

A SERIES PREPARED ESPECIALLY FOR THE "RECORD-UNION."

Presenting Instruction Contained in Lectures from the Chair of Agriculture, State University.

SEVENTH PAPER—PHYSICAL CHARACTER OF THE SOIL (CONTINUED).

(7.) Changes in the volume of the soil caused by changes of temperature and amount of moisture. The alternate shrinking and swelling which is, under the influence of temperature and moisture, almost constantly taking place in soils, is of considerable importance in affecting their physical conditions. It is generally known that most absorptive substances swell when saturated with liquids; and hence, or decrease in bulk, and often crack when exposed to heat until the absorbed moisture is driven off; also that water, in the process of freezing, swells, and in so doing exerts a pressure sufficient to burst the strongest vessels. The action of water and frost upon soils is no exception to the general rule. The effects are, of course, different with the different kinds of soils. Soils rich in humus or vegetable matter are affected more than others. Johnson says that the surface of moors often rise or fall with the wet or dry season through a space of several inches. In ordinary cultivated soils no change of bulk is generally apparent to the observer.

HEAVY CLAYS

Are generally affected by their drying up, especially when the season is very hot and dry. Soils containing much clay, and when not kept thoroughly tilled during the summer time, are often considerably damaged by "caking," or baking into hard lumps, which successfully defy all attempts to pulverize them, for one season at least. The more the clay the more apparent are the effects. In the counties of Yuba and Sutter, and along any river in California which receives the detritus of hydraulic mining, the fields of clay, especially when much sand is mixed in the soil, depend upon the absorptive capacity of the ingredients of the surface soil. The effect of the sun's rays is very different on different objects. For instance, its heating effects on the upper surface of a wetter, and by radiation through the atmosphere, are comparatively small, while many solids not only readily absorb heat, but also accumulate it to such an extent as to burn the hand when applied to them. During the constant evaporation from the soil surface a large amount of heat is rendered latent; that is, is absorbed during the conversion of the liquid into the vapor of water. This result of evaporation is one which, while of the utmost importance, is not generally understood by the farmer; and, in fact, is hardly guessed by the average husbandman. It is a well known chemical phenomenon that ice—the solid form of water—absorbs or renders latent a large amount of heat in passing from the liquid to the gaseous state. To illustrate: if a piece of ice which is at a temperature of 32° Fahrenheit be placed over a lamp so regulated as to raise the temperature one degree every minute, the ice would continue to melt for 140 minutes, at the end of which time it would all have been liquefied, and in so doing would have absorbed the 140 units of heat given off by the lamp during the time—140 minutes. If the same increase of temperature had been kept up for 972 minutes longer, the water would have all been converted into steam with the "locking up" of 972 thermal units of heat. The conversion of steam into liquid, and water into ice, are followed by a freeing of the heat rendered latent during the reverse processes. We may easily apply this principle to the

soil, providing that the plant is supplied with water by its tap and water roots. Considered as an agent in modifying the temperature of the soil, it follows that, when the temperature of the atmosphere suddenly rises, the hydroscopic moisture contained in the depth of soil is attracted by the increased heat and condensed to liquid water with the freeing of the heat which was locked up in the vapor. By this simple means the heat of the soil is frequently quite perceptibly augmented, and plants often saved from injury by frost. The place of the vapor which was condensed is immediately taken by more vapor of cooler temperature drawn up from the lower soil, or drawn from the atmosphere. From the above we see that in considering the ability of a soil to withstand drought, we must take into consideration its hygroscopic coefficient as well as its capillary and retentive power of water.

RELIGIOUS FACTS AND FANCIES.

To the surprise of the rest of the Church the Glasgow Free Presbytery has resolved to ask the General Assembly to permit congregations to use instrumental music. The institution of Lent, it is thought, is due to the efforts of Theodosius, who was Bishop of Rome in 150 A. D. For a long time after it was made a yearly observance it extended only over the strict period of forty days from Quinquagesima Sunday to Good Friday. The four extra days, including Ash Wednesday, seem to have been added in the latter part of the fifth century by Felix III., so that the forty days consecrated by strict traditional right to the period of fasting might therefore count to the beginning of Passion week instead of the Friday in it.

Bishop Reinkens, of the Old Catholic Church of Germany, has issued a long pastoral relation to his recent visit to the island, praising the hospitality and kindness of several prelates of the English Church, and speaking of the Anglican liturgy as uniting "in itself all the elements and parts of the historic (Catholic) ritual." He was impressed with the reverence, the dignity and the devotion of the worshippers in services which he attended, and calls upon his churches to reciprocate the friendly feeling of the Church of England, the "bulwark of Christendom," and intercede for her.

Under the auspices of Lord Ebury, and an influential array of noblemen, clergy and gentlemen, renewed efforts are being made by the Prayer-book Revision Society to terminate the ancient traditional right to the Prayer-book articles and homilies, and deleting those phrases and expressions which may have escaped the notice of the reformers who conducted previous revisions, or which, as the Society urges, are the result of such a compromise as might naturally be expected in the stormy periods when the Church of England was struggling to throw off the yoke of foreign domination—a compromise which has led to much perplexity, to painful litigation and to contentions which have threatened to rend asunder the Church.

The first Protestant in Chicago, so John W. Worth says, was a Baptist, the first book ever written in that city was written by a Baptist clergyman, and it was a Baptist clergyman that preached the first Protestant sermon in Chicago on the 7th day of October, 1837. The first Protestant church in Chicago was the First Baptist Church, which was organized in 1837. The first thoroughbred English horse that ever came to Chicago. Aud to that horse she attributed the preservation of her life; for she was riding it when the Indians made their attack upon the 129 and August, 1812, near where the house of George M. Pullman now is, and, in their strife to get possession of it, they lost sight of her.

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SAN FRANCISCO Business Directory

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SACRAMENTO RECORD-UNION.

San Francisco Office, No. 8 New Montgomery Street (Palace Hotel)—J. H. Sharp, Agent.

For Advertisement of WEIN-STOCK & LUBIN, see Eighth Page. It will be changed daily

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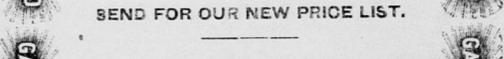


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