

The spontaneous coagulation of milk without the development of acid, which is occasionally met with, is without doubt milk which from some cause contains an abnormal amount of fibrin. Such milk was very prevalent in Rochester, N. Y., a few years ago and was supposed to be caused by a fungus growth of some kind, but nothing of this nature has ever been detected in such milk.

In regard to the quantity of fibrin present in milk I can only say that it is usually very small. There being no method of accurately determining small quantities, I have endeavored, by measuring the amount of oxygen which is set free from the peroxide of hydrogen in equal times, to measure the relative amount of fibrin in different milks. This has proved very satisfactory but gives no clue to the absolute amount. I have compared milk with blood in the same way and find that fresh pig's blood when diluted to two thousand times its volume with water, is fully as active as milk; but blood contains other principles besides fibrin that decompose peroxide of hydrogen so that this gives no clue to the quantity in milk. If blood be diluted with one hundred parts of water it still forms a perceptible clot, and I believe that milk contains much less than one per cent. of the amount in blood. Blood is supposed to contain about three-tenths per cent. of fibrin, and I do not think milk contains more than .002 to .003 per cent., perhaps much less than this.

I may say in conclusion that even this small amount of fibrin is sufficient to explain most, if not all, of the differences between milk and artificial emulsions, and will account for many of the peculiar phenomena of milk. On the practical side of dairying it furnishes a reason for many failures, and is most suggestive of measures by which failures may be avoided.

In order to discriminate between this principle found in milk and the fibrin of the blood, I would suggest that it be known as *lactofibrin*.

THE FLORA OF THE JACK-PINE PLAINS OF MICHIGAN.

W. J. BEAL.

THE Southern Peninsula of Michigan in no place rises into what may be termed mountains, as the highest plateaus are only about 1,200 feet above the surface of Lakes Michigan and Huron. The drift is very thick and rocks are seldom exposed at the surface. The nature of the soil varies according to the rocks from which it is formed, whether it is made from shale, granite, limestone, or sandstone, either one of these pure or whether from a mixture of two or more. The Waverly group is represented over a large part of the surface and it contains much sand-rock.

As almost every one knows, the Southern Peninsula of Michigan has a fine climate tempered by the Great Lakes which surround it on three sides.

A good deal of the surface of the Northern half of the Peninsula which we are considering is sandy, or in some places a sandy loam. In such a climate as ours, the soil to a great degree determines what naturally grows upon it. Or, to state the reverse, an expert soon learns to judge of the nature of the soil by what he sees growing upon it. This sandy soil rests on similar sand of great depth. It dries out quickly after a rain, and is then especially liable to be burned over, the burning often destroying every living plant above the surface. The fire removes much of the vegetable matter, so that the new growth is often thin and is more liable than ever to become dry and burn over again and again. Such land is often gently rolling, and with scattering low trees presents an attractive appearance. It looks as though it would make a nice farm. The ease with which it can be cleared has induced many a man to purchase and begin to establish a home.

Owing to the poor soil and improper management, after a few years many have abandoned their homesteads in discouragement. Many now believe in the words of the late State Geologist, C. Rominger, "That the productiveness is so soon exhausted and its moisture so soon lost, that it can never be used for agriculture on a large scale with any prospect of success." Whether the latter statement be true or not, it is not now my purpose to attempt to decide.

I call your attention to a list of seventy-two species of plants, all of which are almost certain to be found in considerable quantity on any extended area of Jack-pine plains:

<i>Helianthemum Canadense</i> Michx.,	Frost Weed
<i>Viola pedata</i> L.,	Violet
<i>Viola Canina</i> var.,	Violet
<i>Polygala polygama</i> Walt.,	Pink Polygala
<i>Ceanothus Americanus</i> L.,	New Jersey Tea
* <i>Prunus pumila</i> L.,	Sand Cherry
* <i>Prunus Pennsylvania</i> L.,	Wild Red or Pin Cherry
* <i>Prunus Virginiana</i> L.,	Choke Cherry
<i>Rubus Canadensis</i> L.,	Dewberry
<i>Rubus hispidus</i> L.,	Dewberry
<i>Fragaria Virginiana</i> var. <i>Illinensis</i> ,	Strawberry
<i>Potentilla Canadensis</i> L.,	Five-finger, Cinque-foil
<i>Potentilla tridentata</i> Ait.,	Three-toothed Cinque-foil
* <i>Amelanchier Canadensis</i> var., <i>oblongifolia</i> Torr. & Gray,	Dwarf June Berry
<i>Oenothera biennis</i> L.,	Evening Primrose
<i>Aralia hispida</i> Michx.,	Bristly Sarsaparilla
<i>Diervilla trifida</i> Mönch.,	Bush Honeysuckle
<i>Houstonia purpuria</i> var. <i>longifolia</i> Gray,	Houstonia
<i>Liatris cylindracea</i> Michx.,	Blazing Star
* <i>Solidago memorialis</i> Ait.,	Golden-Rod
* <i>Solidago</i> sp.,	Golden-Rod
<i>Solidago</i> sp.,	Golden-Rod
* <i>Aster</i> sp.,	Aster

* <i>Aster</i> sp.....	Aster
* <i>Erigeron Canadensis</i> L.	Horse Weed
<i>Erigeron strigosus</i> Muhl.	Daisy Fleabane
<i>Antennaria plantaginifolia</i> Hook.,	Plantain-leaved Everlasting
<i>Gnaphaleum decurrens</i> Ives,	Everlasting
<i>Rudbeckia hirta</i> L.,	Cone-flower
<i>Helianthus divaricatus</i> L.,	Wild Sunflower
<i>Cnicus pumilus</i> Torr.,	Low Thistle
<i>Krigia amplexicaulis</i> Nutt.,	Dwarf Dandelion
<i>Hieracium venosum</i> L.,	Rattlesnake Weed
<i>Campanula rotundifolia</i> L.,	Bluebell
<i>Gaylussacia resinosa</i> Torr. & Gray.....	Black Huckleberry
* <i>Vaccinium Pennsylvanicum</i> Lam.,	Dwarf Blueberry
* <i>Vaccinium Canadense</i> Kalm.,	Low Blueberry
* <i>Vaccinium vacillans</i> Solander.....	Low Blueberry
* <i>Arctostaphylos Uva-ursi</i> Spreng.,	Bearberry
* <i>Epigaea repens</i> L.,	Trailing Arbutus
* <i>Gaultheria procumbens</i> L.,	Wintergreen
<i>Apocynum androsaemifolium</i> L., ..	Dogbane
<i>Lythospermum hirtum</i> Lehm.,	Hairy Puccoon
<i>Convolvulus spithameus</i> , L. C.	Low Bindweed
<i>Melampyrum Americanum</i> Michx.,	Cow-wheat
<i>Monarda fistulosa</i> L.,	Wild Bergamot
<i>Rumex Acetosella</i> L.,	Sheep Sorrell
<i>Comandra umbellata</i> Nutt.,	Bastard Toadflax
* <i>Comptonia asplenifolia</i> Ait.,	Sweet Fern
<i>Quercus alba</i> L.,	White Oak
* <i>Quercus coccinea</i> Wang.,	Scarlet Oak
* <i>Quercus tinctoria</i> Bartram.....	Black Oak
* <i>Salix humilis</i> Marshall,	Low Willow
* <i>Populus tremuloides</i> Michx.,	Aspen
<i>Populus grandidentata</i> Michx.,	Large-toothed Aspen
* <i>Pinus Banksiana</i> Lambert,	Scrub or Jack-pine
<i>Pinus resinosa</i> Ait.,	Red or Norway Pine
<i>Pinus strobus</i> L.,	White Pine
<i>Majanthemum bifolium</i> D. C.,	Two-leaved Solomon' Seal
* <i>Carex Pennsylvanica</i> Lam.,	Pennsylvania Sedge
<i>Panicum depauperatum</i> L.,	Panic Grass
<i>Panicum dichotomum</i> L.,	Panic Grass
* <i>Andropogon provincialis</i> Lam.,	Finger or Beard Grass, or Turkey Foot
* <i>Andropogon scoparius</i> Mich.,	Beard Grass
* <i>Oryzopsis Canadensis</i> Torr.,	Mountain Rice
<i>Agrostis scabra</i> Wild.,	Hair Grass
* <i>Danthonia spicata</i> Beauv.,	Wild Oat-Grass
<i>Koeleria cristata</i> Pers.,	Koeleria
<i>Festuca ovina</i> L.,	Sheep's Fescue
* <i>Pteris aquilina</i> L.,	Eagle-Fern
<i>Lycopodium complanatum</i> L.,	Club-Moss

The twenty-seven species marked with a * appear to be the most abundant everywhere on the pine plains.

The list consists of representatives of twenty-seven families, of fifty-four genera, and of seventy-two species. Were we to include all the plants ever found on such plains and all found in the neighborhood of the plains, we might find, perhaps, nine hundred species or twelve times as many as we find on the plains.

The above list is as nearly typical as I am able at present to make it, and is the result of repeated studies over a large extent of territory.

The families of plants best represented on the plains are the ROSACEÆ, nine species, COMPOSITÆ, fifteen species, VACCINEÆ, seven species, and GRAMINEÆ, nine species.

The following large and prominent families of the State are not represented in the list above given: RANUNCULACEÆ, CRUCIFERÆ, CARYOPHYLLACEÆ, SAXIFRAGACEÆ, UMBELLIFERÆ, ORCHIDACEÆ. The most remarkable of all is the absence of LEGUMINOSÆ, though the family contains 6,500 species and is the second in size only to the COMPOSITÆ.

Of the list of seventy-two species, sixty-eight are perennials and four are biennials. The perennials are mostly persistent plants and well adapted by long deep roots and root-stocks to live in poor soil which is subject to severe droughts.

Most of them are admirably adapted to surviving after a severe fire has burned over the ground and killed the tops to the ground.

After a few generations, most likely Norway Pine, and White Pine would disappear, but *Pinus Banksiana* or Jack-Pine is admirably adapted to continue its existence in a succession of seedlings. It grows rapidly, bears seeds when very young in large quantities. The cones, when ripe, open slowly to part with their seeds. Burning of plants below the trees, killing the trees or from some other cause, the old cones open and scatter seeds after a fire has killed the pines. The ground is then ready for a new crop to succeed the old trees. A very large per cent. of seeds from cones four to seven years old will germinate; in one case 85 per cent. in a trial of over 200 seeds.

The number of biennials given in the above list is remarkably small, and there are no annuals in it.

In this list is a thistle and two species of flea-bane, which seed freely and the wind aids in sowing the seeds. The evening primrose seeds abundantly and often on the plains grows in a globular form, a foot to two and one-half feet in diameter. When ripe it loosens its hold on the soil and becomes a "tumble weed," rolling for considerable distance before the wind and scattering its seeds on the way.

In like manner I might prolong this paper by showing the special adaptation of each of these plants in the above list to survive the severe tests applied to it on these sandy plains.