PURE BRED HEREFORD YEARLING BULLS ON PASTURE—THESE ANIMALS ARE THE TYPE FOR RANGE BREEDING.—Courtesy of Canoa Ranch.

SANTA RITA RANGE RESERVE FIELD DAY

By IRWIN INGRAM, '26

A Strict Conservative Use of the Natural Range Forage Is the Primary Contributing Factor to the Economic Success of the Range Livestock Industry of the Southwest

GOVERNMENT officials in charge of the Santa Rita Range Reserve were hosts on October 3rd to visiting stockmen and University and state officials including his excellency Gov. G. W. P. Hunt; the occasion marking the first annual field day of the Reserve since its establishment in 1903. The Reserve is a tract of range land embracing an area of 50,000 acres 40 miles south of Tucson and was set aside by government action in order that studies might be made of the most approved methods for production of cattle under range conditions common to this section. Investigations relating to the restoration of depleted ranges, the production costs on fenced versus open ranges, and the seasonal uses have received particular attention, while other studies have included methods of salting, watering, rodent control, and marketing. With sveral years of study devoted to these problems the Range Reserve Officials were prepared to give some concrete results of their work.

Supt. M. Culley and his assistant J. H. Magee, together with supervisor Chapline, chief of grazing range studies of the U. S. D. A., ushered the visitors to the various parts of the Reserve where different experiments were being carried on. At noon a barbecue lunch was served and in the evening a dinner, followed by speeches and a general discussion relating to the present range conditions.

Production Costs on Fenced vs. Open Range

The cost of raising a calf to weaning age on the fenced range was $13.00 and for the open range $18.73, while the cost at one year of age was $17.00 and $22.00 respectively. The yearly operating costs may be divided into three separate headings. First, depreciation and maintenance on ranch headquarters, corrals, fences, wells, pipe-lines, pumping and equipment. Second, the losses on 500 breeding cows, 25 bulls, 12 horses, and 30 yearlings for six months. Third, the expense of salting pasturage, providing water, and labor for handling stock.

A total of the yearly operating costs for the fenced range was $4449.00 and for the open range $4972.00. The total income (selling three-fourths of the increase as calves and one-fourth as yearlings) for the fenced range was $7560.00 and for open range $3402. These figures show a net profit of $3711.00 for the former and a net loss of $1570.00 for the latter. Fenced ranges by the use of improved methods of management yielded 7.4 percent profit on total investment as contrasted with the open ranges which yielded a loss of 5.8 percent. Most of this profit

may be due to the following methods employed.

1. Maintaining breeding stock in a vigorous condition throughout the year.

2. Using only good quality of pure-bred bulls.

3. Yearly culling of aged, off-color, undersized, and otherwise undesirable cows.

4. Selecting the best heifers each year to replace the breeding cows culled from the herd.

5. Segregating, in so far as possible, heifers until two years of age before breeding them.

Recent sales of Reserve stock have shown that it out weighs other stock in the region and brings from two to eight dollars more per head. A good grade of Hereford cattle were used on the Reserve range.

Calf Crop

The number of calves produced for sale is one of the most important features affecting the profits of the industry. It requires an average production of approximately 60 calves per 100 cows to pay average expenses in this region. The number above this largely determines the profit of the herd.

The average calf crop for the Reserve herds over a period of eight years from 1916 to 1923 was 72.6 percent as compared with 55 percent for the same periods on the open ranges.

The following factors should be taken into consideration in order to assure a good calf crop: Use not less than four good active bulls to every 100 head of breeding cows, cull, aged or sterile cows, keep plenty of salt and water available at all times, segregate if possible the breeding from the non-breeding stock, equal distribution of bulls over the range and the careful handling of the stock in general.

Water and Salting

The Reserve has wells, springs, pipelines and surface reservoirs or "tanks" for watering the cattle. Adequate water development is just as essential for the proper utilizing of the range as it is to the cattle. Well distributed watering places, leaving no part of the range over two and one-half miles from water in level country or one-half to three-fourths of a mile in rough country, prevents congestion of large numbers of stock and consequently prevents over-grazing near the watering places. If only a few watering places are available there will be a considerable amount of range beyond the natural walking distance of cattle that will not be utilized.

One method of securing more evenly distributed grazing is by having salting grounds. A wide distribution of salt, therefore, has been invaluable in securing utilization of areas where the vegetation is short lived or only grazed by stock at certain seasons of the year. Likewise a certain amount of protection may be given a part of the range by with-holding salt from that part. Stock accustomed to being salted are much gentler and have a healthier appearance.

Range Vegetation

There are three main types of range vegetation represented in the Reserve, namely: The semi-desert, the mesa, and the foothill type. The semi-desert type has an average rain fall of 10.53 inches and the forage consists chiefly of Six Weeks grasses, Porters Muhlenbergia (commonly called black gramma) and browse. The mesa type has an annual rain fall of 12.71 inches and produces chiefly Rothrock's grama, black grama and a good growth of six weeks grasses. The foothill type has an average rainfall of 16.20 inches and produces a greater stand of perennial grasses, chiefly, slender gramas, curly mesquite, hairy and side oats gramas, and tanglehead. Some browse may also be found.

The improvement of depleted range lands has presented a problem of vital importance to all stockmen. Early investigations on the Reserve began with artificial resseding of the range to both foreign and native forage plants. These proved a failure from a practical viewpoint due to the heavy expense involved and to the depletion during the periods of unfavorable climatic conditions.

Careful observations on the Reserve established the fact that total protection from grazing resulted in the bulk of the range improving to practically a full stand of forage within three years. The project has for its present objective the determination of a system of grazing that will enable the range to recover from its depletion and maintain itself once well established. This phase of the problem is essential due to the impracticability of allowing ranges to remain idle for three years.

In this experiment totally protected areas, along with areas grazed moderately yearlong, conservatively yearlong grazed, deferred summer grazing and yearlong over grazing, as found on certain adjacent public domain ranges, are being used in this study. The results to date are as follows:

1. In the foothill type, moderate grazing (50 to 75 percent of yearlong carrying capacity) for the first year followed with conservative grazing will bring the forage back in about five years.

2. In the mesa type, conservative grazing with partially deferred summer grazing for the first few years followed by conservative yearlong grazing is to be recommended.

3. That any material change in density from year to year is generally caused by climatic variations.

4. That certain variations in volume production does occur to the various systems of controlled grazing.

5. That vegetative stooling or spreading, rather than growth from seed, is the most important means of spread for the main forage grasses.

The Clipping Study

The clipping study was established to determine if possible the influence of different intensities and intervals of grazing on important forage plants on the Reserve.

Plots are being cliped at one and two inches above the ground at weekly, biweekly, monthly and at the end of the growing period. The changes in area of the clumps and the volume of forage produced is being carefully recorded. The first three years' work showed that the longer the interval between clippings the greater amount of forage was produced per unit of area. The plot clipped monthly at six inches and to one inch at the end of the season made practically the same growth as that clippd to one inch at the end of the season.

Carrying Capacities of Southern Arizona Ranges

It is of utmost importance to know the number of cattle a range will carry from year to year. Eight years' study of the fenced areas have indicated that the foothill range, in good condition, will carry approximately one cow to 18 acres, the mesa type 23 acres per cow, and the semi-desert type 49 acres per cow per year.

Proper Seasonal Use

Results have been secured both through observations and measurements on actual grazing and by clipping of the forage to determine varying degrees and periods of use. The results obtained from these experiments are not sufficient to draw any definite conclusions but certain tentative ones are given here as follows:

1. That excessive grazing in the foothill type during the early part

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of the growing season materially decreases the volume production of forage the following year. In the mesa type excessive grazing early in the season will seldom reduce volume production of a succeeding good year, though in a poor year a noticeable reduction will occur.

2. That deferred grazing, particularly of black and slender gramas, allows a vigorous growth and seed dispersal during the summer and then full use of the forage during the winter and spring.

3. That browse furnishes its greatest proportion of the feed in the spring.

4. That range consisting largely of annuals (six weeks grasses) should be fully utilized during the summer and the stock then removed to the other ranges if the full value of the anuuals is to be obtained.

Along with proper seasonal use, the proper degree of utilization should be taken into consideration. To obtain the best results the forage should not be clipped or grazed closer than two inches at the beginning of the growing season. Rothrocks grama, which is a heavy seed producer, and curley mesquite, which is a stoloniferous grass can be utilized slightly closer. Clipping or grazing to one inch would reduce the production from 10 to 15 percent each year.

A STRICT CONSERVATIVE USE OF THE NATURAL RANGE FORAGE CONTRIBUTES MORE THAN ANY OTHER FACTORS TO THE ECONOMIC SUCCESS OF THE RANGE LIVESTOCK INDUSTRY OF THE SOUTHWEST.

Because

It keeps the natural forage grasses in a thrifty growing condition and assures the cheapest possible annual supply of feed.

It keeps breeding stock in good condition yearlong.

It keeps down losses and insures a maximum calf crop.