

## The Farmer's Advocate AND HOME MAGAZINE.

THE LEADING AGRICULTURAL JOURNAL IN  
THE DOMINION.

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JOHN WELD, MANAGER.

Agents for "The Farmer's Advocate and Home Journal,"  
Winnipeg, Man.

1. THE FARMER'S ADVOCATE AND HOME MAGAZINE is published every Thursday. It is impartial and independent of all classes and parties, handsomely illustrated with original engravings, and furnishes the most practical, reliable and profitable information for farmers, dairymen, gardeners, stockmen and home-makers, of any publication in Canada.
2. TERMS OF SUBSCRIPTION.—In Canada, England, Ireland, Scotland, Newfoundland and New Zealand, \$1.50 per year, in advance; \$2.00 per year when not paid in advance. United States, \$2.50 per year; all other countries 12s. 6d. in advance.
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4. THE FARMER'S ADVOCATE is sent to subscribers until an explicit order is received for its discontinuance. All payments of arrears must be made as required by law.
5. THE LAW IS, that all subscribers to newspapers are held responsible until all arrears are paid, and their paper ordered to be discontinued.
6. REMITTANCES should be made direct to us, either by Money Order or Registered Letter, which will be at our risk. When made otherwise we will not be responsible.
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8. ANONYMOUS communications will receive no attention. In every case the "Full Name and Post-Office Address Must be Given."
9. WHEN A REPLY BY MAIL IS REQUIRED to Urgent Veterinary or Legal Enquiries, \$1.00 must be enclosed.
10. LETTERS intended for publication should be written on one side of the paper only. Criticisms of Articles, Suggestions How to Improve "The Farmer's Advocate and Home Magazine," Descriptions of New Grains, Roots or Vegetables not generally known, Particulars of Experiments Tried, or Improved Methods of Cultivation, are each and all welcome. Contributions sent us must not be furnished other papers until they have appeared in our columns. Rejected matter will be returned on receipt of postage.
11. ALL COMMUNICATIONS in reference to any matter connected with this paper should be addressed as below, and not to any individual connected with the paper.

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victim interested. He may lead a young lad over to a fine bullock and introduce the subject of cattle feeding, and soon work around to the worthless premium and the cheap publication. The word "cheap" is used purposely, for no really good paper of value needs to use such methods. As soon as he separates his victim from his money, usually \$1.00, he tackles another, and so it goes.

"The Farmer's Advocate" is not sold on such a basis. The value of the paper is sufficient inducement to subscribers. They subscribe for the wealth of reading matter which it contains, and are not duped into taking it by fountain-pen sharks and razor sharpers. It is sold on its merits. Besides "The Farmer's Advocate" has stood for confining newspaper canvassers to booths or stalls, all on an equal footing, at all our leading exhibitions. People who go to a show to see and learn do not care to be "cat-hauled" around by a talkative newspaper agent. At the Canadian National stalls are now allotted to all farm papers who apply, and all business must be done therein. The sooner other show managements follow the lead the better for all concerned, and the sooner the public beware of the worthless subscription premium, the sooner will they get value for their money.

### Want an Encyclopaedia ?

We have frequently been asked to include in our list of valuable premiums for obtaining new subscribers to "The Farmer's Advocate and Home Magazine," a trustworthy encyclopaedia, but the trouble has been to find one that would fill the bill in point of quality and at the same time be brought within reach of those who might not be prepared to undertake the acquisition of one of the very large and costly works. After a long and careful search, "The Everyman Encyclopaedia," described more fully on page 2301 of this issue, is offered on terms which will be attractive to all. Our readers will, we feel sure, count it a privilege and pleasure to secure such a comprehensive and compact work of reference. Read carefully the description and the terms upon which, by a little prompt effort, the set can be secured.

### Nature's Diary.

By A. B. Klugh, M.A.

There are two kinds of sap in a plant; the water taken in by the root with salts in solution is called crude sap; the sap which contains the manufactured food is termed elaborated sap. The crude sap flows up the stem through comparatively large vessels. These large vessels show towards the pointed end of the bundle in Fig. 1, which is a photomicrograph of part of a stem

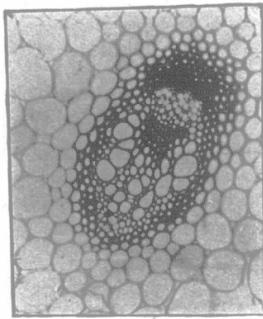


Fig. 1.—Photomicrograph of portion of stem of Buttercup. Photo by Klugh.

of a buttercup taken under the microscope and magnified about forty times. In trees this upward flow takes place through the "sap wood." The greatest upward flow occurs in the early summer, and the vessels which are formed at this season are consequently larger than those which are formed later in the season. As this formation of large and then smaller vessels goes on in trees year after year we get the appearance of rings in the trunk, and from the number of these rings we can estimate the age of the tree. Fig. 2, which is a photomicrograph of a

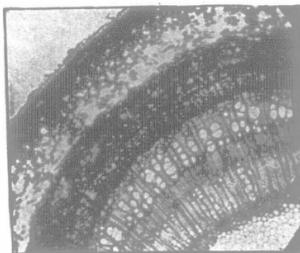


Fig. 2.—Photomicrograph of branch of White Ash, two years old. Photo by Klugh.

branch of white ash, illustrates this, and from the two rings of large vessels we can see that this branch was two years old. We can also observe that it was cut in the late summer as the ring of small vessels is near the bark, but is not yet completed as it would be in the late fall. If it had been cut in the spring or early summer, the ring of large vessels would be near the bark.

The elaborated sap flows down through much smaller vessels. These show at the rounded end of the bundle in Fig. 1, arranged in a somewhat

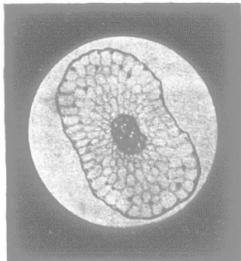


Fig. 3.—Photomicrograph of stem of a Pondweed. Photo by Klugh.

rounded mass in a rather diamond-shaped pattern near the black mass of supporting tissue. In trees these vessels are found in the inner bark, and are shown just outside the outer layer of sap wood.

The fact that the downward conduction of elaborated sap takes place through the inner bark accounts for the killing of a tree when it is "girdled," that is, when a complete ring of bark is removed from it.

Illustrations of this downward movement through the bark may be seen in cases where a tight wire has been placed about a tree. It will be noticed that there is an enlargement above the wire. This is due to the obstruction of the channels of the manufactured sap.

I mentioned in a preceding article that the firmness of the stems of herbs was largely due to their being tensely filled with water. In the case of young woody stems the strength is given mostly by special hard fibres, known as bast fibres, in the inner bark, but as the stem or branch grows the function of support is largely taken over by the wood. Even in herbs we have some supporting fibres, such as are shown surrounding, and particularly at the rounded end of the bundle in Fig. 1.

In the case of plants which grow up into the air, the matter of a sufficient supply of oxygen for all parts of the plant is not a difficult one, but in the case of plants which grow submerged in the water it is a different matter. These plants have, therefore, in their stems large open tubes known as air-spaces. These show clearly in the photomicrograph in Fig. 3 which represents a section of a stem of one of the Pond Weeds (potamogeton). At the centre of this stem may be seen the area containing the larger vessels for the upward flow of crude sap, and the smaller downward conducting vessels.

To see the bundles of vessels which conduct the sap in a common plant one has but to break a dried cornstalk across, the little threads which project are the bundles.

In a perennial plant, such as a tree, all the cells of the trunk and branches originate from an exceedingly thin layer between the wood and the bark known as the cambium. From this the cells which become wood are given off on the inside, and those which become bark on the outside.

### Co-operation.

By Peter McArthur.

At the time of writing the Dominion Grange is having one of the most important meetings in its history. I suppose I should wait for the newspaper reports of the proceedings before making any comments, but, as I have had some experience of the difficulties they will have to contend with, it will do no harm to talk them over just now. In the nature of things difficulties cannot be overcome for many months, and, in the meantime, they must be thoroughly discussed. The most significant thing on the Grange programme this year is the attempt to arrange with the Grain Growers' Grain Company and other organizations of farmers in the West, for an exchange of products. We need their feed grain and grain products, and they need our apples, fruit, honey and vegetables. As there are organizations in the East and West for the purpose of selling products, it is proposed that they make arrangements to deal with one another. The idea is excellent, but, as I pointed out last fall, there is one great difficulty that must be overcome before this exchange can be conducted successfully. At the present time there is an open market for the products of both the East and the West, and the sole purpose of existing organizations is to secure the full market price without paying commissions or profits to agents or commissionmen. If they try to deal with each other, the case will be entirely different. They will have to fix reasonable prices of their own, independently of the market, or there will be no advantage in dealing direct. If we must pay the same price for our grain from the West as we would have to pay to local dealers, where would be the advantage of dealing direct? Similarly, if the people of the West must pay as much for our apples and other products as they now pay at Western points, why should they deal with us? As a matter of fact, both would be doing better by buying from the regular dealers; for these dealers would be taking all the risks and putting up the capital needed to move the products. On the other hand, both could make a good profit, without taking big risks if they would set fair prices and deal direct with each other. But will they do it? They may be educated to that point some time, but I doubt if they will do it right away. Both want all the profits made by the middlemen on their particular products, and if they insist on that there will be no advantage in dealing with each other. If by organizing for the purpose of selling, they can reach the open market easily and get the top price they are going to do it.

Last fall I got more requests for apples than would have sold all that were produced in Middlesex County. As some of these were from farmers' clubs I had high hopes of bringing them into contact with our Apple Growers' Association, and making sales that would be advantageous to both. Our association set a price slightly above what the middlemen were willing to pay. This was necessary because we would have to do at least part of the financing of the movement of the apples, and would have more

risks. The us, because current pr to a midd couple of from one would hav they had could hav these org want the the result middlema scold at trayed in less we a their wor he might the Grain

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