DURING 1950 the demand for most agricultural products will probably be fairly high, but the 1949 downward trend in prices and income will likely continue through next year. The Bureau of Agricultural Economics estimates that both prices and cash income to farmers in 1950 may average about 10 percent below this year. This drop is approximately the same as occurred in 1949 from the record level of 1948. Farm production costs are expected to decline less than cash receipts in 1950. This difference in ratio of decline between prices received and costs of goods purchased will result in a larger drop in net income for the farm operator than in gross cash receipts.

Demand for Farm Products

The domestic demand for farm products in 1949 has been below the 1948 level. This lower demand reflected the slight reduction in general economic activities and employment and consumer income that occurred during the summer months. Another factor that has lowered the demand for agricultural products is the larger amounts spent for the purchase of automobiles and similar durable goods with less for food and clothing.

Foreign export of agricultural products was higher in 1949 than a year ago according to the Bureau of Agricultural Economics. Without considering the international situation and prolonged stoppage of production in basic industries, which cannot be appraised at present, a further slight reduction in economic activity and a relatively slow decline in prices appear likely in 1950.

To offset this decline there is the distribution of about 3 billion dollars of veteran’s insurance funds, increased expenditures by the federal government for national defense and farm aid, national housing programs, and programs by state and local governments for construction of schools and other public buildings, and highways.

No marked change is expected in foreign demand for United States farm products during 1950. The appropriation of 5.8 billion dollars for “ECA” and other aids to foreign countries for the year 1949-50 assures sizeable exports of farm products during the year. However, the exports of farm products in 1950-51 will depend upon the size of the appropriation for foreign aid and the amount of funds appropriated that are allotted to the purchase of agricultural products for export.

With an ample supply of all kinds of goods available there may be further shifts in the kinds of goods purchased by the consumer. The proportion of the consumers’ income spent for food may decline next year. However, because of the large supply of food, and with slightly lower retail prices in prospect, continued high consumption per capita will be encouraged. The consumption of food for the coming year will remain high and may be slightly increased.

Large Production Expected

If growing conditions are average or favorable next year, agricultural production will again be large with surpluses in some commodities. Acreage allotments and marketing quotas for certain crops have been set for 1950. The production and marketing of these control crops may be lower next year. On the other hand, the output for livestock and livestock products will be greater as a result of the large feed supplies available. The U. S. Department of Agriculture expects the total

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Alvin Davis identifying and recording eggs laid by chickens fed mash containing varying amounts of DDT. White Leghorn chickens have been living in individual wire cages and laying eggs for almost two years. These eggs are analyzed for DDT content.

Using rabbits as the experimental animal, Dr. D. A. Greenwood is studying the interrelationship between the composition of the soil and plants and the nutrition of animals and man. Alfalfa fields are being fertilized with manure and inorganic fertilizer containing different amounts of phosphorus and trace elements. The rabbits fed this alfalfa are observed throughout several gestation periods and their tissues analyzed to determine the quantity of these elements present.

Dr. L. E. Harris is studying the metabolism on two lots of eight calves each fed various levels of protein and DDT to determine how DDT affects the digestibility of the ration and the synthesis of protein from urea (upper left).

Dr. L. L. Madsen examines incision through which a piece of liver was taken for chemical analysis of cobalt and copper. This calf is one of a number brought up from Wayne County suffering from an unknown disease. Tests are being made to find out if the trouble is one of mineral deficiency.

Rats looking for their feed from Davis. These rats have been fed cream from cows fed DDT treated hay and fat and meat from lambs fed the same hay. They will be analyzed for tissue damage and presence of DDT.

Small Animal Laboratory

The small animal laboratory houses animals used in various research projects in nutrition, physiology, animal diseases, and related subjects. It consists of several frame buildings adjacent to the Veterinary Science building. Research rooms, colony rooms, a kitchen, a wash room, store rooms, and an isolation room are in the buildings. Cages for rats, mice, guinea pigs, rabbits, hamsters, chickens and turkeys are in use as well as places for sheep and calves.

Alvin Davis, in charge of the laboratory, cares for the hamster colony.
Verticillium Wilt Most Serious Tomato Disease In Utah
Symptoms Similar to Wilt Caused by Wrong Cultural Practices

By ORSON S. CANNON and E. MILTON ANDERSEN

IN UTAH verticillium wilt is the most destructive tomato disease. It can be found in nearly all tomato fields; yet, because the only early symptom, slight stunting, is inconspicuous, few growers know that verticillium wilt is in their fields until it becomes evident at picking time. That stunting is one of the symptoms of wilt has been shown by experiments conducted under controlled conditions in the greenhouse. Plants known to be diseased were compared with plants known to be healthy, and the diseased plants were smaller than the healthy ones. After both the healthy and diseased plants were transplanted to the field, the growth of the healthy plants was only slightly more rapid than the growth of the diseased plants. The other symptoms became evident only after fruit began to ripen.

The destructive phase of the wilt disease becomes evident as picking time approaches. Affected but healthy-appearing plants wilt slightly on hot days and recover at night. Leaves in the center of the plant turn yellow, die, and drop off, leaving the fruit exposed to the sun. Diseased plants are rarely killed outright, but the leaf loss and exposure to the sun’s rays result in sunburned and smaller fruit and in smaller total yields. In Utah damage resulting from such exposure exceeds the combined losses from all other tomato diseases.

Verticillium wilt is caused by the fungus *Verticillium albo-atrum*, Reinke and Berthold. This fungus lives in the soil and enters the plant through the water-conducting tissues of the roots and stems interferes with growth processes, causing stunting, wilting, and loss of leaves. The invading fungus brings about the ill effects possibly by the secretion of toxins, or by partially plugging the water-conducting tissues, or by a combination of both.

The fungus responsible for wilt in tomatoes attacks and produces disease in over 100 other agricultural plants. This makes rotation for the purpose of disease control difficult. Grains or corn help in keeping down the verticillium population. Alfalfa, potatoes, eggplants, beets, and raspberries should not precede tomatoes in a rotation because they, too, are susceptible. Some of the common weeds attacked by verticillium are mallow, redroot, lambs-quarters, bur-clover, dandelion, black nightshade, groundcherry, and horse-nettle. These should be controlled in cultivated fields both to prevent their competition with the crop and to prevent verticillium wilt.

Similar Symptoms Caused by Cultural Practices

Cultural practices that injure tomato roots also cause stunting of plants, partial leaf defoliation, and sunburning of fruits, and at times *Verticillium albo-atrum* is blamed for injuries caused by these cultural practices.

1. Deep cultivation is injurious. Although the roots of tomatoes penetrate several feet deep, there is a greater root concentration in the top six inches of soil than at any other depth. For this reason tomatoes can be cultivated deeply without extensive root injury only immediately after they are planted in the field. All cultivations after the plants have started to grow should be shallow. Under most conditions it is unwise to cross-cultivate tomatoes because cross-cultivation is apt to be deep cultivation.

If a deep irrigation furrow must be used it should be made early and be midway between rows that are at least four feet apart. This spacing is farther apart than is common in Utah tomato plantings but the same number of plants per acre can be grown in wide-spaced rows as in close-spaced ones if the plants are closer together in the row. Naturally each plant will then have the same number of square feet available whether in wide-spaced or close-spaced rows.

(Continued on page 4)
VERTICILLIUM WILT
(Continued from page 3)

2. Excessive irrigation is injurious. Some growers completely flood their tomato fields a short time before the first picking and then discontinue watering for the remainder of the year. When the soil becomes completely flooded for a few hours, air is excluded from the roots and many of the rootlets die, especially during hot weather. The injury to the plants from the death of these rootlets is similar to injury caused by verticillium wilt, and damage in some fields often is greater than that caused by wilt.

On the other hand, fruit setting will be poor if the soil gets too dry between irrigations. Best results are obtained by irrigating with a small stream in each furrow, until the soil becomes soaked to a depth of at least two feet. In no case, however, should water be allowed to run long enough to result in ponding or flooding. This is not apt to occur where small streams are used, unless land is poorly drained.

Wilt-Resistant Varieties

The late Dr. H. L. Blood found several small-fruited South American varieties of tomato that were highly resistant to the wilt disease. He succeeded in developing varieties with large fruit by crossing the small-fruited ones with commercial varieties. Most of these large-fruited resistant types were low yielders or else the crop ripened too late for growing in Utah; however, in 1949 one of his varieties produced a large crop of good-quality tomatoes about as early as the Moscow. Other selections that have been developed by crossing Dr. Blood’s resistant types and Stone are highly resistant to wilt. In plant habit and fruit type they are much like Stone.
MINERAL deficiencies occur in ordinary rations for farm animals under a variety of conditions. Stockmen should use feeds of special mineral value, and even on occasion supplemental mineral mixtures, to satisfy these deficiencies. Recent studies have served to give minerals an enlarged importance in animal diets. But at the same time, it is increasingly evident that additions of minerals to animal diets should be governed by the kinds and quantities of feed used in the rations. A demonstrated requirement does not necessarily call for a mineral supplement in practical rations. Feeding unneeded supplements may be definitely harmful in some instances.

Certain concerns, interested in the sale of mineral products, are conducting active campaigns for their use for all species and under all conditions, and are making claims that suggest to stockmen that by the use of these products they can be their own veterinarian. This article reviews recent developments in mineral nutrition.

Mineral Elements Required by Animals

It has been demonstrated that animals require at least 14 mineral elements. These include sodium, chlorine, phosphorus, calcium, iodine, iron, copper, cobalt, manganese, magnesium, potassium, fluorine, sulfur, and zinc. However, recent research shows that only the first nine of these elements need to be considered in practical farm diets if these diets are balanced as recommended by the National Research Council Committee on Animal Nutrition. Sodium and chlorine should be added to all diets. Additions of calcium are usually necessary in swine diets and phosphorus is usually a necessary addition to sheep and cattle diets. Manganese is needed only in poultry diets. Iodine, iron, copper, and cobalt need to be included in farm animal diets only under special conditions.

Since balanced diets, using home grown grains and roughage and some protein supplements contain sufficient magnesium, potassium, fluorine, sulfur and zinc, no discussion of these will be presented.

Each of the minerals that may be needed under special conditions by the various classes of livestock may be supplied by simple mineral mixtures.

Mineral Supplements

Feeds high in mineral content are given in table 1. The choice of any supplement should be determined according to cost per unit of the element needed.

Deflourinated phosphate should be low in flourine and be specifically prepared for livestock feeding. If it is assumed that a maximum of 3 percent of mineral supplements would be added to the grain mixtures of cattle, sheep, and swine, the permissible flourine tolerances for mineral mixtures, according to the National Research Council on Animal Nutrition, would be: 0.10 percent for swine, 0.20 percent for sheep, and 0.13 percent for cattle.

Beef and Dairy Cattle, Sheep and Horses

Beef and dairy cattle, sheep, and horses need additions of salt and sometimes a phosphorus supplement to their diets. Occasionally calcium, iodine, and copper supplements are needed. Cobalt may be needed for ruminant animals.

Salt. Beef and dairy cattle and horses, on the farm, should have access to rock, block, or crushed salt. Sheep should have free access to crushed salt. The salt should be in a covered container (fig. 1) or be in a trough under a shed to protect it from rain or snow (fig. 2).

Add one pound of salt to each 100 pounds of concentrate or pellet mixture for beef and dairy cattle, horses, and sheep.

It will usually pay to place before beef and dairy cattle, sheep and horses a mixture of 50 percent bone meal or deflourinated phosphate and 50 percent salt. This mixture should be under the shed in a trough or in a covered container when it is fed in a pasture to protect it from snow and rain. It should also be fed free choice to cattle on summer and winter range. This mixture furnishes phosphorus, calcium, and salt. If it is used the animals also need free access to salt.

Horses and beef cattle on the range should have free access to block or crushed salt on the ridges away from water holes. If crushed salt is used a covered trough should be provided.

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Fig. 1. For the most part this salt station is constructed of two-inch material to give it strength and stability against crowding cattle. The overhang on the roof provides complete protection for the salt.

Courtesy, University of Wisconsin

Fig. 2. This heavy, portable box is especially designed for the range country where the herds are moved from one feeding ground to another. It is heavily constructed of two-inch lumber and braced with metal strips.

Courtesy, U. S. D. A.
Trucks such as these constantly ply Utah highways on which this picture was taken.

Trucks are handling the transportation of increasing amounts of Utah farm and other products. The number of motor trucks engaged in interstate commerce and licensed by the Public Service Commission to operate in Utah increased from 3,679 in 1943 to 7,987 in 1947, or an increase of 40.6 percent. Those similarly licensed and engaged in intrastate commerce in Utah increased 37.1 percent in number. Rising freight rates in the Intermountain area are most likely responsible for this increase.

In the September issue of the Farm and Home Science, it was indicated that a request for an additional 13 percent freight rate increase was pending before the Interstate Commerce Commission. The Commission has now acted upon that request and has increased the interim 5 percent granted last January, to 8 percent for this territory. In eastern territory the increase was 9 percent. This brings the level of rates almost 60 percent above prewar. The farmer wonders when and where and how this spiraling will end. He is caught between the upper millstone of declining commodity prices and the lower millstone of increasing costs in getting his commodities to market. A forecast was made by the U. S. Department of Agriculture on October 31 that overall farm commodity prices in the next year would decline about 10 percent.

It is noteworthy that the Utah Public Service Commission has not permitted the railroads operating within this state to apply the most recently granted increase to intrastate traffic. How long the Utah Commission can “hold the line” on this refusal is not known. The railroads may elect to fight the case on the grounds of discrimination. In that event, the court of last resort would be the Interstate Commerce Commission that authorized the increase in the first instance.

Shippers of agricultural products, as well as those of processed goods, are interested in moving their commodities to market at the lowest transportation cost consistent with good service. The determining factor in plant location, with reference to its market, may be the level of freight rates. This is illustrated by the recent reply of an executive of a large corporation operating in Utah and other western states to a question about plant expansion or the establishment of a new plant. The reply was no “because transportation costs are making it more and more difficult to compete with others who are located nearer to the market that we serve.” He then went on to explain that his company had recently purchased a plant in another state. The location of the new plant is less than 100 miles from the principal market for the product. This company at the present time pays out annually millions of dollars to Utah farmers for a certain product. Its expansion here appears to be at an end until a more favorable transportation arrangement is obtained. Other firms find themselves in similar situations.

Volume of Railroad Traffic and Increased Rates

Reports are made by the railroads to the Interstate Commerce Commission on the volume of traffic handled. These reports disclose the number of tons of revenue freight originating and terminating in each state and include all intrastate as well as interstate traffic. It is of interest to note that in the case of seventeen basic agricultural commodities of Utah, 12 show declines in the volume originated, and 12 declined in the volume terminated on class 1 railways in Utah in 1948 compared with 1947.
Trucking Supplanting Rail In Movement Of Agricultural Products In Utah

Rail Rates Have Increased More Than Double Those of Motor Truck — Income of Motor Carriers in Intermountain Area Increased 379 Percent in 1947 over 1946

By V. L. ISRAELSEN

These commodities included cattle, wheat, flour, dressed poultry, eggs, and canned foods. Whereas in 1947 there were 1,064,387 tons of these commodities originating for railway traffic, in 1948, there was only 957,960 tons. This represents a 10 percent decline in this type of traffic.

In the case of freight terminating, the figures for 1947 and 1948, respectively, are 916,123 and 805,528, representing a decline of 12.1 percent. It may be observed that important rail rate increases were granted in January and May of 1948, and further increases have been provided in 1949, one in January and one effective September 1st.

The argument might be made that production was lower, and for that reason tonnage dropped off. However, when the motor truck traffic is reviewed, it appears that motor carriers picked up all of the traffic lost by the rails, plus the increase from business growth. Comparable figures to those given for the railroads are not available, but the trend in postwar motor traffic in this state is clearly evident.

As stated earlier the number of trucks licensed to operate in interstate commerce increased more than 40 percent. What is more significant is the tonnage carried. From 1945 to 1947, the tonnage carried by motor truck firms operating in and through Utah and engaged in interstate commerce, increased from 3,544,279 to 5,986,677 tons, or about 69 percent boost. These 5,986,677 tons handled by motor truck in 1947 were almost three times as great (296 percent) as the 2,022,347 tons of revenue freight representing 17 basic agricultural commodities originating and terminating on class 1 railroads in Utah.

Motor Truck Movement and Revenue

Another measure of the extent to which shippers have turned to common and contract carrier motor trucks as a means of transportation is seen from the truck mileage operated. In 1945, interstate trucks operating in and through Utah travelled 148 million highway miles. Two years later in 1947, they operated 285 million miles, representing an increase of about 93 percent.

Likewise, their gross revenues increased from $56 million to $105 million. Figures released by the Interstate Commerce Commission for 1946 and 1947 show that the net income to motor carriers in the United States rose 154 percent in 1947 over 1946. Comparable income of motor carriers operating in the Rocky Mountain states was 379 percent more in 1947 than in 1946. To put it differently, net earnings of common and contract motor carriers in the United States were about 2 1/2 times as great in 1947 as in 1946, whereas for the Rocky Mountain states, where railroad freight rates are highest, the net earnings of motor carriers were almost five times as great in 1947 as in 1946.

This would indicate a considerably greater shift to motor carrier transport here than is generally the case throughout the rest of the country. This can be accounted for in part at least in Utah by the fact that freight rates here have increased something more than 30 percent, whereas trucking rates have increased only 25 percent over the level prevailing during the war. It appears clearly evident from these figures that the railroads are losing business to the motor trucks.

Length of Haul in Trucking

That the motor truck is more convenient for use and more desirable than the railroad on the short haul, of under 100 miles, few will deny. Its convenient pick-up and delivery, direct door-to-door rapid service gives it a great advantage in the short haul. The railroads have felt relatively secure in the long

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Testing Turkeys for Pullorum Disease

By M. L. MINER

In 1943 the Utah State Legislature passed a law requiring all chicken and turkey breeding flocks to be tested for pullorum disease. Only those birds found free of the disease can be used for commercial breeding purposes. The turkey testing, which is a laboratory procedure, has been done in the laboratories of the Agricultural Experiment Station. More than 50,000 tests will be run this year, mostly at the Provo Laboratory since most of the breeding flocks are in Washington County. The steps in this process are here outlined in pictures.

Pullorum disease is a bacterial infection of chicken and turkeys of all ages. The mature hen’s life is usually little endangered by the disease; but the ovaries are often destroyed. A hen with slightly affected ovaries will lay eggs containing the pullorum organism. Such an infected egg, when incubated, will develop an infected chick or poul.

The infected developing chick or poul may die in the shell, or it may hatch and live a day or a week. A few are able to survive, and they become chronic carriers and spreaders. One infected chick from one infected hen may spread the disease to an entire brood.

The blood agglutination test for pullorum disease is quite accurate, and will identify hens having the disease for over a month. Such reactors are removed from the flock and slaughtered. This procedure will greatly reduce the chances of producing infected offspring; but it will not eradicate the disease. Repeated testing every 30 days must be done until the test shows no reaction in the flock.

This program of testing as set forth by the National Poultry and Turkey Improvements Plans and implemented by Utah State law has resulted in practically complete eradication of pullorum disease in poults from Utah breeding flocks and has reduced the incidence in Utah chicks to only a few outbreaks each year.

DR. MERTHYR L. MINER, associate professor of veterinary science, specializes in poultry diseases.

1. Blood is obtained from the wing vein of each turkey on a farm by a licensed, trained blood collector. It is placed in small vials which are held in cardboard boxes, 48 to a box.

2. Each bird is numbered by either a wing or leg band. This number, which is recorded on record sheets, identifies the blood sample with the turkey. Banding and blood collecting are usually done almost simultaneously by two operators. A crew of six people can handle about 1000 birds a day.

3. The boxes of 48 vials of blood are shipped in wooden insulated boxes by bus to the laboratory. The blood reaches the laboratory within 12 to 20 hours after collection. Here the secretary is checking the record sheets against the blood samples.

4. After the blood sample has stood a few hours, the liquid serum separates from the clot of blood cells. Here .04 cc of clear serum is drawn into a pipette. The serum must be from fresh blood undamaged by excessive heat or freezing.

5. The experienced technician can measure and transfer serum from 48 blood samples in one box in about five minutes. This shows the final step of their transfer, placing the drop of serum into the agglutination test tube. These test tubes are in racks of 48 corresponding to the box of blood samples.

6. Antigen must be added to the serum. This antigen is a cloudy suspension of pullorum...
bacteria in a definite concentration. With an automatic pipetting machine one cubic centimeter of antigen is placed in each tube.

7. As the tests are set up, the racks of 48 test tubes are placed in an incubator at 37° centigrade for 20 to 24 hours.

8. After incubation the test results are read. Here the veterinarian, Dr. H. F. Albers of the Provo Laboratory, who supervises the entire testing operation, is looking at each sample to determine the result. A positive reaction is noted by a clearing of the cloudy antigen-serum mixture. All reactors or suspected reactors are rerun in several dilutions as a check.

9. Since 1000 to 3000 samples may be run in any one day, the vials and test tubes must be cleaned, dried, and sterilized daily to keep them in circulation.

10. The corks and vials are brought from the washroom to a work bench where a girl corks the vials. In order to have enough vials in the hands of the blood collector at all times, about 20,000 vials and corks are needed.

11. Here in the final operation of preparing the blood vials for collection, one girl is attaching labels while the other is numbering the vials from one to forty-eight and putting them in the cardboard box. Since each box has a number the combined box and vial number identifies the blood sample on the record sheet.

12. Five insulated wooden boxes are filled with empty vials ready to be placed on the bus and sent to the blood collector. Each of these boxes holds 21 cardboard boxes of 48 vials or 1008 vials in all. Accompanying each box is a pad of record sheets.
THE ZINC PROBLEM IN UTAH ORCHARDS
By D. W. THORNE and F. B. WANN

ZINC DEFICIENCIES were first noted in fruit trees in Utah about 12 years ago. At that time several orchards in Davis and Utah Counties were observed to be seriously affected from lack of this element in the soil. Investigations showed that the disease could be controlled with zinc sprays. On the basis of recommended treatments developed at that time many farmers have restored affected orchards to normal production.

In 1948 a grant from the United States Smelting, Mining and Refining Company made it possible to survey all Utah orchards for nutrient deficiencies. These surveys showed that zinc deficiency is widespread through the state. About 7 percent of the orchards or plantings have trees showing lack of zinc. Many orchards are seriously affected. Furthermore, it was found that many farmers are unacquainted with zinc deficiency symptoms. In other instances, zinc deficiency symptoms are being confused with symptoms of other diseases.

Zinc Deficiency Symptoms
Zinc deficiency has been observed in Utah in sweet cherries, peaches, apicots, apples, plums, prunes, sour cherries, pears, pecans, and grapes. The most apparent symptom is that terminal growth is stunted on from one branch to the entire tree. The affected portion is usually flat and reduced in height compared with the remainder of the tree. The leaves on the affected branches have a yellowish-green mottled color.

In the stone fruits zinc deficiency is commonly called "little leaf" because the leaves are narrow or small in size. In peach and sweet cherry the small leaves are crinkly along the edges and in apricot they are cup shaped. The leaves often occur as tufts toward the ends of branches. Chlorotic mottling in the leaves is most severe around the margins and in the tissues between the lateral veins, extending inward toward the midrib. The lateral veins and midrib remain green. Often the markings in zinc deficient and manganese deficient leaves are similar. In the latter, however, the chlorotic color has a browner cast and the leaves are not greatly reduced in size. In severe stages of little leaf there is considerable dying of recent terminal growth. This die-back is particularly marked in sweet cherry (fig. 3).

In apples, as well as in peaches and cherries, zinc deficiency is often termed "rosette." This is characterized by dense clusters of small, narrow, yellowish leaves at the ends of twigs that are bare of normal lateral leaves. Stem growth is reduced so that a stem an inch or more long may bear as many leaves as a normal 18-inch twig.

The development of little leaf (narrow crinkly leaves) and of rosette on the same tree commonly occurs in peach (fig 4). In addition to the unusual chlorotic mottling associated with these conditions the leaves frequently show numerous reddish spots, particularly toward the end of the growing season. The tissue in these spots may die and drop out, producing a shot-hole effect. These symptoms of zinc deficiency have considerable similarity to those produced by the western x virus disease. Since in both diseases it is common for symptoms to occur on only one or a few branches of otherwise healthy trees it is not surprising that there has been some confusion in the diagnosis of these diseases in peach. In fact many growers have reported that they have cured western x by using zinc sprays, an indication that zinc deficiency has undoubtedly been mistaken for western x.

Western X and Zinc Deficiency Compared
While it is difficult to distinguish between zinc deficiency and western x, the following general characteristics are of value in making a diagnosis: 1. Western x does not cause a reduction in leaf size; zinc deficiency causes "little leaf." 2. Western x causes the leaves to curve downward and to be rolled in from the edges.
edges; zinc deficiency leaves are not curved downward but have wavy, crinkly edges. 3. With western x, the leaves may drop off in midseason leaving twigs completely bare; with zinc deficiency, defoliation may occur in severe cases but with a rosette of small leaves retained at the tops of the twigs. 4. The chlorotic and red markings of western x tend to be parallel with the leaf margin and extend across the lateral veins; in zinc deficiency the leaf markings are in general at right angles to the margin, in the areas between the lateral veins. When all these general characteristics are taken into consideration a correct diagnosis of the disease is usually possible. However, it must be remembered that both diseases may be present in the same tree in which case typical symptoms of either one may be modified.

Effect on Peach Fruit

Zinc deficiency affects the shape of peaches. In both Late Elberta and Early Elberta varieties many flat, pointed peaches have been found on zinc deficient trees. Often the fruits show severe distortion in shape when leaf symptoms show only traces of zinc deficiency. In Hale peaches many of the fruits in deficient areas are distinctly pointed. It is possible that these abnormal fruit shapes may be useful symptoms in detecting early stages of the disease. Some comparisons between normal fruits and those from zinc deficient trees are shown in fig. 2.

The reduction in crop values because of misshapen fruit may be considerable. In some peach orchards 25 percent or more of the fruit is misshapen and thus below market grade in quality. While such fruit may be disposed of locally it would not pass inspection for shipping. Moreover, the fruit on zinc deficient trees usually matures earlier and thus may be too ripe for shipping when the normal harvest operations begin.

The permanent injury to the tree resulting from zinc deficiency represents another way in which crop losses are increased. Individual limbs or branches become so weakened by the disease that they soon die, easy victims of low temperature and twig borers. This die-back, which may be extensive, reduces the bearing surface of the tree. Some orchards have been pulled up before the owners have become aware of the cause of this progressive die-back condition.

Distribution of Zinc Deficiency

Zinc deficiency symptoms are widespread in fruit growing areas in the northern and central parts of the state. Peach trees are severely affected in the southwestern part of Brigham City. There are also occasional orchards with serious symptoms in Perry, Willard, North Ogden, and Ogden. The disease is extensive in orchards in Davis County. Sweet cherry, peach, and apricot are most widely affected there but most other fruits are occasionally diseased.

In Salt Lake County severe zinc shortages have been found near Draper, Apples, pears, and peaches show zinc deficiency in orchards above Alpine in Utah County. There are also several troublesome areas near Orem, Provo, and on the Mapleton bench. The general location of most of the affected areas is shown in fig. 1.

Soil Conditions Associated with Zinc Deficiency

Zinc deficient orchards usually occur on sandy or gravelly soils. Generally the soils are non-calcareous. Most of the affected orchards are either clean cultivated or have had no adequate program for building or maintaining soil organic matter.

Often severe zinc deficiency symptoms occur in young orchards planted on land recently cleared from an old orchard. This indicates that zinc problems are becoming more general and that fruit growers on old orchard land should watch carefully for any deficiency symptoms.

Control Measures

Zinc salts react vigorously with clay and organic matter. Consequently soil
treatments are generally considered unsatisfactory for controlling the deficiency in horticultural crops.

A dormant spray is generally recommended for zinc deficiency control in deciduous trees. A spray with 25 to 50 pounds of zinc sulfate per 100 gallons of water has given good results if applied in early spring while the trees are still dormant. Such concentrated sprays may cause severe damage if sprayed on foliage. Foliage sprays recommended vary from 5 to 18 pounds of zinc sulfate neutralized with half as much lime hydrate or lime sulfur per 100 gallons.

About 1.5 pounds of high grade zinc oxide may be combined with oil sprays (when recommended by the manufacturer) or with nicotine sulfate sprays.

As a preventative and a more natural control of zinc deficiency a well balanced soil management program should be initiated in orchards. In Oregon, planting an alfalfa cover crop in affected orchards has been reported to result in the gradual disappearance of zinc troubles. While alfalfa is not adapted to many zinc deficient orchards in Utah because of gravelly, porous soils, and inadequate water supplies other means can be adopted for soil improvement. Winter green manure crops such as hairy vetch and Austrian winter pea can be used to advantage where water is limited. Farm manure should also be used in orchards wherever available.

Since the annual zinc requirements for an acre of fruit trees are only about one ounce, zinc deficiency is often a warning that soil depletion has gone too far. Zinc deficiency should serve as a warning to Utah orchardists that better soil management practices are essential for long-lived disease-free orchards.

### MINERAL SUPPLEMENTS

(Continued from page 5)

Sheep on the range should be given access to crushed salt in portable containers on the bed ground each day on summer range, and every other day on winter range. If the winter range forage is growing on alkaline soil, sheep may not need additional salt. However, salt should be offered, and if it is consumed, it should be given every other day.

**Calcium and Phosphorus.** Dairy cattle, horses, and sheep seldom lack calcium in the diet. However, the diet may be deficient in phosphorus if feeds are raised on unfertilized soil. The most economical way to add calcium and phosphorus is to calculate the amounts in the diet and then add enough supplement to take care of the deficiency.

Practical recommendations which usually meet the requirements of cattle and sheep are as follows:

Add one percent bonemeal, or an amount of defluorinated phosphate or dicalcium phosphate equivalent to this amount of bonemeal in phosphorus, to the concentrate mixture to be fed beef and dairy cattle, sheep, and horses, when they are fed in dry lot or when they are fed concentrates on summer pasture. The above supplements will also take care of any calcium deficiency that may exist.

If cattle are fed large quantities of wet beet pulp, feed each animal approximately 0.1 pound of bonemeal or defluorinated phosphate per day.

Add 4 percent bonemeal and 2 percent defluorinated phosphate b. (table 1) or some other phosphate supplement to pellet mixtures for cattle on the winter range.

Add 2 percent bonemeal and 3 percent defluorinated phosphate b. or some other phosphate supplement to concentrate or pellet mixtures for sheep on the winter range.

**Iodine.** Iodine can be supplied by using stabilized iodized salt instead of common salt. In practice it has been found that iodized salt is only needed by breeding animals during the gestation period.

### Table 1. Feeds high in mineral content

<table>
<thead>
<tr>
<th>Feed</th>
<th>Calcium</th>
<th>Phosphorus</th>
<th>Sodium</th>
<th>Chlorine</th>
<th>Iron</th>
<th>Copper</th>
<th>Manganese</th>
<th>Cobalt</th>
</tr>
</thead>
<tbody>
<tr>
<td>percent</td>
<td>percent</td>
<td>percent</td>
<td>percent</td>
<td>percent</td>
<td>mg/lb</td>
<td>mg/lb</td>
<td>percent</td>
<td>percent</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>1.47</td>
<td>0.24</td>
<td>0.13</td>
<td>0.37</td>
<td>0.025</td>
<td>3.7</td>
<td>20.5</td>
<td>*</td>
</tr>
<tr>
<td>Bone meal, steamed</td>
<td>31.7</td>
<td>15.0</td>
<td>0.74</td>
<td>0.09</td>
<td>0.013</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Calcite</td>
<td>38.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cobalt carbonate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cobalt chloride</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cobalt sulfite</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cobalt sulfate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dicalcium phosphate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dicarbonate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ferrous sulfate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green ground bone</td>
<td>10.7</td>
<td>3.9</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Ground meat and bone, horse</td>
<td>2.80</td>
<td>1.20</td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Iron oxide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limestone</td>
<td>38.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manganese sulfate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat scraps, 60% protein</td>
<td>6.09</td>
<td>3.49</td>
<td></td>
<td></td>
<td>0.041</td>
<td>3.7</td>
<td>5.4</td>
<td>*</td>
</tr>
<tr>
<td>Monocalcium phosphate</td>
<td>16.0</td>
<td>24.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mono sodium phosphate</td>
<td>22.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oyster shell</td>
<td>36.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>39.0</td>
<td>61.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skim milk, centrifugal</td>
<td>0.13</td>
<td>0.10</td>
<td></td>
<td></td>
<td>0.005</td>
<td>0.5</td>
<td>0.1</td>
<td>*</td>
</tr>
<tr>
<td>Skim milk, dried</td>
<td>1.30</td>
<td>1.03</td>
<td></td>
<td></td>
<td>0.005</td>
<td>5.2</td>
<td>0.8</td>
<td>*</td>
</tr>
<tr>
<td>Spent bone black</td>
<td>22.0</td>
<td>13.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tankage, 60% protein</td>
<td>6.37</td>
<td>3.23</td>
<td></td>
<td></td>
<td>0.231</td>
<td>19.8</td>
<td>10.0</td>
<td></td>
</tr>
</tbody>
</table>

Data compiled from Morrison's Feeds and Feeding, 21st ed., Morrison Publishing Co.; National Research Council, Recommended nutrient allowances for beef cattle, 1945; and chemical analyses made by Lorin E. Harris, and Charles F. Bassett. A leader (.....) indicates that the feed contains none, or no significant amount, of the constituent. An asterisk (*) shows that the information is not available concerning the content of the mineral. Potassium iodide contains 76.4 percent iodine.

*Value in percent.
practical diets for horses, beef and dairy cattle, and sheep contain plenty of iron.

The animal husbandry department at the Utah State Agricultural College is working on the problem of whether it is desirable to add copper and cobalt to the diets of farm animals. As soon as these experiments are completed, the results will be published.

If stockmen or feed dealers feel that additions of copper and cobalt are necessary, add one ounce cobalt sulfate and one pound of copper sulfate to the diet. This mixture can be added to the concentrate mixture at the rate of one pound per 100 pounds in the place of salt as recommended above; or, a free choice mineral mixture may be made up as follows:

- 50 pounds bone meal or defluorinated phosphate
- 50 pounds salt
- 1 ounce cobalt sulfate
- 1 pound copper sulfate

This mixture can be used to replace the free choice mineral mixture suggested above.

Swine
It usually pays to add additional salt and calcium to swine diets. In some cases iron and phosphorus are also needed.

Suggested Mineral Mixture. Dr. E. W. Crampton of MacDonald College in Canada recommends the following mineral mixture for swine:

- Bone meal: 28 lbs.
- Limestone: 47 lbs.
- Salt (iodized): 25 lbs.
- Ferrous sulfate: 4 oz.

Add 3 pounds of this mineral mixture per 100 pounds of concentrate feed or 60 pounds per ton. It is assumed that the concentrate mixture would be used to hand-feed swine. This mixture may also be fed free choice to swine.

Mixtures to Self Feed with Grain. If swine are fed free choice on grain, one of the following supplements fed free choice will satisfy their mineral and protein requirements. There are also many other supplements that could be used. The free choice system is sometimes used for sows with litters and for fattening market pigs.

The trio mixture of Professor Morison of Cornell University is widely recommended.

- Tankage or meat meal: 50 lbs.
- Ground alfalfa hay: 25 lbs.
- Linseed or soybean meal: 25 lbs.

Salt ............... Free choice in separate container

Another common mixture is as follows:

- Tankage: 10 percent
- Soybean meal: 40 percent
- Linseed or cottonseed meal: 19 percent
- Alfalfa hay: 25 percent
- Ground limestone: 3 percent
- Bone meal: 1 percent
- Salt: 2 percent

When swine are on pasture a mixture of 3 parts soybean meal and 1 part meat scraps along with grain and salt, free choice, is satisfactory.

Prevention of Anemia or "Thumps" in Young Pigs
Anemia in young pigs can be prevented by giving the animals access to fresh soil. If this is not possible dissolve one level teaspoonful of ferrous sulfate in a small amount of water. Sprinkle this on a piece of sod about one foot square and four inches thick. Place iron-treated sod in the pens three times each week. Treatment is not necessary after animals are moved on to pasture.

Foxes and Mink
Fox and mink diets need additions of salt and calcium. In some cases phosphorus is needed.

Salt. Add 1.0 percent salt to cereal mixtures for foxes and mink if these are to be used to mix with meat, tripe, liver, and vegetables to make a diet of hamburger consistency. If a commercial cereal is used no addition of salt is necessary.

Add 0.5 percent salt to a cereal mixture or a cube mixture if it forms the only diet of foxes.

Calcium and Phosphorus. Green ground bone is usually the cheapest source of calcium and phosphorus. The addition of 5.0 percent to diets of hamburger consistency will take care of the calcium and phosphorus requirements of foxes and mink.

Add 1.0 percent limestone and 0.5 percent bone meal to a cereal mixture or a cube mixture if it forms the only diet of the foxes. Add 3.0 percent limestone and 2.0 percent bone meal to cereal mixtures that are to be mixed with meat, tripe, liver, and vegetable to make a diet of hamburger consistency.

Robert K. Gerber, assistant professor of horticulture, is on six months' leave of absence working toward an advanced degree at Ohio State University.

TRUCKING SUPPLANTING RAIL (Continued from page 7)
haul business where several hundred or perhaps thousands of miles were involved. This situation is changing. Evidence of this is readily seen in California. During 1948, California alone received by motor truck almost seven million packages of agricultural produce. This produce came from other states, Canada, and Mexico. In carload equivalents this was equal to more than 14,000 railroad cars or about 40 cars per day throughout the year. Almost 85,000 packages of produce were received in California by truck from Florida, an equivalent of 170 carloads. By the same method, Utah sent to California 631,565 packages of agricultural produce, representing only five commodities. Eggs alone accounted for 366,544 cases or an average of more than 1,000 cases per day. The length of haul by trucks is constantly increasing, and the Florida to California movement of produce shows the transcontinental nature of some of this business.

From Salt Lake City to Los Angeles by highway is about 730 miles. There has grown up an impressive volume of motor truck traffic between these points. A truck can leave Salt Lake City one day and have produce on the Los Angeles market the following morning.

Volume of Truck Movement In and Out of Utah
The Utah State Road Commission through its Highway Planning Department in cooperation with the U. S. Bureau of Public Roads each year compiles data on traffic flow on Utah highways. These figures are derived by means of manual and mechanical counts of vehicles. Automatic traffic recorder stations provide accurate counts during their periods of operation. Manual counts are based on a carefully worked out sampling procedure and undoubtedly reflect a close approximation to actual movement. There are 26 numbered highways and roads that afford points of ingress and egress to or from the state. The average daily total traffic movement of motor trucks across the state line at these 26 points may be summarized as follows:

<table>
<thead>
<tr>
<th>Trucking Classification</th>
<th>Daily Average Movement</th>
<th>Number of Points Carrying Specified Truck Traffic Into or Out of Given Points During 1945</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10 trucks</td>
<td>8</td>
<td>Utah</td>
</tr>
<tr>
<td>10 to 24 trucks</td>
<td>5</td>
<td>Utah</td>
</tr>
<tr>
<td>25 to 99 trucks</td>
<td>3</td>
<td>Utah</td>
</tr>
</tbody>
</table>
Across-Utah-state-line average daily truck movement 2,782

Another way to summarize this traffic flow is to show the number of trucks daily crossing over the Utah state line, moving into or coming from each of the neighboring states. This movement was as follows:

Truck movement across the state line Average daily number of trucks during 1948
Utah-Idaho 1,006
Utah-Wyoming 522
Utah-Colorado 476
Utah-Arizona 485
Utah-Nevada 293

Total average daily movement 2,782

This does not mean, of course, that the outflowing traffic originated in Utah, nor that the inflow movement terminated here. What part may have moved directly across the state is not known. Neither do the figures indicate the volume of in-movement as compared with out-movement. To employ the above figure as an average would indicate that 1,015,430 trucks moved into and out of the state in 1948.

In addition to the traffic count, the Highway Commission, through its Highway Planning Department, maintains 10 loadometer stations for weighing trucks, both empty and loaded. From these data, after full allowance is made for the percentage of empties, a conservative estimate of the average load of each truck is 2.4 tons net. If this figure is employed, then the traffic movement across the state line in motor trucks would amount to 2,437,000 tons annually.

Character of Traffic Moving by Motor Truck

Farm products made up about one of every six of the cargoes weighed. Two hundred forty-seven loads were tabulated, of which 22 were general farm produce, 10 carried livestock, and 11 carried dairy products. Petroleum products accounted for 36 percent of the total weighed traffic in the 18,000 pound class or above. Next in volume was general freight which comprised 31 percent of this traffic. It is obvious that season would have an important bearing on the volume of movement of farm products. July 18 to August 5 may not be fairly representative of the year-around movement. Of the 43 trucks carrying farm commodities, 31 were private conveyances, and only 12 were "for hire" vehicles. This may indicate that many farmers and stockmen are acquiring their own transport facilities to move their commodities to market. To the extent that producers have been driven to acquire their own trucks by high freight rates, carriers will find it difficult to recapture this type of traffic.

The Railways and the Highways

On December 31, 1947, there were 1,854 miles of railroad in Utah, of which 1,697 were owned by class 1 steam railways. Class 1 railroads are those that do more than $1,000,000 worth of business per year. Paralleling almost every mile of railroad is a surfaced all-weather highway. There are, obviously, many miles of highway that have no parallel railway. This means now that shippers do have alternatives. They can ship by rail, by common carrier motor trucks, by contract carrier, or in their own conveyance, if operations are large enough to justify the investment in private transportation equipment. Each shipper would do well to look about for the most favorable transportation facilities to reach the market of his choice. Some methods may be decidedly more favorable to him than others.

Partially offsetting increased transportation costs is the advantage which Utah stands to reap from a rapidly expanding market on the Pacific Coast for most of the agricultural commodities which the state has to export. Between April 1, 1940 and January 1, 1948, the Bureau of the Census estimates California's population increase at 3,500,000 persons. About 25 percent of the total population increase in the United States during that period occurred in California. Whereas population generally in the United States increased 10.4 percent, that of California increased 42 percent.

The southern California market is easily accessible by highway the year round. Likewise it is provided with good rail service. At this time among the most favorable rail rates offered are those from Salt Lake and surrounding area to Los Angeles. In early summer the Union Pacific Railroad voluntarily reduced rates on several basic commodities interchanged between these two areas in an attempt to recapture some business that had gone to truckers. This direct competition between the railways and the motor carriers to serve these markets is another factor favorable to the Utah producer and his market outlet on the West Coast.

For the Utah shipper in intrastate commerce, postwar rail freight rates have risen more than twice as much as motor truck freight rates. In interstate movement, truckers are making rapid gains in volume of traffic, while railroads are losing so far as agricultural commodities in Utah are concerned. The volume of rail traffic of 17 basic agricultural commodities originating and terminating in Utah in 1948 declined more than 10 percent over that of 1947. There is a growing movement for longer hauls by trucks as illustrated by the Florida to California movement of produce. Utah farmers are fortunate in having a rapidly expanding market in California for agricultural produce. This is our best metropolitan market, and Utah is more favorably situated with reference to this market than are many others who are competing for this new business. Utah has every reason to study carefully the wants of this market and then seek to satisfy them. It is fortunate that California needs those commodities which, on the whole, the Utah producer has found profitable. These are dairy products, eggs, beef, potatoes, and poultry. To get these items, California now has to draw on producers much more distant than those in Utah. Transportation costs to this market are more favorable to the Utah farmer than to any other metropolitan market to which he can turn.

AGRICULTURAL OUTLOOK

(Continued from page 1)

agricultural output for next year to be slightly lower than for 1949.

The "Agricultural Act of 1949," recently passed by Congress for price supports for the basic commodities will not be changed significantly in 1950. The support for most of the commodities will be about the same as last year or 90 percent of parity.

Only Slight Reduction in Farm Costs

During 1949 farm costs were relatively high. It is expected that there will be only a slight decline in these costs in 1950. In 1949 United States farm prices for all commodities declined
About the same ratio of decline between prices received by farmers and farm costs will reduce the net farm income to the farm operator. However, in the country as a whole, even with the anticipated reduction in farm income, the average net income to farmers next year will be about three times that received during the prewar period. According to reports of the Department of Agriculture, prices of farm machinery and equipment, seeds, fertilizers, and farm supplies will continue to increase during 1950 while prices for building materials, farm wages, and feeds will decline for the same period.

**Farm Income**

Farm income for Utah for 1949 is estimated at about 140 million dollars compared to 157 million dollars in 1948, or a decrease of 11 percent. The yearly cash farm income has varied from 26 million in 1932 to 157 million in 1948. Previous to the prewar period and not including the depression of the 30's, Utah cash farm income averaged between 50 and 60 million dollars per year. The increase in income during the war and postwar periods has resulted from increase in both prices received and production. The larger factor, however, has been price.

**Land Values Declining**

Land values in Utah declined about 5 percent during 1949. Land values in Utah as in other farming areas increased during War I and War II. Although farm prices during the War II period increased considerably more than during the War I period, land values did not rise as much during the last war and postwar period as they did from 1914 to 1920. The decrease in land values during the past year reflects the decline in farm prices. Although no rapid change in land values is expected, the trend in price of land during the coming year will probably be downward or follow the trend in farm prices.

During the war and postwar periods Utah farmers have paid off about one-half of their farm mortgage debts. Although farm indebtedness has slightly increased during the past year, the ratio of indebtedness to the farmer's equity is indeed favorable. Farmers have not bid up land values during this war period as high as they did during the first war period, nor have they incurred the indebtedness they did during War I.

If land can be purchased and paid for from profits or savings, or if the farmer purchases a small acreage to round out his farming unit, then the buying of land at high values is not a serious problem. Difficulties usually arise, however, when farms are purchased at values too high and a large indebtedness is assumed, most of which must be paid over a long period. Such obligations or indebtedness will likely have to be paid during periods of lower farm prices or with a deflated dollar.

**Farm Prices Declining**

For October, 1949, Utah farm price index for all commodities (1933-39=100) was 226 compared to 292 for August 1948, when farm prices were at their peak, a decrease of 23 points. The index of prices of meat animals is considerably higher than the prices of other farm commodities. Dairy and poultry products are also relatively high compared to the price of crops. Prices received for canning crops during the year were relatively high compared to prices received from fruits and vegetables. Prices received by Utah farmers during the past year declined in about the same proportion as prices for agricultural products over the nation as a whole, and it is expected that Utah prices will decline in about the same proportion during 1950.

**Feed Supplies High**

The supply of feed grains and other concentrates is more than ample to meet the requirements for the 1949-50 feeding season. Feed grain supplies are the largest on record, either in total or in relation to numbers of livestock units. The supply is 35 percent above the 1937-41 average and 8 percent above last year. A large carry-over of feed grains to the 1950-51 feeding season is expected.

Feed prices will average slightly lower during the coming season than during 1948-49, largely as a result of the big supplies and lower price support. Utah is an importer of feed grains, and an ample supply and a possible lower price will benefit livestock producers and especially the dairy and poultry industries. The recent increase in freight rates will partly offset any decrease in price of feed grains in the surplus-producing areas for feed grains shipped to Utah.

**Livestock Numbers Will Remain High**

The increase in number of livestock on feed and in meat output during recent months as a result of the large 1948 corn crop will probably be extended through 1950. The expected total meat consumption for 1950 in the United States will be about 150 pounds per person compared to 147 in 1949 and the 1935-39 average of 126 pounds. The major increase in available meat for next year will be in pork production, with an estimated increase in amount available for consumption of five pounds per person. Cattle numbers are slowly increasing. Beef supplies for 1950 will be approximately the same as for 1949. The quality, however, will be better because of the large numbers that will be finished in feed lots. The decline in sheep numbers has evidently been stopped. The present number is the lowest in about 100 years. The consumption of lamb and mutton in 1949 is the lowest for at least a century. If sheep numbers are built up next year, there will be even less lamb and mutton available for consumption than in 1949.

The Bureau of Agricultural Economics reports that the consumer demand for meat is strong enough to maintain a rather high level of meat prices so long as full employment and high incomes are maintained and meat supplies are not greatly increased. It is estimated that if incomes continue near the present level, the 1950 outlook is for only a small reduction in the price of beef and veal but a lower level of prices for pork, and relatively higher prices for lamb. Usually meat prices follow directly the income of consumers. The level of income in non-agricultural groups for next year will be of great importance to livestock producers.

During the past year the number of dairy cows in the United States has increased, and it is expected that this trend in cow numbers will continue in 1950. The increase in cow numbers and the large feed supply available for next year will probably result in a continued increased milk production in spite of expected lower returns. The Bureau of Agricultural Economics reports "that the cash farm receipts from the sale of milk products in 1950 will be below 1949 and considerably lower than 1948, and the net income from dairying is
likely to decline further in 1950." Like other farm commodities, a demand for dairy products for next year will be greatly influenced by the purchasing power of the civilian population.

**Fewer Chickens and Turkeys**

The poultry outlook is for somewhat fewer chickens and turkeys than the large number produced this year. Egg production next year, however, should be large resulting from the increased number of chickens produced in 1949 and the number of layers available for 1950 egg production. The decline in production in 1950 from the high 1949 level of chicken and turkey outputs may be more moderate than expected on the basis of price output alone. The large feed supplies for 1950, the availability of family labor on farms, and the desire to maintain farm income may partly offset the influence of expected prices for poultry production in determining the volume of the 1950 poultry output.

Prices for poultry feeds in 1950 are expected to be a little lower than in 1949, but not enough to offset the anticipated decline in eggs and poultry prices. Chicken and turkey meat supplies per capita in 1950 will likely be lower than in 1949 resulting from a smaller number raised next year. Turkey supplies available for civilian consumption next year will partly depend upon the stored stocks on January 1 held over for 1950 consumption.

**Billion Bushel Wheat Crop Possible**

Even with the planned acreage reduction in wheat production in 1950 another billion bushel crop is possible next year if weather conditions are average or favorable. With the large expected crop and the outlook for lower exports of wheat, some decline in wheat prices may be expected. A large price support program by the government will be needed to bolster wheat prices next year.

**Potato Production Probably Higher**

The production and prices for potatoes in 1950 will be greatly influenced by acreage allotments, marketing agreements, and level of price supports available. As a result of the short potato crop in 1949, the late crop will likely move at prices above price support level during the early part of 1950. With favorable prices for the 1949 potato crop, the tendency will be for farmers to increase production in 1950. The federal potato program on acreage condition of most canned vegetables probably will continue throughout 1950. Unless the 1950 total pack of canned goods is at least as large or larger than the pack for 1949, the total stocks in the hands of packers and wholesalers will be considerably lower in the fall of 1950 than at present.

**Agricultural Outlook Still Favorable**

Although the outlook for agriculture for 1950 is not as favorable as it was during the war and immediate postwar periods, it points to a relatively profitable year compared to the prewar period. During this period of shifts in demand for and between various commodities there will probably be a wide variation in prices received and in the economic position of various products and enterprises. Prices for certain products where adjustment in production is needed may decline to a low level. On the other hand, if full employment is maintained in this country and the relief needs in foreign countries are supplied in accordance with our present plans for assistance, a favorable price level for agricultural products may be expected to give efficient farmers a fair net return during the year 1950. The economic situation in this country and in the world during 1950 is in such a manner that major changes may take place that would greatly change or effect the economy of the country. Under such conditions farmers should be cautious and plan their farm business and program on a short-time basis. With the economic uncertainty it is not a time to make long-time commitments or major adjustments in the farm business. The immediate future is the time to produce, to sell, and to pay off indebtedness.

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