

Everglade Soil—Continued.

CHAPTER III.

We will now proceed to inquire whether this soil, when drained and areated, contains the necessary humus to produce and sustain vegetable growth and plant life; and no attention will be paid here to the usual distinction between soil and subsoil; because the muck blanket with its silt intermixture, which will when drained constitute the Everglade soil, is when wet of a uniform black color, and apparently of a uniform consistency, whether at six inches or six feet in depth.

Humus is defined to be "a complex mixture of dark tinted substances known as vegetable mold, which is the result of the decomposition of organic matter, by the natural processes of decay to which such matter is subject after death." (Hilgard on Soils, p. 21.)

Such product of decaying vegetation when formed in the presence of an excess of water impeding the circulation of the atmosphere, is known as "sour humus"; and such soil thus produced in nature bears only sour growth, sedges, rushes, and the like; and requires reclamation before being adapted to ordinary crops. (Ibid, p. 122.)

The normal process of humification or the sweetening of "sour humus" soil, occurs when such soil is properly drained and oxygenized by the rapid circulation of air over it and through its interstices; and this should take place under a warm temperature with moderate moisture, and when carbonates, especially that of lime, are present to prevent the formation of noxious acids or to neutralize them if formed. (Ibid, p. 122.)

Under such conditions the black humus soil, particularly at or near the surface, becomes the home and industrial center of myriads of nitrogenous bacteria, whose function consists in segregating the nitrogen from the unlimited quantities in the surrounding atmosphere and fixing it and converting it into nitric acid. This acid unites with the potash, soda, lime and magnesia salts if present in carbonated waters, and forms the indispensable plant food necessary for the growth and maturity of all higher vegetation. (Ibid, p. 143 and following pages with numerous authorities there cited.)

The fertility of all lands depends upon the amount of humus existing in its surface soil; and lands otherwise most valuable and best situated for crop production, when their humus ingredient becomes exhausted by improvident tillage, rapidly becomes sterile and undesirable. (Ibid, p. 131.)

It thus appears that the black muck soil overlying the coralline

rock bottom of the Everglades, and which is submerged by the overflow waters of Lake Okeechobee and by the surface and subterranean waters to which reference has been made, is until drained a "sour humus" soil, and fit only to bear sedges, rushes, etc.

That this is so, is amply borne out by its actual present growth, which is chiefly a heavy and almost impenetrable "saw grass" with other fresh water aquatic plants here and there interspersed, excepting on the occasional hammock islands, which rise a few inches above the flood level and thus permit a limited forest growth of mastic, pidgeon plum, cypress, palms, pine, etc.

That much of the noxious substance formerly present in this "sour humus" soil has been neutralized and precipitated by the intermixture of waters containing lime salts, sufficiently appears by the change from the coffee colored waters, characteristic of swamp drainage, into the clear, translucent wholesome waters of the Everglades. Comparatively little will therefore have to be done to convert the sour humus soil of the Everglades into a productive and rich humus, and this will consist chiefly in draining the soil, so as to permit the air to penetrate and revivify it.

That all soils, irrespective of location, contain an excess of alkali injurious to plant life and growth, except where the rain fall or irrigation waters have leached them from the surface, is indisputable. (Ibid, p. 422.)

In humid climates this is shown to be true by too radical a drainage of swamp overflowed lands. In such cases, as well as in semi-arid tracts under irrigation, a thin white scum of alkali is frequently seen on the dried surface of the soil after the subsidence of the waters. In arid lands, following the heavy rain falls occurring at rare intervals, the evaporation of the waters leave large tracts covered with a layer of alkali brought up by capillary action from below. (Ibid, p. 422 and following pages.) Which is frequently of the thickness of a pane of window-glass.

It is one of the purposes of all irrigation projects to correct this excessive drainage of the soil, by retaining sufficient moisture in the subsoil or at a short distance below the surface, so that the roots of growing plants may readily penetrate this saturated sub-stratum, and obtain the requisite water and plant food to promote their life function and growth. At the same time the drainage flow to lower levels, carries down the excess of alkali which would otherwise rise and form a scum on the surface of the soil. (Ibid, p. 422.)

So that we have under the equable climatic conditions present in the Everglade horizon, as evidenced by the Government reports for the past ten years at Miami and Fort Myers, Florida, near the middle of

this territory, and to which reference is hereafter made, all the essential constituents, when this soil is drained, necessary for a fertile and productive zone:—namely, a climate practically free from frost with ample precipitation; a territory possessing physical features which permit thorough drainage of the entire area, and at the same time an adequate irrigation system in times of drought; a black, rich limestone soil when drained, with abundance of humus and nitrates, capable of maturing its citrus fruits from November to the following May, and its vegetable crops of tomatoes, peppers, egg-plant, white potatoes, celery, spinach and the like, during the winter months of January, February, March and April,—when prices range high, and there is no competition at the North, except in the artificial products of expensive hot houses.

It is as though Nature had provided an exceptionally good soil, upon a terrace susceptible of easy drainage to the ocean, and had arranged an invisible and strongly constructed glass house as a protection against frost, and then had maintained an even warm temperature, by means not perceptible to the natural eye, for the luxuriant growth of plant life; and had done all this without any expense to the land owner; and then to make the gift complete, had provided a storage tank, some forty miles in diameter at a higher level, to corral the drainage and rain waters, and permit their distribution upon the lower lands in time of drought. And that all these benefits would be available upon the construction of adequate drainage canals through an easily excavated soil, at the inconsiderable expense of seven cents a cubic yard for the material removed and deposited upon the sides of the canals.

The Internal Improvement Board of the State of Florida is now, and has been for the past three years engaged in this reclamation project, having at present four large dredges in operation and having excavated about twenty miles of canals, each having an average width of sixty feet and an average depth of ten feet below the earth's surface.

From the proceeds of the sales already made, and from the taxation of five cents an acre on the lands to be benefited a fund of about one million dollars is available for this project. There is yet belonging to the State and unsold about a million and a half acres in this territory.

It is the expectation that in the near future an increased number of dredges will be put on the work, and the excavation of the drainage canals expedited, so that this healthy and attractive country will be rapidly settled, and a veritable new Holland with thrifty and prosperous inhabitants will be planted in America.

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