

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.
2. It is impartial and independent of all cliques 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.
3. 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. in advance.
4. ADVERTISING RATES.—Single insertion, 25 cents per line, agents. Contract rates furnished on application.
5. 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.
6. THE LAW IS, that all subscribers to newspapers are held responsible until all arrears are paid, and their paper ordered to be discontinued.
7. 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.
8. THE DATE ON YOUR LABEL shows to what time your subscription is paid.
9. ANONYMOUS communications will receive no attention. In every case the "Full Name and Post-office Address Must be Given."
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11. LETTERS intended for publication should be written on one side of the paper only.
12. CHANGE OF ADDRESS.—Subscribers when ordering a change of address should give the old as well as the new P. O. address.
13. WE INVITE FARMERS to write us on any agricultural topic. We are always pleased to receive practical articles. For such as we consider valuable we will pay ten cents per inch printed matter. 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 cash and all welcome. Contributions sent us must not be furnished other papers until after they have appeared in our columns. Rejected matter will be returned on receipt of postage.
14. 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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keted the smaller the cost per case, basket, crate, box or barrel, as the case may be. Organizations encourage the "get-together" spirit, and no one interested in the business of fruit growing, beekeeping, vegetable growing, or, in fact, any other branch of agriculture in which there is an active association organized can well afford to stand aloof fighting a lone and uphill fight when he could, for a small fee, join forces with the influential association, reap a great benefit therefrom and do his part in fostering and furthering co-operation.

A*Subscription Christmas Box.

The outstanding event in agricultural journalism of the year and of the coming week, will be the issue of the "best ever" Christmas Number of "The Farmer's Advocate and Home Magazine". Its articles and illustrations will be representative of the most finished work of writers and artists of the first rank. Unlike other publications no extra charge is made for this remarkable number, though worth at least one third the entire year's regular subscription price of \$1.50. A copy will also be sent together with all the remaining numbers of the present year, to new subscribers.

As a Special Christmas Box to all readers whose subscriptions are paid up to the end of 1913, we will accept \$2.25 any time from now till Dec. 31st, 1913, in payment of your own renewal and one new subscription to Dec. 31st, 1914. Among your neighbors and friends there is someone who would value highly "The Farmer's Advocate", if brought to his notice. Let him know what a benefit it is to you and your family every week in the year. You can safely say that its actual cost to produce amounts to double the \$1.50 subscription price for which he secures the 52 copies of the year, and which will furnish more sound, practical reading matter for the farm and home than any other three agricultural publications combined.

Remember this offer is open only to Dec. 31st, so speak to your friend or neighbor personally or over the rural telephone, before he might inadvertently order another paper. Obtain the subscription, at once so that the new subscriber will receive the larger number of this year's copies, inclusive of the Christmas number with which we are sure all will be delighted. To take advantage of the foregoing offer the old subscriber must of course send a bona fide new name. You cannot do yourself and your friend a better turn than this in the closing month of the good old year.

The Lesson of the Arena.

The urban dweller busy with city business, trades and professions goes to a live-stock exhibition to see and admire. He does not hope to become intimately acquainted with the characteristics of different classes and different breeds, but live stock appeals to him, he enjoys looking at it, and he spends the day at the exhibition in much the same spirit as a young man from a remote country district seeing the sights of a large city. He has a good time; he takes pleasure out of everything he sees. Temporary delight may be all he, at the time, expects, but few things he sees are not educative; it adds to his knowledge of things in general, is instructive and valuable.

The stockman, the expert agriculturist goes to a live-stock exhibition to make a critical survey of the animals on exhibition. He knows a good one at sight; he has had experience; yet there are things for him to learn. He must be ever on the alert for new developments in type and conformation; he must know what the best judges demand in an animal. Therefore, he must see the stock together.

The young man from the farm attends a live-stock exhibition to gain more knowledge of his chosen profession. He wants to see every animal of the breed in which he is interested to advantage. He must, to get out of the show what there is in it for him, be able to see the animals lined up and placed so that by comparison the good and their inferior points are plainly brought before him as an object lesson.

All classes go to the live-stock exhibition to see the stock to advantage. There is only one satisfactory place to do this, and that is in the judging ring. Animals cannot be studied, critically and comparatively in the stalls. It is the judging in the ring that educates where a competent judge makes the awards. A casual glance at the stock is not enough for the twentieth century visitor to an exhibition of live-stock. The prime need of live-stock exhibitions is to encourage the breeders to produce more good stock, and to educate them to accomplish this. The first requisite of such a show is then a large arena where the judging is done in full view of all the spectators interested. The public demands such equipment, and it must come. Exhibition managements now see the need of it, and it is to be hoped that every large stock show in the country may, in the near future, be noted for the accommodation provided for seeing the educative feature of the show—the judging.

The Coming Issue of Issues.

It is not an easy task each year to gather a class of material for our annual Christmas Number of such a high order as to eclipse all former issues, but we feel that our readers, when they have carefully read and analyzed next week's "Farmer's Advocate and Home Magazine," will agree with us that the standard has been again set one long notch higher. It will be replete from cover to cover with good things.

The front cover in colors is a Canadian winter scene, prepared by an artist of note, and must be seen to be appreciated. The reading matter is all prepared by the best writers obtainable on matters of interest to all those who enjoy farm life. The studious reader will find the editorial article on The Book of Books and the Farm something entirely new and original in treatment. Of a reminiscent nature is an account by Dr. J. G. Rutherford of farming experiences in Scotland forty years ago. Horsemen will enjoy "Whip's" foreshadowing of the future of the horse, and an excellent history of Percherons in America by Wayne Dinsmore. The lover of good cattle will read with interest how the Aberdeen-Angus has been developed in Scotland—a historic sketch by James R. Barclay. Sheepmen Canada over will be interested in the decline and redevelopment of our sheep industry, by T. R. Arkell. The bacon hog has his innings this year in an excellent article by E. C. Fox. "There is nothing too good for the Irish" and sons of the Emerald Isle, and all admirers of Irish character and achievement will peruse with pride and pleasure a revealing article by Chauncey G. Jarvis. A resume of the agricultural year in Canada, by J. H. Grisdale, is instructive. Dairymen will digest every word of Prof. H. H. Dean's article on "The Outlook for Canadian Cheesemaking." The greatest poultry investigator in the United States, Dr. Raymond Pearl, discusses how to breed hens that will lay. Canada's agriculture is covered from ocean to ocean. In keeping with

the front cover an excellent article on the utility and beauty of snow has been prepared by A. B. Klugh. New Ontario is not forgotten—C. A. Galbraith tells of its advantages; and to cap it all the Home Department will be stronger than ever, with articles of interest in the home. Girls and Efficiency is the topic discussed by Alice Blythe Wilcox. Birds, The Farmer and His Wife, by Mrs. Mabel Osgood Wright, President of the Audubon Society of New York State is another feature, and Peter McArthur has prepared a Christmas Talk which all should read. All this excellent literature, illustrated and interspersed with the best-finished work of the highest-priced cameras and reproductions of masterpieces in painting by several of the most eminent of modern artists; make this one the issue of all Christmas issues.

Nature's Diary.

By A. B. Klugh, M. A.

Of all the phases of botany there is none of greater importance to those who follow agriculture or horticulture, than that which deals with the life processes of plants, and which is termed plant physiology.

Before we can understand anything about plant physiology it is necessary to know a little about the substances which are concerned in the life processes of the plant, and this leads us a little way into the subject of chemistry. All substances belong to one of two classes, they are either elements or compounds. By an element we mean a substance which cannot be reduced any further. Such a substance is iron, we can



Fig. 1—Portion of epidermis of leaf showing stomata highly magnified.



Fig. 2—Cross section through a stoma highly magnified.

treat it in any way we like, but we cannot make it into anything simpler. We can, on the other hand, build elements up into compounds. Thus we bring together the elements sodium and chlorine we have sodium chloride, common salt. We burn carbon, it unites with the oxygen of the air and we have the gas, carbon dioxide, in which one atom of carbon has united with two atoms of oxygen. Water is a compound of the elements hydrogen and oxygen.

The most important elements which are used in the life processes of plants are carbon, hydrogen, oxygen, nitrogen, sulphur, iron and potassium. These are all necessary to the life and growth of the plant and if any of them are wanting in the water, air or soil from which the plant derives its nourishment, death from starvation will follow. There are other elements which are made use of by plants, but as life may be prolonged without them, they are regarded as of secondary importance.

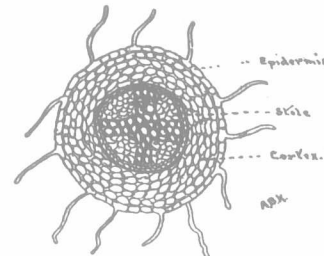


Fig. 3—Cross section of rootlet showing root veins, highly magnified.

Of these elements the oxygen and carbon are derived from the air, the hydrogen from water in the soil, and the rest from the salts of the soil.

The first life process which we shall consider will be the way in which they secure their food. Plants differ from animals, in being able to use raw materials and from these to build up their food. The leaves take in the carbon dioxide from the air. This gas enters through minute openings in the leaves called stomata, which are found on both surfaces of many leaves, on the lower surface only of others, while in such floating leaves as those of water-lilies, they occur only on the upper surface. So small are these stomata that there are about 24,000 of them to the square inch in an apple leaf, and about 300,000 to the square inch in a black walnut leaf. The structure of the stomata is shown in Figures 1 and 2. The "guard cells," which enclose the opening, control the size of the aperture.

If we take up a small root with some earth attached to it, carefully wash away the soil, and examine it with a hand-lens we shall see, just behind the growing point, an area covered with fine hairs. It is these hairs which absorb the water from the soil, and they are really extensions of some of the outer cells of the root, as