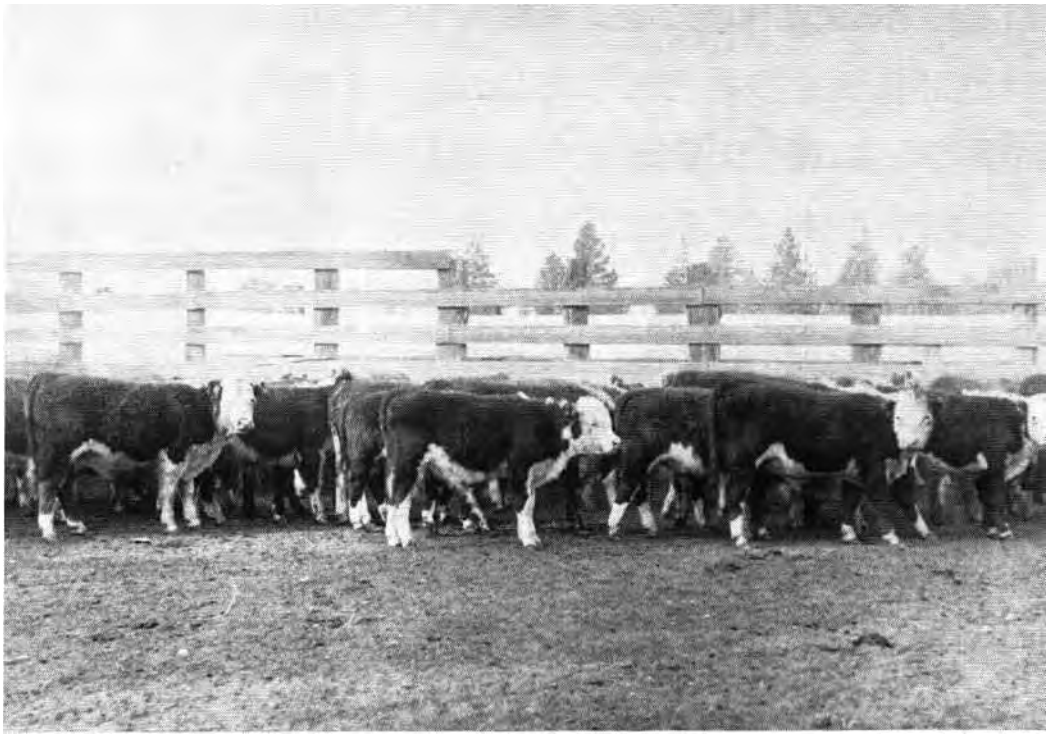

Both early and late castrates seen in photo of cattle from Albert Albaugh's herd showed no pronounced stagginess in trials.

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Age at castration appears to influence growth rate of male cattle. The higher preweaning weight gains of bulls suggest that the male hormone is an influencing growth factor. However, postweaning weight gains are lower in bulls castrated at eight months, which tends to nullify their preweaning advantage. Stress caused by the operation may have been a factor in this response. Differences in weight gains associated with diethylstilbestrol treatment were obtained whenever used in these tests. This is a progress report of experimental use of diethylstilbestrol in tests with early and late castrates to improve weight gains—a practice not presently recommended by the University of California.

Bulls in comparative trial with early and late castrates showed no apparent problems from leaving male cattle intact.

THE PRACTICE OF castrating male cattle is probably one of the oldest surgical procedures known to man. Since ancient times, cattlemen have performed the operation as a means of preventing indiscriminate mating, and to retard the aggressiveness of male cattle. Secondary sex characteristics of the bull, such as the heavy shoulders, and massive head and neck, are absent when calves are castrated before sexual maturity. Castration is also known to increase the amount and distribution of fat in the carcass.

Castration age

Bull calves are normally castrated from a few days up to four months of age. However, the proper age to perform the operation for maximum production has not been established. Removal of the testes or stopping their function halts the production of sex hormones secreted by these glands. Testosterone is the most active of these hormones. Current evidence indicates that testicular hormone stimulates protein synthesis in cattle. Its effect on protein metabolism is believed to increase growth rate of males. Previous investigators have found biologically significant amounts of testosterone in the blood stream of calves three months of age.

Preweaning growth

Tests on effects of this hormone on preweaning growth of male calves were conducted by Extension Service farm advisors from the Humboldt, Inyo-Mono, and Shasta-Lassen county offices. Five trials were conducted on the ranches of Albert Albaugh, McArthur; Bill Barnwell, Bridgeville; Gerald Beck, Miranda; Les Fearrien, Loleta; and Richard Strong, Deep Springs College. Essentially the same procedure was used in establishing all trials in this report.

At normal marking and branding time, 40 Hereford bull calves (average age seven weeks) on the Albaugh ranch were randomly assigned to either a castrate or a bull group. Portable scales were set up in the working corral. Each calf was ear tattooed and tagged with a color-coded, numbered tag in both ears. The 20 male calves assigned to the castrate group were altered while 20 were left intact. Individual weights were recorded throughout the trial. Experimental calves grazed with their dams on Modoc National Forest range during the summer and early fall of 1965. Weight data were obtained in November and the remaining bulls (8 months of age) were altered, using an emasculator to prevent excessive bleeding. Preweaning growth rates of the bulls and steers are shown in the table (test 1). The average daily gain for the bulls was 1.65 lbs as compared with 1.58 lbs for steers. The bulls had gained an average of 13 lbs more than the steers. The average testes weight of the late castrates was 5.9 oz.

Calves in the Strong experiment were grazed on desert brush and salt grass meadow pasture from date of treatment to July 1, 1965. On this date they were

EFFECTS OF CASTRATION AGE AND DIETHYLSTILBESTROL ON WEIGHT GAINS IN MALE CALVES

driven to the forest service range at 8,000 to 10,000 ft elevation in the White Mountains. The experimental calves were returned October 1 and weaned. Final weights were recorded on October 22, 1965. Average growth for bulls was 1.50 lbs and steers, 1.42 lbs per day (see table, test 2).

The Barnwell and Beck experimental animals grazed with their dams on native range pasture until weaning. Fourteen bulls in the Barnwell trial were compared with 10 steers (see table, test 3). At the end of the 131-day test period, average gains were 1.82 lbs for the bulls and 1.64 lbs for the steers. This difference was significant, and at weaning time the bulls had a 25-lb weight-gain superiority over the steers.

The bulls in the Beck trial also gained significantly more than the steers, having a 16-lb weight advantage at the end of the test (see table, test 4).

No difference was found between treatments in the Fearrien trial (see table, test 5). Experimental animals in this trial were grazed on sub-irrigated pasture. Secondary sex characteristics appeared more pronounced and sexual activity was more intense in the bulls of this group.

Calves from the Humboldt County trials (tests 3, 4, and 5) were purchased by the University of California, Davis, on September 15, 1965. They were used in a trial designed by W. N. Garrett to compare feedlot gains, feed conversion rate, and carcass quality of bulls with early and late castrates. Results of this study will be reported in a future article.

Postweaning growth, implants

Diethylstilbestrol (24 mgm) was implanted at weaning to 10 randomly selected, early castrates at the Albaugh ranch. Nine of the late castrates received the same treatment. The animals that did not receive the implants were used as controls for each group. Cattle were fed from November 2, 1965, to April 15, 1966, on a winter growing ration averaging 15 lbs of mixed hay (alfalfa and grass) per head daily.

The effects of castration age and diethylstilbestrol on postweaning growth rate are shown in the graph. The average growth rate over the 163-day postweaning period was higher for the early castrates than those castrated at eight months of age. One exception occurred when the implanted, late castrates gained slightly more than the control, early castrates. Early castrates implanted with diethylstilbestrol gained 21 lbs more than the late castrates receiving the same treatment. The same difference was observed between the control animals. The lower gain made by the late castrates tended to eliminate their preweaning advantage. Stress caused by castration may have

Early castrates at the University of California feedlot, Davis.

Late castrates in trials comparing bulls, early, and late castrates.

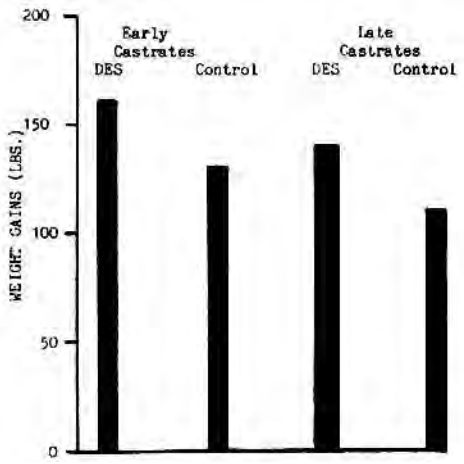
been a factor in retarding the postweaning growth of the late castrates. There was considerable difference in weight gains associated with diethylstilbestrol. Postweaning weight gains of the implanted castrates were 29 lbs greater than the controls.

Sam Thurber is Farm Advisor, Agricultural Extension Service, University of California, Shasta-Lassen county office; John Dunbar is Farm Advisor, Humboldt County; and Dean Smith is Farm Advisor, Inyo-Mono county office. Alex Shockley, statistician, conducted the statistical analysis for this study.

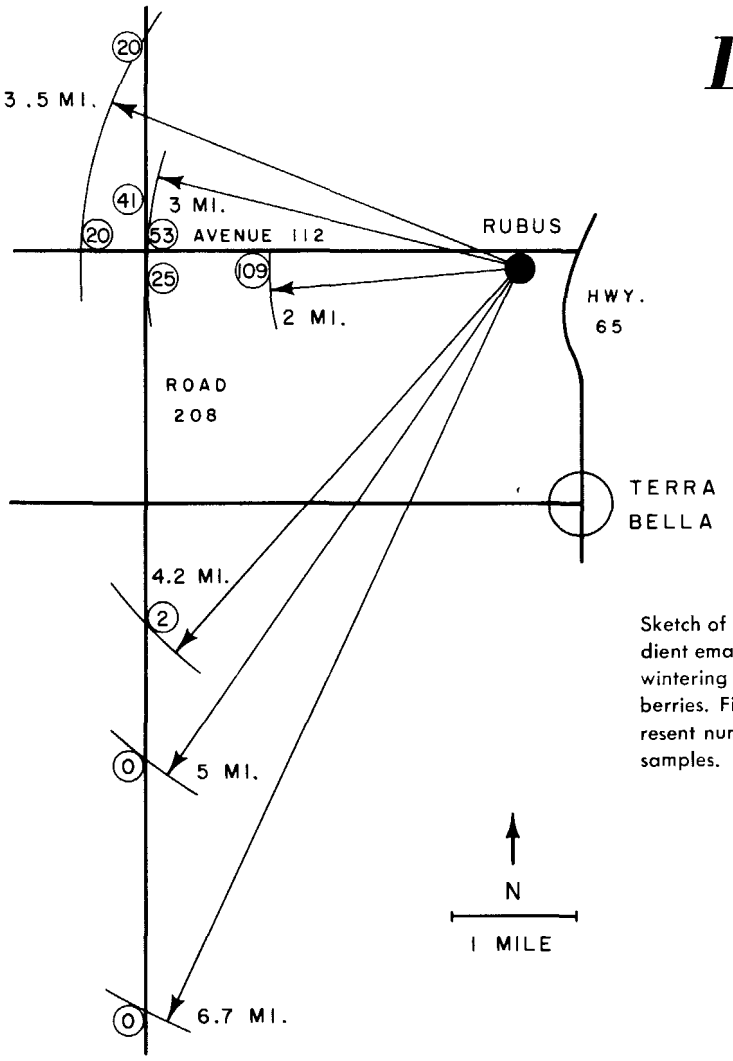
SUMMARY OF PREWEANING GROWTH RATE OF INTACT BULLS VS. CASTRATED CALVES

Tests	Calves in treatment	Initial weight	Gain per calf	Daily gain
	(Number)	(Averages in lbs)		
Test 1. Albaugh Ranch, McArthur—192 days April 24–Nov. 2, 1965				
Bulls	19	129	317	1.65
Early castrates	19	118	304	1.59
Test 2. Strong Ranch, Deep Springs College—153 days May 25–Oct. 22, 1965				
Bulls	9	102	229	1.50
Early castrates	10	84	218	1.42
Test 3. Barnwell Ranch, Bridgeville—May 6–Sept. 15, 1965—131 days				
Bulls	14	184	239	1.82
Early castrates	10	213	219	1.64
Test 4. Beck Ranch, Miranda May 25–Sept. 15, 1965—112 days				
Bulls	16	273	161	1.44
Early castrates	11	276	145	1.30
Test 5. Fearrien Ranch, Loleta June 16–Sept. 15, 1965—90 days				
Bulls	19	387	146	1.62
Early castrates	11	382	146	1.62

EFFECT OF AGE AT CASTRATION AND DIETHYLSTILBESTROL (DES) ON POSTWEANING GROWTH RATE (163) DAYS



Dispersal



Sketch of parasite activity gradient emanating from an overwintering refuge of blackberries. Figures in circles represent numbers of parasites in samples.

An overwintering refuge for egg parasites of grape leafhoppers showed a marked effect in vineyards at a distance of 3.5 miles and its influence could be traced over 4 miles, according to preliminary surveys.

GRAPE GROWERS have planted blackberry thickets near their vineyards in central and southern San Joaquin Valley in an experimental effort to establish seasonal refuges for *Anagrus epos*, an egg parasite of the grape leafhopper. Data reported here, suggesting the dimensions of the area which may be directly and beneficially influenced by such a purposely established overwintering refuge, were obtained in the spring of 1966.

The reason for encouraging these tiny parasitic wasps is that they attack and kill the eggs of the grape leafhopper, resulting in a substantial decrease in numbers of this grape pest during the growing season. Unlike their host leafhopper, which normally overwinters in the vineyards, these tiny egg parasites survive the winter only by breeding in the eggs of a different leafhopper species—a noneconomic form, *Dikrella cruentata*, which lives throughout the year only on blackberries (*Rubus* spp.). If such a blackberry refuge is not available near a vineyard, the parasites must first overcome a barrier of time and space before they can reach the grape leafhopper populations in the spring. The resulting delay in reaching a distant vineyard by early April often precludes the parasite's attack on the first eggs deposited on the vines by the overwintering adult grape leafhoppers. This seriously handicaps the parasites that would otherwise have measurably reduced the first leafhopper generation by killing a proportion of the eggs. An early appearance of the parasites in a vineyard is particularly important since each egg attacked by *Anagrus* results in another parasite instead of a leafhopper nymph. The increase of the parasite population is thereby accelerated, permitting