BEEF CATTLE RESEARCH
at the
University of California

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THE OLDEST PROFESSION? Ask a cat- 
delman and he'll probably tell you 
that it's raising livestock. And he won't 
be too far wrong, at least in California. 
The first Spanish longhorn cattle were in 
the state as early as 1540, many years 
before the establishment of Jamestown 
along the Atlantic coast by the first Brit-

ish colonists.

By 1780 mission herds were expand-
ing, and there were 70,000 head of cattle 
in California. Today there are approxi-

mately 5 million head.

Despite more than 400 years of history, 
most of the industry's major changes 
have been within the last century, with 
organized research accelerating that 
change within the last 50 years. During 
this era, the cattle industry in California 
shifted from mainly hide and tallow pro-
duction to meat production—focal point of 
the industry today. Invention of 
barbed wire and the windmill made it 
possible to segregate herds for beef im-
provement and utilize range areas that 
were previously short of water. Comple-
tion of the transcontinental railroad 
aided livestock movement. The British 
breeds—Shorthorn, Hereford and Angus 
—were gradually used to upgrade the 
Spanish longhorn. Following the turn of 
the century the Texas fever tick was 
under control and vaccines were being 
developed for other diseases such as an-
thrax and blackleg. Cattle are still the 
best “machines” for converting range forage into usable protein in many areas 
of the state, but range finishing of beef 
has, until recently, been overshadowed 
by feedlot finishing with grain to put on 
a lot of pounds in a short time.

The goal of today's beef industry is to 
produce the most meat in the most effi-
cient way possible. For many years re-
search and extension personnel in the 
Department of Animal Science at the 
University of California, Davis, and at 
the University's field stations have been 
working closely with the industry to 
achieve this goal for the benefit of pro-
ducer and consumer alike.

During the 1920's and 1930's, re-
searchers at U.C. Davis sought to increase 
the efficiency of rangelands by studying 
the nutritive value of range grasses. They 
found that vitamin A, protein and phos-
phorus were greatly reduced when range 
grasses dried and withered. Although 
short-term body storage of vitamin A is 
sufficient to prevent a deficiency, the lack 
of protein and phosphorus were reducing 
animal performance. This led to supple-
menting range feed with cottonseed cake 
to provide the necessary protein and phosphorus. The return: about $2 for 
every $1 spent for the cottonseed cakes.

Cattle grading

Also in the early 1930's U.C. animal 
scientists developed the procedure for 
grading and selecting cattle on conforma-
tion and weight-per-day-of-age that is 
now used extensively by cattle producers 
throughout the United States.

Systematic crossbreeding of beef cattle 
began in the early 1940's. Research at 
U.C. and elsewhere showed that cross-
bred cattle reach sexual maturity earlier, 
have a higher conception rate and pro-
duce more and heavier calves than 
straightbred cows. These studies also doc-
umented that the crossbred cow lives 
longer, gives more milk and has an over-
all production record that is 15 to 20% 
higher than that of the straightbred cow.

The practice of breeding yearling 
heifers to get one more calf from a cow 
during her lifetime, followed by some 
70% of today's cattlemen, is based on 
recommendations made by U.C.'s Coop-
ervative Extension Service as early as 
1942. The recommendations followed six 
years of field tests on breeding yearling 
heifers.

Bloat prevention

Between 1938 and 1955 intensive stud-
ies were conducted by U.C. animal sci-
entists on the cause and prevention of 
bloat in cattle. Contrary to the commonly 
accepted view, the researchers found that 
bloat was caused by a breakdown in the 
mechanism of expelling gas rather than 
excessive gas formation. Gas was being 
trapped by foaming of the rumen ingesta. 
Presumably, lack of sufficient scabrous 
scratchy) material in the diet was re-
ducing the flow of saliva, a foaming de-
pressant.

It was found that bloat could be pre-
vented by feeding Sudan or oat hay be-
fore pasturing or by sprinkling vegetable 
or animal oils on alfalfa. A more recent 
bloat preventive procedure is the use of 
poloxalene, an antifoaming agent that 
can be used as a drench, mixed with con-
centrates or added to drinking water.

The use of diethylstilbestrol (DES) to 
increase the average daily gain of beef 
cattle under full feeding was thoroughly 
tested by U.C. and other researchers. Cat-
tle implanted with 30 mg of DES gained 
10 to 15% faster and about 10% more 
economically than those not implanted.

Studies on the influence of certain

C A L I F O R N I A A G R I C U L T U R E , F E B R U A R Y , 1 9 7 5
trace minerals in the diet of livestock have helped cattlemen in various areas of the state. In some areas, excess molybdenum in the soil and forage can decrease livestock performance, but U.C. scientists have discovered that the effects of excess molybdenum can be overcome by giving animals intramuscular injections of copper glycate.

In parts of Northern California, lack of selenium also decreases animal performance, causing a nutritional disease called white muscle disease. Researchers found that the problem could be corrected by treating animals with selenium and vitamin E.

**Performance testing**

Another major step in the progress of California's cattle industry was the advent of performance testing and the subsequent development of the California Beef Improvement Association (CBCIA). The U.C. Cooperative Extension Service helped establish the CBCIA in 1959 and has been an integral part of the organization since.

During the 1950's and early 1960's the widespread use of cattle performance testing helped the beef industry recover from selection trends that were resulting in development of small, compact animals that were plagued with serious incidences of dwarfism and were often inefficient feed converters at conventional slaughter weights. Within the last 10 to 15 years, selection for growth rate—variously labeled or measured as weaning weight, yearling weight, feedlot gain, WDA or gain-ability—has received major emphasis in CBCIA breeding programs. The result has been more efficient animals.

Probably the most serious problem that has always faced the cattle industry is fertility, but researchers are making progress in this area also. Larger calf crops are the result of numerous studies and field tests on semen quality of bulls and the practice of pregnancy testing cows. Ova transfer, estrus synchronization and increased twinning are other exciting areas U.C. animal scientists are investigating as potential solutions to the fertility problem.

Improved feeding efficiency—getting the maximum return for the investment in feed—has long been of concern to U.C. researchers. Fiber analysis of roughage has led to a more accurate evaluation of various roughages as feed. Researchers also found that finishing cattle on grass with only limited concentrate supplementation is feasible and economical. A new system for the evaluation of feed stuffs was developed in the 1960's. This system is useful for predicting animal response to a particular feeding regimen or for determining balanced least-cost diets for beef production. Research on development of low quality roughages such as rice straw and other waste materials is showing that some of these materials, when used with proper treatment and supplementation, can be incorporated into the diet of cattle to help offset the surge in cattle feed prices.

Researchers also are working on ways to make feed more efficient once it is inside the cow by trying to inhibit the release of wasted energy in the form of methane gas inside the rumen and by protecting proteins from rumen microorganisms so they can reach the small intestine where they are absorbed to increase growth and productivity.

Several experiments—early castration, bulls vs. steers, Russian castration and short scrotum animals—have concentrated on harnessing the male hormone testosterone for more efficient beef production. Some of these practices have proved feasible, some have not. To date, none has received widespread acceptance because of marketing or other problems, but, as has been the case with other work, the research could be the framework for future beef management practices.

Carcass quality studies in relationship to rate of gain and federal grading standards are another integral part of U.C. animal science research. The work established that high-gaining cattle produce carcasses that cut out just as high or higher than carcasses of slower-gaining animals. Recent carcass evaluation research indicates that there is no correlation between actual age and bone maturity of young beef animals. Since federal beef grading standards are based on an assumed age-bone maturity relationship, the finding has helped promote proposed changes in these standards.

No one really knows for sure what the future holds for California's beef industry. But, if past performance is any indication, University of California animal scientists will continue to have an active role in shaping that future for the benefit of both the cattlemen and the consumer of his products.

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