfonso de Aguilar, an hidalgos of Burguiños, who emigrated in 1524 and may have raised cattle in the Pánico for a while; he was followed by two of his sons and two other vecinos in 1539. To establish clearer relationships between the Guadalquivir lowlands and stock raising in New Spain it would be necessary to study the land grants in several parts of Mexico for the entire sixteenth century, in the expectation that Boyd-Bowman’s remaining biographical volumes will be published shortly.

It is apparent that a significant component of the urban population in Sevilla participated in the colonization of New Spain. This same urban aristocracy invested heavily in the acquisition of both large estates (Collantes 1976) and large herds (Bishko 1978; also González Jiménez 1983). The estates of the mesas of Sevilla City and Puebla appear to be modeled on the Mesta ordenanzas of Sevilla (Bishko 1978), suggesting a strong Andalucian impact on stock management in New Spain. It could also be argued that the great Sevillian estates served as a model for the Mexican hacienda. The large estates of Sevilla continue to be operated by managers for absentee landlords; they are commercial, rather than subsistence-oriented, where groves and vineyards as standard crops, and horse breeding or cattle raising in some but by no means all instances; the labor is provided on a daily-wage basis by landless workers who live in large villages (Bernal and Drain 1975; Drain 1977). There are, then, more than incidental similarities with the large estates of sixteenth-century Mexico, operated by managers with the help of encomienda labor to produce sugar and other commercial crops for landowners living in Mexico City.

The potential contribution of Sevilla to the early cattle-raising traditions of the West Indies, the Magdalena delta of Colombia, and several parts of Mexico, is highly suggestive. Many of the emigrants were born in Sevilla and its province; rural economic institutions bear strong similarities to those of early New Spain; most of the cattle stock and many of the vaqueros will have come from the Marismas; and the extensive nature of cattle management of the area apparently was unique within Spain. The Mexican evidence seems to support such roots (see Doolittle 1987). Yet only a small part of the early cattle ranchers in Mexico derived from Sevilla, and this influence can be established at this time. It seems pertinent to emphasize the distinction between ganaderos and...
Cattle and Sheep in Spain

Conclusions

The results of this historical interpretation of the Castillian agro-system on the eve of the conquest of Mexico can now be reformulated and summarized:

1. Throughout the late Middle Ages, the average cow was worth five sheep, a ratio that consistently represents par. The Castile does not include the Basque provinces, Navarra and Aragon, for which the 1650 livestock census (IIE 1667) was used to flesh out the peripheral picture; Portuguese data are for 1600 (Ribeiro 1957). The differences between 1750 and 1865 indicate a general 15 percent decrease in cattle, especially in Extremadura (68 percent), where sheep increased 79 percent; as a result the sheep-cattle ratio changed from 6.6 to 17.9 in 1665. The nineteenth century censuses are less representative because of the rapid expansion of cultivation that occurred during this century.

2. Despite the Mesta and popular images, the southeast of the Guadalquivir estuary (Moremi 1969) seems to support this identification.

3. Prior to the modern system of controls, tidal incursions into the extuvarine marshland moved at rates of up to 20 km per hour (Vanney 1970, fig. 12), with an amplitude of 28 ft (Mayer 1969, fig. 86). The hazards of rainfall and run-off-induced flooding are greatest in March (Vanney 1970, 46; also Colón, 481, 3370). During one notorious flood in 1917, 14,000 cattle and horses drowned in the Guadalcquivir (Drain 1977, 115).

4. In the 1797 census (Censo 1801) lists both the number of parishes and of all categories of settlements for each province. Using the better verified population data of 1787, the extreme case of "dispersion" was León, with 186 inhabitants per parish or 196 per settlement; the extreme case of "concentration" was Colón, with 3737 and 3575 people, respectively. In the case of Sevilla, there were 2428 inhabitants per parish and 2636 per settlement. These eighteenth century census data were used to initially map the "strongly nucleated" settlement areas of Figure 6 on a provincial basis and the 140,000 topographic map.

Acknowledgments

William Doolittle, Terry Jordan, and Gregory Knapp (Austin) supplied data; my research interests toward Medieval Spain, generously took the time to make many useful suggestions on an initial draft. Last but not least, Elizabeth Butzer traced the early Mexican stockowners back to Spain.

Notes

1. Throughout the late Middle Ages, the average cow was worth five sheep, a ratio that consistently represents parity. The Castile does not include the Basque provinces, Navarra and Aragon, for which the 1650 livestock census (IIE 1667) was used to flesh out the peripheral picture; Portuguese data are for 1600 (Ribeiro 1957). The differences between 1750 and 1865 indicate a general 15 percent decrease in cattle, especially in Extremadura (68 percent), where sheep increased 79 percent; as a result the sheep-cattle ratio changed from 6.6 to 17.9 in 1665. The nineteenth century censuses are less representative because of the rapid expansion of cultivation (55 percent 1800-60, see Nadal [1970], in part) accelerated by the secularization and sale of underutilized church estates (1837-55) which, in Extremadura, represented 21.5 percent of the land (Martí 1955, 285). It is worth mentioning that cattle reared in Mexico can now be reformulated and a preeminent agricultural sector of wheat cultivation and vineyards.

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14. On the controversy about the socioeconomic function of the Mexican hacienda, and its changes over the centuries, see Van Young (1982).

15. Understanding of sheep transhumance strategies and shepherds in Spain is fairly good, despite a lack of cultural ecological field studies. This is not the case for more than 50,000 beef and "reproductive" numbers of livestock in Lower Andalucía as well as an investment of stockraising procedures on the large estates.

16. The basic stock for the Spanish American cattle were shipped to the W/B Indies from Sevilla as well as Sanlúcar Barrameda, Cádiz and Póza in a very short time (1493-1502), and may have numbered as few as 500 head (Rouse 1977). The interest derived from Marismic stock, presumably controlled imported ships to supply the same assumptions. The introduction of cattle raising to Santo Domingo may therefore be crucially influenced by only a few dozen from Fray W. (1535-1539).

17. The Canary Islands can also be excluded as a source of cattle and related agrotechnology during the sixteenth century, contrary to the views of Rouse (1977, 28-31). There were about a dozen and goats, both of which were to home and often carry bags, but cattle were not very at all the Spanish introductions were made from the 17th century (Aznar 1983, 253-301).

References


Algar, K. W. 1959. The late Spanish Meseta or the 1556-1566. New Mexico Historical Review 45:3-24.


Bakr. Geografía de España del Abú Ubayd al-Bakr. 2660/2000, 59400; Carmona 300/2000, 10300; Alcalá de Guadaira 2000/21000; Ibarra 1600/400, 400 Arcos de la Frontera 1200/30, 1300; Jerez de la Frontera 18,500/24, 300; Sanlúcar Barrameda 2500/2900. The total is 50,000 cattle and 200,000 sheep, 48 percent of the cattle represented as work animals. For Lower Andalucía as a whole, the ratio of cattle and sheep (1947, app. 40) was 13 percent higher than in 1865, the number of sheep 25 percent higher. Even allowing for a comparable higher number of livestock in 1500 and a 50 percent reduction in plow-oxen for a smaller agricultural population, it is difficult to argue for more than 50,000 beef and "reproductive" numbers of livestock in Lower Andalucía as well as an investment of stockraising procedures on the large estates.

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Foster, G. M. 1960. La Jana en Castilla y León. Madrid: Comunidad de Madrid.


Grau, F. 1967. La Viña superior en la obra de al-Andalus. Estudios de Edad Media de la Corona de Aragón 8:447-545.


González Barquillo, F. 1987. La Mesta en los siglos XVI y XVII. Madrid: Universidad Complutense.

Maquere, M. 1984. La simplificación de Europa en el siglo XVIII. Madrid: Universidad Complutense.


Marín Barrúquel, F. 1987. La Mesta en los siglos XVI y XVII. Madrid: Universidad Complutense.


Sánchez Martín, M. 1975. La corra de Iblía (Granada y Málaga) en los siglos X y XI. Madrid: Universidad de Huelva 7:5-62.


