

# Changes in North American animal husbandry from the 17th century to the present: an exploration of potential effects on leather quality

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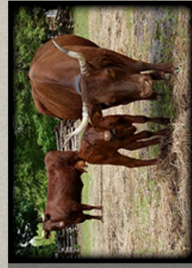
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Part of ongoing research by the Leather Discussion Group, formed in 2016 by book conservators interested in acquiring a better understanding of leather and leather dyes with the goal of conveying conservation needs to leather manufacturers.

## Introduction

This poster will explore the evolution of North American animal husbandry from the 17th century to the present and the potential impact of breed choices, diet regimens, environmental conditions, and abattoir trends on leather quality.

## Breed Specialization



Devon cattle are an adaptable, multipurpose heritage breed that can subsist on forage alone. Photo courtesy: Colonial Williamsburg.

Colonists also imported livestock from Europe in the 17th century. These multi-purpose animals were often used for draft, milk and ultimately meat.

Specialized breeds, inspired by British agriculturalist Robert Bakewell, weren't widely utilized in America until the 19th century.



The Leicester Longwool is a specialized sheep breed inspired by Robert Bakewell. Photo courtesy: Colonial Williamsburg.

These highly-engineered breeds excel in a certain trait such as dairy production or wool quality. The number of breeds increased significantly and multipurpose heritage breeds were surpassed by specialized breeds as farmers attempted to meet increased market demands.

## Environment & Diet

In the southern colonies, farmers typically practiced open woodland husbandry, allowing cattle, pigs, and horses to roam freely, foraging in the woods, marshes, or other open land. Herbivores had access to a variety of grasses, saplings, and roots. Colonists built fences to keep livestock out of fields, especially their primary crops - corn and tobacco.

Many familiar pasture plants in America were introduced from overseas and are now naturalized. They initially arrived in the animals' guts, but later some were intentionally sown when native plants were considered insufficient forage for specialized breeds.

### Some Plants Introduced to North America by Colonists

Grasses	Herbs/Weeds
Early hairgrass ( <i>Aira praecox</i> )	Burdock ( <i>arctium</i> spp.)
Velvet grass ( <i>Holcus lanatus</i> )	Wormwood ( <i>artemisia vulgaris</i> )
Perennial Ryegrass ( <i>Lolium perenne</i> )	Dandelion ( <i>taraxacum officinale</i> )
Timothy-grass ( <i>phleum pratense</i> )	Sow thistles ( <i>sonchus</i> spp.)
Canada bluegrass ( <i>Poa compressa</i> )	Yellow Toadflax ( <i>linaria vulgaris</i> )
Annual bluegrass ( <i>Poa annua</i> )	Red & White Clover ( <i>trifolium repens</i> )
Kentucky Bluegrass ( <i>Poa pratensis</i> )	Tansy ( <i>tanacetum vulgare</i> )
Quackgrass ( <i>elytrigia repens</i> )	Canada Thistle ( <i>Cirsium arvense</i> )



For genus photos courtesy of Doug Goldman, hosted by the USDA-NRCS PLANTS Database



Holstein cattle are a highly specialized dairy breed that requires a high level of care. Photo courtesy of USDA Agricultural Research Service.

Confinement changed animals' diets in notable ways, including the reduction in nutrient uptake from traditional forage. Supplemental feed in the form of corn, other grains, and the leafy tops of root crops provided these missing nutrients. Specialized breeds require increasingly specialized diets, and modern breeds are often unable to gain weight on forage alone. Now, the focus of commercial meat farmers is on 'fattening' animals quickly in preparation for slaughter, and supplemental feed is the norm.

Initially livestock were raised for consumption, but by the late 1600s, as human populations increased, many farmers' goals transitioned to optimizing animal products for sale. This led to the practice of penning livestock - first in fenced pastures and later in confined stalls.

## Dietary & Environmental changes

Traditional Free Range	Commercial Pastured or confined
<ul style="list-style-type: none"> <li>Forage in woodlands, abandoned fields, marshes</li> <li>Little or no supplemental feed.</li> <li>Fences keep livestock out, not in</li> </ul>	<ul style="list-style-type: none"> <li>Pasture grazed after harvest</li> <li>Provided with supplemental feed</li> <li>Introduction of European grasses &amp; clover</li> </ul>

## Abattoir Trends

Southern farmers typically slaughtered livestock at 4+ years but modern animals are often under 2 years old. Slaughter traditionally took place in the fall, but it is now a year-round operation. Early abattoirs were close to farmers and tanners but now hides are sometimes shipped long distances.

Skin defects from the animals' lives show up on the hide, but defects can also be imparted in the butchering. Electric prods, cuts, scores, or 'corduroy' on the hide mar it, leading to a lesser quality skin. Excess meat or fat on the hide can lead to spoilage. Minimizing the time between skinning and curing is essential to the quality of the finished leather.



A salted skin awaits transfer to the tanner. Photo by author.

## Conclusions & Further Research

Modern breeds are more specialized, or engineered, than traditional ones. The transition from a pastured, woodland diet to feeding livestock supplemental grains for 'fattening' has an observed impact on animals' muscle quality. Does it also impact the skin? Changes in the butchering and tanning process may affect the long-term preservation of the hide. How do bacteria, metals, or even the wrong type of salt introduced in processing and storage affect hide preservation?

Research into these questions is underway with a comparative analysis of historic bookbinding leather as well as raw skin and leather from traditional and modern breeds with known diets. Testing includes organoleptic evaluation, protein identification, detection of salts, sulfur quantification, consolidant identification, tannin classification, and identification of tanning and dye compounds.



Bookbinding leather. Photo by author.

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