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The Field.

Duncan's Improved Hay Elevator.

AMONG the implements at the Provincial Exhibition we noticed a very simple but apparently efficient hay elevator, which was shown at work, and so far as we could judge under the circumstances, seemed to be very easily manipulated and to perform its office thoroughly. The invention is Mr. Duncan's, and rights to manufacture, as will be seen by advertisement, are sold by Mr. Mann, of Port Dover.

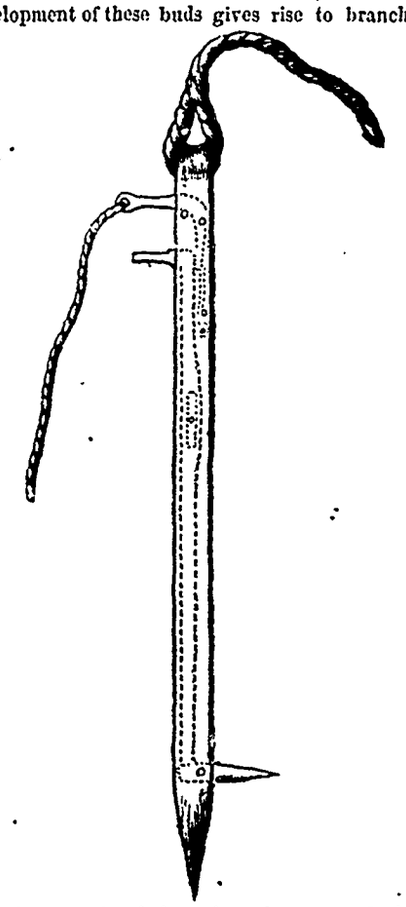
The accompanying illustration shows the appearance and construction of this implement. The working gear, represented by the dotted lines, is enclosed by two bands of iron, or one band bent into a loop at the top for the insertion of the hauling rope, and uniting at the other extremity in a sharp point to be driven into the hay. The weight of the enclosed bar throws the point of the beard up so that it offers no impediment to the passage of the fork into the mass of hay to be elevated; and the weight of the hay itself presses the beard down half way, where it is retained in position by the spring catch at the upper end of the inner bar. By pulling a rope with an easy and slight jerk, the hold of this catch is detached, the weight of the hay will then force the beard completely down, and the load on the fork is liberated. The implement appeared to work well, and does not seem liable to be soon disarranged.

We have been furnished with a certificate from a number of farmers and others in the Township of Woodhouse, who have used this new fork, and testify to its efficacy and confidently recommend it. Now that labor has become so scarce, and wages so high, every efficient labor-saving contrivance is a valuable boon to the farmer, and a cheap and good horse hay fork, which this appears to be, is not the least important of such useful inventions.

Structure and Growth of Stems.

IN a recent number of the CANADA FARMER a short account was given of the roots of plants; the subject of the following remarks is the structure and growth of the stem.

For the clearer explanation of the matter, it may be necessary, perhaps, to recapitulate briefly what has already been said in regard to the germination of seeds. If the reader will examine any seed in the act of germination, he will find the rudiment or embryo of the future plant in the form of a slender stem, one or two more or less fleshy leaves or cotyledons, and between these seed leaves, when there are two, or at the base when there is only one, a small bud. In germination, this stem, which is technically called the caulicle, increases in length until it pushes the two seed leaves above ground, while it sends out roots from the lower extremity. The little terminal bud, or plumule, then expands and developes another leaf or pair of leaves, with a stem, which goes on lengthening so as to raise the new leaf or leaves some distance above the first. The subsequent growth of the stem consists merely in repetitions of this process. Hence the summit of every stem is always occupied by a bud. A bud is also produced in the upper angle formed by every leaf with the stem. This angle is called the axil; and buds occurring in this situation are called axillary buds. The development of these buds gives rise to branches;



and the growth of these branches proceeds in a manner precisely similar to that of the original stem. The general character and duration of these parts form the distinctive features of the popular classification into trees, shrubs, and herbs. When the whole is perennial and the main stem forms a distinct trunk, a tree is formed; and when the distinct trunk is wanting, the principal branches springing up in a bushy manner close to the ground, the plant is called a shrub; while, if the stem is but of one year's duration, though the root may be perennial, the term herb is applied.

The nutriment of plants—principally water, containing carbonic acid and ammonia in solution—is chiefly absorbed by the roots, and is thence carried through the stem to the leaves, where it undergoes a change under the influence of light, and is fitted to become part of the living vegetable organism. The elaborated sap then descends, and by some wonderful process, the nature of which is unknown, is converted into wood. That the nutritive fluid descends from the leaves to form the wood is evident from several considerations. For example, the growth of new wood, other things being equal, is directly proportionate to the extent of foliage, and the growth of the tree begins and ends with the vitality of the leaves. In endogens (a class of plants of which we shall speak presently) the new formation can be traced from the base of the leaves downwards. Again, if a bandage be tied round a branch, a swelling will take place *above* the ligature, because the nutriment descending from the leaves will be there arrested, and the part in question will receive an undue quantity of nourishment.

The mode in which the new wood is arranged in the stem gives rise to two general types of structure, on which two great classes of plants have been founded. In all those plants in which there are two seed-leaves, or cotyledons, the wood is arranged in a series of concentric layers around a central pith, and between it and an external bark. Each of these concentric layers represents the growth of one year, and was formed within the bark and outside the circle of the previous year's wood. This mode of structure is termed the exogenous structure, and plants in which it occurs are called exogens—outward growers—or dicotyledons—the latter name meaning plants with two cotyledons. Plants of this class resemble each other not only in the number of their seed-leaves and in the structure of their stem, but also in many other important particulars. The veins of their leaves are spread out in numerous ramifications, and form a net-work, and the parts of the flowers generally occur in circles of five or some multiple of that number—sometimes in fours or sevens, but very seldom in threes.

All the large trees, and most of the herbs, of temperate climates belong to this class. An illustration of exogenous structure may be easily obtained by cutting across a stick of any ordinary wood, as maple, when the layers of wood will be seen in the form of concentric rings. The section will also show lines of communication between the central pith and the outer circles. These are called medullary rays, and establish a connection between the central column of cellular substance and the leaves and lateral branches. Their integrity is essential to the life of the plant. Outside of the woody circles, in stems of the exogenous structure, is a covering of bark, which, like the main column of wood, also increases by the formation of annual circles; but these are deposited