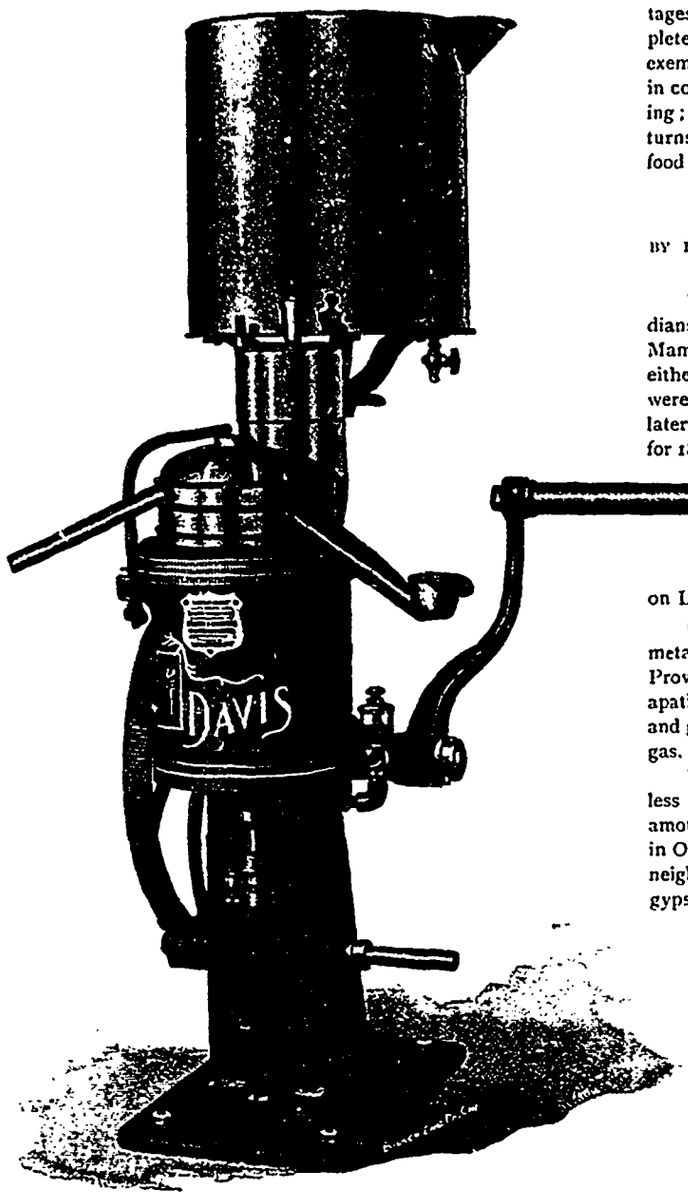
The accompanying illustration shows the Davis Cream Separator with handle to work by hand, but a pulley can be put on to work by power, apparatus being supplied to work it by tread power, steam or electricity. The separator is also made to combine with a feed cooker and with an attachment for churning and butter working.

To the uninitiated the process of raising cream by machinery may be explained as follows: When fresh milk is allowed to stand, the globules of fat contained in it being lighter than its other elements, rise slowly to the top to form cream. This is the law of gravitation, and nature's method has been in use from the earliest times.



The object of a separator is to hasten the ordinary process of setting milk, by substituting centrifugal force for gravity. A bucket of water swung rapidly at arm's length pulls on the arm, while the water remains as deep in the upper side of the bucket as on the lower. This is caused by centrifugal force, the same that tends to make a revolving body move away from the centre of motion. The faster we swing the bucket the greater is the pull. Centrifugal force increases as the square of the velocity—that is to say, if we swing the bucket twice as fast, the pull becomes four times as great; if we swing it three times as fast, the pull becomes nine times as great, and so on. If we put milk into the bucket to take the place of water, and swing it very fast, the centrifugal force pulls the milk against the bottom of the bucket, just as gravity does when the bucket is at rest, the only difference being that when the bucket is swung rapidly the centrifugal force is much greater than gravity, and the pressure on the milk is correspondingly stronger. The result is that the cream is forced to the surface of the milk, just as it would under the influence of gravity, but more rapidly. Exchange the bucket for a bowl rotating on a vertical axis, and the milk will press against the outside of the bowl and the cream form a vertical cylinder. The delivery tube carries the skimmed milk to its pan, and the cream overflows in the other, separating the milk in a continuous manner into cream and skim-milk. The separator bids fair to revolutionize butter-making, in that it assures us a uniform quality of cream and affects the housewife's work on thousands of farms. With a separator at the barn or dairy-room, the milk can be skimmed at each milking in a few minutes, the cream put away in fine shape, and the sweet, pure, fresh skim-milk fed to hogs or calves, with an assured increase of from ten to twenty-five per cent. more butter, and of better quality. All this without the tedious handling of milk from pails to crocks and pans, and without the washing and handling of innumerable vessels.

To sum up, the separator possesses several decided advantages over the gravity methods. These are: (1) more nearly complete and uniform separation of the cream from the milk; (2) exemption from the conditions of temperature, period of lactation in cows, and disturbing influences that may beset gravity creaming; (3) requires no ice; (4) skims the milk while it is warm, and turns out the skim-milk in the best possible condition for use as food for calves; (5) saves time in butter-making.

ONTARIO AS A MINING COUNTRY.

BY DR. A. P. COLEMAN, PROFESSOR OF MINERALOGY, SCHOOL OF PRACTICAL SCIENCE, TORONTO.

The first mining in Ontario was the work of pre-historic Indians, who dug their trenches and mined the native copper, at Mamainse, with tools of wood and stone; but left no other trace either in history or tradition. The first recorded mining operations were also for copper and were carried on about 1770. Thirty years later iron mining was undertaken, and the Bureau of Mining report for 1892 states that iron was smelted at the Falls of the Gananoque, about 1800. With the exception of the bog iron ore mine in Charlotteville township, near Lake Erie, 1723, smelted at Normandale, and the early attempts in Madoc and Essex counties, no further effort was made until the Bruce copper mines on Lake Huron, were opened about fifty years ago.

Gold, silver, copper, nickel, cobalt, iron and lead, among the metals, have been obtained by mining at one time or another in our Province; as well as a number of non-metallic substances, such as apatite, barite, graphite, gypsum and mica, not to mention liquids and gases obtained by boring, such as brine, petroleum and natural gas.

The total output of cobalt from the Sudbury mines amounts to less than fifty tons probably, and the lead produced probably amounts to only a few hundred tons. At present, the metals mined in Ontario are gold, copper, nickel and cobalt, the last three in the neighborhood of Sudbury only. The non-metallic minerals, mica, gypsum, salt, petroleum and natural gas, which is a mineral by a United States legal decision, complete the list. The mining of copper, iron, and phosphate is in a state of suspended animation. Apatite or phosphate was mined in 1870 or 1871; but the first shipment took place seven years later In 1891, 1,551 tons were shipped from Ontario, but from Quebec 4,900 tons. Canadian phosphate has been driven from the market, however, and cannot be expected to be extensively mined until the Carolina and Florida deposits are exhausted.

Barite has been mined at McKellar Island, in Lake Superior. In 1890, the product was stated to have been 1,842 tons Operations appear to have ceased, however, as no further report is made.

Graphite was mined to the extent of 429 tons in 1877. Since then, the product has diminished, though recent explorations with the diamond drill show deposits that should be worked with a profit. Mining operations have been confined to the Ottawa valley.

Most of the gypsum produced in Ontario is mined on the Grand River near Paris, amounting in 1887 to 8,560 tons, and in 1894 to 3,253 tons, valued at $9.760.

The production of mica in 1891 in Ontario was 240 tons, valued at $31,200; in the following year only seven tons; in 1893, 70 tons; in 1894 no output is reported. The new use of mica as a non-conducting packing for steam pipes furnishes an outlet for much material that formerly went to waste in cutting dimension mica, and thus will assist the industry.

All the petroleum produced in Canada comes from the Petrolia region in Ontario. The first important discovery was about 1861. Apparently no more than 500,000 barrels were obtained in any year up to 1887, but in 1893, 1,000,000 barrels were produced, valued at $2,146,937.

Natural gas to the value of $160,000 is reported in 1892, and in