

HOW SCIENTISTS EXAMINE SOILS

Survey of Important Work of One of Branches of Department of Agriculture.

STUDIED VARIED ACTIVITIES

Bureau Took Active Part With Geological Survey in Nation-Wide Search for Deposits of Nitrates and Potash.

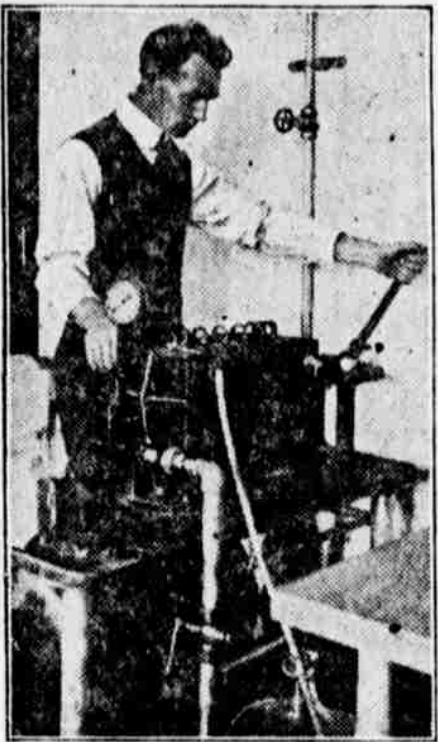
During the twenty years of its existence, the bureau of soils, United States department of agriculture, has studied the chemical constituents of the soils of all parts of the country. It has investigated these constituents qualitatively and quantitatively, showing their relation to one another and to plants, their solubility and permanency, and the manner of their functioning. It has studied the problem of alkali—that condition arising where soils contain an excess of soluble salts—and devised methods for measuring the content of alkali in the field and for eliminating it under field conditions. It has studied hardpans, explained the manner of their formation, and suggested the means of improving lands affected with the different sorts. These various activities have involved the making of thousands of analyses and the devising of much apparatus.

Public Given Advice and Counsel.

Advice and counsel is given by the bureau to the public on all matters connected with soil chemistry. The bureau has also investigated the physical properties of soils. It has devised apparatus for measuring the temperature of soils, the movement of water and of air and other gases in soils. The absorption of water, the extent and rate of capillary action, the effect of pressure on the concentration of the nutrient solution, and on the retention of that solution in the soil, the relation of soils to erosion, and many kindred problems have been worked upon.

The bureau has also worked upon the problem of the fixation of nitrogen found in the air in its experimental factory at Arlington, much advance having been made. Carried to its logical conclusion this move will result in supplying easily all the nitrogen the country needs in agriculture and industry.

Soil surveys have been made in all the states of the union. The surveys are of two kinds; detailed surveys on the scale of one inch to the mile usually covering county units, and reconnaissance surveys much more general in character, made on scales of four to six inches to the mile and covering large areas. At the close of the last fiscal year an area of 331,487-



Filter Press, Used in Soil Investigations.

300 acres had been surveyed in detail and 322,760,960 acres on a reconnaissance basis. These surveys involve the identification and classification of the many types of soils found in various parts of the country, a study of their agricultural value, and a determination of their relation to the various crops and systems of agriculture.

Advancement of Agriculture.

The results of the soil survey work form a basis for the logical advancement of agriculture through experimentation of scientific workers in all its varied lines.

The land classification work of the bureau is done in co-operation with the forest service and other departments of the government, and has for its purpose the exclusion, from the national reserves, of lands that are suited for agriculture.

An interesting special investigation in connection with the potash supply has to do with the extraction of this salt from the giant kelp of the Pacific coast. A fully equipped factory has been operated at Sumnerland, California, for the last two years, and thousands of dollars worth of potash has been sold to the fertilizer trade or direct to farmers.

The plant will be operated during the coming fiscal year, a careful study being made of the practicability of recovering various by-products, so that the industry may be able to compete with imported potash and the kelp beds may become a permanently valuable asset of the nation.

HINTS FOR BUILDING ICE HOUSE FOR FARM

Erection of Structure Depends Much on Local Conditions.

Size of Building and Difficulty of Obtaining Ice Are Important Factors—Other Details Must Be Considered.

Construction of a farm ice house depends to a great extent upon local conditions, the size of the house, and the difficulty of obtaining ice. These factors help to determine the sum that may wisely be spent for such a building. Where ice is expensive or hard to obtain, a better constructed and insulated and therefore more expensive ice house is advisable. Where natural ice can be harvested and stored cheaply a cheap structure is usually satisfactory and the loss from melting ice is a small consideration.

The cost of harvesting and storing, the interest on the money invested, and repairs and depreciation on the building are to be considered in relation to the ice loss from melting; and the type of house to be built depends upon these factors. It never pays to build permanently in other than a substantial manner, and careful thought should be given the matter before erecting a cheap makeshift that will not give adequate service.



A Good Ice House, Well Filled, Is a Real Asset to the Modern Farmer.

Various types of ice houses, how to build them, and other phases of the subject are discussed in Farmers' Bulletin 1078, "Harvesting and Storing Ice on the Farm," which can be obtained free of charge from the United States department of agriculture.

OATS ARE ECONOMICAL CROP

Not Generally as Profitable as Some Other Grains, but Needed in Good Rotation.

It is sound farm business to sell some crops for cash. Farm management surveys have shown that the safest and soundest practice is to have about one-fifth of the total receipts on the farm come from sale of crops. The other four-fifths will come from the sale of live stock or live stock products.

The crop that can usually be sold for cash most economically is oats. Oats are not generally as profitable a crop to grow as some others, but a good rotation needs this small grain in it. It makes a very satisfactory connecting link between the corn crop and the hay crop. Corn, if sold as a cash crop, makes a larger return to the acre, but corn can usually be fed more profitably than it can be sold for cash. It is ordinarily a cheaper feed than oats. Hence, if any crop is to be sold, it should be the oats.

WEIGHTS PER BUSHEL

A bushel is regarded as a definite weight rather than a cubic measure in the estimates of production and prices made by the bureau of crop estimates. The weights which are regarded as a bushel for various products are as follows:

Wheat, 60 lbs.; corn, 56 lbs. 1/2; shelled, 70 lbs. if in ear; oats, 32 lbs.; barley, 48 lbs.; rye, 56 lbs.; buckwheat, 48 lbs.; white (Irish) potatoes, 60 lbs.; sweet potatoes, 55 lbs.; apples, 48 lbs.; pears, 48 lbs.; peaches, 48 lbs.; walnuts and hickory nuts, 50 lbs.; beans (dry), 60 lbs.; onions, 57 lbs.; turnips, 55 lbs.; clover seed, 60 lbs.; alfalfa seed, 60 lbs.; timothy seed, 45 lbs.; Kaffir corn, 56 lbs. Estimates of yields and prices in tons are always on the basis of 2,000 pounds.

TESTING SOIL FOR ACIDITY

Experiment Station Will Tell How Much Limestone to Apply for Crop of Alfalfa.

It is a waste of time and money to sow alfalfa on sour soil and if you are not sure whether your soil is acid or not test it for acidity or send a sample to your experiment station and have it tested. The experiment station will not only tell you whether the soil is acid or not, but will also advise how much ground limestone to apply per acre in order to put it in good condition for alfalfa or other legumes. The lime may be applied next winter if time does not permit of applying it this fall.

GOOD BARN MEAN CONTENTED COWS

Type of Structure That Contains All Modern Equipment.

VENTILATION IS IMPORTANT

Design Provides Accommodations for Twelve Cows and Six Horses—Well Built and Protected Against the Elements.

By W. A. RADFORD.

Mr. William A. Radford will answer questions and give advice FREE OF COST on all subjects pertaining to the subject of building work on the farm, for the readers of this paper. On account of his wide experience as Editor, Author and Manufacturer, he is, without doubt, the highest authority on all these subjects. Address all inquiries to William A. Radford, No. 137 Prairie Avenue, Chicago, Ill., and only include two-cent stamp for reply.

Whenever you see a good looking herd of healthy cows, you can immediately conclude that they are well fed and housed. Unless a cow is protected by a modern, substantial home, she is not likely to be a heavy producer.

There are several essential features in the construction of a dairy barn that will aid in increasing production and the barn shown here contains many of those features. In the first place it should be firmly built and protected against the elements of wind, lightning, etc. If you will notice, this barn has been equipped with lightning rods. Every year the toll exacted by this single element amounts to \$8,000,000. And the heaviest loss is found among farm buildings. In a recent report the United States department of agriculture stated that 95 per cent of this loss can be averted by the use of efficient lightning rod systems.

Another important feature of barn construction, and one that has been taken care of in this building, is ventilation. The health of the animals housed in a barn of this kind depends primarily on the supply and kind of air they have to breathe. Unless the barn has been built so as to provide a maximum of fresh air the effect will be noticed in the animals' output. This barn has been fitted with the most modern ventilating system, and all the foul air is drawn off through four air flues which lead from all parts of the barn.

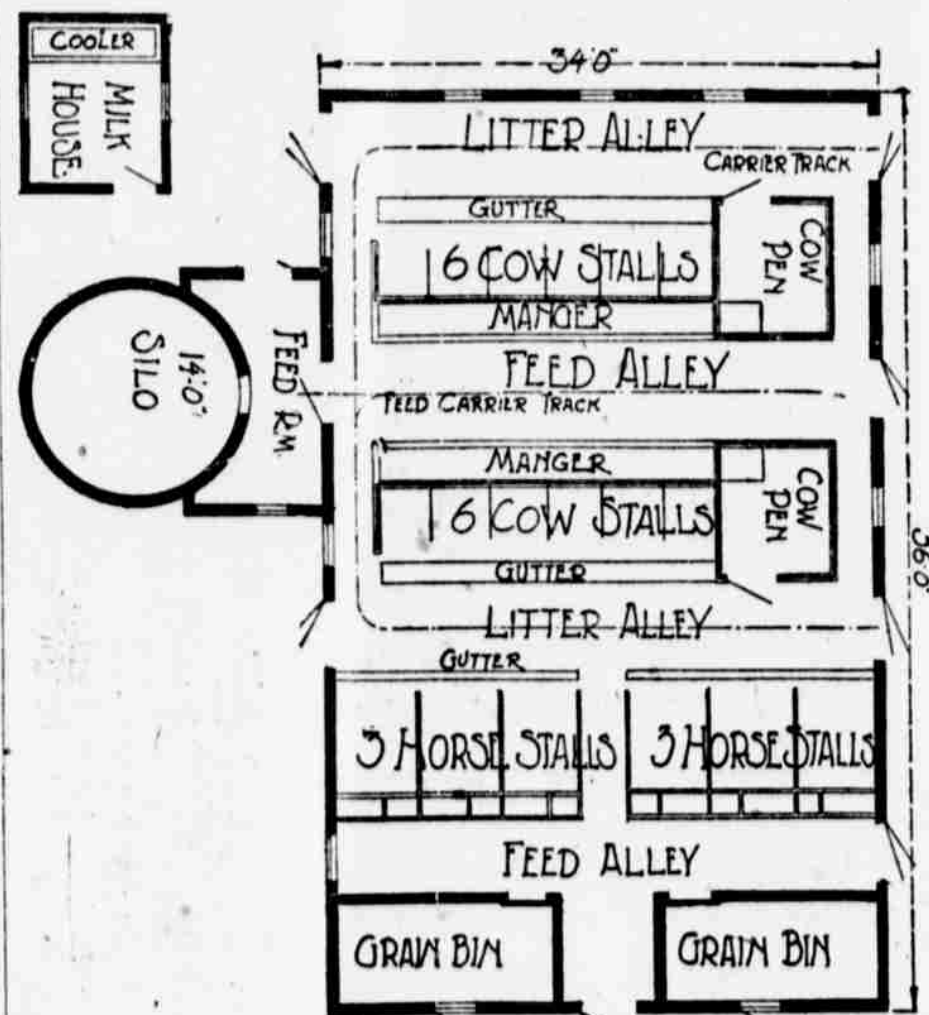
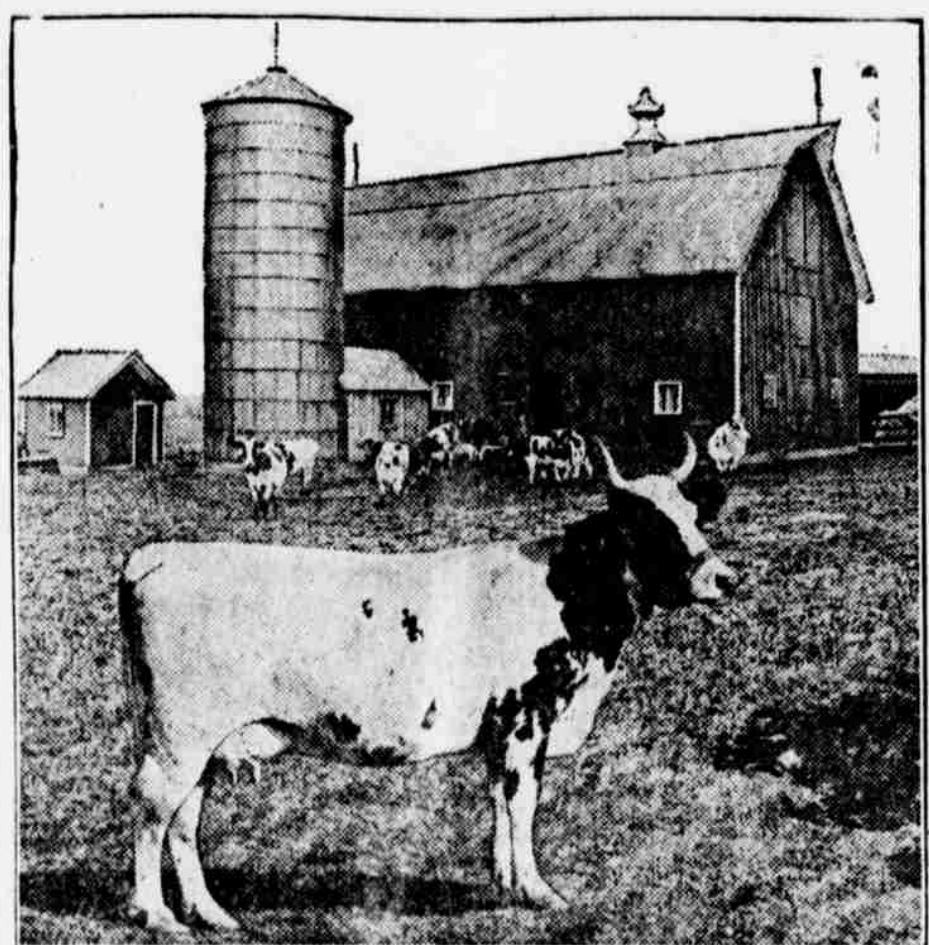
This barn is a good type, built for farmers who do not have a large herd. It is of plank construction, 34 by 36 feet, and will accommodate 12 cows and six horses. The cow stalls have been placed at one end of the barn, two rows of six facing in on a feed

alley. Litter alleys have been placed at the ends of the stalls. All of these alleys have been fitted with overhead carriers, systems which relieve this type of work. Farmers who have equipped their barns with these labor-saving systems have found they do not have much trouble keeping their help. The old system of hauling litter away in wheelbarrows was a back-breaking proposition at the best, and did much toward discouraging the help, not to mention making the farmer boys dissatisfied and anxious to go to the city.

All of the stalls are of the modern type, being equipped with the latest kind of stanchions and drinking cups. Plenty of good fresh water will help increase the milk flow. The drinking cup also does away with the old system of leading the cows to a trough, a task which was not very attractive in the cold winter season.

At the other end of this barn are located the six horse stalls with a feed alley running along one end. Two grain bins at the far corner provide storage facilities from whence a supply can be drawn for the daily rations. At the end of the feeding alley running between the cow stalls is a feed room where the feed can be ground and loaded onto the carriers for distribution among the various stalls. The silo is next to this feed room. It is built of wooden staves, a type that is very popular in some sections of the country. The staves are interlocked so as to form a continuous wall. The lightning rod at the top is designed to protect it from fire. A short distance from the silo is a small milk house equipped with a cooler where the milk can be kept in good condition until it is hauled to the factory. This building is a very convenient asset to the farm building group.

A large hay mow above provides plenty of space in the barn for feed storage. For the farmer who has



ment of agriculture stated that 95 per cent of this loss can be averted by the use of efficient lightning rod systems.

Another important feature of barn construction, and one that has been taken care of in this building, is ventilation. The health of the animals housed in a barn of this kind depends primarily on the supply and kind of air they have to breathe. Unless the barn has been built so as to provide a maximum of fresh air the effect will be noticed in the animals' output. This barn has been fitted with the most modern ventilating system, and all the foul air is drawn off through four air flues which lead from all parts of the barn.

about ten to a dozen cows and a few horses this type of barn is very admirably suited, and should prove to be an efficient unit in his plant. He does not have any waste space, but has all the modern conveniences of the large ultra-modern dairy farm. Constructed of the best material in the first place, it will prove an economy as far as maintenance goes, and an actual money saver because of its effective help in keeping up the morale of the help and health of the animals.

The most important building to the farmer is the dairy barn because in it he houses his all-year source of income. Unless he gives it his careful attention he is liable to pay heavily for his neglect. It is better to build well then suffer later even though the expense may be somewhat greater. The initial cost is not the important factor. It is the upkeep and a good substantial barn of this type does not require as much expense as a poorly constructed building.

CO-OPERATION IS CURE FOR EVILS

Marketing Organization Successful Only When Formed on a Sound Basis of Service.

SUCCEED BY TEAMWORK ONLY

Characteristics and Makeup of Local Population Should Be Considered in Formation of Association—Other Essentials.

There is no magic about co-operative marketing, although in hundreds of cases it has produced remarkable results. Nor does it serve as a cure-all for our present distribution problems, though it has proved a successful remedy for many present evils. There are 14,000 or more farmers' co-operative buying and selling associations in this country bearing testimony to the practicability of the co-operative principle, which is, in substance, an economic adaptation of the old political slogan "In union there is strength."

It is the desire of the United States department of agriculture that persons interested in co-operative marketing thoroughly understand the basis of such organized effort and follow the right methods. The bureau of markets of the department of agriculture, having made an extensive study of this subject, is prepared to advise with any group of farmers who want to undertake buying—or selling—co-operatively. A number of requirements must be met before prospective co-operators can succeed.

In the first place the characteristics and make-up of the local population should be considered in the formation of a co-operative marketing association. A community which produces a considerable quantity of one product or a few products offers better opportunities for an undertaking of this



Members of a Co-operative Organization Bring Their Wool to Be Pooled.

sort than one which produces a little of several different products. One advantage of joint effort arises from the handling of relatively large quantities. Unfortunately some groups of farmers have tried to form marketing associations without having a sufficient volume of business and they have failed.

Loyalty to Co-operative Idea.

If the existing marketing agencies in the community—whether for grain, wool, fruit, garden produce, or whatever the line contemplated for co-operative selling—are efficient and reasonably adequate, and if the farmers in the community feel that they are being served satisfactorily by these private concerns it is doubtful if a co-operative organization will succeed. But if the existing private agencies are inadequate and if the farmers can be made to see the saving that will result to all concerned if they unite heartily in an association, then there is a good chance of winning. But the co-operative principle must be adhered to. Members of an organization supposed to be co-operative cannot be expected to have a vital interest in a project which is really operated for the profit of and controlled by a few individuals.

Many persons do not have a clearly defined idea of what a co-operative organization is. The term "co-operative" is often used rather loosely. Where a concern is operated for the profit of the persons investing capital in it and seeking dividends on its capital, the undertaking is non-co-operative. On the other hand, in a co-operative marketing or selling organization each member usually has one vote (in a non-co-operative concern the votes are in accord with the money invested) so that one or a few members will not control its operations. It is conducted to render service and effect savings for the members and not to earn profits for distribution as dividends on the money invested. To be sure, a fair rate of interest is granted to capital invested by the members and the balance of any surplus to be distributed is divided in accordance with patronage; that is, the amount of business transacted with the organization.

Essentials to Success.

Contracts between the members and the organization whereby they agree to market certain products through it are vitally important in many instances, especially in the case of associations handling perishable products. The Michigan Potato Growers' exchange, the California Fruit Growers' exchange and many other successful organizations follow this plan.

The pooling of products sold through the organization is also an important feature. By pooling is meant averaging the returns received for products sold during a certain period, or for

to adopt the pooling principle may result in injustice to some of the members, as experience has proved more than once. Conditions and practices in grain marketing make the outright purchase of members' products feasible, but this does not usually apply to organizations handling other commodities.

Form of Organization.

Farmers' co-operative marketing associations are formed with capital stock or formed on the nonstock plan. Both forms have favorable features which the bureau of markets will be glad to explain to any interested person. Another matter to which careful attention should be given is the proper financing of a co-operative project. The by-laws of the association should be painstakingly drawn and should be thoroughly discussed by the membership so that there will be no misunderstanding later. The question of incorporation will also have to be decided. While incorporation is not necessary, in most cases it is considered advisable. Unfortunately the state laws for bodies of the character here discussed are far from uniform, some of them making no provision for co-operative associations.

The above paragraphs serve only to suggest some of the principal problems that have to be considered in forming a co-operative enterprise. Persons wishing to investigate this matter further will find it profitable to communicate with the United States department of agriculture, which will supply them with literature containing a full discussion of these and related questions.

WELCOME SOURCE OF PIN MONEY IN SUMAC

Many Tons of It Allowed to Go to Waste Each Year.

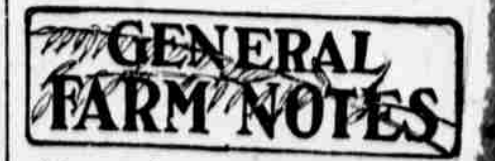
Plant Can Be Gathered and Cured Any Time During Summer and Marketed Whenever Convenient—Bonus Given for Leaves.

The demand by manufacturers for American sumac this season totals 500 to 700 carloads, or from 5,000 to 7,000 tons, according to information received by the United States department of agriculture. The price ranges around \$2 a hundred pounds for sumac delivered at the shipping point or at the extract factory.

Country people should find a ready market this year for all the sumac they can gather. Being a wild plant, sumac costs nothing to raise, and the many tons of it allowed to remain un-gathered each year can be readily turned into profit. The sumac season lasts about three months. Unlike berry and other crops, sumac does not have to be harvested all at once. It can be gathered and cured from time to time throughout the summer and marketed when large enough quantities have been collected.

In addition to offering higher prices this year, several manufacturers are willing to pay bonuses for sufficient quantities of clean, bright, well-cured sumac leaves, containing not more than 10 per cent of stalk. By properly gathering and curing the sumac, the gatherer can make more money and will help to establish more firmly the domestic sumac industry, which through development and expansion should provide a welcome source of income and employment in normal times.

Gather only the black or dwarf sumac, which can be easily distinguished from the other varieties by the peculiar wing growth along the leaf stems and by the brittle, black-speckled stalk. In some sections the white sumac is also gathered, but it generally brings a lower price, as all manufacturers prefer the black variety. Harvest during July, August and September. Break the sumac stalk off close up to the leaves just under the lowest leaf stem, or, better yet, gather only the leaves and leaf stems. Do not collect long bare stalks, as this produces low-grade, low-priced sumac. Cured sumac ready for market should contain very little stalk, never over 25 per cent. If a good bit of stalk has been gathered with the sumac it can be easily removed by flailing and forking out after the sumac has been cured and is ready for bagging. Do not gather red or yellow leaves, or berries and bloom. The bloom will ruin good sumac. As soon as the sumac has been gathered, place it in the shade or under cover. Exposure to the sun for an hour or two may do no harm, but the pulled sumac should never be left all day in the sun, as it will quickly scald and be ruined in color. Never let the gathered or cured sumac become wet from either dew or rain. At the end of the day's gathering, haul or carry the sumac to a barn or cover. Spread it on a clean floor or on sacks in layers not over 1 1/2 feet deep and turn it once or twice a day until thoroughly dry and crisp.



Plow early for winter wheat.
Sweet clover makes the soil rich.
Take care of the mowing machine.
Alfalfa is an exceedingly profitable crop.