

important experiments were conducted as far as possible on summer-fallowed land or in a biennial cropping system. The variety trial with cereals was carried on in two groups, nursery planting and plot planting. The nursery planting included row trials with varieties of wheat, barley, and oats. About a hundred strains of hybrid wheats were also grown in rows for the purpose of comparison and for the establishment of type. The nursery planting also included breeding and straight selection with wheat, barley, and oats, using Centgener methods. By this process of selection strains of wheat and barley have been secured which yielded 10 and 15 per cent. respectively higher than the stock from which they originated.

The plot experiments included variety trials with wheat, barley, and oats. The plots were one-twentieth to one-tenth of an acre in size.

The fertilizer experiments were carried out on about thirty plots, upon which various amounts and combinations of commercial fertilizers were applied to determine their effect upon the yield and composition of wheat. These plots have been cropped for many years.

Rotation experiments were conducted on about fifteen plots. These are designed to determine the effect of summer fallow, and the use of various green-manure crops upon the yield of wheat as compared with continuous cropping.

Forage Crops.—Trial plots of maize, sorghums, Kafir corn, and lucerne were also carried on.

Soudan Grass.—An experiment with this new grass was being conducted to determine its value as a forage plant. No definite data regarding results was procurable. The crop was vigorous and healthy. Soudan grass is a true bunch-grass, after the manner of timothy, and is just as easily handled. It grows very tall, is very leafy, and produces splendid crops of seed. Depending on the rainfall, it can be cut from two to three times in a season. Sheaves of this grass sown in the Kansas State exhibit, Palace of Agriculture, Panama Pacific Exhibition, San Francisco, were 10 ft. high. It is said to grow well in moist soils in Kansas State, and makes excellent forage—superior to Kafir corn or sorghum, because it is easier to handle and cures more rapidly. It is said to be a drought-resistant plant suitable for semi-arid regions; stand frosts; grows rapidly from seed. For a hay crop it should be cut when 3 ft. high. This would probably prove a suitable forage grass for northern parts of New Zealand.

Burr-clover.—A large number of varieties of this legume are under test. At time of my visit a crop for seed-production had been harvested but not removed from the plot: thus I had an opportunity of observing the many varieties as distinguished by their seed-pods. Many of the varieties would become a menace to wool-production if introduced into New Zealand, owing to the burr on the seed-pods. Burr-clover is used as a cover-crop in South California. The University of California has inaugurated an experiment to determine the value of legumes as winter-grown manure crops for citrus fruits. For this experiment the seeds of the following legumes are sown in September: Purple vetch, Tangier peas, species of melilotus, fenugreek, common vetch, lentils, burr-clover, bitter vetch, and Canadian field-pea. When the plants have grown they are ploughed under to a depth of 9 in. to 10 in. The soil is thus prepared for the planting or sowing of summer crops, which forms the second part of the experiment, from which the results of the nitrogen added by the various legumes are obtained. Vegetable and forage crops such as potatoes, sugar-beet, maize, sorghum, &c., are sown so that each cover-crop has growing upon it during the summer the same-sized plot in duplicate of each vegetable or forage used. Uniform cultivation and irrigation are given to all plots. Purple vetch (*Vicia atropurpurea*) in these experiments has given the highest yield per acre of green crops, exceeding by $4\frac{1}{2}$ tons that given by Tangier peas, which is the next highest, and $9\frac{1}{2}$ tons more than Canadian peas, which gave the lowest yield.

Dairy Herd consists of Holstein, Jersey, Guernsey, Ayrshire, and grade cows. The soiling system is adapted to the feeding of the dairy herd—that is, they are not depastured, but are kept in a large yard adjoining the barn or milking-shed, and the food is placed for their consumption in racks and feed-boxes according to the nature of the food supplied. This consists largely in spring and summer of green crops, usually cut the day before they are to be fed to the cows in order that a portion of the moisture may be removed by drying in the sun and air, thus allowing the crop to wilt, which prevents the cows from becoming blown or hoven. This precaution is necessary with such succulent green crops as lucerne, clover, and tares. Corn or maize, both in its green stage and as ensilage, is largely fed to the herd; also lucerne in the form of hay is extensively used, as well as ensilage made from the roughage of the farm. A grain ration consisting of barley, bran, and in some cases oil-meal is fed in addition. A two-year-old Holstein Friesian heifer, bred and raised on the farm, and fed as above mentioned, produced 18'57 lb. of butter-fat in seven days. This is the Californian record for an animal of that age, and ranks well with the world's record for this age and breed.

Throughout the United States considerable interest is being attached to investigations of problems connected with the feeding of dairy cows with grain while at pasture, these being conducted at several of the experiment stations. For some years at the University Farm, Davis, investigations in connection with the value of barley for dairy cows fed alfalfa (lucerne) have been undertaken. The majority of dairy-farmers in the irrigated valleys of the Californian State depend upon lucerne for feeding their cows, and, as a rule, these receive no other feed the year round. The cows are pastured on lucerne during the summer, or are fed green lucerne in feed-racks in corrals (yards), and during the winter season they are fed lucerne hay either in the yards or in the barn (byre or cowhouse).

I was fortunate in meeting two of the principal investigators of these feeding problems when at the Davis Farm—viz., Gordon H. True, Professor of Animal Husbandry, and Fritz W. Woll, Professor of Animal Nutrition (the latter I had previously met and with him had acted as a member on several international juries of awards at the exhibition, San Francisco), who very courteously placed all the information available at my disposal.