Home Course In Modern Agriculture

I.—How a Seed Starts to Grow

By C. V. GREGORY,

Africultural Division, lowa State College Copyright, 1908, by American Press Association

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 plant, and if it cannot get food of ever dreamed of.

Take a behn-just an ordinary white bean out of the pantry-and look at it. The smooth white outer covering is the seed cost. It is simost 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 sear and is the place where the little stem that fastened the bean to the pod was attached. Near one end of the seed sear, or hilum, as the botanists call it, is a small round hole. water it will soon begin to swell be- kin or squash seed and see if you cancause of the water which it absorbs through the micropyle.

scaked for a few hours. The seed frost or in some other way.

cont will come off enally. The part of the bean that is imide 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 close ly 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 FIG. I-A LISTLE plumule, a tlay BEAN PLANT. bunch of leaves so small that you may have difficulty in making them Farther on, at the end of the bean, is the stubby root, or radicle. These different parts are found in ev-

ery 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

Now let us look at a different kind of a seed. Take a kernel of corn that has been sonked for several hours and cut it in two lengthwise the narrow large part of the front of the kernel is taken up by the soft, oily germ,

pointed stem which points upward and tion requires a great deal of heat. 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 cern 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 Inyers 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 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 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 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



SEED is a simple thing to look 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 course it cannot grow.

After the plant has started to grow the seed cost 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 contriv ance with which nature has provided R 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. the micropyle. If you put a bean in Watch for this in a germinating pumpnot notice it. In some seeds, like blck. ory nuts, the plant is unable to get out Now, take a beau that has been until the seed coat is cracked by the

We have seen that a seed cannot start to grow unless it has moisture. warmth and air. It not only needs but it needs them in the proper proportions. In a light, sandy sell 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 to 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 tacking. If such a soil is parked 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 soll 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 spiralling stalks if planted in a cold sell will grow into strong plants if planting is delayed until the soil has come warm. Any seed will make a stronger, better producing plant if it has a warm seed bed to start from.

The rapidity with which soil will warm up in the spring depends a great deal upon the nature of the soil itself. The back of the grain is made A sandy soil warms up quickly beup in part of a hard, flinty substance cause the air can get down into it and in part of a white, mealy layer. A easily, thus warming it all the way through at once. Another the higher temperature of sandy soil Look at the cut section of the germ is its greater dryness. As long as waearefully. The little plant can be ter is evaporating rapidly the ground made out very plainly. The little will be cold. The process of evaporawill be cold. The process of evapora-

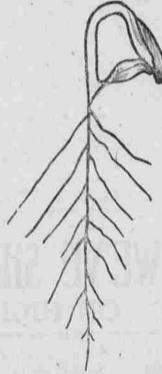


FIG. 11-HOW A SQUARE PRANT TAKES OFF

We can help the soll to become warm in the roring, 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 harrowed? This is because stirring and loosening the soil stope the water from coming up from below. The water in the loose uppe ager soon evaporates, and after that the heet is used to warming the soil flow the surplus water to be given off by evaperation we must provide tile the sell in anather article.

Seven Years of Proof.

"I have had seven years of proof that Dr. King's New Discovery is the best medicine to take for coughs and colds and for every diseased condi-tion of the throat, chest or lungs." of proof that Dr. King's New Discov-ery is the best remedy for coughs and colds, la grippe, asthma, hay fe-ver, bronchitis, hemorrhage of the , and the early stages of con-

THE GRANGE GOOD ROADS

J. W. DARROW, Chatham, N. Y., ondent New York State Grouge

SOME GRANGE HISTORY.

After the Civil War. About forty-two years ago in the city

of Washington a few men put their beads together to see if something could be done for the farmers of the lay prostrate because of the civil war. believe that the coming together of these men and what resulted from Has Measure That Prohibits Heavy their coming together was momentous in its results in the interests of the farmers of America and even the world. I believe that their names will ive when the names of many now of fame will be forgotten. Let me name them here. They were O. H. Kelley, John Trimble, F. M. McDowell, J. R. Thompson, A. B. Grosh, William Baunders and W. M. Irelaud.

What was it that these men did that, as it seems to me, was of such conseuence and importance? They organized and put into actual working condition the Order of Patrons of Hus-bandry, commonly known as the Judge Webster referred to the system their own interest in the history of the the prisoners of the city and county world. The fact last stated, if it be a jails. The speaker was followed by world. The fact last stated, if it be a jails. The speaker was followed fact, is in itself of profound significance. Through the ages men and women, too, have tolled upon the land. But through the ages it was not until judge of Clackamas County, talked But through the ages it was not until But through the ages it was not until the last half of the nineteenth century that conditions were so that these tollers could get together and consider why and how and for where the their continuous ward for where the their continuous considering the conditions with the conditions with the conditions with the conditions of the conditions of the conditions with the conditions of the cond why and how and for whom they toll-ed and wherein their toll could be a sentatives next Monday, and which better, a brighter, a nobler thing for them, and not for them only, but for wood, saw logs, timber, lumber, ties all. The time has not yet come when piling or heavy merchandise over and

in the flush of this unexpected success in the Act-these farmers would go too fast and County S. Certainly not. It could hardly be oth- taining talk on "Education." erwise. The reaction came, and with it for a time discouragement and obloquy. But let it be noted that before this decline in numbers and influence the Order had done something to such benefit not only to furmers, but to the country at large, that if it had done nothing else its existence would have been more than justified.

But, though decline and depression came to the grange, death came not. Its sickness was not mortal. In fact, the sickness only proved the vitality and strong constitution of the patient. This, too, is significant. If the time had not at last come when farmers were able to work together the grange would have gone down to rise no more. Since then the steady, healthful growth of the Order and its work and achievement in the interest of the furmers is a thrice told tale. Its membership is great and constantly increasing.-Michigan Grange Bulletin.

A Model Grange Bank. The pretty little bank building thus-trated herewith is at Laceyville, Wyoming county, Pa. Its size is 21 by 48 feet, and it is built of pressed brick and blue stone trimming. The front room is 23 by 19 feet and subdivided



GRANGE BANK, LACEYVILLE, PA.

into a general banking room, cashler's room and lobby. The vault is one of the most secure that can be built. It has a spherical safe with triple time noticeable fact that there is an locks. This bank has 160 stockholders, and, while it was instituted by the grange, it does a general banking busi-

Grange Scholarships at Cornell. The New York state grange has renewed its offer of scholarships to mem bers of the grange at the above named Institution, examinations for which are to be held the third Saturday in June in each county. The value of the six scholarships for the winter short course scholarships for the winter short course hallway on the south side of the is \$300, or \$50 for each, and they are to building. The corner stone is crackbe awarded to the six contestants who ed also. to both men and women who are mem-bers of the Order, but the student must foundation, and have been gradually be seventeen years of age on entering crushed under the immense on general knowledge, arithmetic, history, civies, English, spelling and agriculture. Those who desire to take these examinations should notify their Pomona master or the county deputy at least three weeks before the examinations.

Grange Growth. During the quarter ending April 1 there were 116 new granges organized instead of turning the water into va- and thirty reorganized in the United our. Of course if we are not going to States. New York is credited with 15 new granges. Washington 16, Vermont 15, Pennsylvania 12, Ohio 9, these bedrains and difehes to carry it away, ing the largest. Connecticut reports We shall study more about drainage the largest number of reorganized and the measurement of water through granges namely, 9-West Virginia 5 and Pennsylvania 3.

Legislative Delegation Departs. The delegation to the legislature from this city left Monday morning for Salem, and is composed of State Senator J. E. Hedges, Representatives Linu E. Jones, J. U. Campbell and Walter A. Dimics. Miss Beryl Long. tion of the throat, caes, of Anama, Mo. Walter A. Dimics. Miss Leah Miss Vada Elliott and Miss Leah Miller have gone to accept clerkships during the legislature.

Kennedy's Laxative Cough Syrup sumption. Its timely use always pre- it cures the cold by gently moving yents the development of pneumonia. the bowels and at the same time it is Sold under guarantee at Jones' Drug soothing for throat irritation, thereby Store. 50c and \$1.00. Trial bottle stooming the cough. Sold by Jones

Drug Co.

Men Who Founded the Order Just COUNTY OFFICIALS TALK ABOUT HIGHWAYS AT POMONA GRANGE MEETING.

southern states, where agriculture then DIMICK PROPOSES LAW

Hauling Over County Roads Between October 1 and May 1 of Each Year.

Clackamas County Pomona Grange held its quarterly meeting Wednes-day at Oswego, and the inclement weather kept many people at home. County Judge Lionel R. Webster, of Mulinomah County, talked on "The Johnson Good Roads Bill," which was introduced in the legislature. He analyzed the several sections of the So far as I know it was the of working convicts on county roads first organization of real farmers in and in getting out road material by this has been appreciated, but it will upon the improved public highways come. Once fairly started, the order spread with astonishing rapidity until it overran the country. Is it surprising that in the flush of this margareted successful and the flush of the flush of

these farmers would go too fast and County School Superintendent T. J too far and that reaction would come? Gary, of Clackamas, made an enter

OUR HOMICIDE RECORD.

One homicide occurred in Clackamas County in 1908. Last July Math Jancigaj, an Austrian, murdered Mary Smrekar, the 16-year old daughter of John Smrekar. Janeigaj was infatuated with the girl, but her parents frowned upon his attentions because of his dissolute habits. Janeigaj was tried at the November term of the Circuit Court, and convicted of murder in the first degree. He was sentenced to be hanged January 8, 1909, but the case is now on appeal to the Supreme

Walter St. Clair, John Riley, Earl Ransier, J. M. Dickenson and his two sons, John and William Dickenson were tried last April for the murder of Harnau Singh, a Hindu, at Boring in October, 1997. Dicken-son and his son William were sentenced to the penitentiary for life and St. Clair was sen tenced to serve 10 years. The other boys were paroled.

DON'T FORGET THE BIRDS.

President of Humane Society Issues Timely Warning.

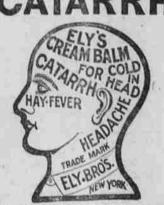
It is requested by the President of the Humane Society, Miss Anita Mc-Carver and other officers of the organization, to place out food for the birds during the cold snap. It is hard for the hirds to procure anything to finitery better than others. eat when the ground is covered with the mantle of snow. Many of the res idents of the city have been feeding the birds during the cold weather, and and John Adams Street, there were 100 birds at one time, and were feast ing on the apples and bread that the good housewife gave them. It is a usual large number of birds in the city at present, and it is an assured fact that they will not go hungry.

BUILDING STONES CRACKED.

Pillars in New Masonic Temple Crushed Under Weight.

Tenants of the new Masonic Temple ere considerably alarmed Monday at the discovery of great cracks in the stone blocks at the entrance to the It is believed that this is attain the highest standing in the ex- due to the fact that the concrete walls amination. The examinations are open have settled slightly and that the college. The examinations are based of the concrete. Beyond the disfigure likely that serious damage will re-

CATARRH



ELY'S CREAM BALM Sure to Cive Satisfaction.

CIVES RELIEF AT ONCE. It cleanses, soothes, heals and protects the diseased membrane resulting from Catarrh

Did You Ever Stop

That when 50 cents buys \$1.00 worth of merchandise, that in justice to yourself you should take advantage of it. That is what we are offering during our

Great Money-Raising

We quote below a few of our unmatchable bargains:

\$12.50 to \$15 Suits \$8.35 and Overcoats

\$15.00 to \$18 Suits \$13.25

OTHERS REDUCED IN PROPORTION

\$6.50 heavy wool Mackinaws

\$2.25 heavy wool

\$3.95

\$3.50 W. L. Douglas

\$3.05

Flannel Shirts \$1.40 \$3.00 Hawes Hats - \$1.90 WE DEFY COMPETITION AT THOSE PRICES

Yours for Real Bargains, PRICE BROS.

6th & Main Sts.

Oregon City, Ore.

Humor and Philosophy By DUNCAN M. SMITH

PERT PARAGRAPHS.

Most of us consider ourselves impor-The game is to conceal that

The person who demands more attention than is coming to him generally has the others going.

If cheerful, uncomplaining people knew how their kind exasperates the pessimist, life would be one long howl



the summer than they do in the win- abundance of water.

Faith without a ferment is as flat as year's dog license.

When a big man misbehaves it seems a lot more endurable than when a li man does the same thing.

WORKS FOR HUMANITY The difference is mainly that some of us are able to conceal our appetite for

The Simple Expert. "You say this is time tobacco land?" "The best in the world." "Indeed! Pray how many boxes of cigars will it grow to the acre?

in Solf Defense. He ceased to use the hareful weed. To pieuse his wife, but then. He were so very large a grouch. She made him start again.

Brutally Frank. "One thing I like about a dentist." "What is that-his absence? "No. When he pulls a tooth he does not claim that this burts him worse than it does you."

A Soft Concussion. "He went against his will." "He wasn't hurt, I guess." "What do you mean?" "His will is so soft."

ONLY THREE IN JAIL. Two Prisoners Are Released From Hotel Beatle,

The county jail has only three pri-soners, an Indian and his wife, who are held for burglary, and Charles Sutton, who was arrested Christmas county jail for stealing a knife from trade in the meat business. Friday, his term having expired.

Piles! Piles! Piles!

Williams' Indian Pile Ointment will cure Blind, Bleeding and Itching Piles.

WATER IS PROMISED

SUPPLY WILL BE ADEQUATE WHEN TWO NEW PUMPS ARE INSTALLED.

The capacity of the municipal water system will be increased one-half, according to a statement made by Charles H. Caufield, president of the board of water commissioners. The purchase of two new Gould's pumps, each with a capacity of 1,000,000 gal-lons, has been arranged, and the commission will also install two 27-inch McCormick water wheels. These improvements will be made without delay and the augumented system will be installed and in running order by Department of "The Orange,"

will be taken care of readily. The two pumps now in use have a capacity of 1,000,000 gallons each, but one of these pumps is of an obsolete-patern and will not be moved and set up when the pumping station is munis printed by any College in the moved from its present location to the northwest. The annual this year is new reinforced concrete structure that expected to surpass the last in both will be erected on the East side of Main street. This building will be it will contain the photographs of the fire-proof and water-proof and when atudents of the four collegiate class-the improvements in contemplation es, together with the pictures of the It always seems easy to accept the decision of an individual who has San-have a total capacity of 3,000,000 There will also be photographs of dow's strength and seems awfully will-gallons. This will insure pienty of the different forms of athletics as pressure in the extreme hill section well as scenee of the class and labora-

walt and Joseph E. Hedges, working without a salary, are doing eve. ya pancake and as useless as a last thing in their power to give the city an adequate water supply at a mini-

OFFICER BRADLEY ROUNDS UP TWO HORSES AND 20 HEAD OF CATTLE IN SNOW.

Humane Officer Darwin Bradley, working without salary in the interests of humanity, with three able as-sistants, rounded up two horses and 20 head of cattle that were out in 20 head of cattle that were out in the cold weather without protection from the severe elements. The horses from the severe elements. The horses were brought to Oregon City Tuesday and placed in a feed barn, where they will be cared for and fed at the expense of their owners. The animals pense of their owners. The animals were found on the west side of the Willamette, where there is 12 inches of snow. This weather is exceedingof snow. This weather is exceeding an intense burning sensation as if by trying to livestock. The cattle two live coals were placed directly will be taken to a comfortance where they may have food. Officer from my kidneys were also unnatural fradley states there is a heavy fine in appearance. After using two boxes of Doan's Kidney Pills I did not least pain in my back or Fradley states there is a neavy had provided in cases where owners of livestock permit their horses or cathave the least pain in my back or trouble with the kidneys. I give all trouble with the kidneys. I give all the change in my condithe credit for the change in my continue his work under the direction of the Clackamas County Humane Society.

Plenty more proof like this from Oregon City people. Call at Huntley Bros. Co. drug store and ask what their customers report.

August Bremer, of New Era, Purchases Butcher Business.

The Frank L. Smith meat market take no other. located on the corner of Main and Fifth streets, has again changed eve on a charge of threatening to kill his wife at Island Station near Milwaukee. Sutton has been unable Bremer, a well known young man of Bremer, a well known young man of to obtain ball. J. B. Long, who pleaded by the state of the Peace Samson's court to petit larceny and was sentenced to serve 12 days in the county jail, was released Friday, his wife paying \$19, the balance of his fine of \$24 equivalent to nine and one. Logus and was sold about two years ago to R. A. Sawyer. H. W. Strebig bought the market from Mr. Sawyer, who afterwards sold it to the Frank fine of \$24 equivalent to nine and one. fine of \$24, equivalent to nine and one-half days in jail. Long was charged with stealing from the store of W. charge in this city by D. T. Davis, Mellien & Company, where he was who will be associated in busi-employed, and the complaint was ness with Mr. Bremer. Mr. Davis, almade by O. W. Eastham, proprietor of though has been a resident of Oregon of the furniture business. Ed Wilson, who has been serving a term in the friends and is building up a large

DEEN'S WILL PROBATED.

Lucinda Dean, by her attorney,

residue to be equally divided among their children, Mrs. Nora A. Richey, W. P. Deen and Dora I. Deen. At her death, if still his widow, the same dis-

position of the property. He named his widow as executrix without bonds. The will was admitted to probate, and letters testamentary were issued to Mrs. Deen. Geo. Epperson, C. A. Bartlemay and William Norris were appointed appraisers. The estate is valued at \$1200.

BREITHAUPT IS HONORED.

Clackamas Student On Staff of O. A. C. Junior Annual.

CORVALLIS, Or., Jan. 11.—Leroy Breithaupt, of Clackamas County, a student at the Oregon Agricultural College, has been elected to the Class June 1, 1909, and the increase of bus-iness, due to the summer sprinkling. In one of the most important college publications, and it is considered a great honor to be elected on the staff.

"The Orange" published last year of the city and in the event of un-Relatives in the country seem a lot favorable weather conditions, such as courses taught in the institution, nearer, dearer and more desirable in now exist, residents will have an These together with the individual The water commission, composed lege along the lines of illustrating, of Charles H. Canfield, Bruce Zum- poetry, and story writing make up a

EVER WATCHFUL.

A Little Care Will Save Many Oregon City Readers Future Trouble.

Watch the kidney secretions, See that they have the amber hue of

The discharges not excessive or

Contain no "brick-dust like" sediment. Doan's Kidney Pills will do this for They watch the kidneys and cure

them when they're sick.
N. S. Williams, carpenter, of 239
Liberty Street, Salem, Oregon, says: "A number of years ago the doctors told me my kidneys were in bad climate would help me but such was not the case. Nothing I did or took cine I had ever used. At the time I procured them I was suffering from

their customers report, For sale by all dealers, Price 50 cents. Foster-Milburn Co., Buffalo, New York, sole agents for the United

Remember the name-Doan's-and

States.



STEP IN PLEASE! We want you to closely examine our Late Boring Resident Leaves An Es- Dried Apricots at 121/2 a pound. They tate Worth \$1200. once they learn their fine quality.

Extra Dried Peaches........10c lb.

