

dance has been away beyond all expectation. Demonstration work is being carried on throughout the province in sheep and poultry husbandry and in horticulture. Courses in agriculture have been established at Prince of Wales College. Women's Institutes have been inaugurated, and provision made for introducing nature study in the public schools.

Nova Scotia.—During the past two years much needed additions have been made to the buildings and equipment of the Maritime Agricultural College, at Truro, and additional instructors have been appointed on the staff. The College has also undertaken a considerable amount of extension work, thereby serving many parts of the province and enlarging the influence of the College. Women's Institutes have been assisted, and summer courses in agriculture for teachers have been conducted. A large amount of demonstration work is being carried on.

New Brunswick.—Two agricultural schools are being established, one at Woodstock and one at Sussex. Special travelling instructors have been appointed. Demonstration trains have been run. A Director of Agricultural instruction for public schools has been appointed, courses for teachers established and school gardens encouraged. Women's Institutes are being organized and courses given in domestic science. Demonstration work, also, is being undertaken along several lines—poultry, beekeeping, dairying and horticulture.

Quebec.—First of all \$20,000 each has been handed over to the three teaching institutions, Macdonald College, Oka, and Ste Anne De La Pocatiere for equipment, additional instructors and extension work. Some assistance is being given to normal schools, for teachers and to domestic science schools. The rest of the grant is being used for demonstration work in poultry, bacon production, fruit growing, apiculture, maple sugar making, crop production, clover and underdrainage. Demonstration trains are provided for. It is also proposed to locate some county or district representatives.

Ontario.—During the past two years the Federal grants have made possible several important additions to the buildings at the Agricultural College at Guelph—field husbandry building, \$50,000; poultry building, \$30,000; apiary building, \$6,000, and some other additions, \$5,500. No less a sum than \$80,000 has been added this year to the regular provincial appropriations of \$83,000 for district representative work. Nearly every line of instruction and demonstration work carried on by the Department has been assisted—underdrainage, short courses, fruit growing, vegetable growing, beekeeping and soil cultivation. Domestic science courses also have been materially assisted. Public school instruction in agriculture is being developed. Fall fairs for rural public schools is a most promising line of work that is being assisted.

Manitoba.—The most elaborate work undertaken here is in connection with demonstration farm work, a very thorough system having been inaugurated to demonstrate the best methods of crop rotation and to encourage the growing of alfalfa—the whole scheme being planned to encourage mixed farming. Travelling instructors are employed, and a special feature is the giving of instruction to the foreign settlers in various districts. Demonstration trains and short courses also are provided for, with the publication of a special series of popular farm bulletins. Farm clubs for boys and girls are assisted.

Saskatchewan.—This Province carries on through its Agricultural College a lot of work that in other provinces is done by the immediate staff of the department. The grant, therefore, is divided, one-half going to the college at Saskatoon, which has added a number of instructors whose work is mainly that of extension or taking instruction to farmers. The departmental officers are using their half of the grant in demonstration work and in giving instruction in dairying, live stock, and weed destruction.

Alberta.—About \$40,000 of the total grant is being used in the maintenance of the three agricultural schools recently opened at Claresholm, Olds and Vermilion. The buildings for these schools were erected at a cost of \$30,000 each. The equipment added \$80,000. Each school is erected at a demonstration farm. The Provincial Department will add equipment and buildings as required, and the Federal grant will be used for maintenance. These schools will be used as centres for extension work. Field husbandry, animal husbandry, farm mechanics and household science are the subjects provided for. The permanent staff is assisted from time to time by provincial officers of the department.

British Columbia.—Instructors in agriculture and short courses are provided for. Women's Institutes are assisted through the organization of courses of instruction. Fruit packing and stock judging competitions are held. Demonstration work is carried on in crop production, dairying and horticulture. School gardens are assisted.

From the foregoing statement it will be seen that the various Provincial Departments are heartily co-operating with Hon. Mr. Burrell in

working out the scheme which he provided for in his bill of last session, and which became operative on the first of April, 1913. It might be mentioned here that the Lever Bill of somewhat similar nature was introduced into the House of Representatives of the United States on April 4th, 1912, was passed on August 23rd, 1912, but has not yet received the assent of the Senate.

### Nature's Diary.

By A. B. Klugh, M.A.

In our last article we dealt with the way in which plants secure their raw materials and manufacture them into starch. Starch is a compound which is insoluble in water and consequently has to be changed to some soluble substance in order to be transported to the different parts of the plant. This substance is sugar, which is formed from the starch by the action of chemical agents known as ferments. Part of the sugar may be used in building up the cells of the plant, part of it may act as a "fuel" to be burnt (oxidized) to supply energy, while the rest is carried to the stem or root to be stored, after being reconverted into starch, for future use. We know well enough that we can get sugar from the sap of the sugar maple during the growing season, but where is the sugar during the winter? If we make a chemical test on a twig of sugar maple in spring or summer we can detect sugar, but in the fall and winter we find starch. This formation of sugar from starch is spoken of as digestion.

The work which is done by the plant in building up its tissues is called assimilation. This process goes on in all the living parts of the plant. In assimilation the sugar or starch (both of which substances are termed carbohydrates from the fact that they are composed of carbon and the elements of water) is united with the nitrogen, sulphur and phosphorus to form proteids. The three last named elements are taken in by the roots from solutions of ni-

the appearance of a "wilted" plant, and we know that it may be rendered rigid again by supplying it with plenty of water. Hence one function of water is the maintenance of rigidity or turgidity, as it is termed in plant physiology. To see how water acts in maintaining turgidity we have only to take a rubber tube, which, when empty, is quite "flabby," tie one end, attach it to the tap and turn on the water. The tube will then be comparatively firm and rigid.

Plants in taking up salts from the soil absorb more than they need for the manufacture of proteids, and also take up some salts which are of no service to them. When the water, in which these salts have been carried up to the leaves, is given off through the stomata the salts are left behind. This is why a bonfire of leaves makes such a surprisingly large heap of ashes. An abundant constituent of burnt leaves in silica, a substance chemically the same as sand. This the plant is forced to absorb along with the potash, compounds of phosphorus, and other useful substances found in the soil water, but since silica is of hardly any value to most plants, it is accumulated in the leaf as so much refuse. Lime is much more useful to the plant than silica, but a far larger quantity of it is absorbed than is needed, hence it, too, accumulates in the leaf. We see then that when a dead leaf falls to the ground it carries with it the waste material of the tree, and the leaves thus play a part, in quite a different way, it is true, but the same part nevertheless as the kidneys of animals.

## THE HORSE.

### Evolving the Exmoor Pony.

Editor "The Farmer's Advocate":

Exmoor once possessed what was, for quite a long time, thought to be a spectral horse. This was none other than Katerfelto, an animal of some fourteen hands, which roamed the moors,

and no one knew from whence he came. He was seen, as were the Doones in Ridd's day, but could never be caught. Many an expedition to seize him failed, until one real organized effort was made, about a hundred years ago, to secure him. Ere he yielded up his freedom, Katerfelto made a leap, called extraordinary in those days, and still spoken of as "Katerfelto's leap." He was captured, after this last mighty effort to retain freedom, by an ancestor of the Froude family at East Anstey.

He was a dun with a black "bit" down his back, and he presented all the appearances of a blood-like stallion, being, to present-day ways of thinking, extremely like the small Thoroughbred to the Polo-bred stallion. Some would call him a Galloway—meaning, of course, the racing pony called by that name to-day.

The story which has gone down to history regarding him was that he belonged to a political offender, or an outlaw, who rode him from up the country to Porlock, and escaped by sea to foreign parts. But one thing is certain—for well nigh three years Katerfelto was running free and wild with the ponies of Exmoor, and his influence upon the mares must have been a considerable one. Much of the present-day blood can be traced to him.

There have been many tales told of this once spectral stepple-chaser, and "The Druid" believed that Katerfelto's dam, stolen by some gipsies, proved in foal to an Arab stallion; but the version recorded herein was given by the late Froude Bellew to the late George S. Lowe, who made such a special study of horse and pony lore.

The evolution of the Exmoor pony also reads like a romance. Sir Thomas Ackland and John Knight were the actual pioneer breeders of the type upon a large scale. The 12-hands pony came from their mares as regularly as clockwork. They fell chiefly as buff-bays or browns, and many of them had mealy mouths, but there were a few chestnuts and greys. The fame of the pony spread far, and once all London was talking of these Exmoors.



A Drafter and His Load.

One of the six-horse team of drafters belonging to the Union Stock-yards Co., Chicago, Ill.

trates, sulphates and phosphates in the soil. The proteids are most highly complex substances, and protoplasm, the living matter itself of both plants and animals is a proteid.

A plant in taking in water with the dissolved salts in it takes in a good deal more than is needed for the manufacture of carbohydrates. This excess is given off through the stomata, and the process is termed transpiration. The function of the guard-cells of the stomata is to regulate transpiration. When the plant has an excess of water the guard-cells stand wide apart at their centers, thus allowing the water to pass off in the form of water-vapor. When there is no excess of water the guard-cells are closed. The amount of water transpired by the plants is large. During 173 days of growth a corn plant has been found to give off nearly 81 pounds of water. In 140 days a sunflower plant gave off 145 pounds. A grass-plant gives off its own weight of water every twenty-four hours in hot summer weather. This would mean that about six and a half tons of water would be given off from an acre of meadow in twenty-four hours. A birch tree, standing in open ground, was found to transpire from seven to nine hundred pounds in a hot day.

We have referred to the use of water in the formation of carbohydrates and as a solvent for salts, but it has another very important function in the plant. We are all familiar with