

Home Course In Modern Agriculture

XIII.—How Animals Grow

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ANIMALS, unlike plants, can obtain none of their food from the soil, air or water, but must have it prepared for them. Without plants there could be no animal life, since animals are dependent upon them, either directly or indirectly, for food. A study of the way animals make use of this food in building up their bodies will help us to better understand the principles of feeding.

There are three main constituents of feeds—fats, carbohydrates and albuminoids, or protein. The fats are made up of carbon, hydrogen and oxygen. The carbohydrates, of which starch and sugar are familiar examples, are made up of the same elements put together in different proportions. Another of the carbohydrates is cellulose, or the woody fiber of plants. This is hard to digest, but some of it is used in animal growth. Albuminoids contain not only carbon, hydrogen and oxygen, but nitrogen also. In addition to these three constituents of food it also contains some mineral elements, which are commonly referred to as ash.

This ash is used in building up the bones, hair, horns and hoofs. The al-



FIG. XV.—GROUND FEED IS DIGESTED MORE QUICKLY AND COMPLETELY THAN WHOLE GRAIN.

buminoids also form a considerable portion of these parts of the body. Their chief use, however, is in building up the muscles, tissues and various organs. The fats and carbohydrates are used to furnish energy and heat. They are the fuel of the body. By uniting with oxygen they give off the heat and energy required to keep the body running, in much the same way that the elements of coal or wood unite with oxygen to furnish heat and power when burned in a steam engine. Not all of the fats and carbohydrates are burned immediately, however. Some of the fats go to build up fatty tissues. Some of the carbohydrates are changed to fats and used in the same way, and some are stored in the liver in the form of glycogen to be used when needed.

Before these various food elements can be used by the animal they must go through a process called digestion. The first step in digestion consists in taking the food into the mouth. Each class of animals has a different way of doing this. Watch the cows feeding in the pasture. They reach out their long tongues and gather in a mouthful of grass, breaking it off with a peculiar twist as it comes against their lower teeth. They cannot bite it off, since they have no upper teeth in front. The horse gathers in the grass with his lips and bites it off between his teeth. For this reason horses can eat grass down much closer to the ground than cattle can.

After the food is taken into the mouth it is chewed and mixed with saliva. This saliva serves two purposes—to moisten the food and to change some of the starch to sugar. This change is brought about by the action of enzymes which the saliva contains. These work in the same way as do the enzymes in a germinating seed, which prepare the food for the little plant.

Sugar and starch, as we have learned, are both composed of carbon, hydrogen and oxygen, the only difference being that they are put together in a little different way. The action of the enzymes changes the relation of these elements in the starch, arranging them in such a manner as to form sugar.

All the starch in the food must be changed to some form of sugar before it can be used by the animal in building up the various parts of its body. Since the food remains in the mouth only a comparatively short time, however, only a small part of the starch can be acted upon there. The rest is changed later, as we shall see.

The main purpose of the saliva is to moisten the food. This moistening, together with the chewing, reduces it to a moist, finely divided mass, ready to be swallowed and acted upon by the other digestive juices.

While the essential processes of digestion are the same for all animals, the way in which the work is carried on varies somewhat. The horse and the hog have but one stomach. As the food enters this a churning motion begins, which gradually forces the partially digested mass along toward the lower end. The saliva continues to act on the starch, and another fluid, the gastric juice, is poured

out from the walls of the stomach. The main duty of this gastric juice is to change the albuminoids into a form in which they can be absorbed and used by the animal.

Cattle and sheep have a very large stomach, which is divided into four parts. Animals of this kind are called ruminants. When the food is swallowed it passes into the first stomach, which serves the purpose of a storehouse. Here the action of the saliva continues, and the water which the animal drinks softens the food to a considerable extent. After a time the food passes into the second stomach, which forces it back to the mouth, a little at a time. Here it is chewed thoroughly. You have often seen cows lying in the shade "chewing their cud." This cud is the food that has been sent up to the mouth by the second stomach.

After being chewed the food is swallowed again. This time it passes directly through the first stomach to the third. Here it becomes still further softened, finally passing into the fourth or true stomach. The function of the first three compartments is simply to prepare the food to be acted upon by the true stomach.

After leaving the stomach the partially digested food passes into the small intestines. Here it is acted upon by three fluids—the bile, pancreatic juice and intestinal juice. The chief use of the bile is to digest the fats, making them into a sort of a soapy fluid, in which form they are ready to be absorbed into the blood.

Both the pancreatic and intestinal juices act upon the remaining starch, completing the change into sugar. The pancreatic juice also completes the digestion of the albuminoids, in which work the intestinal juice may also take a small part. Another work of the pancreatic juice is to assist in decomposing the fats. The intestinal juice breaks cane sugar up into simple sugars, such as glucose.

After the food has been digested the usable portions are ready to be absorbed into the blood. Digestion has changed the fats, proteins and starches into a form in which they are soluble. In this fluid state they pass through the walls of the stomach and intestines and are emptied into the blood.

The blood is taken to all parts of the body by the arteries, which subdivide to form tiny capillaries. These are so small and close together that a pin prick on the skin anywhere will pierce some of them. There are two main parts to the blood—the fluid of plasma and the red corpuscles—which give it its color.

Each part of the body selects from the blood the food materials which it needs. Thus the bones will take ash, while the muscles will take protein, to build up their worn-out parts. The waste, broken down parts are burned, together with as much fat and sugar as are needed, to furnish heat and energy. All through the body there are thousands of little fires. To keep these fires going oxygen is used, and carbon dioxide is given off in the same way that a fire in a stove takes in oxygen through the lower draft and sends carbon dioxide up the chimney.

In the body the corpuscles supply the oxygen and carry away the carbon dioxide. The other waste materials, or ashes, are gathered up by a system of vessels called lymphatics, which empty into the veins. These veins carry the blood back to the heart. The change of the contents of the corpuscles from oxygen to carbon dioxide changes the color of the blood from a bright red to a much darker shade.

From the right side of the heart, to which the blood is brought by the



FIG. XVI.—SUPPORT TIME

veins, it is sent to the lungs, where the corpuscles exchange their carbon dioxide for oxygen and are ready for another trip through the body.

Since oxygen plays such an important part in keeping up the fires that supply the body with heat and energy, it is just as important that the animals be well supplied with fresh air as it is that they have enough food. In the winter especially the stables are often closed so tightly in the attempt to keep them warm that the air becomes very deficient in oxygen. In consequence the work of the body is delayed and the general health suffers. By having ventilators in the roof, together with plenty of windows at such a height that the draft will not blow directly upon the animals, fresh air can be admitted and impure air drawn off constantly.

Kills Her Foe of 20 Years.
"The most merciless enemy I had for 20 years," declares Mrs. James Duncan, of Haynesville, Me., "was Dyspepsia. I suffered intensely after eating or drinking and could scarcely sleep. After many remedies had failed and several doctors gave me up, I tried Electric Bitters, which cured me completely. Now I can eat anything, I am 70 years old and am overjoyed to get my health and strength back again." For indigestion, loss of appetite, kidney trouble, lame back, female complaints, it's unequalled. Only 50c at Jones Drug Co.

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HENDERSON LOSES COW

JURY GIVES BOVINE TO JOSEPH REED, WHO FILES ACTION FOR REPLEVIN.

POSSESSION CONFUSING

Defendant Insists That He Owns Father and Mother of the Animal and Will Appeal to Supreme Court.

The suit of Joseph Reed against Charles C. Henderson for the possession of a cow took up the time of the Circuit Court Wednesday. The jury awarded the cow to Reed and Henderson will appeal to the Supreme Court. George C. Brownell appeared for Reed and Henderson was represented by O. D. Eby.

Reed instituted an action to replevin the cow, alleging that he was the owner and testified that he bought the cow along with his mother and raised the calf. Henderson insisted that he is the owner of the cow and owns its father and also its mother. The parties live in the Happy Hollow country, near Damascus. The cow is marked with Henderson's brand.

The cattle in that country run at large to an extent and in this manner the possession and ownership became confused. Reed went to Henderson's place and demanded the animal and was refused possession and ordered off the place. He returned with several other men and they put a rope around the cow's horns and started to lead the animal away, when Henderson rushed to the house for a gun. His mother is wiser in years and declined to let the young man have the weapon so Henderson whipped out his knife and cut the rope. The next time Reed came the Constable was with him and the cow was taken.

Henderson had two cows that were very similar in appearance and he says that Reed and the constable got the wrong cow. It appears that at one time Reed cut the initial "J" on one of the cow's horns and Henderson says he still has this cow.

The case was an unusual one and attracted considerable interest. The jury returned a verdict in favor of Reed at 4 o'clock Wednesday afternoon.

LOCAL WOOLEN MILLS BUY POOL OF WOOL

THIRTY THOUSAND POUNDS SOLD AT HIGHEST PRICES PAID THIS YEAR.

The Oregon City Manufacturing Company has purchased a pool of wool at Scio, Linn County, paying 21 and 81 hundredths cents per pound. This is the highest price paid for wool in the Willamette Valley this year.

The company, which operates one of the largest woolen mills in the West, had a representative on the ground and entered into competition with Eastern and local concerns, as the pool was auctioned off at public sale to the highest bidder. About 4000 fleeces were purchased, amounting to close to 30,000 pounds. This sale of wool is far out of the ordinary transaction in this valley.

Huntley Bros. Company will give to any poultry owner calling this week a 25c copyright book on poultry. Full of sound chicken sense. By mail 4c.

OAKLEY HAS ISSUED BOOK

CONGREGATIONAL MINISTER IS AUTHOR OF PLEASING VILLAGE TALE.

STORY OFF THE PRESS

"Dyke's Corners" is Suggestive Title From Pen of Man Who Has Not Lived and Studied All in Vain.

Few, if any, towns in Oregon, have produced so many authors as Oregon City, the birthplace of Edwin Markham, the girlhood home of Ella Higginson, and the present abode of Eva Emery Dye, and the newly discovered E. Clarence Oakley. Not even the closest friends of Mr. Oakley, the popular pastor of the First Congregational Church, have suspected that he had a book in hand, that for genuine wit, humor, and what the



REV. E. CLARENCE OAKLEY, pastor of First Congregational Church, of Oregon City, who has written "Dyke's Corners," an interesting village tale.

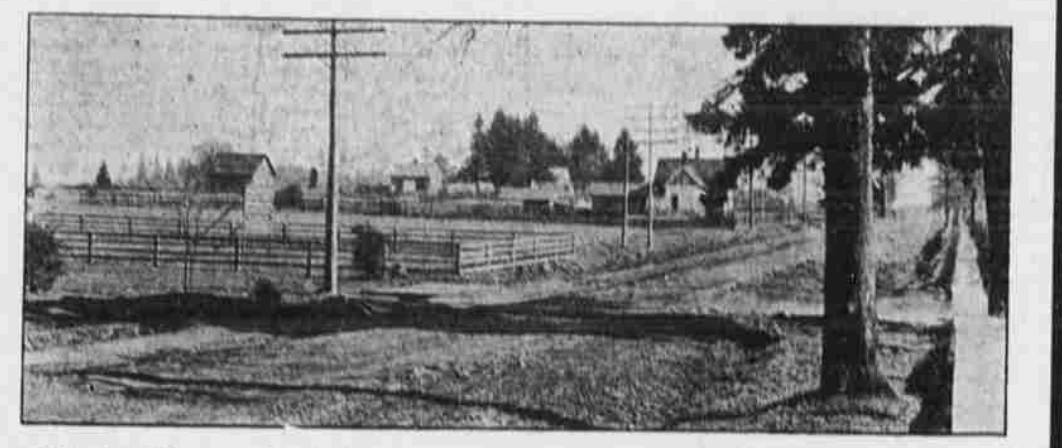
actor folk call "heart interest" probably surpasses anything yet done by an Oregonian. "Dyke's Corners" is the suggestive title of a village tale just published by Richard Badger of the Gorham Press, Boston, that from a mechanical point of view attracts at the first glance. Whether anything between the covers is actual, or not, or whether the scene lies in Oregon or the East, or whether Mr. Oakley delves out of his own experiences as amateur photographer, musician or minister, the reader must discover and decide for himself. At any rate there is a mystery, a plot, and considerable psychological interplay that may have occurred at any point between Eugene and Oregon City, among any of a score of village corners like "Dyke's."

Those who look for anything sad or solemn will be happily disappointed, for from start to finish an undercurrent of humor bubbles in this latest Oregon book, and bids fair to make it one of the "best sellers" the Beaver State has ever known. Like Ralph Connor and Ian McClaren, Mr. Oakley has not lived and studied among his parishioners in vain.

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This beautiful corner lot 50x100 feet in dimensions, in South Oregon City, an ideal residence section, to be given to the person receiving the greatest number of votes between this date and August 31st, 1909.

This Contest Is Open To Everyone, So Get Busy

To the person receiving the highest number of votes up to August 31st, 1909, we will give a warranty deed to this beautiful lot pictured above.
To the person receiving the second highest number of votes up to August 31st, 1909, we will give a credit of \$50.00 on any unsold lot in South Oregon City.
To the person receiving the third highest number of votes up to August 31st, 1909, we will give a credit of \$25 on any unsold lot in South Oregon City.

These credits will be accepted by the owners of the property at their face value and will be credited against the purchase price of these lots. Balance may be paid in small monthly payments if desired.

- 1 year's subscription (now or renewals) paid in advance entitles you to 150 votes
- 2 years 350 votes
- 3 years 550 votes
- 4 years 750 votes
- 5 years 950 votes
- 6 years 1150 votes

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ON DECORATION DAY.

Mountain View Cemetery, at Her Resting Place.

Life does not dwell in mortal man, Nor in the world's activity; It does not dwell in plant, nor can Be drawn from earth's nativity.

Though in profession all around I see the floral beauty spread, Which makes an Eden of the ground Where resting lay the silent dead.

Unmindful of the feet that stepped Upon the sod, and slowly moved; Nor of the hearts that bitter wept And suffered pains for those they loved.

We come within a few short days To see the flowers we did lay Exposed to sun and sweetening rays And find them doomed to death, decay.

Life is not in material things In tree, grass, flesh, or blood, or bone; It is not in the pain that stings, Nor in the things that turn to stone.

Life is not in mortality, Dwells not in hearing, sight, nor breath.

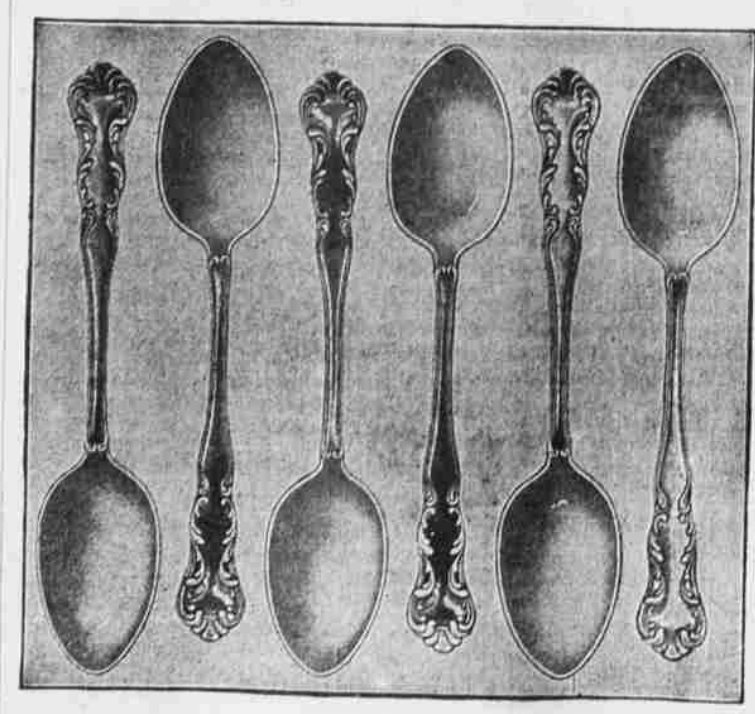
Life is a divine quality And never dooms a "Man" to death. Then soaring into higher realms Where "Man" is walking in God's path; And anchored in these peaceful calms My soul asserts: There is no death. GEO. FREY.

WOODMEN MEMORIAL DAY.

Service Will Be Held Next Sunday by Willamette Falls Camp.

The Woodmen of the World will hold their memorial services and unveiling of the deceased neighbors' monuments on Sunday, June 6, at 2 P. M. All members and their families are requested to be present, and the public is cordially invited. The Woodmen are all requested to bring flowers. A committee from the lodge will decorate the graves of the deceased members after the memorial services. The orator of the day will be Rev. Mulkey, of Gladstone.

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