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A HOME COURSE IN AGRICULTURE

1 .-- How a Seed Starts to Grow By C. V. GREGORY

Agricultural Division Iowa State College

SEED is a simple thing to look at. It might as well be a 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 beau-just an ordinary white the seed coat. It is almost water eq most do Eumoo most selem out tight and is a protection for the parts sdops gos equ figurescol pur fullants that He within. On one side you will sensood , sign tpomorred used pur to the pod was attached. Near one end of the seed scar, or bilum, 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 sonked for a few hours. The seed tout will come

off entity. The part or 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. Fasten-

ed to it is the plumule, a tiny BEAN PLANT. 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 the same way. It is much the same inside as the bean, only flatter. The bilum 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 teed 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, olly 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.

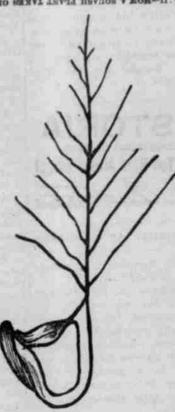
You have doubtless been wondering what the rest of the kernel the part back of the germ. is for. While it is not a part of the plant itself, it is of very great use to it, as we shall see. The little plant when it begins to grow must have food. At first it has no roots to get this food from the soil. so it must get its nourishment from some other source. This source is the part of the kernel outside of the gerne itself, or the endosperm. In the pum kin seed and the bean the endosper. and the cotyledons are the same-that is, the food material is stored in the large, fishy 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 | no 192 of eldenn st infid out is no Tio form. This is one of the reasons why seeds will not germinate without water. The other reason is that the water 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 ongue 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 Mo23 of petiess and fueld edit relify 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

the soil in another article. and the movement of water through pebble or a grain of sand for exemps more atom apure Hads om drains and disches to earry it away. by evaporation we must provide the allow the surplus water to be given off por. Of course if we are not going to instead of turning the water into vathe satt galmany at bear at saed edt bean cut of the pantry-and look at it | 1841 1314s bus estatedays uoos 13/at The smooth white outer covering is saddn asoot out ut salam out 'mot notice a very conspicuous spot. This it sails are emused piet tem a to esur is the seed scar and is the place where -ins squ Apoinb mon somou isas now the little stem to speck evaporation. Did area present that tastened the pean bid. warm in the spring, then, by doing all We can bely the soil to become

TAOO GENERAL TAKET PARKET TAKES OFF.



tion requires a great deal of heat. will be cold. The process of evaporater is evaporating rapidly the ground is its greater dryness. As long as wathe higher temperature of sandy soft through at once. Another reason for easily, thus warming it all the way cause the air can get down Tolnb dn surum flos Apries V deal upon the nature of the soll itself.

The rapidity with which soil will has a warm seed bed to start from. stronger, better producing plant if it become warm. Any seed will make a planting is delayed until the soil has it sinaid groups ofth work libw itos spindling stalks it planted in a cold apple moniq tor or broques only before planting the seed. Many seeds to wait until the seed bed is warm look. It is of the utmost importance the plant will have a weak, unhealthy gin to grow progress will be slow, and start to develop. Even if it does beamounts, and still the seed will not moisture and air in exactly the right warmth, A cold soll may have The most important factor of all is

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

moisture and so bastens germination. the field helps the seed to absorb with the broad, flat planter wheels in no brand a dilw to sod a to sbiz taft down the soll in the row with the tact with it on all sides. Packing the particles of soll are in close conwill soak up moisture more rapidly it ed tightly around the seed. The seed Start more , stelly -dang at the. rease IIIM IIIM Daas

"OUI aul bar ... ard nos Aprius the 254020

spaau Ap .. has moisture, лопиво реев и ди, поев еди, од frost or in some other way.

until the seed coat is cracked by the not notice it. In some seeds, like bickkin or squash seed and see it you can-Watch for this in a germinating pumpneatly as you take off your coat. the seed cont and peels it back as seed, This hook catches on the end of tiny hook on the lower end of the it it could not get out at all. This is a ance with which nature has provided deed, were it not for a little contrivits heavy coat, has a barder time. Ineasily. The little pumpkin plant, with the little plant finds its way out very to it. In some plants, such as corn, the seed cont is no longer of any use course it cannot grow.

plant, and if it cannot get food of zymes cannot prepare the food for the without both afr and warmth the enthey cannot get air. The reason is that ter how warm they are kept, because that they will not germinate, no matbeans in a glass of water and leave pup III-M not skep paleass for ment H. Hirschberg, Pres. A. Nelson, Vice Pres. C. W. Irvine, Cash.

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