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Soil Troubles and Wheat Culture

Prof. H. L. Bolley of North Dakota Agricultural College, in Dry-Farming Bulletin, Prescribes Treatment for Sick Plants and Ground

Since I began to write about the findings of the Botanical Department of the North Dakota Agricultural College Experiment station relative to certain diseases of wheat which affect the roots, straw and seeds of the wheat plant, and which tend to be carried over from crop to crop either in the seed or in the soil, certain people, not particularly well informed regarding farming methods, have exhibited considerable needless apprehensions regarding the matter. Some, I fear, only pretend great apprehensions. Now let me say that I do not write about plant diseases for the purpose of frightening anyone, but am doing so to call farmers attention to conditions relative to proper cropping, so that they may raise as large crops each year as possible. This will tend to make the farmers prosperous and those whose land and in the crops which the farmers grow, ought to be enough about their own welfare not to object when it is necessary to point out the difficulties which stand in the way of good agriculture.

In calling the farmers attention to the fact that the methods which are, at present time most commonly followed in cropping to wheat in the northwest are bringing about a condition of soil sickness which is quite analogous to the flax-sick condition of soil. I am stating a plain truth, but there is nothing about this fact to cause anyone to worry about Minnesota or Dakota soils. These facts of disease have not been stated before, because no one had previously made proper studies upon wheat seeds, wheat roots and wheat soils to allow one to do so. This teaching which calls for a proper care of the wheat soils with reference to their sanitary conditions for the growth of wheat, it is true is new, but the diseases of wheat roots are old. Agriculturists have always known that proper long series crop rotations help to raise a wheat crop, but they could not account for the rapid deteriorating of the wheat yields upon lands yet known to be fertile. It was usually said that rather constant cropping to one crop tends to reduce the fertility of the soil below a pint at which a pay crop could be produced. However, often, the best sort of rotations have failed miserably to give the results naturally to be expected. This finding regarding internally infected seed and disease infected soils is perhaps the chief explanation of such reduced yields on lands of known fertility and proper culture.

In other words, now that we know about these rather persistent wheat and soil troubles, our farmers can take rational steps to counteract their affects, indeed, in large part, to do away with them. This is real doctrine of hope, hope that we can soon arrange such proper and successful crop rotations, seed selections and seed treatment and so handle the farm manures that uniformly, much better results shall come from farm efforts; hope that by proper deep plowing and the other necessary methods of culture, the older wheat areas may again be brought back to proper yields of normally plump grain at a reasonable cost of effort.

When the symptoms and nature of these wheat-root diseases are as well and generally understood by the farming public as is now the case with potato scab and wheat smut, farmers will see and understand quite clearly the chief reasons for careful seed grading, seed treatment and fertility of the soil rotation. It is not that fertility of the soil is so much injured by the use of the single crop method as that its mechanical texture is spoiled and that it has become filled with the sort of disease germs which are characteristic of that particular crop.

There is nothing about the nature of the root diseases of wheat which may not rather easily be overcome by proper methods of agriculture when we can succeed in getting farmers generally to plow properly, harrow and pack properly and to use farm manures; to grow and save their own seed; to grade and disinfect it; and to carry out proper crop rotations.

As in the past, some such diseases will appear in every crop just as some smut now escapes, but their occurrence in generally

destructive form should from now on be wholly unnecessary.

What to do: 1.—Grow your seed. 2.—Grade it each year to proper size, weight and color and treat it thoroughly before planting. 3.—Rotate your crops, using four or five other sorts of crops on your fields between wheat crops. Pasture land, corn and flax usually gives the best results in the northwest. 4.—In making use of barnyard manures which are made from wheat barley or oats straw, they should either be thoroughly composted or, if hauled fresh from the stables, the manure should be applied to grass, corn or potato lands at least two years before wheat is to be sown there. A good start for rotation to be applied to old wheat lands would be:

1. Grass, with manure spread on the grass.
2. Hay.
3. Pasture.
4. Corn.
5. Flax.
6. Wheat.

MODERN DEVELOPMENT.

Accepted Knowledge Not Always the Keynote to Science.

The science of human surgery has been evolved from study and observations of experiments on and experience with, an unvarying structure over a period as long as the story of human life is old. In the sense that the profession of surgery has ever followed methods founded on accepted knowledge it has always practiced scientific management. During that time, however, it has known and taught many things that were not so. It was within the memory of men now living that surgery learned the inestimable value of absolute cleanliness. Wounded sufferers on the battlefield were bled under scientific management to reduce the consuming fever. Patients perishing of thirst were denied water because accepted knowledge decreed that it must not be administered. Many important discoveries were thrust upon the medical profession through what were regarded as blunders. Nature asserting itself through a tortured patient, insane from suffering, transgressed some inflexible rule and revolutionized a science.

The development of the modern locomotive has in many instances been accomplished by transgressing scientific rules and disregarding the mandates of accepted knowledge. The injector is an instance in point. From the standpoint of accepted knowledge it was regarded as so paradoxical for a jet of steam under a given pressure to enter a boiler against the same pressure and at the same time heat and carry along with it a quantity of water that indignant scientists immortalized their ignorance by writing learned dissertations to prove that it contradicted all the laws of conservation of energy. Dogmatic instructions are often limiting. Unlike the human anatomy, the bones, muscles, arteries and nerves of a locomotive are not of the same structure in two classes of locomotives. Conditions and requirements are constantly changing. The railroad surgeon is a developer and a creator, constantly confronted by new conditions and called upon to solve problems on which past experience cast but little light and afforded but little guidance.—George J. Burns in Engineering Magazine.

Petroleum Production.

More than 200,000,000 barrels of oil, with a value of nearly \$128,000,000, were produced in the United States in 1910, according to David T. Day of the United States geological survey. The United States is now by far the greatest oil producing country. In fact, it produces more than all the rest of the world together. In 1910 the wells of this country yielded nearly 64 per cent of the total production, Russia scoring a very poor second, with about 70,000,000 barrels, or 21 per cent. The production of other countries is comparatively negligible, the third on the list, Galicia, contributing only 3.87 per cent of the total.

Mosquito Pest in the Klondike.

The mosquito is more numerous in the arctic zone than in the tropics, though there is no land too cold or too hot for its habitation, and the only place where it is not found is in localities where there is little or no moisture. There is no country where the mosquitoes are so large and so numerous as they are in the Klondike, and it is impossible to destroy them, as they propagate in the heavy moss that grows there, which contains moisture almost equal to swamp lands.

Rejuvenation From Fatigue.

According to a French physician a short period of rest is sufficient to prepare a person for new exertion after heavy but not protracted work, while longer rest is necessary after continuous work of a lighter nature.

Dr. Joseph A. Holmes, director of the federal bureau of mines, startled the chemists with the declaration that of all the coal mined in the United States, fully one-half was wasted.

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