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IRRIGATION IN CALIFORNIA.

In 1871 the crops in the valley of the San Joaquin River, California, from a long drouth and severe north winds, were threatened with entire destruction. Some of the farmers then hurriedly cut a few ditches from the King River, and the flooding they thus obtained made the wheat yield from 30 to 55 bushels per acre, and land which had previously been hard to sell at $2.50 per acre rose in value to $25 and $30. From that time to this the system of regularly managed irrigation has steadily grown in all that valley section, lying about 200 miles southeast of San Francisco. There are now six companies organized for this purpose, with an estimated capacity to furnish water for the irrigation of about 650 square miles, although past experience tends to show that, after the system of irrigation has been once established, the water supplied will go further and probably make cultivable a much larger area. The farmers buy their water rights from the companies at the price of $10 an acre, for which they can take as much water as the area of ground requires, and draw at any time and as often as they choose. They have to make their own laterals, which are usually ditches four feet wide by one deep, and can be made cheaply by plow and scoop. Since this system of irrigation has been adopted, many thousands of acres of land, heretofore almost barren, have been turned into some of the most productive farms on the Pacific coast, and are especially valuable for the raising of grapes and other fruit.

IMITATIONS OF COSTLY LEATHER.

The custom of carrying lunch reticules, money purses, and traveling bags of leather has made an increased demand for the leather from rare animals, or for leather of attractive appearance. As the natural supply of alligator and the great python or boa skins is not sufficient to keep up with the demand, these skins—or the leathers from them—are imitated very largely by using the leather of commoner and cheaper skins. Even seal leather, goat leather, and kid leather, or morocco, are imitated. The surface of alligator leather consists of almost exact rectangles or squares, separated by deep furrows, the squares gradually diminishing in size as they recede from the center of the skin. The boa leather is in diamond shaped patches, forming a fine network, and is very elegant, the division lines being very fine. Sealskin leather is a fine diapered or arabesque pattern of irregular divisions raised and depressed. Goat leather is crossed in regular lines at acute angles, forming minute elongated diamonds.

As some of these leathers are too costly to be furnished at low prices, the million who desire the best, but cannot always afford the cost, are supplied by fair imitations which are not as durable as the genuine, serving in part the purposes of the costly leathers. These imitations are made by the aid of photography. A genuine seal, alligator, boa, or other costly skin is photographed, then printed on sensitive gelatine, the parts not acted upon by light dissolved out in water, and a cast or an electrotype plate then made in copper or type metal, as practiced in the reproduction of engravings, and then the metal plate and the smooth leather of some domestic animal are passed between rollers under pressure, and the figure on the plate is permanently fixed on the leather by great pressure. Any of these leathers may be stained, colored, or dyed to any tint desired; but plain black or the color left by the tannin is generally preferred.

THE CHINCH-BUG IN NEW YORK.

Dr. Lintner, Entomologist of the State of New York, has recently issued a bulletin stating that the much dreaded chinch-bug, which has caused so much destruction to the crops in the West, is present in alarming numbers in some parts of New York. We are pleased to note the commendable enterprise of Dr. Lintner in warning the Eastern farmers of their danger. The pest has been discovered in St. Lawrence County, and the State Entomologist desires every farmer in that part of the State to examine his meadows for patches of dead grass, which look as if winter killed. If such places are found and the bugs discovered, it is recommended to scatter straw over these dying patches, and afterward burn it. This work must be done with great care, and a favoring wind is important. The burned area should afterward be deeply plowed, and not in ridges. To the more effectually bury the chinch-bugs, the plowed land may be harrowed. If the meadow will not permit of being plowed, the next best thing is to apply gas-lime at the rate of two hundred bushels per acre. The gas-lime may be applied at any time during the coming winter, but, of course, the plowing must be done before the ground freezes and prevents the sod being turned.

A more widespread attack of the chinch-bug may be looked for next June, when it will be time to use other means of destroying this enemy to our grass and grain crops.

Professor Riley, the Government Entomologist, in the last issue of *Science*, states that he thinks that Dr. Lintner is wrong in his opinion that the chinch-bug was brought in a freight car from the West. Fitche's record of having found this bug in northern New York leads to the belief that it has long been in the East, and the present outbreak is due to an increase in numbers from some favoring condition instead of an invasion. However this may be, the importance of taking all precautionary measures remains the same. A bug which will destroy millions of dollars' worth of crops in a single State, as it has done in Illinois and elsewhere, is one not to be desired.

ADULTERATIONS OF FOODS—GLUCOSE IN SUGAR AND IN SIRUPS.

The fact is so well known as to be admitted by all, that a considerable part of the articles which we consume for food and for drink are open to the belief that "things are not what they seem." Meat and fish cannot very well be imitated, and we probably buy real beef, and veal, and chickens, and codfish, and halibut, though they certainly may be all of them so wonderfully fitted up for the purposes of sale as to impose on the purchaser sadly. But butter, and sugar, and coffee, and tea, and vinegar, and spices of every sort, we purchase in a state of purity in only exceptional cases. Wherever an imitation can be made that costs less money than the article which is the original, we may be sure that on an average our chance is good for getting the counterfeit.

We are apt to think that if we select a grade of high price in any special line, we are sure of getting what we profess to get, and perhaps it is a good plan to lay that flattering unction to our souls, for we feel better after it; but the simple fact is, that in general the higher the cost the better the adulteration pays, and as human nature is open to influences, the larger money brings us a more elegant style of imitation only.

Inasmuch, then, as the admixtures are so very common, it becomes for us a question of almost vital interest to know whether they are injurious to health, or whether they are harmless. If we barely lose our money, because we do not get what we think we do, that is bad enough; but if, on the other hand, we are at the same time poisoning or at least injuring ourselves and our families, the case assumes a very different aspect.

Our attention has been recently called to one form of adulteration which is so exceedingly common that we cannot go a single day free from it. We allude to the presence of glucose in sugars and in sirups, and we take up the subject in the hope that we may dispel some groundless fears. That the glucose is there is as sure as the sun rises daily. There may be *some* sugars and sirups that are pure and honest, but there are many which are not. We are not speaking at random in this, we are only testifying to what we know by experiment. We have purchased sample lots, here and there, in New York and in other places, taking care to get them only from dealers where we were likely to get our articles of as good quality as could be found. Chemical trial showed in almost every instance the presence of glucose.

An apothecary submitted to our examination a sample of sugar from a lot he had just purchased for his pharmaceutical use, which had been recommended to him as absolutely pure; it showed over *five per cent of glucose!* We have seen barrels opened, found the maker's guarantee of perfect purity lying under the barrel-head, taken samples from directly beneath the printed falsehood, and found them rich in glucose!

We do not, therefore, dispute the presence of the admixture, but it is a perfectly harmless substance and need never cause alarm to any one. This is what we meant by saying that we hoped we might allay groundless fears. We may eat and drink glucose all our lives, our children may take it down *ad lib.* in their candy, as they are doing every day, we may have our delicious maple sirup on our buckwheat cakes, and they will not hurt us any more than the cakes are bound to any way; we may revel in glucose, and live and die happy.

Let us look at it chemically. There are, as natural products, two forms of sugar everywhere diffused; they are known as cane sugar, and grape sugar. Taken as a rule, it may be said that cane sugar exists mostly in the sap or juices of plants, and grape sugar in the fruits, though there are many interchanging exceptions. They are composed of carbon, oxygen and hydrogen, the proportions being in cane sugar $C_{12}H_{22}O_{11}$, and in grape sugar $C_{12}H_{12}O_6$. They are both harmless and nutritious to the human system; they are both sweet, the sweetness of grape to cane being about as one to two. Chemically, cane sugar is a saccharose, and grape sugar is a glucose, the latter retaining this as a market name.

What we buy as *sugar* professes always to be cane sugar, made hitherto almost exclusively from the sugar cane. If now our grape sugar or glucose had been a natural product, say from fruits, there would probably never have arisen the prejudice against it which now exists. But it is not so; it is altogether a factitious article, and few people are sufficiently familiar with chemical principles to realize at once its real nature. All the glucose and grape sugar in the market is made by the action of sulphuric acid (oil of vitriol) on some vegetable material. In this country starch is used chiefly, as being the cheapest and most convenient, but linen rags are equally serviceable and produce an equally pure and excellent *sugar*.

That is one of the wonders of chemical combination—as much a wonder to the most thorough chemist as to any one else. He sees the work grow under his fingers, and what is done he does not know; he knows nothing but the result. He boils starch with sulphuric acid and water. The mixture instead of being very sour is sweet to a certain extent, that is to say, sugar is there, but the acid is also there, for the acid has changed the starch to sugar and yet has itself not been affected in the least. He throws in powdered chalk, which unites with the acid and settling to the bottom leaves a beautiful, clear, sweet solution of *grape sugar*.

The acid is gone, the starch is gone, and pure, harmless