

toxic qualities of alkali are not due to any original properties of the soil itself, but due to the presence of poisonous compounds, and it has been proved that if these compounds are removed the remaining soil will be extremely fertile.

What is perhaps of more importance to the practical agriculturist, than the cause and nature of alkali land is how to overcome or remove the noxious properties, but in order to be able to apply remedies intelligently and successfully it is first necessary to understand something of their properties and composition. In the central provinces of this country and the Middle States these undesirable spots as a rule are so small and infrequent in occurrence that it is not profitable to expend much time and energy in endeavoring to make them productive, but in many districts of the western part of North America there are large tracts of little or no agricultural value from this cause, and in these cases it is necessary as well as desirable for the benefit of the farmers of those districts and of the country in general that some methods be adopted or at least some efforts made to destroy that which is undesirable in the soil and make them fertile and of value to their owners.

By far the best way to attain this end and rid the soil of alkali is to endeavor to grow some kind of crop on it, because there are many ways in which this is effectual, and although the first few crops grown may be of practically no value either as feed or market produce, they will probably leave the land in such a condition that a valuable crop may be realized in the near future. Naturally the difficulty arises as to what kind of crop may be grown on such soil because it is just the fact that alkalis are detrimental to plant growth that makes them undesirable, but it has been found by exhaustive experiments and trials that sugar beets and mangels will tolerate alkali very well and they absorb much of the mineral salts which are subsequently removed along with the roots. The first crop or two will probably have a very bitter taste and may be quite unfit for feeding to cattle, but even if the crop is thus a total loss from a feeder's standpoint, this loss is compensated for by the land being quickly brought into such condition that it will produce cereals or other valuable crops. Many of the leguminous plants, especially peas, will grow to some extent on alkali land but here, however, another difficulty arises, because peas contain a great deal of fat in their composition and the salts found in alkali soils are detrimental to the germination of these seeds; but if they are sown early in the spring when the salts present in the surface soil have been washed away by the melted snow and before those in the subsoil have had time to rise, it is probable that the peas will germinate and attain sufficient growth before the alkali rises in large enough quantities to be able to kill the young shoots, and the plants will be able to resist its action when it does come. When once well started legumes will withstand much alkali and will often flourish where no other crop would grow, and some returns given for the expense incurred in the course of treatment. Some common grasses, such as brome, timothy and red top will withstand the action of white alkali to a very great extent, and if not required for permanent pasture or hay meadows, will be useful in obliterating the almost unfertile tracts of land. This growing of plants embraces two of the many objects sought in the treatment of this kind of soil. The first is to remove the salty incrustation from the surface, and this is done when the crop is removed, because in the course of growth the plants will take in much of the alkali salt. The second object obtained by growing plants is that of to some extent preventing the rise of the alkali by checking evaporation. Plants of all kinds offer some shade to the ground on which they grow, and keep it cool so that the moisture does not pass off rapidly and the undesirable salts remain in the subsoil and are probably not reached to any extent by the plants' roots unless the season happens to be an exceptionally dry one.

Physical treatment or cultivation of the soil is resorted to with much success in the treatment of alkali spots. In places where the deposits of salts on the surface is very thick it may be scraped off and removed wholesale in this way. The presence of excessive amounts of salts may be due to a very heavy close-textured subsoil that prevents proper drainage and does not allow them to be carried away in the drainage water, but this may be remedied by subsoil plowing or otherwise opening up the subsoil to allow free passage of water. The creation of a surface mulch

either by cultivation or the application of a heavy straw or manure mulch is very effective in preventing the rise of alkali to the surface. One of the most important ways in which the water in the soil moves is by what is known as capillary action, and this takes place by means of minute tube-like passages that are formed by the soil particles when they are firmly pressed together, and through which the water rises to the surface. If these tubes are broken by surface cultivation or by a layer of straw or manure, the moisture will not rise to the surface so readily, and thus evaporation and the consequent rise of soluble salty materials in the water is prevented.

There is yet another form of treatment to which alkali soil may be subjected, and that is by setting up a chemical reaction in the soil. Heavy manuring of the land with fresh manure will result in the formation of certain acids when the manure decays and this counteracts the alkali salts and makes them neutral, that is, neither acid nor alkaline in action, and so their presence is not felt to any extent by the plants. There are also certain chemicals that may be obtained and applied to the land that will set up this chemical reaction and be beneficial in the same way as manure. The best known of these is gypsum, which is chemically called calcium sulphate, and this is especially beneficial in treating black alkali, containing, as it usually does a large proportion of sodium carbonate. The reaction resulting from the application of gypsum to this kind of soil is the formation of calcium carbonate and sodium sulphate. This is beneficial in two ways: first, it destroys the sodium carbonate which has poisonous properties, and second, it forms calcium carbonate which is of great value both as regards the chemical and the physical condition of the soil; and it is an important constituent in any soil because it keeps the particles open and allows percolation and the free passage of air and water through the soil.

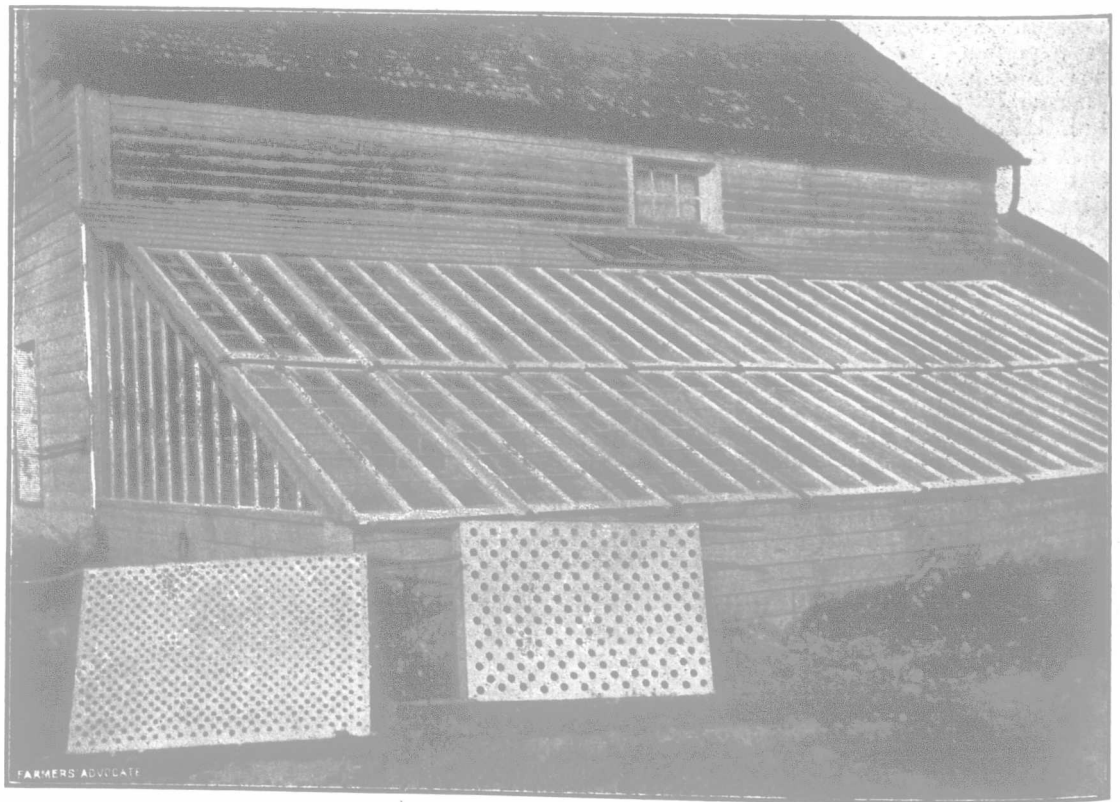
When considering the question of the reclamation of alkali soils it is well to remember that the most profitable and effectual way of converting these barren spots into fertile land is to grow, if possible, some kind of crop on the land and remove the noxious mineral salts along with the plants, or by keeping the alkali in subjection as before described. In conclusion, it is only necessary to repeat what may be said of almost all instructions or rules laid down for the guidance of those engaged in farming operations, and that is, that the farmer must use his own discretion and be guided by prevailing conditions, and if he has not had any previous experience in the reclamation of sterile soils of this nature he may benefit by the experience of others. In this way much land that is at present untouched or abandoned by settlers may eventually be reclaimed and made fertile and profitable, and add much to the possibilities and resources of our Great West.

Man.

HENRY SAVILLE,

Man.

D. W. BUCHANAN.



GREENHOUSE ON SOUTH SIDE OF HOUSE HEATED IN EARLY SPRING BY MEANS OF STOVE; SCREENS FOR ONION SORTING TO LEFT; ON FARM OF KLAAS DE JONG.

## HORTICULTURE

### Increase in Fruit Acreage

Fruit tree acreage in British Columbia will show a big increase in 1910, according to Thos. Cunningham, provincial fruit inspector. He states that he has received an inquiry from an American firm for a tract of from 5,000 to 10,000 acres of land for fruit growing. He instanced a case where an up-country rancher had just returned from a trip to Oregon, where he had ordered 17,500 young trees, and this same gentleman had also ordered 30,000 more in Victoria.

This, says Mr. Cunningham, is indicative of the rapid growth of the fruit industry. Two hundred acres of fruit land in the interior will be planted in nursery stock shortly. During the past couple of weeks five carloads of nursery stock have been inspected.

### Growing Cranberries

EDITOR FARMER'S ADVOCATE:

Can you give me information concerning the cultivation of cranberries in Southern Alberta? Where can I procure vines for planting? Is the high bush cranberry so common in New England States a native of Western Canada? Can barberries be grown here, or is the climate too cold? Also, what about hazelnut bushes? The above named vines are very hardy, but I have found none listed in the seed catalogues. I would like to try them, but do not know where to obtain the stock.

The cultivation of the cranberry of commerce, so far as we know, has not been undertaken in Alberta. Cranberry growing is a business which no amateur should undertake until he has made himself familiar at least to some extent with the requirements of the plant. It is not a garden plant, as plants are generally understood, and requires special treatment and a considerable outlay usually to provide for flooding, draining and control of flow of water. We would advise the procuring of a book on cranberry culture, after perusal of which you will have some idea as to whether your place is suited to the growth of this plant.

The high bush cranberry, so called, is a native nearly all over Canada, even to the Arctic region, varying slightly in form in different sections. It is not a cranberry at all, but a viburnum. It is easily cultivated. Barberries are grown in several forms for ornamental purposes, but would not be profitable for fruit. Two species of hazelnut are native in various parts of the West, and could no doubt be successfully cultivated. They are quite common in most parts of Eastern Manitoba.

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D. W. BUCHANAN.

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