Agricultural Chemistry.

Butter.

The milk of a cow or other female mammal is seen under the microscope to consist of a clear fluid, containing a number of minute oil globules. If a drop of acetic acid (purified vinegar) be added, many of the globules will be seen to coalesce and form little granular masses of fat. The globules are enclosed in a delicate membrane which the acid seems to break down. This result is accelerated by agitation. The operation of churning consists in agitating the milk till the globules adhere together, or, as it is technically called, till "the butter comes." It was formerly thought that the cohesion of the butter-globules was brought about by the formation of an acid in the milk, as shown by the sourness of the buttermilk, even when the cream used is perfectly sweet. But it has been found that if this acid is neutralized by bi-carbonate of soda, the butter will come quite as readily. The best temperature for churning has been found by experience to be between 50° and 55°, Fahrenheit.

Butter, chemically, is a mixture of fats, being composed of glycerine, in combination with palmitic, stearic, oleic, and small quantities of capric, caprylic, caproic and butyric acids. It is to the glycerides of the last four acids that butter owes its peculiar odor and flavor. In practice, butter always contains more or less buttermilk which has not been separated from it. This buttermilk consists of water holding in solution a kind of sugar called milk sugar and *casein*, or the substance which forms curds, and from which cheese is made. This casein differs from the other constituents of milk by containing nitrogen, and like all nitrogenous organic bodies is very liable to putrefaction. If the casein contained in the butter becomes putrid, it will communicate its decomposing condition to the other constituents of the butter, and hence the latter will become *rancid*. Rancidity consists in the separation of the fatty acids mentioned above from the glycerine with which they are united in the fresh state, which separation brings out the peculiarly unpleasant taste, smell and other properties of these acids. Intimately connected as this process is with the presence of readily putrescent casein in the buttermilk retained in the butter after churning, it becomes a most important object to get rid of this most injurious impurity—an impurity far worse in its influence on the preservation of the butter than many an adulteration, the detection of which would be fatal to the sale of this important product. Too much stress cannot be laid upon the care which should be taken to free the butter from the buttermilk by the ordinary methods of washing with water, kneading, pressing, &c. In addition to these methods, the admixture of a proper proportion of salt. One quarter of a pound of salt to six pounds of butter has been recommended for this purpose. Another method of preserving butter is as follows: The butter is melted in a vessel immersed in hot water, and the heat continued until all the curdy matter has subsided to the bottom and the butter is transparent. The clear melted butter is then poured off, or strained through a cloth, and cooled by cold spring water or ice. Butter cured in this way is said, if kept in a cool place, or in a close vessel, to keep for six months or more, as sweet and good as when first prepared.

There has been much discussion recently in England on the subject of the adulteration of butter. The detection of some of the ingredients fraudulently added being very difficult. The usual adulterations comprise water, salt, and various kinds of fat, such as lard, suet and dripping. The water and salt are added by melting the butter and pouring them in while it is in the fluid state. By stirring round until all is cold, the salt and water are thoroughly incorporated with the butter. The presence of the water may be ascertained by placing the butter in a common four-ounce phial, and putting this into hot water until the butter melts. On standing, the water sinks to the bottom, while the butter floats at the top. To determine the presence of a fraudulent quantity of salt, the butter is calcined when the salt is left as an ash. Of course, butter always contains a certain proportion of water and salt; but there should not be more than 1 per cent. of the former, and 5 per cent. of the latter.

At the present time there is a company in New York engaged in the manufacture of artificial butter. The *Scientific American* in its last issue gives an account of this curious process. The suet, after thorough washing, is finely divided by a "hashing machine," by which it is ground and pressed through a fine sieve. It is then exposed to steam heat in large vats for two hours, by which the olein and stearin (combinations of glycerine with oleic and stearic acids) are separated from the animal matter, such as shreds of membrane, fibres of muscle, &c. The fatty matters rise to the top and are drawn off while melted. It is then subjected to powerful pressure in cotton bags. By this process the fluid olein is separated from the solid stearin. The next step consists in churning the olein with one-fifth of its weight of sour milk. At the expiration of twenty minutes the oil is converted into a semi-solid mass, which, on cooling, salting, and working in the usual way, becomes firm, and can scarcely be distinguished from ordinary butter. It is palatable, can be made at a less cost than butter from milk; and owing to the absence of any caseous matter, will keep well in any climate without any tendency to rancidity.

Veterinary Department.

Diseases of the Hock Joint in the Horse.

Bog Spavin.

Bog spavin is the name applied to a soft, puffy tumor situated on the inner and front part of the hock; and consists in distension of the capsular ligament of the true hock joint. It is somewhat similar to windgall, but as the capsular ligament is affected, it proves of a more serious nature. Bog spavin, in the early stage, is merely due to an extra secretion of synovia in the joint, forcing the ligament outwards, and especially at that part where it is not firmly bound down by tendons.

In the healthy joint there is usually about two drachms of synovia for the lubrication thereof; whilst in many cases of bog spavin, the synovia increases to seven or eight drachms, and becomes charged with large quantities of calcareous matter.

This is a very common disease amongst certain breeds of horses in this country, and particularly the heavier class of horses, but it does not prove of quite so serious a character as when occurring in the lighter breeds, as in bloods, or roadsters. The causes of bog spavin may be defined as predisposing and exciting: amongst the latter being sprains, hard and fast work, overfeeding, and the great strain thrown upon the hock; as when a horse is forcibly backed when attached to a heavily laden waggon.

Symptoms.

This disease is very easily detected: a swelling appears on the hock which is soft, and yields readily to pressure, and is altogether different from the hard and unyielding tumor of bone spavin. It is frequently very quickly produced, and in many cases it does not cause lameness. In young horses this disease not unfrequently appears after one hard drive; the muscular system may be soft, and the general condition of the animal plethoric, and in this state a young horse is driven rapidly for twenty or thirty miles; he is put into his stable, and next morning he may possibly be found to exhibit symptoms of bog spavin, which is the result of the excessive demands of the previous day; the process of absorption not having been equal to that of secretion. If an animal is kept at work when these symptoms appear, the spavin very soon becomes confirmed, and extensive disease is set up within the joint; the bones become affected, and all the parts materially altered in structure. Owing to the distension of the capsular ligament, the vein passing over the hock becomes more prominent, and this altered state of the parts is often erroneously termed *blood spavin*. The treatment of bloood spavin must necessarily be varied according to the extent and duration of the disease. The horse should be allowed perfect rest, and in recent cases great benefit will be derived from cold applications, or hot fomentations, followed by careful bandaging and moderate pressure—for the latter purpose the elastic truss is very useful. If the horse is in a plethoric condition, it is advisable to administer a good dose of purgative medicine, which tends to increase the action of the absorbants. When inflammatory action is reduced, blisters are useful, and either cantharidine or biniodide of mercury ointment may be used.

In blistering for bog spavin, it is well to apply the blister over a considerable extent of surface. Other blisters are frequently applied, but only such blisters should be used as are not likely to leave a permanent blemish. In recent and mild cases, a complete cure may be effected if the above mentioned measures are carried out in a proper manner. In cases of old standing, and where all the structures of the joint are involved, the joint can never be restored to a sound condition, but very great relief may be afforded by a proper course of treatment, such as giving rest, and the free use of counter-irritants; and, in some instances, it may be necessary to use the firing iron.

☞ Keep the mud off horses legs and heels at this time of year, to avoid the scratches.

A HUMANE ACT.—The act to prevent cruelty to animals while in transit by railroad or other means of transportation, passed by the last Congress, went into operation on October 1. The first section of the act makes it unlawful to keep animals confined while in transit for a longer period than twenty-eight consecutive hours without unloading them for rest, feeding and water for a period of at least five consecutive hours. Violation of the act is made punishable by fine of not less than $100 or more than $500.

ABOUT SICK ANIMALS.—Nearly all sick animals become so by improper feeding, in the first place. Nine cases out of ten the digestion is wrong. Charcoal is the most efficient and rapid corrective. It will cure in a majority of cases, if properly administered. An example of its use: The hired man came in with the intelligence that one of the finest cows was very sick, and a kind neighbor proposed the usual drugs and poisons. The owner being ill, and unable to examine the cow, concluded that the trouble came from overeating, and ordered a teacupful of pulverized charcoal given in water. It was mixed, placed in a junk bottle, the head held upward, and the water and charcoal poured downward. In five minutes improvement was visible, and in a few hours the animal was in the pasture quietly eating grass. Another instance of equal success occurred with a young heifer which had become badly bloated by eating green apples after a hard wind. The bloat was so severe that the sides were almost as hard as a barrel. The old remedy, saleratus, was tried for correcting the acidity. But the attempt to put it down always caused coughing, and it did little good. Half a teacupful of fresh powdered charcoal was next given. In six hours all appearance of the bloat had gone, and the heifer was well.—*Live Stock Journal.*