

# ALBERTA Is The Coming Wheat Granary Of The World!

You can buy land that will produce from 35 to 50 bushels of winter wheat, 45 to 60 bushels of barley and from 60 to 100 bushels of oats, from the Canadian Pacific Railway Company, at \$12 and \$15 per acre, one-tenth cash and the remainder in nine years at 6 per cent interest.

This land is in the Bow river valley east of Calgary, in the chinook belt of Alberta, along a main line of railroad, is well watered, free from rock, gravel and alkali and covered with grass which will make two tons of bunch grass hay per acre!

**One Sod Crop Actually Pays For The Land And The Railroad Company Will Help You Farm It. If You Raise No Crop You Make No Payment! You Can't Lose**

Thirty practical farmers and investors of Umatilla and Union counties have bought this land. Ten car loads of work horses and farming implements are being shipped from Pendleton into this new district this spring. These farmers know a good thing when they see it.

The Alberta winters are not severe. The country is visited regularly by warm chinook winds during the winter season and cattle winter out and stay fat without hay or shelter.

**Hundreds Of Wide Awake Americans Paid For Their Land With Their 1908 Wheat Crop**

It is no experiment. Hundreds of new homes are being built, railroads are being constructed, thousands of acres have been broken out and seeded and it is the last new country on the American continent.

Buy direct from the railroad company and get low prices and easy terms. The company wants you. It wants your citizenship in Canada and it wants traffic to haul out. It will help you pay for your land. It will fence, break sod, drill wells, build houses or do anything for its settlers.

It costs but \$55 to make the round trip from La Grande to Calgary and return, by getting our cheap rate. The weather is mild and open. Inquire for the date of the next trip. Go and see Alberta now.

Jonathan Johnson, Canadian Pacific Land Dept. Pendleton, Oregon.

Or J. E. Reynolds, La Grande, Oregon.

## Home Course In Modern Agriculture

### I.—How a Seed Starts to Grow

By C. V. GREGORY,

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**A** SEED is a simple thing to look at. It might as well be a pebble or a grain of sand for all there seems to be to it. Only a bean, you say, yet there's a great deal more to that bean than you ever dreamed of.

Take a bean—just an ordinary white bean out of the pantry—and look at it. The smooth white outer covering is the seed coat. It is almost water tight and is a protection for the parts that lie within. On one side you will notice a very conspicuous spot. This is the seed scar and is the place where the little stem that fastened the bean to the pod was attached. Near one end of the seed scar, or hilum, as the botanists call it, is a small round hole, the micropyle. If you put a bean in water it will soon begin to swell because of the water which it absorbs through the micropyle.

Now, take a bean that has been soaked for a few hours. The seed coat will come off easily. The part of the bean that is inside is found to be split in two lengthwise. These two halves are called cotyledons, which is only another name for seed leaves. Spread the cotyledons apart carefully. If you look closely you can see a little plant tucked snugly away between them. Just to one side of the middle is a small stem, the caulicle. Fastened to it is the plumule, a tiny bunch of leaves so small that you may have difficulty in making them out. Farther on, at the end of the bean, is the stubby root, or radicle. These different parts are found in every seed, no matter how small. Now that you have seen what is in the bean, examine a pumpkin seed in

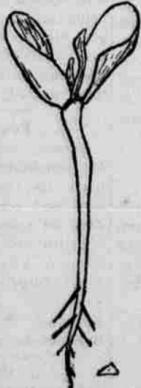


FIG. 1.—A LITTLE BEAN PLANT.

the same way. It is much the same inside as the bean, only flatter. The hilum is at the pointed end, and the plumule is so small that you may not be able to see it at all. In these two seeds there are only two main parts, the seed coat and the little plant. By far the greater part of the room inside the seed coat is taken up by the fleshy seed leaves.

Now let us look at a different kind of a seed. Take a kernel of corn that has been soaked for several hours and cut it in two lengthwise the narrow way. The back of the grain is made up in part of a hard, flinty substance and in part of a white, mealy layer. A large part of the front of the kernel is taken up by the soft, oily germ.

Look at the cut section of the germ carefully. The little plant can be made out very plainly. The little pointed stem which points upward and outward is the cotyledon. There is only one cotyledon in corn instead of two, as in the other seeds you have examined. If you will take a cotyledon of a corn plant that has been left in a warm place until it has commenced to grow and cut it in two lengthwise you will see that the inside is packed with layers of tiny leaves ready to unfold as soon as their turn comes. This is the plumule. The other parts of the little corn plant you will be able to make out with little trouble.

You have doubtless been wondering what the rest of the kernel, the part back of the germ, is for. While it is not a part of the plant itself, it is of very great use to it, as we shall see. The little plant when it begins to grow must have food. At first it has no roots to get this food from the soil, so it must get its nourishment from some other source. This source is the part of the kernel outside of the germ itself, or the endosperm. In the pumpkin seed and the bean the endosperm and the cotyledons are the same—that is, the food material is stored in the large, fleshy seed leaves.

This food material consists largely of starch and oil. Neither of these can be used by the developing plant without first being changed to a liquid form. This is one of the reasons why seeds will not germinate without water. The other reason is that the wa-

ter is needed to soften the seed coat so the plant can get out. But this starch and oil will not dissolve in water without first being changed to a soluble form. This is accomplished by means of ferments called enzymes. If you will put a piece of starch on your tongue for a moment you will find that it will begin to taste sweet. This is because the ferments in the saliva are changing it to sugar. The enzymes in the endosperm work in much the same way, changing the starch and oil to sugar and other soluble substances. These are dissolved by the water and go to feed the growing plant.

These enzymes cannot work without air and warmth. You already know that a seed will not germinate in cold ground, and if you will put some beans in a glass of water and leave them for several days you will find that they will not germinate, no matter how warm they are kept, because they cannot get air. The reason is that without both air and warmth the enzymes cannot prepare the food for the plant, and if it cannot get food of course it cannot grow.

After the plant has started to grow the seed coat is no longer of any use to it. In some plants, such as corn, the little plant finds its way out very easily. The little pumpkin plant, with its heavy coat, has a harder time. Indeed, were it not for a little contrivance with which nature has provided it it could not get out at all. This is a tiny hook on the lower end of the seed. This hook catches on the end of the seed coat and peels it back as neatly as you take off your coat. Watch for this in a germinating pumpkin or squash seed and see if you cannot notice it. In some seeds, like hickory nuts, the plant is unable to get out until the seed coat is cracked by the frost or in some other way.

We have seen that a seed cannot start to grow unless it has moisture, warmth and air. It not only needs these, but it needs them in the proper proportions. In a light, sandy soil moisture is often lacking, and the seed is slow in germinating for this reason. In such a soil growth will start more quickly if the soil is packed tightly around the seed. The seed will soak up moisture more rapidly if the particles of soil are in close contact with it on all sides. Packing down the soil in the row with the flat side of a hoe or with a board or with the broad, flat planter wheels in the field helps the seed to absorb moisture and so hastens germination.

In a heavy, sticky clay soil there is usually plenty of moisture, but air is often lacking. If such a soil is packed down too tightly over the seed the particles are forced so closely together that very little air can get through, and hence germination is delayed. In a soil of this kind seeds should never be planted very deeply.

The most important factor of all is warmth. A cold soil may have

moisture and air in exactly the right amounts, and still the seed will not start to develop. Even if it does begin to grow progress will be slow, and the plant will have a weak, unhealthy look. It is of the utmost importance to wait until the seed bed is warm before planting the seed. Many seeds which would rot or produce only spindling stalks if planted in a cold soil will grow into strong plants if planting is delayed until the soil has become warm. Any seed will make a stronger, better producing plant if it has a warm seed bed to start from.

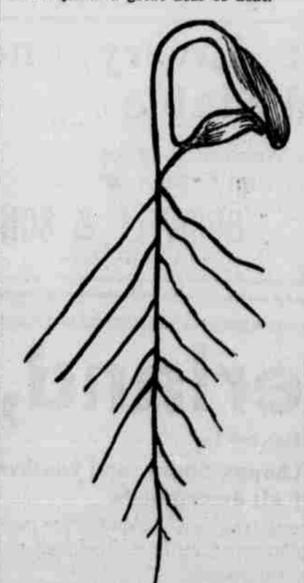


FIG. 2.—HOW A SQUASH PLANT TAKES OFF ITS SEED COAT.

We can help the soil to become warm in the spring, then, by doing all that we can to check evaporation. Did you ever notice how quickly the surface of a wet field became dry after it had been barrowed? This is because stirring and loosening the soil stops the water from coming up from below. The water in the loose upper layer soon evaporates, and after that the heat is used in warming the soil instead of turning the water into vapor. Of course if we are not going to

allow the surplus water to be given off by evaporation we must provide the drains and ditches to carry it away. We shall study more about drainage and the movement of water through the soil in another article.

[TO BE CONTINUED.]

#### Red Cross Gives \$150,000.

Rome, Feb. 9.—It is announced officially that the American Red Cross, through Ambassador Griscom, has put \$150,000 at the disposal of the committee organized by Queen Helena, which has undertaken the establishment of an orphanage to be devoted to the care of children of homeless and without care of parents after the earthquake disaster.

#### A Common Cold.

We claim that if catching cold could be avoided some of the most dangerous and fatal diseases would

never be heard of. A cold often forms a culture bed for germs of infectious diseases. Consumption, pneumonia, diphtheria, and scarlet fever, four of the most dangerous and fatal diseases, are of this class. The culture bed formed by the cold favors the development of the germs of these diseases, that would not otherwise find lodgment. There is little danger, however, of any of these diseases being contracted when a good expectorant cough medicine like Chamberlain's Cough Remedy is used. It cleans out these culture beds that favor the development of the germs of these diseases. That is why this remedy has proved so universally successful in preventing pneumonia. It not only cures your cold quickly, but minimizes the risk of contracting these dangerous diseases. For sale by Burnough & Mayfield.

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**4** quart bottles, packed in plain cases \$4.90 all charges prepaid to the nearest railroad express office for \$4.90

No danger of refilled bottles when you buy from us. No danger of some cheap worthless substitute being palmed off on you. We have been the distributors of this famous brand, selling wholesale only, for 44 years. Pure—old—honest whiskey aged in wood. Every bottle guaranteed.

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