

CHEMISTRY—AGRICULTURE

Whey To Make Candy

Dairy By-Product, Now Largely Wasted, Developed Into Tasty Confections By Agriculture Department Scientists

By DR. FRANK THONE

CANDY made from whey, a dairy product hitherto largely wasted, is science's latest offering to America's sweet tooth—and also to the prosperity of American farmers and dairymen. Deliciously tempting, in half-a-dozen forms, it has been made up on a generous experimental scale in the laboratories of the U. S. Department of Agriculture in Washington by workers under the direction of Dr. B. H. Webb of the Bureau of Dairy Industry.

Feminine America will take lively notice when it is learned that this new whey candy is definitely less fattening than kinds now on the market, as indicated by tests made on experimental animals. Whey candy itself is not obtainable commercially at present, although it is hoped that candy manufacturers will soon become sufficiently interested to undertake its large-scale production.

The new candy is made from sweetened condensed whey. Whey is the watery liquid that is left when cream (butterfat) and cheese (casein) are removed from milk. It still contains valuable food materials, notably a certain amount of protein and considerable quantities of lactose or milk sugar. About 7% of whey consists of solids, and three-fourths of the total solids is milk sugar.

Although vast quantities of whey are produced in creameries and cheese factories all over the country, it is either put to such low-grade uses as feeding pigs or even thrown away outright, for lack of suitable ways of getting it into use as human food. Complete drying into powder makes it readily transportable to market. It is used in feeding young children and in other diets where high mineral content and easy digestibility are especially desirable. However, these special uses account for only a small fraction of the total whey output of the country's great dairy industry. New outlets are still being sought.

Fully dried, powdered whey is not necessary for the making of the new candy. The usual procedure is to use sweetened condensed whey, primarily because it costs substantially less than the

dried product, and yields results just as satisfactory.

Sweetened condensed whey is made by adding 7% of ordinary granulated sugar to the whey (after first pasteurizing it) and then boiling off the water in closed vessels under partial vacuum and at moderate temperature, until the originally watery fluid has been reduced to a thickish, cream-colored sirup. This will keep indefinitely in closed containers, without further treatment. It is usually stored in large sirup cans until wanted.

Two of the most successful forms of whey candy thus far worked out are fudge and caramels. In each, the sweetened condensed whey constitutes nearly half the total weight of ingredients. The rest is made up of standard candy-making materials such as corn sirup, invert sirup, sugar, skimmilk solids, coconut fat, butterfat, chocolate and chopped nuts. The materials are cooked in a kettle having a fast double-action stirrer, and finished in the manner usual for handling such candies.

The real innovation, in form as well as substance, is a confection which Dr. Webb has christened "Wheyfers." Coated with chocolate, wheyfers are a crisp and crunchy candy somewhat like molasses chips, but without the hard texture which many persons find disagreeable in that confection. They are also entirely different in flavor; most of those who have tried wheyfers are enthusiastic.

Wheyfers are the easiest to make of all the forms of the new whey candies. Only one ingredient besides the sweetened condensed whey is used. This is a finely ground pre-cooked dry cereal. Chopped nuts can also be added, although they are not essential.

The sweetened condensed whey is first whipped in a motor-driven beater until its volume is at least doubled. Then the cereal is added until the whey has become a somewhat thickish paste. This is put into a machine called an extruder, which squeezes it out in strips about a quarter of an inch thick, very much as toothpaste is squeezed out of its tube.

The strips of raw wheyfer material are caught on a screen tray that slowly moves under the extruder. If nuts are

to be added, they are first sprinkled on the screen. After the tray is covered with the damp strips it is placed in a drying oven, with the temperature at just the boiling-point of water, and kept there until the wheyfer material is dry and crisp. Then the strips are taken out and cut into convenient lengths.

They make exceedingly tasty nibbling at this stage. Indeed, when Dr. Webb has been making up a batch of them for experimental purposes, and has a pile of wheyfers on the laboratory table, it is remarkable how the number of persons increases, who have errands that will take them through his laboratory!

Wheyfers would not need chocolate coating to make them more attractive to most candy fanciers; they are plenty good enough as they are. The trouble is, that in dried form whey possesses a strong attraction for water in the atmosphere, and soon becomes sticky if the humidity becomes at all high. Wheyfers keep all right in winter, in most places, because the humidity is low, but damp weather in the summer would spoil them. Hence the chocolate coating, which serves as a kind of water proofing.

Whey has not always needed these modern improvements to get people to



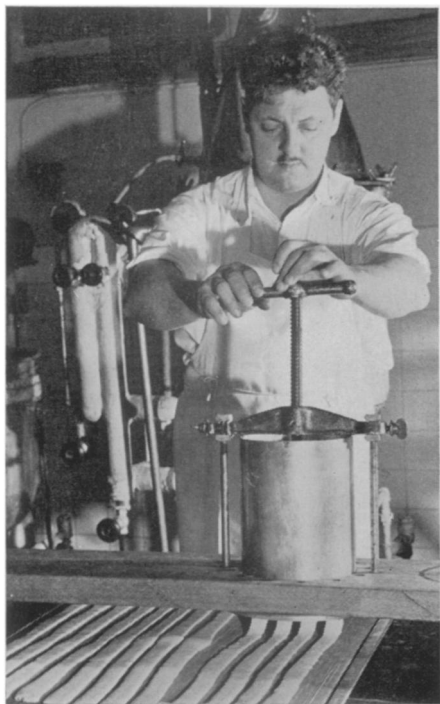
POURING

This laboratory worker at the U. S. Bureau of Dairy Industry is pouring a batch of whey candy from the mixer.

ASTRONOMY

New Comet Discovery Is Third Made During January

On Same Night That Friend's Comet Was Confirmed, Encke's Return Was Seen; Third Will Be Visible to Eye



WHEYFERS

Here is the new sort of candy coming from the machine onto the screen tray ready to slide into the drier. Later the strips will be cut up and coated with chocolate and will taste somewhat like the "chips" you get in mixed chocolates.

consume it. It used to be a rather popular beverage in country districts, in an earlier and simpler age—witness Little Miss Muffet and Old Grimes. Then as now, whey was a by-product of dairy operations, and it wasn't thrifty to waste it. However, when butter and cheese were made in small quantities on individual farms, there wasn't so much whey but that little girls and old grandfathers could drink it up and like it. Now, with cheese being made by the trainload in huge factories, whey flows out in rivers, and larger-scale avenues of consumption must be found for it. Hence the research of the Bureau of Dairy Industry, which promises a time soon to come when you can finish a dinner with cheese and bonbons that both came out of the cow.

Science News Letter, February 1, 1941

RADIO

Conway P. Coe, U. S. Commissioner of Patents, Lawrence Langner, secretary of the National Inventors Council, and Watson Davis, director of Science Service, will discuss the work of the Council of which all three are members on "Adventures in Science," over the coast to coast network of the Columbia Broadcasting System, Thursday, Feb. 6, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST. Listen in on your local station. Listen in each Thursday.

WITH three comets discovered during January, one of which will soon be visible to the naked eye in the southwestern sky after sunset, the year 1941 has made a good start, astronomically speaking.

The latest discovery was reported first by Dr. John S. Paraskevopoulos, in charge of Harvard Observatory's Boyden Station, near Bloemfontein, South Africa. He found it on Jan. 23, when it was in the constellation of Ara, the altar, a group not visible from the United States. It was then of magnitude 3.5, bright enough to be seen easily without a telescope, and had a tail about ten times the diameter of the full moon in length. The next night the comet was independently found by three Argentine astronomers, named Dartayet, Bobone and Cecilio.

Within a few days enough observations had been secured to permit Leland E. Cunningham, of Yale University Observatory, to calculate its orbit, and predict its path. His work shows that it was closest the sun on Jan. 27, at a distance of 73,500,000 miles.

The ephemeris, or time table, that he prepared of its motion, indicates that it is moving northeasterly, through the group of Grus, the crane, Sculptor and Cetus, the whale. At the beginning of February, it will reach a position where people in the United States can see it just after sunset. This is shown by the map on this page. The horizon is shown about where it would be at 40° north latitude at 6:00 p.m. The numbers 3, 7 and 11, respectively, show its place on those dates.

By the time the comet appears in these groups, it will already have started to fade so the sooner you look for it the more likely you are to find it. By the eleventh of February, it will be around the fourth magnitude. The moon will then be full, adding further to the difficulty of seeing it.

Within an hour after he had verified the year's first discovery of a new comet, made by an amateur astronomer in California, Dr. George Van Biesbroeck, of the Yerkes Observatory, Williams

Bay, Wis., completed the first observation of Encke's periodic comet on its latest visit. This is the most frequent of these regular visitors, coming around every 3.3 years. It was then in the constellation of Pisces, and of the 17th magnitude. It is never visible to the naked eye. Astronomers have watched it on each of its 35 returns since 1819, when its periodicity was first recognized by Johann Franz Encke, German astronomer after whom it is named.

Clarence L. Friend, amateur of Escondido, California, was the discoverer of the new comet, on Jan. 17. It was the third he has made. Independently discovered the next day by E. J. Reese, of Uniontown, Penna., officially it is the Friend-Reese Comet. When Dr. Van Biesbroeck observed it, on Jan. 18, the object was still in the constellation of Lacerta, the lizard, a tiny group seen in the northwestern evening sky. It is above Cygnus, the swan, in which the "northern cross" appears, and below Cassiopeia. It was then of the tenth magnitude, with a definite nucleus and a short tail. It will not reach naked eye visibility.

Friend's comet was found just as Cunningham's comet, which, to the disappointment of astronomers, did not become as spectacular as they had hoped, was disappearing from view. Cunningham's comet did, however, reach an unusual degree of brightness, and was seen with the naked eye by many observers.

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