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Omnium rerum, ex quibus aliquid acquiritur, nihil est agriculturâ melius, nihil uberius, nihil homine libero dignius.—Cicero : de Officiis, lib. I, cap. 42.

VOL. IV.

HALIFAX, N. S., SEPTEMBER, 1885.

No. 61.

EXHIBITIONS.

- Provincial of Nova Scotia.—Kentville, King's County, September 29th to October 2nd.
- Yarmouth County.—Yarmouth, October 8th and 9th.
- Upper Stewiacke, (under Valley and Lorne Granges), October 7th.
- Dominion Exhibition.—London, Ontario, September 7th to 12th.
- Prince Edward Island.—Charlottetown, October 7th to 19th.
- Toronto.—September 7th to 19th.
- Boniface, Manitoba.—September 28th to October 3rd.

At the Retreat Farm, Sackville, we noticed on 31st August, a phenomenon illustrating the action of frost. In a level field near the river a large pile of compost is covered with squash vines, some of the shoots of which had run along the grass on the level. The leaves of the shoots on the level are completely blackened and destroyed by the night frost, whilst those at a slightly higher elevation all over the compost heap are quite green and uninjured. Here we have an illustration on a small scale of the effects of a very slight elevation in protecting plants from the injury of summer frost.

We are indebted to Hon. S. H. Holmes for a valuable and interesting paper on Condensed Milk, which is reprinted in the present number. We understand that one of the best samples of which analysis is given in this paper

is from the Truro Condensing Company. We also publish other papers on the subject of Milk Manufacture, which is becoming an industry of considerable importance in this Province, and has obviously a future before it.

We have received from P. Jack, Esq., a plant collected by George Thomson, Esq., at Wolfville, which, although a colonist, is of some interest. It is *Inula Helenium*, commonly called "Elecampane." Dr. Gray gives the etymology of the name as "*Inula*, the old latin name of the plant," and is followed by Wood and by Hooker. Loudon says: "corrupted from *Helenium*,—and, in another place, explains that *Helenium* is named "after the celebrated Helen." Mentzelius identifies it with the *Enula* of Pliny, *ivēros* of Hippocrates, *Theophrastus* and *Dioscorides*; *Enulecampane* of old French authors,—whence probably our English name *Elecampane*. It is known in Quebec Province, according to the Abbe Provancher, as *Aulnée*, *Enula Campana*. Tournefort gives the French name as *Aunée*, referring this plant to his genus *Aster*, as "*Aster omnium maximum, Helenium dictus*." It is a native English plant, but rather rare. Linnæus gives its native countries as follows: "*Habitat in Anglia, Belgio*." In England it was, in early times, a domestic remedy,—the root boiled, yielding a mucilage, which, when mixed with sugar, was taken to promote expectoration, and to "strengthen the stomach." A spirituous extract was also used, and

supposed to contain more of its aromatic and tonic properties. Sir Jas. Smith says, in the "English Flora," published sixty years ago: "The plant is generally kept in rustic gardens, on account of many traditional virtues." Dr. Lindley, after recounting the properties of the famous homœopathic remedy *Arnica montana*, "a virulent plant, acting as a powerfully narcotico-acrid agent, * * * recommended in the cure of putrid fever, ague, palsy, amaurosis, &c., * * *, the *Panacea lapsorum* of continental Europe,"—remarks: "It seems that properties analagous to those of *Arnica* occur in various species of the genus *Inula*, of which the most remarkable is *Elecampane*, an aromatic plant whose root contains a white starchy powder called *Inuline*, a volatile oil, a soft acrid resin, and a bitter extractive; it is regarded as a tonic, diuretic, and diaphoretic, and has been used in dyspepsia, pulmonary affections, and other diseases. It furnishes the *Vin d'Aulnée* of the French." In some parts of Ontario the root is commonly used as a horse medicine, being administered in spring-time to promote the shedding of the winter's coat.

The plant is not rare in Ontario, growing by roadsides and near old settlements. We have also seen it along the roadsides between Paradise and Bridgetown, in Annapolis County. It grows among the ruins of the McCabe farm buildings, between the first and second Sackville Lakes in Halifax County. It is a splendid foliage plant, and we com-

mend it to the notice of the appreciative Superintendent of the Public Gardens.

Inuline, the peculiar carbohydrate contained in the root, is a white powder, not only like starch but similar in composition. It diffuses, however, to some extent, in its physical characters, for, whilst, like starch, it is insoluble in cold and soluble in hot water,—yet it does not form a permanent solution, but is deposited on cooling. With free iodine it gives not a violet, like starch, but a greenish yellow compound, which is not permanent. The other carbohydrate to which Inuline is allied is gum, from which it differs in its insolubility in cold water, and by not giving saccharic acid when digested in nitric.

PROF. LAWSON has sold the splendid yearling Short-Horn Bull "Sixth St. Nicholas of Lucyfield" to A. B. Fletcher, Esq., Folly Village, Co. Colchester.

CROP REPORTS.

FROM RUFUS W. ELLIOTT, ESQ.

Spa Spring, August 17, 1885.

I received a letter from you asking for a statement of the apple crop in this district. In answer, I would say, soft apples an average crop; good winter fruit scarce—not more than a half crop. Hay crop extra, housed in good condition. Our grain crop light,—hope will be well filled. Potatoes look well.

FROM E. M. JORDAN, ESQ.

Kentville, August 14th, 1885.

In answer to yours of the 3rd inst., I would say, I have visited a number of orchards for the purpose of getting the information you desire. I should think the crop must be considerably below an average, while most of the owners would say they would have no apples. I found on most trees a small crop, and many well loaded; but, on the whole, a small crop is all we can count on.

FROM DAVID ARCHIBALD, ESQ.

*Upper Musquodoboit, }
Aug. 24, 1885. }*

DEAR SIR,—In our part of the country orchards and apple trees are things of the past, and the cultivation of the same, to any extent, gone with the last generation.

Individuals amongst us have tried, on a small scale, the cultivation of the apple crop, but failure has generally been the result. My impression is that in parts of our country where this crop is cultivated so successfully, the soil is partly composed of white sand. We have little or none of this kind of soil. Also, in our western counties, their

proximity to the Bay waters, gives them a milder winter and an early spring.

Our hay crop on uplands, light; on lowlands, fair to good; but the weather for the past three weeks has almost brought the securing of this crop to a standstill.

Wheat, where sown, has matured beautifully—little or none of the weevil.

Barley, below an average. Oats, very good.

Buckwheat,—the crop uncommonly heavy on the ground, yet it appears to be filling fairly.

Peas, not extensively cultivated, but, where sown, are good.

Potatoes give promise of an abundant crop—little or none of the fell blight—and the prospects for this crop most encouraging.

Mangolds give fair promise of a good yield.

Turnips will be behind an average crop—largely damaged by the turnip fly.

To obtain milk pure and unadulterated, especially in large towns, has, up to the present time, been nearly an impossibility, as seen by the daily reports in the newspapers of adulteration. It is a well known fact that a great number of cows are fed mostly on swill, and, pushed to an excessive production of milk, they soon fall sick, and, as a natural consequence, the use of their milk is productive of fever and diphtheria. The consumer has therefore to rely upon the doubtful quality of the so-called "pure milk," which, besides all this, runs the risk of adulteration and dilution at the hands of the farmer and middlemen. The way in which cows in numerous instances are fed and watered is disgraceful, and that it is to the use of their milk that the origin of diseases is to be ascribed is proved by the most eminent medical authorities.

Well known authorities, like Pabst, Max, Flaubner, Lurn, Marker, Tohuc, Wolf, and others, agree with the decision of Billinger, that swill or refuse, as a fermenting food of cattle, imparts to the milk a somewhat sour condition; that this food for cattle is, under all circumstances, abnormal, and its use in general associated with want of exercise and air. Further, that the great mortality in children can be distinctly traced to the use of milk from cows fed as above mentioned, and also that a great number of the calves of these animals die of diarrhoea, etc. Van Camaille and others also found that swill or slop fodder is productive of more water and less fat. The first named author puts the relative value of the milk of cows fed on swill or on dry fodder as follows:

| | Water. | Casein. | Al- bumen. | Fat. | Sugar of Milk. | Salts |
|---------------|--------|---------|---------------|------|-------------------|-------|
| Fed on swill. | 92.65 | 2.64 | 0.43 | 1.31 | 3.35 | 0.57 |
| On dry fodder | 87.90 | 2.53 | 5.31 | 3.1 | 3.71 | 0.60 |

SWEETENED CONDENSED MILK.

But there are other dangers, not less serious, which people incur by the daily use of the ordinary sweetened condensed milk, as may be seen by the following extract from the *Noue Freie Presse* (Vienna), September 5, 1881:

Dr. Strohmayer writes that "the discovery of a method for condensing milk was a step in the right direction, but condensed milk, as hitherto prepared, has been only a poor substitute for the real article.

"By diluting it with water, the same delicate distribution of the component parts that exist in raw milk cannot be reproduced, nor does the diluted milk possess the same pure flavor.

"The addition of sugar in preparing it causes, moreover, a change in the relative proportions of the several constituents, and this is a most serious matter, especially where the diet of infants is concerned; the evil consequences which have frequently followed the bringing up of children on 'condensed milk,' such as imperfect development, scrofula, rhachites and aneuria, etc., are, according to Dr. Biedert, attributable to this."

It is to be added that observations of medical authorities agree, even if, in some cases, infants are brought up entirely on condensed milk, being apparently in good health, have a much less resistance to intercurrent illness than infants brought up on mothers' or pure cows' milk. The reason is, without doubt, the very large addition of sugar, which most certainly does not agree with the digestive organs of the infants.

PRESERVED MILK—(O. V. RODEN'S PROCESS).

Up to the present time the ideal of preservation of milk was to find a process by which the decomposition of milk should be avoided, through physical or chemical influence, without adding any foreign substance, or subtracting any of the original constituents. After long trials and costly experiments, Mr. Otto von Roden, of Hamburg, Germany, has realized this ideal, by discovering an entirely new method of preserving milk in its natural liquid state, without the addition of any foreign substance whatever. The process is the following:

Fresh, pure cow's milk (taken from selected cows, which are under the care of a veterinary surgeon), is bottled (or placed in cans) and closed hermetically with glass or cork stoppers, and heated in a water or steam bath, under a pressure of three atmospheres. The milk is then cooled and ready for use.

By this method all germs (discovered by Paul Bert) are killed, and the thus prepared milk, hermetically closed against

any influence of the outside air, will keep in its natural liquid state unchanged for months. During a year's time observations and examinations have been made by eminent chemists in this way. Of a certain number of bottles which were prepared at the same time, one was examined at once, while the others were kept without precaution under the influences of changes in temperature, and opened in monthly intervals. The examinations were made in regard to the reaction, taste and flavor of the milk, and also in regard to the determination of the solid bodies and sugar of milk. The results have been that, after months, no change had taken place. The preserved milk tastes perfectly sweet,

As is known, cows' milk and human milk act differently after entering the stomach; while the cows' milk coagulates to a more or less solid lump, the casein of human milk separates in small flakes. This is, without doubt, the reason that human milk is more digestible than cow's milk, and that it is not the difference of the composition in regard to the quantities which causes this result.

The preserved milk after entering the stomach acts perfectly uniform with human milk in regard to the separation of the casein. No solid lumps are formed, but the casein of it separates in small flakes. This quality brings the preserved milk nearer to human milk than anything known, and it is, therefore, superior, as infants' food, to fresh cows' milk, condensed milk, or any other substitute.

Referring to what has been said above, milk preserved by Mr. Otto von Roden's process has in a sanitary direction the following advantages, viz.:

1. All germs which may cause a decomposition are perfectly killed, and as, by the hermetically sealing, the admittance of fresh air is prevented, the milk possesses a nearly unlimited keeping quality.

2. The casein, which forms an essential part of milk, is changed in a way that, by the influence of the stomach, it does not form solid lumps, but coagulates in small flakes (like human milk), which increases in consequence its digestibility.

3. By this process not only those sub (1) mentioned germs are killed, but also all germs of disease which may have been transmitted to the milk by diseased cows are destroyed, and it is impossible that the preserved milk can become the communicator of diseases by receiving germs of diseases during its transport, which is very often the case with milk transported in open vessels. Experiments made by Schwann, Lancaster, Cohn, and others, in regard to the influence of high temperature upon germs, and the experiments made by P. Bert in

regard to the influence of compressed air, and, finally, the experiment made by Profs. Fleischmann and Munk in regard to the mentioned changes of the casein, proved what has been stated above.

A proof that milk preserved by Roden's method will withstand the effects of tropical climate is the award of a prize medal at the international exhibition at Porto, Alegre, Brazil, 1881.

The great value of pure milk in tropical climates cannot be over-estimated.

The award of the first prize to Mr. O. von Roden at the General Agricultural Exhibition at Hanover, Germany, 1881, for his prominent discovery to the benefit of agriculture in general shows that full credit was given to it by most prominent agricultural men of Germany.

The process has been thoroughly tried in Europe, and milk treated by von Roden's method has long been shipped from Hamburg to London. The product is endorsed by the highest authorities in Europe and America.

The great advantages of this system are that milk can be preserved in its natural condition any length of time, in any climate, and transported any distance without the addition of any foreign substance whatever. It will enable the cities of the South to get milk of the best quality from the East at reasonable prices, while for ocean travellers it will prove an inestimable boon, as every vessel can always have fresh milk in its stock. The American Milk Company, Jos. H. Reall, president, 32 Park Row, New York, has been formed to operate Mr. von Roden's invention in the United States, and will at once begin operations between the West and South.—*Thoroughbred Stock Journal*.

CONDENSED MILK.*

(BY THOS. MADEN.)

[From the PHARMACEUTICAL JOURNAL, Dec. 13, 1884.]

Condensed milk occupies an important position in the dietetics of the age, and though its introduction, at least in the forms in which we are now accustomed to, it is, comparatively speaking, somewhat recent, the industry has already assumed enormous proportions. The modern method of condensing milk was originated by an American about thirty-five years ago, though it was some ten years later before it came to be considered a practical success. But the idea of preserving milk by concentration was by no means new, as, according to Marco Polo, the Chinese Tartars were, so far back as the thirteenth century, in the habit of preparing a condensed milk, which differed from that now in use chiefly in this, that the fat was made use

of for butter, while the preserved milk consisted chiefly of dried casein, milk, sugar and mineral matter.

The processes for preparing condensed milk have been greatly improved upon of late years and the methods given by some writers are probably now quite antiquated. The following epitome of the process as described in 1872, by Mr. Willard, of Cornell University, New York, may be of some interest:—"The milk when received at the factory is first passed through a strainer to the receiving vat; from this it is conducted off, going through another strainer into the heating cans, each holding about 20 gallons; these cans are set in hot water and the milk is set in them till it reaches a temperature of 150° to 175° F.; it then goes through another strainer into a large vat, at the bottom of which is a coil of copper pipe, through which steam is conducted, and here the milk is heated up to the boiling point. Then the best quality of white granulated sugar is added, in the proportion of 1½ pounds of sugar to the gallon of milk, when it is drawn into the vacuum pan, having a capacity of condensing 3000 quarts or more at a time. The milk remains in the vacuum pan, subjected to steam, for about three hours, during which time about 75 per cent. of its bulk in water is removed, when it is drawn off into cans holding 40 quarts each. The cans are only partially filled and are then set in a large vat containing cold water, the water being of a height equal to that of the milk in the cans. Here it is stirred until the temperature of the condensed fluid is reduced to a little below 70°; it is then turned into large drawing cans with faucets, in order to facilitate the filling of the small cans, holding 1 pound each, which are then immediately soldered to exclude the air."

If this represents the actual process as now carried on, it effectually disposes of the allegation so frequently made, that a portion of the cream is taken from the milk before condensation. Of all the condensed milks I have examined there is only one in which there was the slightest ground for suspicion that a portion of the cream had been abstracted, and, generally speaking, I believe that condensed milks are perfectly reliable so far as the relative proportions of cream and casein are concerned.

Condensed milk is also sent into the market without added sugar. One practical difference between the sweetened and unsweetened milk is that the former keeps good almost indefinitely after the tin has been opened, whereas the latter must be used up immediately, otherwise it is certain to go bad.

Having during the past year had considerable experience with the use of con-

* Read at a meeting of the Hawick Pharmaceutical and Chemical Association, December 2nd.

condensed milk as infant's food, I have been at some trouble to go carefully into the whole question, and as I am not aware that any comparative statements have ever hitherto been attempted, save on the most superficial bases, I am not unwilling to put my results into a somewhat permanent form.

In the first place I was naturally anxious to secure the best milk, and for that purpose I—with the assistance of Mr. Dechan, without whose constant presence in the laboratory it would have been quite impossible for me to have overtaken the work—undertook the analysis of a number of the best brands in the market, both sweetened and unsweetened, representing Swiss, English, Irish, Canadian and Norwegian manufacture. As the results of our work in this direction may be of some interest, I here insert them in tabular form, omitting, for obvious reasons, the name of each brand. They are classified in what seems to me the order of excellence, that order depending on the combined weight of the casein and fat. The milk sugar is calculated from the quantity of casein present. These—the milk sugar and casein—usually occur in the proportion of about 4.0 to 4.5, but, as it is probable that some of the latter is lost in the process of condensation, I allow 5 parts of milk sugar for every 4 parts of casein. A mean has been taken in each case, of two or three, and in some instances six analyses.

COMPOSITION OF VARIOUS BRANDS OF CONDENSED MILK.
Sweetened.

| | Casein. | Fat. | Milk sugar. | Cane sugar. | Salts. | Water. | Sp. gr. of 50° P. c. solution. |
|---------|---------|------|-------------|-------------|--------|--------|--------------------------------|
| A | 11.5 | 10.5 | 14.4 | 34.5 | 1.0 | 28.5 | 1048.7 |
| B | 12.3 | 9.6 | 14.7 | 33.3 | 1.0 | 28.5 | 1044.4 |
| C | 12.12 | 9.0 | 15.2 | 34.4 | 1.0 | 28.5 | 1048.4 |
| D | 12.0 | 8.0 | 15.0 | 32.9 | 1.0 | 28.5 | 1048.4 |
| E | 11.3 | 8.0 | 14.0 | 36.0 | 1.0 | 28.5 | 1049.2 |
| F | 11.5 | 8.0 | 14.4 | 35.0 | 1.0 | 28.5 | 1048.5 |
| G | 12.0 | 6.7 | 15.0 | 36.0 | 1.5 | 28.8 | 1050.0 |

Unsweated.

| | Casein. | Fat. | Milk sugar. | Salts. | Water. | Specific gravity. |
|---------|---------|------|-------------|--------|--------|-------------------|
| H | 11.0 | 10.5 | 12.5 | 2.0 | 64.0 | 1093.0 |
| I | 9.0 | 8.25 | 15.75 | 3.0 | 63.0 | 1007.4 |
| K | 8.2 | 8.3 | 13.0 | 1.0 | 63.9 | 1031.9 |

From the first we had been using milk E, but we subsequently adopted one of the other milks, and have had no reason to regret having made the change.

Of the unsweated milks, the only one that I can regard as really containing no added sugar is that marked H.

The process adopted in the analysis was substantially that given in a paper on "Milk Analysis," by Mr. Dechan and

myself, which was published in the *Analyst* for last October. The only difficulty exists in the drying in order to ascertain the percentage of moisture; the large proportion of sugar renders it very difficult to drive off the water, and as a consequence the process from first to last is exceedingly tedious.

There has always been considerable difference of opinion regarding the use of condensed milk as a food for infants, and many medical men are strongly opposed to its employment, especially in the sweetened condition. The question has frequently been discussed, and some months ago an interchange of medical opinion again took place in the columns of the *British Medical Journal*. To one of the letters that therein appeared (June 28, 1884, p. 1285), viz., that of Dr. O. Davies, I shall presently refer in some detail. Acting on the suggestions contained in these communications, I was induced to consider the advisability of giving up sweetened condensed milk altogether in favor of the unsweetened; but on going into the question I found that unless milk sugar were used to bring up the carbohydrates to the normal of mother's milk there would be no advantage, while in any case a great amount of unnecessary labour would be entailed. Moreover the question of expense, though probably in the circumstances not of so much consequence to me, would weigh very considerably with many heads of families, who would probably think twice before spending 1s. per day on unsweetened milk and milk sugar, or 9d. if cane sugar were used, when at the utmost 4½d. per day would amply suffice for the cost of the sweetened milk.

Before a proper comparison can be instituted between the different substitutes for mother's milk and that milk itself, it is absolutely necessary to have some idea of the relative quantities of solid nourishment contained in each of these, and I propose, therefore, to give the results of my calculations in the direction of at least an approximately correct series of figures.

In the letter to which reference has already been made, Mr. Davies states that "it is estimated that a healthy woman gives three pints of milk in twenty-four hours." He does not say, and I have no means of knowing, whether this is simply the estimated average, but we may assume that it is so. It is extremely difficult to fix the composition of woman's milk, since not only the quantity but the quality of the milk depends on such a variety of circumstances that no two women will give milk of the same composition. Very variable results have been obtained by different analysts, and, in order to be as fair as possible, I have taken the mean

of four analyses, from which I find that woman's milk may be represented as containing milk solids in the following percentage:—Casein, 2.63; fat, 3.0; milk-sugar, 5.7; and saline matter, .2. From these figures we can readily calculate the amount of solids in three pints of milk.

There is no difficulty in finding the percentage of solids in diluted condensed milk, but there is considerable difficulty in knowing to what extent condensed milk ought to be diluted. The Anglo-Swiss label recommends that for infants the milk should be diluted with from 7 to 14 parts of water; the Avenicum says 7 to 19, the Scandinavian 10 to 15 and so on, the idea being that the milk should be used weaker at first and gradually increased in strength. According to Dr. Davies there is no evidence to show that a woman's milk is stronger at six months than it is at one month after parturition, and consequently he prefers to use milk of a uniform strength all through. After some tentative experiments, we decided to dilute the sweetened condensed milk in the proportion of 1 to 11 of water, and that strength has been adhered to from first to last, with excellent results. I have noted the quantity of milk used each day, the average being as nearly as possible, eight tins in thirteen days for each child, and from this we calculate the solid nourishment taken every twenty-four hours. As a general rule nurses give the milk very much stronger than 1 to 11. I know of no instance in the circle of my personal acquaintance where so weak a milk is given, but I do know of several where children of six months were allowed as much as a tin a day. At this rate we need hardly wonder if medical men sometimes had cause to find fault with its use.

The main purpose of Dr. Davies's letter was to condemn sweetened, or at least to recommend unsweetened condensed milk. His words are:—"With regard to condensed milk, the 'First Swiss Brand,' that is the unsweetened milk (the only kind that should be used), is four times as strong as the ordinary milk from the cow, therefore a tin would be equivalent to a quart of milk. A tin a day is about what should be given, diluted with five times its bulk of water." As each tin contains about 11 ounces we can readily find the proportion of solids for each twenty-four hours, where this quantity of milk is used. (The notion that condensed milk equals four times its bulk of cow's milk is very common, but also very erroneous. Neither the First Swiss Brand nor any other brand that I have met with contains anything like this strength. It is nearer the mark to say "three times as strong" and some brands are not even so strong as that.)

Again, some medical men strongly recommend milk from one cow, or mixed cow's milk, either of its natural strength or diluted in different proportions with water. There is the same difficulty in getting at a reliable standard for the composition of cow's milk as in woman's milk, but the variations in the analyses of the former are not so marked. I have taken the mean of the results obtained by four eminent chemists, and this gives the composition of the solids of cow's milk as follows:—Casein, 4.68; fat, 3.75; milk sugar, 4.26; and salts, .62 per cent. From these figures I get the quantity of milk solids as in case of the other milks.

The following table expresses the estimated quantities, in ounces, of the various milk solids taken by an average child in twenty-four hours, when fed on mother's milk, condensed milk, cow's milk, and mixtures of cow's milk and water.

| | Mother's milk. 3 pints. | Sweetened condensed milk (A). 3 pints. | Unsweetened condensed milk (B). 3 pints. | Pure cow's milk. 3 pints. | 2 parts cow's milk, 1 part water. 3 pints. | Equal parts cow's milk and water. 3 pints. | 1 part cow's milk and 2 parts water. 3 pints. |
|----------------------|-------------------------|--|--|---------------------------|--|--|---|
| Casein. | 1.57 | 1.12 | 1.12 | 1.57 | 1.12 | 1.12 | .75 |
| Fat. | 1.8 | 1.04 | 1.15 | 1.8 | 1.5 | 1.27 | .85 |
| Milk sugar. | 3.42 | 1.41 | 1.37 | 3.42 | 2.4 | 2.27 | 1.2 |
| Mineral matter. | .12 | .15 | .12 | .12 | .12 | .12 | .12 |
| Cane sugar. | | 3.30 | | | | | |
| Total solids. ... | 6.91 | 7.11 | 3.96 | 7.97 | 5.31 | 3.97 | 2.65 |

It is hardly necessary for me to analyse this table; each one who has an interest in the question can do this for himself and draw his own conclusions. It is very evident, however, that as they stand the milk that comes nearest the mother's milk in the total amount of solids is the sweetened condensed milk. The milk that approximates most nearly in the quantities of casein and fat is the mixture of two parts cow's milk and one part water; but this is of course deficient in the saccharine principle, and requires the addition of either milk sugar or cane sugar to the extent of one and a half ounces per day. The deficiency of casein and fat in the diluted condensed milk could be got over by making the milk stronger, that is, by adding less water, but this increases the quantity of cane sugar also, which is undoubtedly not desirable. As compared with mother's milk even the best of these substitutes is no better than an approximation, but there are several reasons why condensed milk should have the preference over ordinary cow's milk.

Objection is frequently taken to the use of sweetened condensed milk, and from various standpoints. For example;

we are told that the excess of cane sugar decomposes and forms lactic acid which gives rise to irritation and diarrhoea; but this may readily be obviated by a more or less liberal allowance of lime water, this being particularly necessary during teething time, when the natural tendency is for acid secretions to be formed. We are further assured that ossification is retarded by the use of this milk. The following sentences are quoted as an example of a common line of argument, from a work intended as a text-book for students, and published so lately as this year. The author says:—"Condensed milk cannot be regarded as a model food in the same way as pure milk, for the proportions of heat-giving and nitrogenous matters are too high. Children fed upon it fatten rapidly, but, owing to the comparatively small quantity of saline matter present, the bones are only imperfectly formed. Generally a weak state is produced and a predisposition to disease." With reference to these statements, it is obvious from the tables I have given, that the nitrogenous matter is not too high; on the contrary, it is rather low; and that the saline matter is not present in "comparatively small quantity," but, as compared with human milk, in large quantity. The idea expressed in the last sentence is also very common, but I would be glad to see the statistics on which it is based. I find that medical men themselves can rarely point to a single case among the hundreds that pass through their hands, and say "that child has been injured by the use of condensed milk." My own observation leads me to believe that children fed on condensed milk are quite as healthy and as able to resist disease as those fed on ordinary cow's milk, and while I am not at all inclined to regard the former as a perfect food, I prefer it to the latter, even when that is mixed so as to be brought to the nearest possible approximation to human milk, for several reasons.

Condensed milk is more digestible than ordinary cow's milk, a fact which is admitted even by those who say it should not be used. It is less liable to turn sour in the bottle—and how great a boon this is is known only to those who have to do with feeding-bottles. It is less liable to decompose in the stomach. A medical friend informs me that he frequently finds that children fed on cow's milk are troubled with flatulency, diarrhoea, green-stools, and want of health generally, and that on changing the food to condensed milk these symptoms at once disappear and a most healthy condition of body is induced. Condensed milk is less liable to vary in composition and more likely to be pure. It is well known that the quality of cow's milk

varies with the food supplied to the cow, and as in these days it is often the main object to have quantity, quality is frequently at a discount. Besides this, the change of a cow, the introduction of a new cow into the dairy, the use of milk before it is quite free from the colostrum, all these have often been accompanied by dangerous results. Now this cannot happen with condensed milk. It is in the interests of the dairymen themselves to use the very richest milk for condensing purposes; the cows are fed on Nature's food, whether in the green Swiss valleys or the Norwegian dals, or "in the pastures of the far-famed Acadia of Longfellow's 'Evangeline,'" as one advertisement sets forth in poetic language; and if due care is taken to mix and properly condense and preserve the milk, the chances of variation or impurity are indeed few and far between.

The conclusion, therefore, to which I arrive is that when mother's milk is not available, a good sweetened condensed milk is the best substitute, and, though it is not by any means a model food, it is not quite so unsatisfactory as some authorities would have us believe.

P.S.—Since the above was in type, I notice in the *Chemical News*, for Dec. 5, the first instalment of a very complete paper by Professor Albert Leeds, on "The Composition and Methods of Analysis of Human Milk." So far as it has gone this valuable communication contains nothing that affects the tables I have drawn up. The percentage of ash in the sample with which Professor Leeds experimented was 0.21, which very nearly corresponds with what I have given as the mean of four analyses, viz. 0.2, and the other figures as stated above may also be accepted as giving an equally reliable average.

PREVENTION OF MILK FEVER.

There has been much written about milk fever; various remedies are given for it, claimed as certain, but still we often hear of fatal cases, and these usually where the cow is of high value.

Two kinds of treatment, to prevent the disease, are advanced by experts, exactly the reverse of each other, one tending to lower the tone of the system, the other to reinforce it. It seems to me that both are wrong and both right, for the treatment should depend on the condition of the animal, aiming to put her in that state which will best encounter the strain to be put on her, especially the feverishness invariably accompanying calving.

If a cow in the sixth or seventh month is low in condition, whether she feeds well or not, means should be taken to put her on the gaining road. The

way. To do this varies with the animal, which must be watched, and various feeds tried; almost invariably an increase of the ordinary rations will answer; if not, change the grain, even if Indian meal must be used. Roots are most excellent, but often mangolds or carrots are not relished when potatoes or apples would be; in an obstinate case I found condimental food effectual.

Once the animal is decidedly on the gaining road, leave off—should they have been resorted to—Indian meal and condimental food. Keep her in robust health, guarding against feverishness, the main thing for this purpose being to keep the bowels rather loose than the contrary.

On the other hand, should the system be plethoric, the animal in high health, aim to keep her well and strong while reducing the flesh. This can usually be done by feeding solely on good hay—good meadow hay is often the very best food in such cases; roots will generally keep the bowels open; if not, give daily two quarts of shorts, with one quart *old style* oil meal.

As the time for calving approaches, say a month previously, the milk will, usually, decidedly decrease. This may be assisted by not stripping at milking time, then milking once a day, then less frequently, until scarcely any is given, when it will take care of itself. To get a cow dry, I should never reduce her condition; if, as is often the case with large milkers, she can not be dried off, water may be given sparingly; that is, she must not have all she will drink, but always enough to insure against thirst, and her food reduced as much as it can be without loss of condition, choosing also the kind that least tends to milk. Do not milk dry, but keep the bag easy, free from caking, by gentle manipulation. It seems to me that any purge, before or after calving, is unwise as reducing the strength.

As soon as the cow has licked the calf over, give her a gruel, blood warm, made of one quart of rye meal and one quart of shorts, quite liquid, with a tablespoonful of powdered nitre, well dissolved in boiling water, in it, and leave her in quiet to get rid of her afterbirth; in four hours give her another drink, made in the same way, should the afterbirth not have come away; if it has, of two quarts of shorts of the same temperature and consistency as before, and in either case with the nitre; also a handful, not an armful, of good sweet hay, free from clover. After this, feed three times a day a gruel made of one quart of ground oats and one quart of shorts, with the tablespoonful of nitre morning and night, and the handful of hay each time.

The grain for the gruel should be

thoroughly wet with cold water first, but not stopped; then *boiling* water poured on, enough to cook it, and the mixture cooled with cold water to the proper temperature; thus there will be about a pailful of liquid three times a day, which is sufficient for thirst. At the noon feed, when no nitre is used, put in half a spoonful of table salt; continue this treatment for 72 hours, when the cow and calf should be separated and a gradual return made to her full and usual feed, if all is right. There is always a slight feverishness after calving; should it increase instead of diminish, give 40 drops (about three-fourths of a teaspoonful) of tincture of acouite every four hours, until the fever is reduced, omitting the powdered nitre in the gruel.

If when offered her gruel at any time after calving, the cow refuses it, she is probably very ill, and the sooner prompt measures are taken against milk fever, the better.

Above all, guard against a chill at the time of calving and for four days after, both in winter and summer, and against overheating in the latter.—*From Country Gentleman.*

The following appeared in the *Gardeners' Chronicle*, London, July 25th, 1885:—

The Apple Crop in Nova Scotia is a matter of so much concern to British consumers and British merchants that we hasten to lay before them the following communication from our correspondent in Nova Scotia, and in which the prospects of the apple crop are spoken of very favourably:—

"The spring season was a very favourable one for cultivators of the soil this year; the heavy covering of snow last winter prevented the frost going very deep, and in April we had the unusual phenomenon of the frost being out of the ground (as it is commonly expressed) before the covering of snow had left us. All crops started early; we had fine weather for seed time. Our apple orchards profited by the genial weather. Blossoming was abundant, and the early growth strong, but we had a long course of unmitigated dry weather in June. This seemed to shrivel up some of the newly formed fruit.

The most reliable reports I have received from the several counties in which fruit is raised, correspond very well with a very explicit statement made to me by Colonel W. E. Starratt, of Paradise, Annapolis County, who is himself owner of one of the finest orchards in the Annapolis Valley. He says that there will be an ample, if not unusually abundant, crop of fall (autumn) and early winter apples, and that the clean, healthy ap-

pearance of the trees gives every indication of good quality of fruit. We shall thus be able, it is hoped, to hold our own in the English market as regards quality and beauty of sample in early winter apples; and as regards quantity the number of barrels will certainly not be less than heretofore, as new orchards are coming into bearing every successive year. As regards late winter or spring fruit we cannot say so much. There is a decided deficiency in quantity, and what the quality will be remains to be seen. Nonpareils are, in many orchards, a complete failure. (The Yellow Bellefleur, or "Bishop's Pippin," as it is commonly called in Nova Scotia, has of late years become so spotted and small in size, that its vocation as one of our leading market apples is well nigh gone.)

"Our small fruits had a hard time during the June drought, but we have had abundant warm showers so far during the present month (July) which has brought about a great change on all our crops in field and garden. We are now in the midst of our strawberry season. The Sharpless appears to be the most showy one offering on market. Strawberries are now selling at from 10 to 15 cents a box (supposed to contain a quart), say from 5d. to 7½d. per quart."

[The reports from correspondents, in our last and present numbers, modify the Fruit Prospects as indicated in the above article. A synopsis of them have been sent to the London publication.]

In the evidence before the Royal Commission on the Housing of the Poor, we find some interesting statements by Mr. William Smith, farmer, West Drums, near Brechin, Scotland. In less than 20 years the wages of farm labourers have risen 50 per cent. The money wage runs from \$125 to \$170 per annum, but the usual allowances of meal, fuel, milk, &c., increase it to \$250 or \$275.

"By the Chairman—Then the condition of the labourers of the eastern counties of Scotland as stated by you is distinctly favourable. It appears at first sight to compare very favourably with that of the labourers of the south of England, and to compare very well even with that of the labourers of the north of England?—We have a very good class of men. They are well paid, and they are industrious and saving. I could give you some curious reminiscences if time permitted. Three of my first men have educated sons for professions. In the case of one of them his son is an advocate, another is in the management of a railway in South America, another is at the head of a foundry in Canada, another fills a responsible position in a mercantile house in Glasgow, and another has the management of Irish property. Those

were men of great industry and thrift; and not only they, but their wives too; their wives wrought regularly at out work, and made their sixteenpence a day—not so much indeed at that time—say one shilling a day only—but they educated the boys.”

Facts like the above explain to us the reason why so few emigrants come from Forfarshire and other parts of the lowlands. The people are thrifty and happy at home, and, whilst thoroughly industrious and hard-working, they are not in a hurry to get rich, but are contented to see their sons and daughters rising to higher positions in life.

J. B. LAWES, writing in *The Albany Cultivator*, says:—Although I have taken the title of my paper from the Bible, I do not propose to preach a sermon, but simply to point out that the very existence of man throughout the world is dependent on the labour he bestows on the plants which furnish him with food; and, further, that some variety of the cereal grain furnishes the bulk of the food of almost the whole of the human race. Rice, wheat, maize, rye, barley, oats, and millet are all annual plants, belonging to one botanical family, though their exact origin, and the time when they first came to be used as food, are as equally uncertain; and more so than ever now, as from the evidence I am about to bring forward, it appears doubtful whether they could exist in a wild state.

When I first began my experiments on the growth of wheat, it was considered necessary to have several unmanured spaces in which to grow the crop. We therefore took about half an acre across the top of the field, and a similar space at the bottom, as well as about an acre down the whole length. Eventually, however, this latter area was found to be ample for all our requirements.

It is now 44 years since these plots have received any manure whatever, and the average produce over the last 40 years has been 14 bushels per acre. It is probable that the average wheat crop of the world does not exceed this amount. Much surprise has been expressed at the largeness of this yield under the circumstances, and there can be no doubt that the soils upon which wheat is grown generally are far more fertile than mine, but in the case of other soils, their fertility is for the most part shared by other plants growing with the wheat; while on my land, owing to the absence of weeds, the smaller amount of fertility liberated from the soil each year is almost entirely at the disposal of the crop.

A few years ago, when writing on the subject of fertility, I hazarded some speculation as regards the time which

would be likely to elapse before the cereal crops would entirely disappear, if the human race ceased to exist, and in the autumn of last year I made up my mind to devote the half acre of unmanured wheat then growing at the top of the field, to the test of experiment. The produce, as we now know by the threshing of the other unmanured experiments, would have been about 13 bushels per acre, and the thoughts that passed through my mind, as I looked at the crop about to be abandoned to its fate, might be expressed somewhat as follows: “My friend, for the last 40 years you have lived on the fat of the land; man and horse have alike toiled for you, you have been provided with a good seed bed, and a standing army has been kept up at my expense to defend you, while the native owners of the soil have been destroyed in vast numbers in order that you might enjoy its whole wealth in peace. Nations, we know, become effeminate under too much ease and affluence, and have been subdued, and even exterminated by more hardy races; we shall now see whether plants are subject to the same law. I am going to withdraw all protection from you, and you must for the future make your own seedbed and defend yourselves in the best way you can against the natives, who will do everything in their power to exterminate you. The only help I propose to give you is this—I will not remove any part of your family; therefore, while I shall only sow two bushels of seed on an acre of the protected ground, you will be able to sow 26 bushels on the same area.”

Specimens of the wheat grown on the protected and the unprotected land have been forwarded to the editor of this journal, and an illustration is given which will speak for itself. The yield of the protected land will be in all probability about 13 bushels per acre, while the history of the unprotected land may be given in a very few words. The seed that was shed came up thickly enough, but the crop was almost completely destroyed by weeds. The winter was unusually mild, and there was hardly a day in which growth could not take place. The crop of wheat was not so much smothered, as starved, and the dense mass of couch grass—which was one of the chief weeds—seemed to be capable of appropriating every particle of food. It is quite impossible, therefore, to form any estimate of the yield, and as I wish to see what will be the result of another year's self-sowing, the crop, such as it is, will be left standing; but it would be quite safe to state that the produce of the half acre this year would not amount to more than a few pints.

Some important practical knowledge can be gained from this experiment. We see that wheat has no power to contend against the natural vegetation of the soil; we may also assume that weeds, although they may not be able to destroy a crop, yet must greatly reduce the yield throughout the world. Some weeds are far more injurious than others. Thistles, for example, and similar plants which take their food from the subsoil by tap roots, are far less injurious than plants which feed near the surface; but the most injurious of all are those perennial plants which belong to the same family as the wheat, and have creeping roots. Couch grass, therefore, which possesses all of these injurious properties, is the greatest enemy to cereal crops, and, where it abounds, wheat-growing is almost impossible.

Some time ago I pointed out in this journal that although weeds and the natural fertility of the soil might exist together, artificial manures and weeds could not exist together with profit to the cultivator. Weeds have an extraordinary avidity for artificial manures, and it gives us more trouble to keep half an acre of highly manured land clean, than five times the area of unmanured, or badly manured land.

Weeds with roots close to the surface seize upon nitric acid before the crop can get hold of it, and although we may hoe them up, and they are left on the land to decay, still they are not available as food for the crop until the following year. I think, therefore, that I shall not be in error in saying that the profitable use of artificial manures must be accompanied by a cleaner system of farming; and, further, that this cleaner system of farming cannot be carried out successfully, except by the introduction of crops somewhat similar to our root crops, on which the cleaning is chiefly done by means of the horse hoe.

THE Gravenstein apple is the best apple in the world, as all promologists agree. The other day we met the man who set the first grafts of this variety of apple in America. Mr. Corham Parsons of the Fatherland farm, Byfield, received from Europe a package of the grafts from the seedling tree. They were left at his counting-room in Boston, and he sent them to his country place in Brighton, but his overseer, having no spare stocks for them, sent them to Byfield. Our informant, Mr. H. D. Rogers, was grafting over the old trees at Byfield when the grafts arrived, but the foreman of the place seeing that they were a little shrivelled, owing to their long voyage, and that they were rather small specimens of grafts at best, refused to have

them set, declaring that he wouldn't pay for the work. Mr. Rogers, nothing daunted, carried the poor grafts to his father, a somewhat celebrated fruit-raiser, and proposed to set them in his trees. But Rogers, senior, didn't believe in new-franged apples in general nor in these withered grafts in particular, and he would have none of them. As a last resort Rogers carried the scions to James Peabody, who favored everything new and fancy, and who gave him permission to set them, with the understanding that they would go halves on the profits. The third year the trees came into bearing and Mr. Peabody carried a plate of the apples to the cattle show, where they attracted much attention though the committee could not name them. They were cut up into minute pieces and distributed among the connoisseurs, all of whom pronounced it the champion apple. The next year Mr. Peabody carried a plate to the fair of the Massachusetts society, where he met Marshall P. Wilder, the president, who had just arrived from Europe with a basket of apples, a bunch of the grafts and the name, which has always been spelled wrong, Grass Stein—Count Stone—being the name of the proprietor of the estate on which the apple originated. All the grafts in this country came from Mr. Peabody's trees, who took pity on the poor imported scions, after they had been refused everywhere else.—*U. S. Paper.*

In July last a deputation, of which Mr. Moreton Frewen was the chief spokesman, approached Lord Carlingford at the Privy Council, and asked him to relax that clause of the contagious diseases (animals) Act which prohibits the importation of live cattle from any part of the American Union, in favour of the North-Western States. The deputation submitted that as contagious pleuro-pneumonia had never, as was said, been introduced into the Western States of America, and the sanitary condition of animals there was satisfactory, cattle from Wyoming territory, Montana, and Dakota might be imported into Great Britain by the Lake route—through Canada, and landed in this country without being subject to slaughter. If this were allowed the practical advantage thrown out was that a vast supply of store cattle could then be poured into this country from these States, and fattened here at half the cost at which they can be fattened there, and the food supply of this country correspondingly increased. Correspondence which has since taken place on the subject between the Privy Council, the Colonial Office, and the Canadian Government has now been issued as a Parliamentary return. The Clerk of the Council points out that if Mr. Moreton

Frewen's proposal were entertained, the animals admitted under it would practically become Canadian animals, so far as the country is concerned, and the consent and co-operation of the Canadian Government would be necessary to the success of the undertaking. The Canadian Government has considered the question, and their opinion is set forth by the Marquis of Lansdowne, in transmitting to Lord Derby a report of a Committee of the Privy Council for Canada upon the question, as also a report by the Minister of Agriculture. The Governor-General says that the subject is one which has commanded much public attention, and been anxiously considered by his Ministers. The feeling which prevails with them, as with the agriculturalists of Canada, is that no effort should be spared in order to retain for Canada the advantageous conditions under which her cattle are now admitted to British ports. The result of the investigations which have recently been instituted by the desire of the Minister of Agriculture has been to satisfy him that, although there is no evidence to show that infectious disease at present exists in Wyoming, Montana, and Colorado, pleuro-pneumonia has undoubtedly manifested itself in Illinois, in the neighbourhood of Chicago, the headquarters of the western cattle trade. In view of this state of things the Dominion Government has come to the conclusion that the moment would be a very inopportune one for a relaxation of the precautions against the admission of disease, and that, on the contrary, the time has come when more strictly-framed regulations should be enforced along the frontier of the Western States. The government of the Dominion therefore declines to pass through its own territory and to export from the same ports as those used for the exportation of Canadian cattle, animals coming from the districts in question. There the matter ends for the present.—*Agl. Gazette.*

A GRADE Shorthorn cow, tested at the fair at Lexington, Kentucky, some weeks ago, gave 62 pounds of milk in a day, while her successful competitor, a pure-bred Dutch cow, gave only 54 pounds. A herd of grade Shorthorns excelled a herd of Dutch cows in milking, but were ruled out of the competition because "they represented no breed."

AYRSHIRE Cow Duchess of Sutherland, 4,256 (Ayrshire Breeders' Association, Brandon, Vermont), gave, under official test, 463½ lbs. milk in seven days, which yielded 19 lbs. 6 oz. of butter. She has given, on moderate food, without forcing, 9,216 lbs. of milk in one year.

THE question comes up now, Does it pay to feed cows ground food while at pasture? We entirely agree with the *Canadian Breeder* when it says: "While it is a fact that taken alone there is no better food for a cow than good pasture, yet the experience of many of the best dairymen throughout the country is in favor of quite a liberal feeding with corn meal and bran, even while the cow is on the best of pasture, and apparently doing as well as could reasonably be expected of her." The grass furnishes the finest of flavors and all the moist elements, but the meal gives butter qualities to an astonishing degree, so much so that old dairymen who have had the nerve to give it a full and fair trial have stuck to the practice even when butter was selling at very low rates. The *Breeder* also wisely suggests that some dairymen try this experiment by giving the cow at once a very large feed of meal, which disarranges the stomach and stops the flow of milk. They therefore come to the conclusion that meal at least is not good for their cows. There is a right way and a wrong way of doing most everything, and this is the wrong way to feed meal. The cow should be gradually accustomed to the meal by increasing the ration day by day, until the stomach becomes accustomed to it. This also is the way to find out when you reach the maximum point of feeding meal for profit. When the increase of butter ceases the meal should stop, and usually it would be well to decrease the feed a little until the exact point of profit is determined.—*American Dairyman.*

Advertisements.

Resolution of Provincial Board of Agriculture, 3rd March, 1882.

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