albumen is extracted from the rest and sold for sugarrefining purposes and for leather-dressing. Other uses to which the by-products of the pig factory are put include the manufacture of neat's-footoil and gelatine, and the conversion of rough fats into grease and fertilizers.

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FARM.

The Tale of the Rings.

BY HERMAN H. CHAPMAN, GRAND RAPIDS, MINN. HOW A FOREST RECORDS ITS HISTORY IN ITS TREE TRUNKS, TO BE REVEALED WHEN THE TREES ARE FELLED.

Every tree has its life-history securely locked up in its heart. Each year of its growth a thin ring of wood is formed next to the bark, and a corresponding layer of bark adjoining it. As the tree swells and swells, the bark is forced outward, and splits into wide fissures. Much of it falls off altogether, but each ring of wood remains a faithful record of the year in which it was formed. When the axe or saw of the woodman ends the life of the tree, and brings its body crashing to the earth, this record is unrolled before us, and by it we can determine almostevery incident in the life and growth of the tree.

Trees, as well as human beings, have their period of struggle and hardship, their prosperous times, their terrible misfortunes and hair-breadth escapes, their injuries and recovery, or their complete submergence in a struggle in which the odds were too great for their feeble strength to cope with.

Here is a sturdy oak, whose tale revealed is that of steady perseverance in the face of difficulties—a slow, gradual growth, never checked, never daunted, till the final goal is reached, and it stands supreme, literally monarch of all it surveys.

supreme, literally monarch of all it surveys. Here is a mighty spruce, which has a tale of perseverance, but of a different sort. The oak conquers by force of character, by its fighting qualities. The spruce succeeds by its ability to endure. It is like the patient Jew, frugal, living on what would be starvation to others, till, when their day of strength is past, and sudden disaster overtakes them, he enters into his inheritance and prospers amazingly.

See the record of this spruce: Fifty, sixty, seventy years, each represented by a ring so small that it takes great care to distinguish them at all, and the whole seventy do not occupy the space of three inches at the heart of the tree. What a tale of hardship this sets forth. Other trees have preempted the light on which the existence of a tree depends. The poor spruce must be content with the twilight that filters through the branches of its enemies, the poplar, birch and pine. But it is content. Itknowsthatif the young poplars or pinespring up beside it in the shade, they could not endure, but would quickly die. It knows that the time will come when old age or disease will weaken the poplars, or perhaps a heavy wind will lay them low, and the spruce, old in years, but insignificant in stature, will escape injury, and still young in vitality, will soon spring ahead in the race.

Now, see its rings. It has made as much growth in ten years as in the preceding seventy, and soon becomes a large tree.

What does the stump of this old white pine teach Evidently something extraordinary has hap-118? pened to it, for away in near the heart a black scarruns around the edge of one of the annual rings for nearly one-fourth of its circumference, and outside of this the rings are no longer complete, but have their edges turned in against the face of the scar. Each subseing reaches further across it. By the time they have met in the center many years have elapsed, and there is a deep fissure where the scar once existed. But the later rings have bridged the gap, and, growing thicker in the depression, soon fill up the circumference of the tree to its natural roundness, leaving no sign of the old wound. What happened to the tree? While it was still young, its nappened to the tree? While it was still young, its mortal enemy, the forest fire, swept through the woods, destroying most of its companions, and burning a large strip of the tender bark on its ex-exposed side, so that the bark died and fell off. But being better protected than the others, and having cill three fourths of its hark left uninjured, it seen still three-fourths of its bark left uninjured, it soon recovered, and its stump reveals how successfully it strove to heal the wound, and grew to maturity, to perpetuate its species.

plain—there were too many trees—and as none would give up the struggle, all suffered alike.

THE FARMER'S ADVOCATE.

But they were not the only sufferers. Here and there we see a slender, struggling white pine making a vain attempt to capture its share of sun and rain. Count reveals that these white pines are also all of the same age, but, unfortunately, only 126 years old. The Norways had 12 years the start of them, and the delay was fatal.

How did it happen that these trees came in so thickly, and all the same year? Perhaps further study will help us to find out. So we go to another Perhaps further Here we find cutting, over a mile from the first. many trees about the size of those we have left, and counting the rings, we find them to be of the same age-138 years. But here there is something more. In a secluded nook stands a group of immense white and Norway trees, perhaps a dozen. These prove to be very old, but, remarkably enough, also of even age—each stump showing 315 rings. Where is the rest of this patriarchal forest? Close about the few remaining may be seen the forms of many more, stretched upon the ground and slowly decaying. These have evidently been blown down, possibly after being killed by fire. Their fate give us the Their fate give us the the others. It is plain clue to the disappearance of the others. that some time before 1763 a great disaster overtook the pine forest in this place. Most of it was wiped out of existence, either by fire or wind. But here and there a clump remains, and from them in a Most of it was wiped favorable seed year, came the seed which started the new and thriving crop of Norway pine.

To find out, if possible, whether this conflagration or blowdown was more than local, we go to a cutting some ten miles from our first, and here again the oldest and largest of the stand, which is all rather small, prove to be 138 years old. Whatever the cause, then, it must have operated over a large area. But this is not a thick stand; in fact, there are many gaps, and much of the timber is limby and knotty, a sure sign that it has not been grown very close together, and soon we find that many—in fact, most—of the trees are but 101 years old, there being two distinct age classes.

How did this come about? Let us look at the older trees. Here upon one of them is a fire scar, made when the tree was 18 years of age. Upon another we find a similar scar, made in the same year. And on close examination, we can hardly find one of the older trees free from the marks of this fire. How plain it is, that this fire, occurring just 120 years ago, or in the year 1781, when the young forest was 18 years of age, killed nearly all the young pine, and gave the forest a blow from which, in this place at least, it never fully recovered. But it did the best it could, for the age of the second class of trees, 101 years, shows that the young survivors of the fire grew rapidly, until at the age of 38 years they were enabled to produce a crop of seeds, or possibly the old trees from which the first ones came were still living, and seeded down the ground a second time, so that a fairly good stand of trees was finally produced.

These studies lead us to infer that pines reproduce themselves as forests, generally under exceptional or unusual circumstances, and that that is their natural way of maintaining themselves as species. The young white and Norway pine, especially the latter, cannot endure much shade when small, and could not possibly grow up as a thick forest under their own shade or the shade of other trees, yet we nearly always find them in dense groves. The rings tell us the secret. In the long period of 200 to 300 years during which the pines live, the "accident" of fire or wind becomes a certainty, and when a strip of forest is laid low or burned up, the neighboring trees stand ready to scatter the seed far and wide in the wind, and the new growth springs up and flourishes.

Prof. Reynolds' Ventilation Plan Discussed.

FOUNDED 1866

A correspondent writes : "It seems to me that the ventilation pipes suggested in Prof. Reynolds' very excellent article in your last issue are very large, and as there will be a horse-fork car underneath the ridge, through center of barn, the freshair inlet pipes would have to be at the ends. The foul-air outlet pipes could not be put behind the door next the wall in rear of passage behind cattle, as suggested in plan (page 398), for the reason that the large door hinges close to the wall. Prof. Reynolds' plan provides for the foul-air pipe there by the end wall jutting in about a foot. A pipe could extend up by end wall near rear of cattle, starting say from just above the gutter. The plan does not state how high above the roof the foul-air outlet pipe should extend. Understand it runs straight up from floor through the roof. Would it not be more economical to bring the fresh air in underground by running a pipe a short distance out from the building, and placing a cowl there instead of on the roof? This barn runs north and south. Would a cowl be needed on each end to make the system effective?" In reference to the foregoing, Prof. Reynolds

writes at follows:

First.—As regards the size and location of the pipes, I do not think that the pipes are too large for the number of cattle to be stabled. As to location, it is of no consequence just at what point through the barn, or even outside the barn, the inlet pipes are carried down. It is requisite only that the cowl be sufficiently elevated above surrounding objects to catch the force of the wind in whatever direction it may be blowing.

Secondly.—As regards the outlet pipes, it is not indispensable for them to be carried to the floor in every case. If they open from the ceiling, their purpose will be served with perhaps an occasional danger of too low temperatures in the stable. Nor need they be just at the points where I have indicated in the plan. So long as the air after being admitted to the stable is compelled to circulate through the stable space before being carried off, its purpose is served.

Thirdly.—The outlet pipe need not go much above the roof at the point through which it passes. So long as it is carried through the roof sufficiently to allow free passage of air and for a weather cap to be placed over the end of the pipe, it is sufficient. With the cowl for the inlet, the circulation of air is kept up by the force of the wind, and all that is required for the outlet is a simple opening. So far as the stable itself is concerned, it would be sufficient if the foul air were allowed to escape in the barn, but that might be injurious to hay, straw or grain stored in the barn ; and, therefore, it is better to carry the foul air quite outside by a straight pipe, or by a pipe bending from the barn floor to the outside and turning up again after passing through the outside wall.

Fourthly.—The principal places where I have seen this plan of ventilation in use are at Mr. Massey's farm at East Toronto, and Mr. Tillson's at Tilsonburg. I'know of one or two places that introduced the same system on a smaller scale last year; and I visited one of these two or three weeks ago, and found it to be working very satisfactorily. This system was placed in a hogpen. The address is J. F. Maunder, Little Britain, Ont. The use of the cowl is becoming quite common in connection with sub-earth ducts for cheese factories, and the method of the distribution of the air is, I believe, after the system of Mr. Usher It of wh to fa impro ingen system The n prove will f insign

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But as it takes many swallows to make the summer, so it takes many trees to make a forest, and the forest has almost as much individuality as the tree itself. Though each tree and each species struggle with each other for life and supremacy, yet, in a sense, they are helpful to each other, and protect each other from their common enemies.

The enemies of the forest—the wind and the fire. Other enemies there are, such as insects and disease, and sometimes the forest suffers so severely that its whole aspect is changed, and new species come in and replace the old. Much of this history the rings will reveal to us, as is the case in some of the following actual examples from studies recently made in the pine forests of Northern Minnesota :

In one locality, where rather small Norway pine stood very close together, making a thick stand, it was found that almost without exception the trees were of the same age—138 years. No matter how large or how tender the tree, it was just as old as its neighbor.

The rings on all these trees were very large at the heart, but as fifty or sixty years went by, they got narrower and narrower, until some of the smaller trees seemed hardly to grow at all. The reason was This is nature's method. But nature's methods are so perfectly harmonized that but little is needed to throw them out of balance.

Nature clears in strips and dashes seed there, and fires are rare and far apart. Man clears over wide areas, and fires of his origin sweep repeatedly over his slashings. The young pines spring up even after the second and third fires, but by perseverance the fires finally destroy them all, and what nature intended to be the young pine forest becomes a barren wilderness.

Preserve Harness in Good Condition.

The rainy day may be profitably employed with a little labor looking to the care of the harness.

Much may be done to prolong the life of a set of harness by giving it a little care and attention in the matter of oiling. Not only does an occasional oiling, when properly given, lengthen the life of the leather, but it also renders it pliable and more comfortable to the animals by which it is worn. Harness should always be wiped clean after being used, so as to prevent the formation of that clammy compound of perspiration and dust which is so frequently seen on badly-kept harness. The natural tendency of the leather is to dry and become britle; this may be guarded against by subjecting it to a good soaking with oil now and again. The oil when so applied should be well rubbed in with some coarse cloth, and the leather afterwards dried by being thoroughly wiped with a dry rag or woollen material. The best oil to use for the purpose is neat's-foot. The required shade of color can be given to the oil by the addition of fampblack.

As is well known by the farmer, harness costs money. In a comparatively dry climate, such as we have, a little work performed as indicated above will return a handsome profit. after the system of Mr. Usher. Fifthly.-As to bringing the air underground a short distance, this would be an advantage, since the air would be warmed in winter and cooled in summer in passing through the ground; but I do not see how it would be more economical, since you have just as great a length of vertical pipe from the cowl down, and the additional cost of the ground tile.

Sixthly.-I think that one large cowl at the end of this barn could be made sufficient. The dimensions that I stated in my last letter are not too great for satisfactory ventilation at all times. must not be forgotten that provision is to be made for calm days, when the movement of air will be very slow, and that on cold, windy days the shutoffs may be used to check the inflow of air. While the dimensions I have stated are, I think, none too large, yet a somewhat smaller inlet pipe will be found to serve the purpose with more or less satisfaction. Those who are putting in the ventilation system must be guided by their own judgment and by local circumstances, such as the elevation of the site and the amount of cost they feel inclined to bear in this connection. A comparatively small pipe under the system that I have outlined will be found very much superior to no ventilation at all or to another system without the cowl.

Very truly yours, J. B. REYNOLDS.

Ontario Agricultural College.

The spring crops and hay in most parts of the Province of Ontario are very promising for a good yield, frequent rains having supplied ample moisture. Fall wheat in some sections suffered from cold. dry winds in May, and in some parts the Hessian fly has damaged that crop considerably, while in others the prospect is very satisfactory. The only feature that mars the beauty of farm crops is the alarming spread in some districts of such weeds as charlock and ox-eye daisy.