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On the Farm.

IMPROVEMENT OF LAND BY DRAINAGE.

In both ancient and modern agriculture, in fact in the agriculture of every age of the world, three fundamental principles have been recognized as essential to its development and progress, writes Prof. J. Fremont Hickman.

1. A seed bed in which to plant; 2. moisture; and 3. heat. Each of these three foundation principles are dependent one upon the other. The earth furnishes the seed-bed, but cannot produce a crop without moisture, for without moisture the seed would not sprout. Again with the earth and moisture we could not produce a crop without heat because very few seeds sprout at a temperature below fifty degrees, while most seeds require a much higher temperature. Again we may have the seed-bed and heat essential to the production of a maximum crop, but because of too much moisture our crop fails to grow, or fails to mature. This is often brought about by water accumulating on top or within the soil where it remains for days after it has rained.

Where the growing crop is thus submerged the damage is almost, if not entirely, complete. Where it stagnates upon the soil it decomposes or rots the roots and stems of plants; even where it does not remain on a spot for a great length of time, the temporary stagnation renders the land unproductive.

Seasons of tillage are often lost, and in wet years the crop must always be sown and precarious. But drain this land properly and instead of growing the poorest crop it will produce the best, not only in quality but also in quantity. Heavy rains after planting on any undrained land, may cause the seed to rot in the ground, or to germinate imperfectly. Should the plant pass successfully this critical stage, heavy rains during later growth may cause an unnatural development or a feeble character of the plant. Later in the season the want of sufficient rain upon the undrained land may cause the crop to be destroyed by drouth, for the wet soil, being compacted and firm, does not permit the roots to penetrate as deep as they would in a dryer soil.

Fall and spring plowing is often retarded because of too much moisture in the soil. Where the ground is well drained crops can be put out much earlier, which brings in turn an earlier crop, and this, as a generally accepted principle, gets onto the market when produce is highest.

The object of drainage is to improve the land by imparting to such soils the mellowness and dark color of self-drained and friable soil. Exactly how it does so might be difficult to explain in every particular. It is evident that the effect is produced by the fibers of the roots of the growing crop intersecting every particle of the soil, which they never could do before the land was drained. These with their excretions decompose on removal of the crop and are acted upon by alternating air and water, which also decompose and change in a degree the inorganic substances of the soil. Thereby drained land, which was before impervious to air and water, and consequently unavailable to air and roots, or to vegetable matter and animal life, becomes by drainage populated by both.

A single experiment can be tried by any one which, if faithfully carried out, ought to convince him that the best means of permanently deepening and mellowing the soil is by thorough drainage to afford a ready exit for all surplus water. Let him in spring, while wet, take a quantity of his hardest soil, such as presents a baked and brick-like character under the influence of drouth, and place it in a box or barrel open at the bottom, and frequently during the season let him saturate it with water. Observations from time to time will disclose the fact that it will become more and more porous, and finally hold water less and less perfectly as the experiment proceeds, and in the end it will attain a condition which, from its deep and mellow character, is almost perfect for the growth of plants. This change if examined carefully, would be found to have been largely a matter of decomposition and is, I assume, the result of chemical action brought about by a changed condition of heat and moisture in combination with atmospheric conditions.

This brings us back to the foundation principle of heat and moisture being admitted freely into the soil from which we expect to reap a maximum crop. It also indicates plainly that the necessary heat to properly support vegetable life cannot be secured so long as the proportion of water in the soil is allowed to remain so high. Upon the principle, too, that air does not readily pass through water, and that so long as the soil is thoroughly saturated temperature remains too low for

the complete development of vegetable life, we note that it results in imperfect germination, in incomplete development, and in immature and abnormal conditions of the ultimate crop.

It has been estimated that soil will hold one-fourth its bulk of water; that is to say, four inches of soil will hold one inch of water.

According to estimates forty-two inches of rainfall within one year means four hundred and fifty tons of water falling upon each acre of land. Taking simply a common sense view of the matter we can scarcely imagine how the land is to rid itself of this amount of water through natural channels. It, therefore, follows that we must anticipate a large proportion passing off over the surface or by artificial drainage. We find at once that water carried off over the surface results in a decided loss to the soil. It carries with it more or less of the surface soil, decomposing vegetable matter, as well as applied elements of yard and commercial manures. On the other hand, where tile drainage has been provided, the passage of water through the soil adds to it heat and while it is being filtrated through the soil the surplus carbonic acid, nitric acid, etc., carried down from the atmosphere by the rain may be absorbed by the soil, and held in readiness for the use of plant life.

Furthermore, its passage through the land is opening channels through which the air may pass and by its presence cause chemical action to set in whereby plant food already in the soil may be so prepared that the plant can assimilate and appropriate to its use elements which in the absence of the air it could never reach.

Drainage furnishes a way for deeper root growth, and thus enables plants to secure food which it would be impossible for them to reach without the channels which drainage opens. This deeper root growth also enables the plant to better withstand the drouth of summer because the roots are farther from the surface and cannot be so soon affected by the hot sun and dry weather.

Dry earth we are ready to admit does not expand at any temperature, but wet earth expands in proportion to its composition and the amount of water it contains. Therefore, as we reduce the amount of water we reduce the chances of expansion and, consequently, reduce the proportion of destruction to the roots of plants buried in that soil.

Upon the system of drainage rests the problem of greater benefits and greater productiveness from the use of manures organic and inorganic, of manures vegetable and manures mineral. We apply them to our land and they are often surrounded by a saturated soil which retards or entirely prevents the presence of atmospheric air which is necessary to their disintegration and decomposition, and this prevents them from becoming

Salada

CEYLON GREEN TEA
is pure and uncolored.

All Japan teas are colored.

ing fitted for the rootlets of the plant or available to its use.

Drainage, therefore, improves the land by making the plant food applied more effective.

Drainage then affords the conditions which favor perfect germination, speedy development and complete maturity. It admits a free circulation of air and moisture in the soil and makes possible both animal and vegetable life. It breaks down and mellow stiff and otherwise unillable soil. It induces chemical action to take place in the land and thus prepares plant food. It admits a deeper root growth and gives a wider range from which to draw sustenance for the plant. It makes it possible to secure greater benefits from the application of both yard and commercial manures. It reduces injury to wheat and other crops from freezing. It lengthens the time of tillage and renders cultivation possible when it would be out of the question if undrained.

ON THE FIRING LINE.

Ladies of Canada:
Side by side stood Canada's noble sons with the best brawn of Ceylon and India in the recent unpleasantness. The slogan was "help one another," and no one forgot the watchword. You, ladies of Canada, have the power to wage a relentless warfare on the impure teas that come into your homes from China and Japan, and at the same time assist your brother colonists who produce the pure Ceylon and India teas. If you drink Japan tea, try Salada, Monsoon or Blue Ribbon packets of Ceylon and India Green teas.—Colonist.

THE DOLLAR'S POWER.

I may go to mah Malindy when de buskin work am done
Wif a song of honey lub to cheer her hyart,
I may tell her of de pumpkins lollin yaller in de sun
An de golden ears of corn upon de cyart,
But she neber smile so sweetly,
An she neber dance so neatly,
An her eyes dey neber twinkle in dere glee,
Lak dey do when I'ze got money,
An I tell her she's mah honey,
Den de shadders frum de cabin up an feel
'Twill be frosty in de mawnin, an de rabbit mak' his track;
'Twill be possum time, an, swingin down de hill,
may bring de fattest feller hangin heavy on mah back
An call her fer to 'xamine of mah kill,
But she'n't 'tun her hade away,
An she won't have much to say,
An she fussy, an she grumpy, an she queer,
But when I rattle money
Den she shorly an mah honey,
An her smile jest fill de cabin wif its cheer!

Went an won a turkey gobbler at de raffie down de road,
An I tuk him home in triumf jest to see
How den eyes of mah Malindy wid dere rapture would 'xplode,
But she only gabe a c'ryous glance at me;
Neber chucked at de heah!
Dat my luck had brought upon huh;
Ain't nothin fer Malindy I can do
'At will set her eyes to flashin
An her lips in laughin fashion
Lak de dollah wif de sunlight drifin through!

It's de sunlight of de dollah dat can turn de cabin walls
Into jasper like de castle of a king
An can wake Malindy's laughter; it's de sperrit, sah, dat calls
Her hyart upon her honey lips to sing!
It can scare de gloom completely,
It can set her dancin neatly,
It can mak' her black eyes twinkle wif dere glee,
An it's when I bring her money
An I tell her she's mah honey
Dat de shadders dey jest rise right up an feel!

Preposterous.

He—Did you tell that other fellow you were engaged to that you loved me more?
She—Yes, and the horrid thing, he wanted me to return the ring!

FOR AULD LANG SYNE.

Ladies of Canada:
"Should old acquaintance be forgot?" The answer comes mechanicaly from every Britisher. Nor should new acquaintance be forgot. Remember that on the bloody fields of South Africa your brave soldier boys were on the firing line, flanked by loyal British subjects from Ceylon and India. In the midst of danger, lasting friendships were formed, and you, ladies of Canada, have it in your power to cement those bonds. The Green teas of Ceylon and India appeal to you from sentiment. By using them you not only aid your brother colonists, but you get absolutely the best tea. Those of you who drink Green Japan teas have a revelation in store if you make the change. Blue Ribbon, Salada and Monsoon packets may be had from your grocer.—Colonist.

AN UNCOMMON OCCURENCE.

Five generations alive in one family is not a common occurrence, but Mr. William Smith, of Haswell, England, can boast that he has lived to see four generations of his descendants. Mr. Smith, who is eighty-nine years of age, has a daughter, Mrs. Slater, who is aged sixty-six, living at Haswell. Her daughter, Mrs. Brown, aged forty-four, who resides at Ryhope, is the mother of Mrs. Burnip, aged twenty-two, who lives in the same village, and the latter is the mother of a six months' old baby, thus completing five generations. Mr. Smith has nine children, forty-nine grandchildren, forty great-grandchildren, and one great-great-grandchild.

PTE. MULLOY'S SAD FATE.

LOST HIS EYESIGHT IN THE SOUTH AFRICAN WAR.

He Bears His Misfortune Like a Brave Fellow—The Last Thing He Saw in the World Was the Boer Who Shot Him.

The Morning Post had the following article the day after a party of invalided Canadians sailed for home on the Tunisian:

A notable figure in the Tunisian—one among several notabilities—was Private Mulloy; "Lorne" Mulloy, as he described himself. It would perhaps be fairer to call him "lone" Mulloy. Mulloy left Canada over twelve months ago, full of vigour, hope, and happiness, eager for the fray, capable and wishful of doing great and important service to the Empire. He was then in perfect health, every human organ in the highest state of development. Now he is totally blind, and can never hope to see a glimpse of this fair world again. Mulloy is a man of the type regarded as the highest form of physical humanity; not over tall, well set, with an infinite capacity for work shown in every muscle and fibre of his body. He has gone through much hardship, but in spite of all he is alert, cheery, and as he came to the front of his companions on the call of Sergeant Craik, he looked, indeed, every inch a hero. His face was wreathed in smiles, but the thick glasses he wore only too vividly told the tale of his misfortune. He narrated his experiences quietly, and without the slightest tinge or suggestion of boastfulness.

"He can never see again in this world," said the Canadian friend who had hold of Mulloy's arm.

"Is that so, Mr. Mulloy? How sorry I am; how sorry everybody must be."

THE FORTUNE OF WAR.

"It is the fortune of war, sir—to some death, to others glory and reward—to me misfortune. It is all in the swing of a soldier's life."

Mr. Mulloy, in answer to a question,

BACKACHE?

If you have Backache you have Kidney Disease. If you neglect Backache it will develop into something worse—Bright's Disease or Diabetes. There is no use rubbing and doctoring your back. Cure the kidneys. There is only one kidney medicine but it cures Backache every time—

Dodd's Kidney Pills

said he had no objection whatever to tell all he "knew" about himself.

"You should be an Irishman, Mr. Mulloy, judging by your patronymic!"

"I am, sir."

"No! no!" said several of his comrades who were standing around, "he is a Scotchman."

Mulloy smiled, and added, "You may call me what you like, but I am an Irishman, of Irish parentage, and can go a long way back with it, too." When the little noisy, humorous dispute as to his nationality had quieted down, Mr. Mulloy said he received his wound at Bronker Spruit, where the Canadian Lieutenant Birch and others had been killed.

"Do you remember anything special about the engagement?"

"Indeed I do, and it can never be effaced, it is in my mind now; but it was war, and I have no regret or ill-feeling about the matter, except one—nothing but an explosive bullet was used."

LAST HE SAW IN THE WORLD.

"You saw the man who shot you?"

"That was the last thing I saw in this world, or shall ever see. The Boer was not far away when he fired at me, and I toppled over at once, remembering nothing more at the time, I was hit in the temple, but of course I knew nothing, and felt little or nothing. It was only when I began

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to recover in hospital that I felt pain—a pain mingled with wonderment. I tried to think, and I thought; I tried to recollect things, and I did; and then I looked about for those who had been with me in the engagement. I could see nothing, I could see no one; I could hear voices, and I called out and wished to look on a human face—but my eyes were bandaged, and the conviction slowly stole over me that I was totally blind for life.

"Terrible!"

"It was terrible—that first awful moment of returning consciousness; but I quickly remembered that I was a soldier, that I had risked all, and I became reconciled to my lot."

HIS SPEECH AT LIVERPOOL.

In a speech at the Lord Mayor's banquet at Liverpool Pte. Mulloy is reported to have said:

"I am glad that I have the privilege of speaking to a portion of the people of our British Empire. I am not a regular soldier. A year ago I was a student studying in the university, and ought now to be in the university out there. But when Canada was called upon to send out men, she did not send her 'corner boys,' but the best she had to give. I do not know how it came about, but I happened to be in that crowd, and I came, because, like the cat, I could not stop away. I could not attend to my business. I have no regrets for the past. I think if a man decides that a course is right and has followed that course out, he has no right to regret afterwards, whatever the consequences may be. Of course it looks rather unfortunate to see one's hopes, aims and aspirations all cut down in a swoop, sudden and irrevocable, but there are conditions which alter circumstances, to a certain extent, and I believe that the truly brave man and soldier will accept with manly fortitude the vicissitudes of fortune, and will not be overwhelmed by any circumstances, but will still, with a calm heart and serene mind, go bravely forward. I thank you very much in the name of the Canadian soldiers for the reception you have given us. That is all I have to say. I will not take up your time any longer. I will now call her three cheers for the beloved Queen, whom we love quite as well as you do."

RICH MEN'S ESTATES.

The United Kingdom of Great Britain is owned by 180,000 people, whose estates average \$30 acres. The average Austrian estate is only 20 acres and that in France \$2 acres.

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MRS WINSLOW'S SOOTHING SYRUP has been used by no less than a million mothers for their children's teething. It soothes the child, softens the gums, relieves pain, cures the wind colic, and is the best remedy for diarrhoea, sicca bottle. Sold by all druggists throughout the world. Be sure and ask for "Mrs. Winslow's Soothing Syrup."

TROUBLE AVERTED.

Won't you present me to that pretty young woman you were talking to?

I don't dare to; her name is Smith or Jones, and I can't remember which.

AGREED.

Mrs. Henpeck—The trouble with you is that you never know when to let well enough alone.

Mr. Henpeck—That's right, I realize it. I was very happy when you and I were engaged.

There is more Catarrh in this section of the country than all other diseases put together, and in the last few years was supposed to be incurable. For a great many years doctors pronounced it a local disease, and prescribed local remedies, and by constantly filling to cure with local treatment, pronounced it incurable. Science has proven catarrh to be a constitutional disease, and therefore requires constitutional treatment. Hall's Catarrh Cure, manufactured by F. J. Cheney & Co., Toledo, Ohio, is the only medicinal cure on the market. It is taken internally in doses from 10 drops to a teaspoonful. It acts directly on the blood and mucous surfaces of the system. They offer one hundred dollars for any case it fails to cure. Send for circulars and testimonials.

Address, F. J. CHENEY & CO., Toledo, O Sold by Druggists, 75c. Hall's Family Pills are the best.

A PATRIOTIC FATHER.

There was a small boy named Hugh, Who carefully slipped in the shoe Of his pa a large tack— And the small boy's back, Was afterwards red, white and blue.

PAST TENSE.

She married a millionaire, didn't she?
You mean that he was a millionaire at the time she married him.

TO CURE A COLD IN ONE DAY

Take Laxative Bromo Quinine Tablets. All druggists refund the money if it fails to cure. E. W. Groves' signature is on each box.

FURTIVE ATTEMPT.

What kind of fur is that box Miss Klickitat wears around her neck?
I don't know. At this distance I can't make head or tail of it.

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Bobbs—Bobbs says he runs his business just like clockwork.
Dobbs—Yes. I understand he runs on tick.

W. P. C. 1056.

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