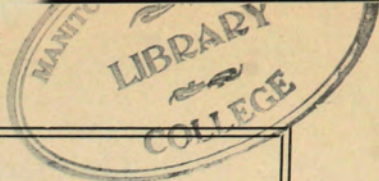


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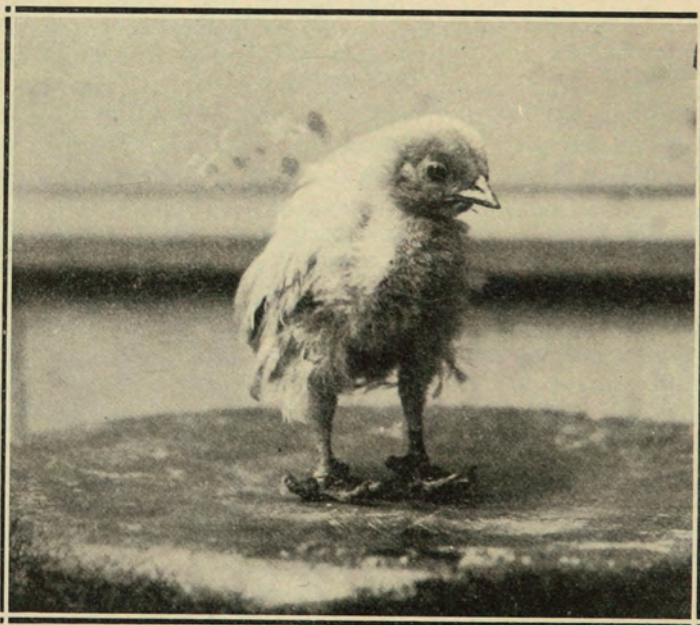
October, 1920

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The Agricultural Experiment Station
OF THE
Colorado Agricultural College

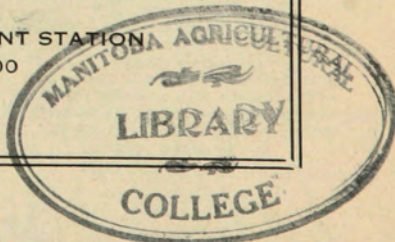
SOD DISEASE OF CHICKENS
(*Vesicular Dermatitis*)

By

I. E. NEWSOM and W. H. FELDMAN



PUBLISHED BY THE EXPERIMENT STATION
FORT COLLINS, COLORADO
1920



Colorado Agricultural College

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SOD DISEASE OF CHICKENS

(*Vesicular Dermatitis*.*)

Synonyms—Foot and Head Disease—Foot and Head Blister

History—For the past 7 or 8 years letters coming in from eastern Colorado during May, June and July have described a peculiar disease affecting the feet and heads of chickens, which descriptions did not conform to the symptoms exhibited by any previously known malady. It was frequently mentioned that the toes became scabby and that the chickens became blind.

Finally about six years ago several of these affected birds were sent to us for examination. On account of the condition of the feet, we suspected that they had been walking in some caustic material such as lye or lime, but further information gave no clew to any such experience. We were informed by those writing that in many cases information had been sought through poultry journals and from other experiment stations, but in no case had any one, to whom application had been made, been able to satisfactorily recognize the malady.

Owing to the continuance of the letters and the apparent seriousness of the disease, we began some three years ago to make a systematic investigation with a view to setting down the more important facts, and if possible, to determine the cause.

As a result of these investigations, we believe the disease to have existed in eastern Colorado for at least twenty years. We have the statement of Mr. Gus Setterburg of Elba, Colorado, that he has observed the disease practically every year for the past thirteen years. Many who live in this district tell us that several years ago their chickens had the disease but that in recent years they have had no difficulty with it. It appears to be most prevalent during the months of May, June and July and is largely a disease of small chickens during the first month of life, but does in some cases affect old hens as well.

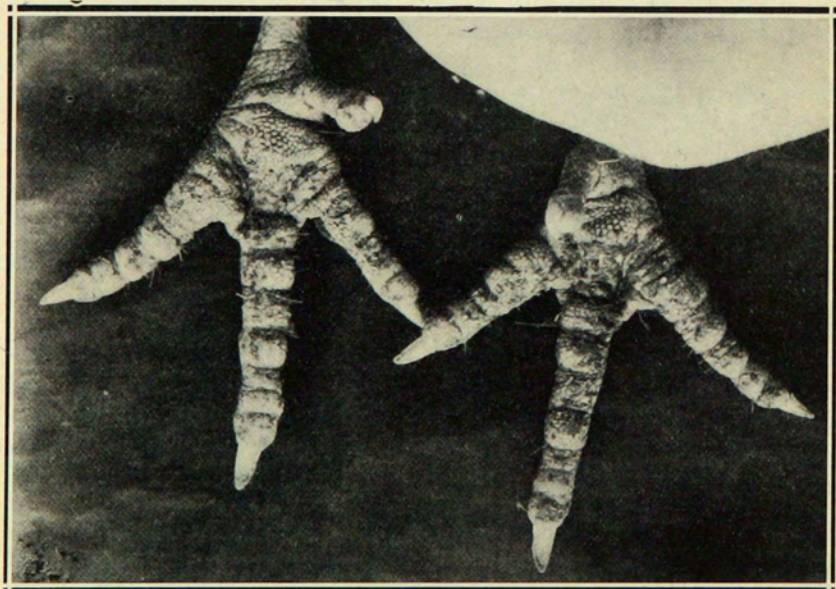
So far as our observations go the disease is quite prevalent throughout all of Colorado east of the Rocky Mountains wherever prairie sod remains unbroken. We have never had a report of it from the Western Slope of this state. The disease appears also to

* Since this disease has never been previously described in any literature to which we have access, we find it necessary to select a name for it. There is no name in common use even among those who suffer from its effects. We have been wont to speak of it as foot and head disease but, since our observations seem to indicate that it is also associated with virgin sod, we have selected the name which appears at the head of the pamphlet. The term "*Vesicular Dermatitis*" is used technically because of the inflammatory condition of the skin of the face and feet, which is so frequently associated with the formation of blisters.

be fairly well known in western Kansas, Nebraska and in eastern Wyoming. In no instance have we seen the disease on irrigated land but it does occur in irrigated districts in places where the chickens have the run of sod above the irrigating ditch.

It has been so serious in certain localities as to cause settlers to stop raising chickens entirely. In several instances it has been known to cause from 50 to 90 per cent of fatalities in all young chickens raised in a single season, and several of the homesteaders have explained to us that they were unable to raise chickens with any degree of satisfaction on account of this one disease. In other places, it seems to take only a small percentage and while it causes some loss, yet it is not looked upon as being serious. It has also been the experience of some that the disease was extremely virulent in certain years, only to disappear entirely in the year succeeding. We could find no association with either dry or wet years.

Cause—As is usually the case with an unknown malady, various explanations have been given as to its cause. While the problem appeared to be capable of easy solution during the earlier part of our investigation, we now find that we have not been able to accurately determine the cause of the trouble. Among the causes most commonly suggested may be mentioned chemicals, sand, sun, ants, cactus, sod and infection. The presence of caustic chemical substances has never been shown to exist, and as a consequence this theory had to be abandoned. Sand is quite prevalent throughout

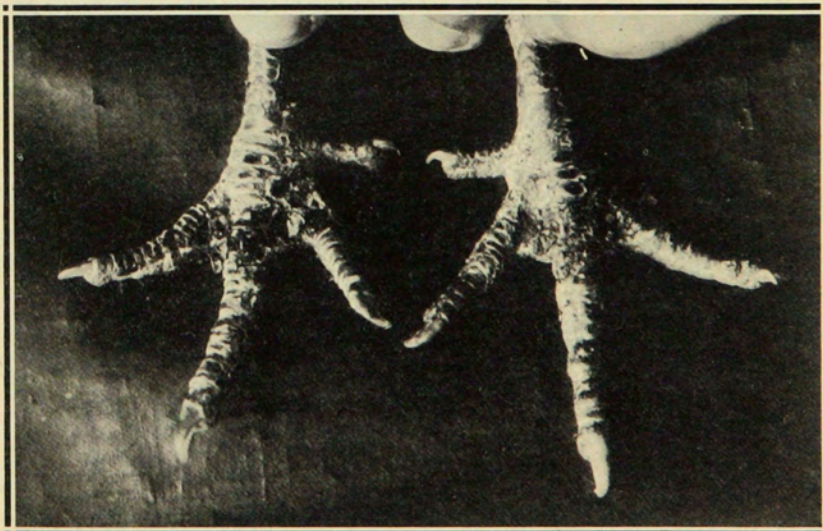


Showing spines in the feet after running on cactus for one day.

the district affected but the disease appears on adobe as well as on sandy soil. Furthermore, sandy soil is also present in irrigated districts. Throughout this whole area the sun is extremely hot in summer and it is well known that white hogs do not thrive well because of the fact that the sun blisters the skin. This theory has been given much credence by some, but does not seem in itself to be a sufficient explanation since, in experiments conducted by us, the chickens kept on plowed ground in the sun did not develop the disease.

Ants are of course very prevalent throughout the district but the evidence for this theory is not conclusive. The presence of cactus throughout all of this district and their practical absence in plowed ground, early led to the assumption that the spines of this plant were responsible for the difficulty. However, in our experiments, chickens on cactus alone did not develop the trouble.

The evidence in favor of the disease being associated in some way with sod is considerable. In the first place, the disease has never been known on irrigated land, nor does it occur on dry land where the sod has been broken up and the fields have been cultivated for a few years. We have in our records the outline of one case in which a lady lived on an irrigated farm near Fort Collins for several years, having no trouble, and in fact being in entire ignorance that there was such a disease. During 1916, she moved to a dry hill above the ditch, not, however, a half mile distant from her former location. There, during the first summer, the disease manifested itself and caused a considerable loss. The following year she had the same

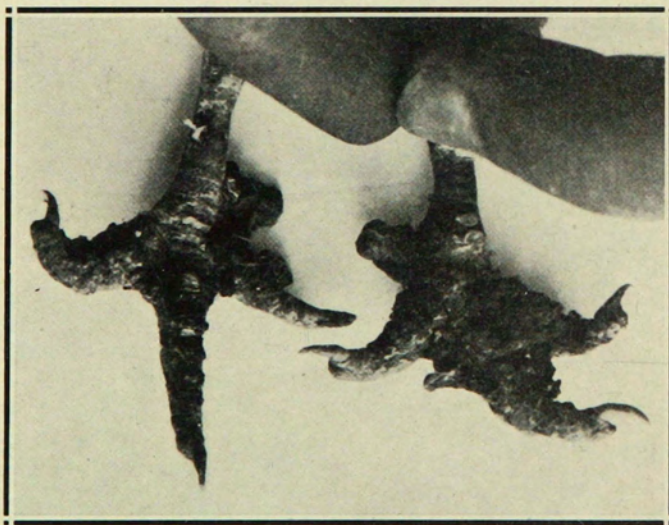


Scabs are falling off and the chicken is making a fair recovery.

experience. The year after that she moved away and during 1918 a new tenant took the place. A considerable amount of the ground in the immediate vicinity of the house was plowed with the result that only a few chickens were affected. Since that time there has been no trouble on that place.

In another instance the house was located not 50 feet above an irrigating ditch and on many days the chickens, of course, ran down across the ditch. The disease developed in one brood, with the loss of all but two chickens, including the old hen. Mrs. George William Day of Orchard, Colorado, informed us in 1918 that she had lived on the place occupied at that time for six years and that she had the disease every year but one, that one being a year when she had raised the chickens entirely under cover and consequently both in the shade and off the sod. Experiments seem to point conclusively to the association of the disease with sod.

It seemed to us that there was a strong probability that the disease was infectious, if not contagious, and as a consequence we attempted several times to isolate an organism which might have some association with the malady, but always with negative results. We did in one case isolate two separate organisms, one a coccus and another a bacillus, but neither would produce the disease on inoculation. In most all of our cases the cultures remained sterile when made from the material within the vesicles. In several instances, we removed the vesicular content with a sterile hypodermic syringe and inoculated it under the skin of the feet of healthy chickens, with negative results. In at least three different instances, we placed

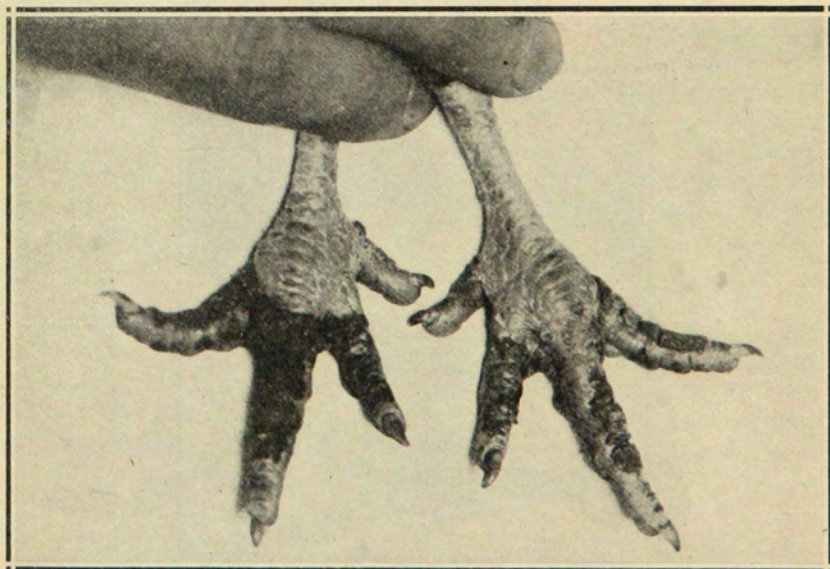


The scabs have piled up and the ends of two of the toes have dropped off, making walking very difficult.

healthy chickens in cages with affected chickens, but in no case were we able to show any transference of the disease. Consequently, while we still lean to the infection theory, we must admit that our experiments have not added any support to it.

Our investigations are now outlined with the possibility in mind that an infection does exist and that it gains entrance through abrasions caused by cacti or Russian thistles. For this view, however, we have no positive evidence.

Symptoms—The disease frequently manifests itself during the first week of life, its presence being evident to the observer because of the fact that the affected chicken becomes dull and remains behind the rest of the brood. A close examination at this time will often reveal the presence of blisters between the toes or possibly small scabs on top of the toes and on the lower portion of the leg. Scabs have not been found on the under surface of the toe. The whole foot is usually swollen and is very tender to the touch. Owing to the pain, the chicken sits down a great deal. In the course of two or three days the vesicle ruptures and is replaced by a thick heavy scab. The toes increase in size and become very rigid. Occasionally a joint or even a whole toe drops off. If the chicken survives, the scabs disappear in the course of two or three weeks longer and the toes become extremely distorted, turning usually in an upward direction so that the only portion of the foot that touches the ground is the heel. During the scabby stage, chickens pick at the feet a great deal.



Showing a moderately bad case in the later stages.

The symptoms may or may not appear on the head, and in some instances they may show on the head and not on the feet. In the early stages small vesicles may be found in the unfeathered skin around the bill and around the eyes. These are followed by considerable swelling, increasing redness and later by the presence of scabs. Often the eyelids become glued together and the chicken becomes totally blind. It appears that many chickens starve in this stage because of inability to find food. Older chickens are not nearly so frequently affected, but when the disease does attack them, it produces similar conditions of the feet and shows considerable swelling around the eyes with rather extreme redness. Vesicles have not been noted in hens, it requiring from one to two weeks in most instances for the disease to prove fatal; whereas in small chickens, the disease may terminate fatally in one or two days.

The flock mortality may run as high as 90 per cent in virulent outbreaks. Generally, however, it will not average above 20 per cent. Most of the affected birds die and the rest are practically worthless, since they become stunted and their feet are so distorted that they can not get around readily. As a consequence they are frequently destroyed, even though they appear to recover from the acute symptoms of the disease. Therefore, it may safely be said that of the chickens which are affected, the loss is practically 100 per cent.

Differential Diagnosis—The disease is more apt to be mistaken for roup than any other malady, but can be rather easily differentiated since roup is largely a cold weather disease and this appears in the summer. Furthermore, the disease under consideration affects



Showing typical posture in bad cases. Walking causes such pain that the chicken sits a great deal.

more especially small chickens, whereas roup appearing in the winter time is more likely to be a disease of adults. The swelling associated with roup is more frequently due to accumulation within the maxillary sinus, whereas the inflammatory disturbance in this disease seems to be confined to the skin. The sod disease does not show the presence of false membranes in the mouth as does roup. Contagious epithelioma can be differentiated because of the warty projections associated with it, whereas in the sod disease the comb and wattles may become scabby but not warty. Bumble foot might be confused but is usually an inflammatory condition of the deeper structures and is seldom associated with the presence of scabs on the upper surface of the toes. Scaly leg can be differentiated by finding the mites and also by the fact that it is largely a disease of the leg rather than of the toe.

Treatment—The most common treatment which has been used consists in dipping the affected members in kerosene oil. Furthermore, this treatment seems to have been more effective than others which are more complicated. The daily dipping of the feet and bills in kerosene oil has in many instances been followed by rather rapid and fairly permanent improvement. This is especially valuable for older chickens where the disease is more chronic. No treatment seems to be of much avail in very young birds. Others recommend dipping in one of the coal tar preparations which are commonly used for dipping sheep and cattle, following this by the use of vaseline, lard or zinc ointment. While these treatments will be found helpful, they should in no case be depended upon for permanent results.

Prevention—As the prairies are coming under cultivation, the disease appears to be growing less prevalent and will doubtless in time completely disappear. In the meantime its exit can be hastened by plowing up the sod in the immediate vicinity of the chicken house and planting to some crop. If chickens could be confined on plowed ground, it seems reasonable to believe that the disease would not develop. Irrigation seems also to successfully eradicate the malady.

Acknowledgment—Our thanks are due to Drs. H. S. Eakins and E. W. Alkire, members of the station staff, during a portion of the time the work was in progress and to Mr. and Mrs. Gus Setterburg, Mr. and Mrs. Elmore Chipps and Mr. and Mrs. Geo. Wm. Day who furnished material and gave much assistance in the investigation.

LIST OF BULLETINS

AVAILABLE FOR GENERAL DISTRIBUTION

The following is a list of bulletins published by the Colorado Experiment Station, that will be mailed on request while the supply lasts.

Residents of the State desiring to receive these bulletins regularly should write to the Experiment Station asking to have their names entered upon the mailing list. Private parties living outside the State are not placed on the regular list, but we are glad to send them bulletins when requested to do so.

The bulletins may be grouped under the following heads:

General Farming
Dry Farming
Fruit and Vegetable Raising
Stock and Poultry Raising.

When writing for bulletins state which of the above groups are desired. All bulletins are free.

Write your name and address plainly.

202.—**Testing and Handling of Milk and Cream**, by Roud McCann. 32 pages.

Deals with herd testing, milk testing, care of milk and cream, care and sampling of cream, cream stations, and dairy law.

203.—**Costs on the Colorado Agricultural College Farm**, by Alvin Kezer, 56 pages.

A plot of the college farm is given with costs of production of various farm crops, methods of determining their yield per acre. The method of employing the college farm department as a college and experiment station service bureau, is also explained.

205.—**Yellow-berry in Wheat**, by Wm. P. Headden. 38 pages.

The bulletin discusses reasons heretofore given for the production of yellow-berry and gives the results of experiments that seem to prove that the chief cause is the excess ratio of potash salts to the nitrates in the soil. One colored plate.

209.—**Irrigated Agriculture in the San Luis Valley**, by V. M. Cone and Alvin Kezer. 32 pages.

This bulletin gives the results of field investigations and the growing of crops in the San Luis Valley for three consecutive years. It deals with such topics as topography, climate, soil, irrigation, crop rotation and the growing of such crops as alfalfa, peas and the common grains.

217.—**A Study of Colorado Wheat, Part II**, by Wm. P. Headden. 48 pages.

This bulletin is a continuation of the work reported by Dr. Headden in Bulletin 208. It contains a very large number of chemical analyses and is of chief interest to technical workers. There are practical conclusions concerning the effect of soil, climate, moisture, and cultivation on the quality of the crop produced.

218.—**A Bacterial Stem Blight of Field and Garden Peas**, by W. G. Sackett. 44 pages.

This is a technical bulletin which describes a bacterial stem blight of field and garden peas. It contains an account of the history, distribution and symptoms of the disease, together with a complete description of the causal micro-organism. Methods of infection, control measures and variety tests for resistance are also considered.

219.—**A Study of Colorado Wheat, Part III**, by Wm. P. Headden. 132 pages.

Continuation of Bulletin 217, giving many pages of analyses of wheat.

223.—**A Fruit Survey of Mesa County**, by E. P. Sandsten, R. A. McGinty and T. F. Limbocker. 52 pages.

A complete orchard survey of Mesa County, Colorado, giving varieties, acreage, bearing and non-bearing trees.

224.—Native Vegetation and Climate of Colorado In Their Relation to Agriculture, by W. W. Robbins. 56 pages.

A study of the native plants in the mountainous sections of Colorado as indicators of crop possibilities.

228.—Divisors, by V. M. Cone. 52 pages.

Tables for the computation of water through divisions of different dimensions.

229.—Brisket Disease (Technical), by I. E. Newsom. 32 pages.

Gives a rather full account of the history and cause of this disease and the remedy.

231.—Black Alkali in the San Luis Valley, by Wm. P. Headden. 15 pages.

A discussion of the condition of the valley from the standpoint of its alkalis.

233.—Grasshopper Control, by Charles R. Jones. 27 pages.

Gives habits of common grasshoppers with full directions for methods of control.

234.—Beans in Colorado and Their Diseases, by Alvin Kezer and W. G. Sackett. 32 pages.

This bulletin gives information concerning varieties, soils, planting, culture, irrigation, harvesting, machinery, marketing, cost of production and bean diseases.

235.—Reclaiming Nitre Soil in Grand Valley, by E. P. Sandsten. 8 pages.

Records the result of experiments for the purpose of reclaiming soils that had gone bad from the presence of niter, "black alkali."

236.—The Dandelion in Colorado, by B. O. Longyear. 36 pages.

A well illustrated bulletin giving the life history of the dandelion and the results obtained in using different means of control.

237.—Is Colorado Wheat Soft? by Wm. P. Headden. 32 pages.

Gives the results of experiments showing the causes leading to the production of "yellow-berry" or "soft wheat."

238.—Cleaned, Treated and Tested Seed for Colorado, by W. W. Robbins, H. E. Vasey and G. E. Egginton. 40 pages.

Gives information concerning selecting, storing, testing, planting, cleaning and otherwise dealing with seeds. Also a full explanation of the Colorado Seed Law.

239.—Alkali in Colorado, Including Nitrates, by Wm. P. Headden. 76 pages.

A popular discussion of the common alkalis occurring in Colorado soils, with recommendations as to methods of control.

240.—Irrigation by Means of Underground Porous Pipe, by E. B. House. 12 pages.

This bulletin gives the results of an experiment to determine the practicability of irrigating underground through the use of porous tile.

241.—The Home Vegetable Garden, by R. A. McGinty. 40 pages.

Practical information concerning the growing of vegetables in Colorado.

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An illustrated information bulletin of 22 pages.

243.—Potato Culture in Colorado, by E. P. Sandsten.

Treats of soil, seed planting, cultivation, irrigation, grading, diseases, storage, etc.

244.—A Study of Colorado Wheat, Part IV, by Wm. P. Headden.

Treats of effect of food supply, irrigation, nitrates, hardness, fallowing, bread making quality, milling, etc.

245.—Colorado Climatology, by Robert E. Trimble.

Gives weather data compiled by Colorado Experiment Station from 1887-1917, with comments.

246.—**A New Poisonous Plant, The Whorled Milkweed (*Asclepias verticillata*)**, by George H. Glover, I. E. Newsom and W. W. Robbins.

A well illustrated bulletin giving valuable information concerning this very poisonous plant and the loss it causes to livestock in Colorado.

247.—**A Study of Colorado Wheat, A Resume of Bulletins Nos. 205, 208, 217, 219, 237 and 244**, by Wm. P. Headen.

A summary of results reached in studies of this subject, most of which have been reported in Parts I to IV.

248.—**Alfalfa Dodder in Colorado**, by W. W. Robbins and G. E. Egginton, Habits of dodder, occurrences in the state and means of control.

249.—**Mendelian Inheritance in Wheat and Barley Crosses, With Probable Error Studies on Class Frequencies**, by Alvin Kezer and Breeze Boyack.

A well illustrated, technical bulletin, giving results of a large amount of original research along the line indicated in the title.

250.—**Orchard Management**, by E. P. Sandsten.

A practical bulletin concerning planting, pruning, fertilization, cover crops, cultivation, irrigation and thinning.

251.—**The Identification and Control of Colorado Weeds**, by W. W. Robbins and Breeze Boyack.

A thoroughly illustrated bulletin of 120 pages, treating of Colorado weeds and their control.

252.—**Is Honey a Carrier of Intestinal Disease?** by Walter G. Sackett.

A study of honey for the purpose of determining whether or not it is a carrier of micro-organisms which are responsible for intestinal diseases.

253.—**Irrigation Water as a Factor in the Dissemination of Weed Seeds**; gives results of an important investigation. By Egginton and Robbins.

254.—**Orchard Survey of Fremont County**; gives data on acreage, number of trees of different varieties and kinds of fruits grown. By Sandsten and Tompkins.

255.—**Whorled Milkweed**, its importance as a stock-poisoning plant, its habits of growth, distribution and methods of eradication. By William May.

256.—**Horticulture at High Altitudes**; gives results of experiments in this line in Colorado. By R. A. McGinty.

257.—**Factors that Affect Alfalfa Seed Yields**, by P. K. Blinn.

