will also destroy the color; potassium hydroxide, sodium hydroxide and ammonia do not affect the color. The writer cannot explain the action.

Five pounds of collodion and 25 ounces of salicylic acid when mixed gelatinized. It required a large volume of alcohol and ether to dissolve the gel, but 5 percent of acetone brought it into perfect solution.

Essence of pepsin, containing 8 percent of alcohol, gave much trouble in filtering when talc was added, however, when allowed to stand a few days, and then a small amount of talc added to the decanted clear fluid, filtration proceeded quite rapidly.

What is Camphorated Oil? The U. S. Dispensatory says it is a German preparation, official as Oleum Camphoratum, composed of one part of camphor and nine parts of olive oil intended for hypodermatic use. The writer has always dispensed U. S. P. Camphor Liniment for it. The American Dispensatory and Standard Formulary give the latter as a synonym of Camphorated Oil.

When definite weights of oils, balsams, etc., are to be filled into bottles the work can be expedited by balancing 6 to 12 bottles on each scale pan, adding the required weights, one at a time, on one pan, and filling the bottles as the weights are consecutively added, until the bottles on one scale pan are filled. Then take off a weight at a time and fill the bottles consecutively on the opposite scale pan until all bottles are full, when both sides will balance.

A batch of syrup was made which when finished appeared dark. Investigation proved that the sugar had been partially caramelized in the process of manufacture. Though white in appearance, it had a molasses-like odor.

Solution of ferric chloride, labeled U. S. P., became turbid on the addition of alcohol and precipitated; oxychloride was present and a deficiency of hydrochloric acid shown. The solution assayed 10 percent iron, whereas a solution of the so-called neutral chloride of iron assayed 12.3 percent of iron.

Magnesium carbonate was used as a filtering medium for an extract of grape containing a large amount of grape juice. An inky black product resulted; the addition of a little citric acid restored the purplish red color.

Tincture of Iodine made from Denatured Alcohol No. 25, gave a light yellow precipitate when the additional iodine and potassium iodide were added. The presence of copper was proven and present in the denatured alcohol. A small amount of sodium thiosulphate added to the denatured alcohol decolorized the iodine and precipitated the copper so that it could be filtered out.

Sulphuric acid was used in an endeavor to remove some F. I. D. Amaranth Red No. 107 from a mortar. A deep green color developed which changed to red on the addition of water. It is supposed that a salt of the dye was formed, which is green, and the water dissociated it into the basic dye and acid radical.

ANIMAL AND VEGETABLE RENNETS.*

Their Properties, Their Preparation, and Their Mode of Action.

The coagulation of the casein of milk by rennet is one of the most singular problems in biological chemistry, and still imperfectly understood, though much studied by such men as Richard Peters, Duclaux, Chodat, Javillier, Gerber, etc.

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Animal Rennet.—Rennet is secreted by the gastric glands of young animals; it also appears in the stomach of adults when milk is taken. Rennet solidifies the casein into an unctuous mass very different from the crumbly mass produced by acids. Its active principle is an enzyme, *chymosine* or *lab*, always found mixed in the stomach with two other ferments, pepsin and trypsin or casease, whose function is the digestion of milk. Rennet is used in cheese making.

Cleaning the Rennets.—The rennet bags of calves, lambs or kids are prepared in abattoirs or even by gut workers. They are scraped to remove the clotted milk, tied by a string at one end, inflated with air and dried. After a few days they are deinflated, packed in dozens and sent to the factories.

Industrial Preparation.—The rennets, cut in thin strips, are macerated in salt water at 35° C., 50 gr. of salt and 60 gr. of rennet to a little of water; after five days they are carefully filtered. The liquid thus obtained is the usual rennet, whose coagulating power = 10,000. Most manufacturers add 4 percent of boric acid to preserve it; others get the same result with a little glycerine or alcohol; some, finally, fraudulently add hydrochloric acid, which increases the coagulating power but gives a curd which is hard to work. By evaporating the liquid rennet, or precipitating it with alcohol, solid rennet is procured and sold in cakes whose coagulating power is 30 to 40 times as great as that of the liquid for an equal weight.

Determination of Coagulating Power.—Rennets offered in the market are stamped with a mark showing their degree of coagulating power. *Normal* rennet is that one volume of which ensures the total coagulation in 40 minutes of 10,000 vol. of milk kept in the water bath at a temperature of 35° C., or otherwise that one volume of which in the same conditions of temperature ensures the total coagulation of 10,000 vol. of milk in 4 minutes (240 seconds).

If a specimen of rennet, held at 35° C., coagulates 10,000 times its volume of milk in 160 seconds its coagulating power is equal to

$$\frac{240}{160} \times 10{,}000 = 15{,}000.$$

In practice the operation is as follows: One cubic centimeter of the rennet to be tested, diluted with 10 times as much distilled water, is poured into 100 Cc. of milk kept at 35° C.; the time required for complete coagulation is then noted. The power is obtained by multiplying 10,000 by a fraction whose numerator is 240 and whose denominator is the number of seconds required for complete coagulation.

Properties of Animal Rennet.—There are certainly slight differences in the composition of rennets coming from different species, which explains, for example, why sheep's milk is not coagulated well except by lamb's rennet; but these are so unimportant as to be negligible.

Animal rennet coagulates *raw* milk readily and *boiled* milk with difficulty. It acts only between 20° C. and 60° C., the optimum temperature being 40.5° C., *i. e.*, the one which acts most rapidly. The coagulation is accelerated by acids, by the neutral salts of calcium and of barium, and is retarded by the bases and neutral salts of potassium and of sodium, and by dilution with distilled water. The coagulation of the casein is always total, whatever the percentage of rennet used, but the time required is longer in proportion as the percentage is less and as the

temperature is lower. This is expressed in the law of Segelcke-Stork: The product of the mass of the ferment by the time required for the total coagulation of the milk operated upon by rennet is a constant number.

White cheeses, for immediate consumption, are obtained from milk held at a low temperature (18° C. to 20° C.) and with an amount of rennet calculated to produce complete coagulation in 20 to 24 hours; the curd thus formed becomes very unctuous. The cheeses fermented in a state of *soft paste* (Brie, Camembert) require a coagulation period of one to three hours, the temperature of the milk varying from 28° C. to 32° C. The *hard paste* cheeses (Dutch, Parmesan) require a rapid coagulation (15 to 60 min.), the temperature of the milk varying from 34° C. to 40° C.

Vegetable Rennets.—The researches of Gerber have shown that almost all plants contain a juice having the properties of rennet and which is specially abundant in the green organs (young stalks, buds, leaves), in the flower (especially the style), the young fruits and the seeds. The following may be noted as particularly rich in rennet: the wild or prickly artichoke, the yellow cheese-rennet, the common fig, the butterwort, the papaw, the *witania coagulans* of India, the paper mulberry, the darnil, the lucerne, the lupine, the euphorbias, the madder, etc.

Properties of Vegetable Rennets.—Many of their properties are identical with those of the animal rennets, but they act chiefly at high temperatures. The optimum temperature is about 75° C.; it may go as high as 80° C. for the papaw rennet, 85° C. for that of the pastel or wood, and even 90° C. for that of the fig. These rennets act hardly at all on milk below 20° C.; however, that of the papaw will coagulate milk even at 0° C. (32° F., or freezing point).

The coagulation is always accelerated by increasing the percentage of rennet, by raising the temperature (up to the optimum peculiar to each species), or by increasing the percentage of mineral or of acid content. Bases retard or prevent the action of vegetable rennets.

According to Gerber these ferments may be divided into 2 classes: 1. The rennets of *boiled* milk, the most numerous, which coagulate boiled milk more readily than raw milk (fig, pastel or wood, etc.). 2. The rennets of raw milk, which have the inverse property; such are the wild artichoke and the paper mulberry.

Preparation of Vegetable Rennets.—There are several processes for extracting the rennet forming juices of plants. The method of Javillier furnishes juices exempt from microbes; the plant is crushed and the juice pressed out; the extracted juice is then saturated with chloroform, placed in a full flask and stoppered and kept in a dark place for 24 hours; it is then filtered through filter paper, neutralized by soda, and sterilized by filtering through a porous flask.

Chodat's method, which is simpler, consists in macerating for from 24 to 48 hours the active parts of the plants cut into small fragments in salt water (a 7 per cent solution) to which have been added a few drops of the essential oil of mustard. Finally, one may confine himself to precipitating the juice of the rennet-forming plants by alcohol. In practice it is the fresh plants alone that are employed. Hence their utilization is possible for a few months only each year: in the spring in the case of the rennet forming buds; in the summer with the flowers, etc. Herein lies an inferiority to the animal rennets.

Method of Employing Vegetable Rennets.—These ferments have been used from the most remote times to prepare curds of milk and cheeses. Homer speaks of them in the Iliad.

In the west and the middle of France it is customary to use flowers of the wild artichoke (*cynara cardunculus*), which looks like a large thistle, attaining a height of more than a meter. Two or three stalks of this plant, which usually grows in uncultivated places, are often raised in gardens for the purpose of making compressed curd or cottage cheese. A pinch of the flowers tied in a little muslin bag is placed in the heated mill; at a temperature of about 65° C. coagulation is very rapid.

The true cheese rennet (*galium verum*) is one of the madder tribe and is very common in our meadows. This perennial herb, half a meter tall, has leaves in whorls of 6 to 12. Its flowers are small and numerous, of a clear yellow and with the odor of honey; they appear from June to September. In the west of England the flower heads are employed for the preparation of cottage cheese. Mixed with calf rennet they are used in making Chester cheese, to which, moreover, they impart a yellow color.

In the Balearic Isles the peasants, who are very fond of clotted milk, prepare it as follows: The milk is boiled, and while still very hot it is stirred with the young branch of a fig tree, left crosswise. Almost at once the milk forms a homogeneous mass which is immediately eaten with a spoon. The fresh fig branches may be replaced by a rennet-forming solution procured by macerating young roots in salt water. This solution acts rapidly upon raw as well as upon boiled milk, at about 70° C.

In Lapland and in the villages of the Italian Alps the curd is prepared with the leaves of the common butterwort (*pinguicula vulgaris*). This little perennial herb dwells in the peat lands and the humid places of the extreme North and of mountainous regions. In the center of its foliage rosettes rise in May and August, its flower stalks of a height of 8 to 15 Cm. The flower, provided with a spur, is blue, violet, rose-pink or white.

In Japan the leaves of a very widely grown tree, the paper mulberry, are used (*broussonetia papyrifera*); in the warm regions the juice of the papaw (*carica papaya*), etc.

The seeds of the *puneeria* or *witania coagulans*, one of the *solanaeæ* of India, are very rich in rennet. When macerated in salt water to which 4 percent of alcohol has been added they yield a solution which keeps well and whose activity almost equals that of animal rennet.

EXPERIENCES OF A WOMAN PHARMACIST.*

BY MRS. MAY O'CONNOR DAVIS.

About seven years ago, upon the successful termination of five years at College, with a resulting Master's degree in botany in hand, I decided the nearest I could ever get to Medicine was Pharmacy, and planned forthwith to take the Pharmacy Course. My decision called forth much anger and sorrow from relatives, who

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