represents 100 calories, or each centimeter, 1,000 calories. The "calories per pound" scale at the top of the chart represents a millimeter tape with the calory units marked on it, and it may be cut out or copied for use, but it is not long enough and should be extended. A fine thread may be used in conjunction with the "calories per pound" scale, as in the ordinary practice of measuring with a string and transferring to a rule.

A list of the foods and their weights in pounds is prepared. Beginning with the first food on the list, the scale opposite its name on the chart is found and the number corresponding to its weight is noted on the scale and the distance from this number to the left hand end of the scale is measured with the tape. The part of the tape used in this measurement is marked off by covering it with the left thumb, the next succeeding portion of the tape is used to measure the second article of food, and at the end of the process, the calorific value of the whole list of foods is read off directly from the tape. For instance, let us suppose that we wish to calculate the total calorific value of 1 pound of bread and 10 pounds of apple butter. Using the millimeter tape measure (which is identical with the "calories per pound" scale at the top of the chart) we measure off one unit of the bread scale and find it to be 13 mm. Then, taking the same measure and commencing at the 13 mm. point we measure 10 units on the apple butter scale. We shall find that this will take us up to about 84 mm. Therefore, the total calorific value of the 1 pound of bread and 10 pounds of apple butter are 8,400 calories. There may be an error in calculation of 20 calories, which is only 0.5 per cent. Of course, in rapid work, ten times as great an error may occur.

Some further examples are as follows: Suppose a meal is made of 1 pound of beef and 1 pound of potatoes. We measure the beef as about 10 mm. and the potatoes as about 3 mm., or a total of 13 mm. or 1,300 calories (whereas the correct calculation is 1,307 calories by multiplication and addition). Besides this slight error in calculation there is a much greater error in using an average figure for beef. If we were calculating the beef used in an army mess, the data would be nearly correct; but when the beef is cut up there is considerable variation in the different cuts, as illustrated by the fact that Atwater and Bryant devote ten pages of tables to data on fresh beef. Since the different cuts vary from 125 calories per pound for very lean neck to 2,440 calories per pound for very fat flank, it might seem useless to use the chart for beef at all. In case of the higher calorific values, most of the calories are due to large masses of fat that would not be eaten as such, and the lower calorific values are due to the presence of much bone that makes the cuts fit only for soup. In the ordinary practice of eating steaks and chops, the average figure for beef would not be very far wrong. If we have a different scale for every cut of beef, the chart would be too large for ordinary use.

As another example, suppose we make a pudding of a dozen eggs, 5 pints of milk and half a pound of sugar. A dozen eggs weight approximately 1½ pounds, and 5 pints of milk 5 pounds. We find that eggs have the same calorific value as canned baked beans, and milk the same as bananas, to remember which will aid in finding the scale. We measure off 1.5 units on the egg scale and find it to be 9 mm., and 5 units on the milk scale and find it to be 15 mm., or a total of 24 mm., and half a unit on the sugar scale and find it to be 9 mm., making a grand total of 33 mm., or 3,300 calories. The correct calculation gives 3,317 calories; hence our error is about 0.5 per cent.

If the food has been weighed in ounces, the same chart is used, but a new measuring tape must be prepared by cutting out or copying the "calories per ounce" scale at the top of the chart. For instance, to find the calorific value of 1 ounce of butter we measure one unit on the butter scale with our new tape and find it to be 217 calories, whereas the correct calculation gives us 217.38 calories.

If the weight of the food is recorded in grams, the same chart is used, but a third form of measuring tape is prepared by cutting out or copying the "calories per gram" scale at the top of the chart. For example, to find the calorific value of 1 gm. of butter, we measure one unit on the butter scale with this third form of tape, and we find it to be 7.7 calories, whereas the correct calculation would give us 7.668 calories.

In case the food is not sold by weight, the capacity of containers may be estimated. The volumetric capacity of containers may vary if not fixed by law, and the gravimetric capacity may vary with variation in the character of its contents. The tabulated data, obtained in San Francisco, may be of some use. The weights are net.

ESTIMATED CAPACITY OF CONTAINERS

Apples	40 lbs. per box (135 apples in a 4-tier box).
Bananas	70 lbs. per bunch.
Beets	10 lbs. per dozen.
Cantaloupe	65 lbs. per crate.
Cassaba melon	40 lbs. per crate.
Carrots	80 lbs. per sack.
Cauliflower	40 lbs. per dozen.
Celery	3 lbs. per bunch
Cucumbers	40 lbs. per lug-box.
Corn (green)	70 lbs. per sack.
Eggs	54 lbs. per case, 1½ lbs. per dozen.
Grapes	45 lbs. per lug-box, 40 lbs. per crate.
Grapefruit	65 lbs. per crate (64 grapefruits).
Lemons	70 lbs. per crate (350 lemons).
Lettuce	40 lbs. per crate, 13 lbs. per dozen.
Milk	2 lbs. per quart.
Oranges	70 lbs. per crate.
Peaches	55 lbs. per lug-box, 40 lbs. per pony-crate.
Potatoes (sweet)	118 lbs. per box.
Radishes	7 lbs. per dozen bunches.
Spinach	10 lbs. per dozen bunches.
Tomatoes	55 lbs. per lug-box.
Turnips	80 lbs. per sack.

The weight of contents of canned and dry package goods is marked on the container. The foods sold by volume and not weight are usually of low calorific value, and hence the absolute error in estimating the weight is very small.

Therapeutics

A DEPARTMENT DEVOTED TO THE IMPROVEMENT OF THERAPY. A FORUM FOR THE DISCUSSION OF THE USE OF DRUGS AND OTHER REMEDIES IN THE TREATMENT OF DISEASE.

USE AND ABUSE OF CATHARTICS*

(*Continued from page 30*)

THE CATHARTIC SALTS

"Taking a dose of salts" is generally considered an easy and simple way of producing an evacuation of the bowel. Consequently few medicaments are more generally used—and abused—by both physicians and laymen than are the saline cathartics. These salts, in fact, belong among the habit-producing drugs, and are responsible for a large proportion of cases of cathartic habit. That they are occasional accessory causes of death from ileus and appendical and other forms of peritonitis is only too well known to the surgeon.

The chief effect of the salines is to interfere with the absorption of some of the ingested water, so that it is eliminated into the stool instead of passing through the system. They do this, presumably, because they are practically nonabsorbable in the alimentary tract and therefore retain enough water in the colonic contents to render them isotonic with the blood.[1]

As an isotonic solution of sodium sulphate is 2 per cent. of the dried (4 per cent. of the crystalline) salt,

* This is the thirteenth of a series of articles on the pharmacology, physiology and practical application of the common laxatives and cathartics. The first article appeared October 18.

1. Other theories have been advanced to explain the action of these agents. Space for the discussion of these is not taken here, as they do not influence their use.

it would take 500 c.c. (1 pint) of fluid to carry out of the system a dose of 10 gm. (2½ drams) of this salt. In case of magnesium sulphate, 7.5 per cent. of which is isotonic, the proportion of water abstracted is somewhat greater, because this substance is converted in the intestine into magnesium bicarbonate and sodium sulphate, both of which are soluble and practically nonabsorbable. Evidently this is why magnesium sulphate is a more efficient purgative than sodium sulphate. Magnesium citrate, on the other hand, yielding sodium citrate and magnesium bicarbonate, is proportionately less powerful than magnesium sulphate, to the extent that sodium citrate is a feebler cathartic than sodium sulphate.

ILL EFFECT ON THE STOMACH

When the salts are ingested in any other than isotonic strength, they are rendered isotonic in the stomach. In case of strong salt solutions, this is accomplished at the expense of delayed evacuation of the stomach and irritation of the gastric mucosa. We may, therefore, formulate the rule that *salines should be given in dilute solution—generally, a teaspoonful to a tumblerful of water—unless abstraction of fluid from the system is aimed at.* The gastric distention produced is by no means advantageous to the functions of the stomach. This is so well known that purgative salts are preferably taken on an empty stomach; their ingestion is so timed, that they have largely left the stomach before food enters it, which is ordinarily accomplished by giving them at least half an hour before meals. This presupposes, however, a normal emptying time of the stomach. When there is gastric motor insufficiency —a condition in which fluid is evacuated with difficulty and therefore interferes with digestion—these agents are, as a rule, not well tolerated. The condition of sufferers from gastritis is likewise aggravated by any but most moderate doses of isotonic alkalized solution. When there is nausea or vomiting, these agents, with the exception of magnesia, cannot be administered, for they have a tendency to provoke nausea and vomiting in sensitive persons. These are the reasons that most of the cathartics of this class are practically taboo with the gastro-enterologist, who deals with so many of these patients. Even their transduodenal administration by means of Jutte's tube has recently been advocated, to spare the stomach the action of these chemicals.

EFFECTS IN INTESTINE

While these bodies delay the evacuation of the stomach when they are given in concentrated solution or when they produce diarrhea, the moment they enter the intestine they hasten the onward progress of its contents, producing a liquid evacuation within from one to four hours of their ingestion. Such prompt effect is dependent, however, on good peristaltic activity. When this is deficient, as is likely to occur in those confined to bed, instead of one prompt and comfortable bowel movement in one, two or four hours, several small bowel evacuations may ensue with considerable griping in the course of twenty-four hours. For this reason the salines may be advantageously combined with peristaltic stimulants, as salts and senna, sulphur and cream of tartar. From what has been said it is evident that the best time for giving these salines is in the morning before breakfast: while administering them last thing at night is least likely to produce desirable results.

The rush of fluid through the intestine, induced by saline cathartics, results in a veritable washing out of the bowel, which cannot, however, be complete. Liquid and solid materials are passed along the intestine by different processes. While the rhythmic segmentation movements of the intestine may cause a rapid passage of fluid, solid contents, which depend for their propulsion on peristalsis, may be left behind. While the artificial diarrhea produced may carry away poisons, it also causes the loss of a certain amount of nutriment. On the latter action is based their use in the treatment of obesity, which, however, is not nearly as rational as diminution in the intake of nutriment. Not much can be said in favor of their action in so-called intestinal autointoxication: for, while they may remove some of the bacteria and the poisons produced by them, the fluidity of the bowel contents and the greater amount of organic matter contained in them may favor the more rapid growth and development of those organisms left behind.

The evacuant action of the salines is chiefly useful when a single flushing out of the bowel is desired to remove, as thoroughly as possible, irritant or otherwise offensive material. As they produce but little irritation in the intestine, they may be used even in the presence of enteritis and in dysentery. Salines are the classical evacuants to be used in connection with mercurials and anthelmintics, and in case of poisoning.

One of the chief faults of the cathartic salines is their deficiency in stimulating peristalsis: indeed, intravenous or intramuscular injection has been shown to inhibit bowel movement. The rapid evacuation produced is due to distention of the intestine with fluid; and this is so marked that salines are particularly obnoxious for preoperative purgation or for evacuation of the bowel prior to a roentgenologic examination of the abdomen. They are contraindicated in chronic atonic constipation, as they not only do not antagonize the underlying pathologic condition, but actually aggravate it by lessening the need for peristaltic activity, as liquid contents are more easily propelled than solid material. Their use in dyschezia (torpor recti) is irrational, as in these cases they act no better than an equivalent amount of water injected by rectum; and it surely is not good sense to upset water absorptive and other physiologic processes all the way down the alimentary canal in order to distend its lowest segment with fluid that might so much more readily and efficiently be introduced from below.

The chronic use of salines is justified only in those cases of constipation due to minor colonic stenosis, even cancerous, and to partial anatomic obstacles (adhesions, etc.) in patients for whom surgical relief is not desirable.

SYSTEMIC EFFECTS

The source of the fluid eliminated in the stools in the course of saline catharsis is chiefly ingested water. Even if the saline is not taken in isotonic solution, enough water is ordinarily consumed in our diet to produce isotonicity without abstraction of fluid from the blood. It is only when dry diet and concentrated salt solution are used simultaneously that abstraction of fluid from the system occurs. As a result of such concentration, the red blood count may rise to 7,000,000 per cubic millimeter, to return to normal within the next few hours even if no fluid has been taken. A second less marked rise in the concentration of the blood may be observed during the stage of diuresis.

Alongside of this temporary diminution in the volume of circulating fluid there is a tendency to depression of the circulation. This accounts for the feeling of faintness experienced by feeble individuals at the height of action of these agents, as well as for the relief of headaches due to cerebral hyperemia or high blood pressure testified to by others.

In treatment of dropsy, the cathartic salines are perhaps the least harmful among the hydragogues, owing to absence of intestinal irritation. However, their unfavorable action on the stomach may render jalap or elaterin preferable in certain cases. When given for this purpose, from 15 to 30 gm. (½ to 1 ounce) of sodium sulphate (preferable to magnesium sulphate for reasons to be given below), dissolved in from 30 to 60 c.c. (1 to 2 ounces) of water, are taken on an empty stomach, best in divided doses every fifteen minutes until all has been taken. It would be poor therapy, however, to force a patient to take this disagreeable potion, obnoxious not only to the palate but also to the stomach, unless moderate drink restriction is practiced at the same time. The policy of this therapy may be questioned when we realize that mere drink restriction could produce the same result, as far as dehydration of the system is concerned, in a more gradual and less disturbing manner. There are a number of other weighty objections to it. Thus, the salines fail to produce their purgative effect as soon as a certain degree of systemic dehydration has occurred. Under such circumstances they are absorbed; and, if they cannot be promptly thrown out by the kidney, must be retained with an adequate amount of water to maintain isotonicity, thus still further adding to the waterlogged condition of the patient. Furthermore, in the dropsy of myocardial insufficiency, the weakening of the patient by the routine administration of heroic doses of salines more than offsets the benefit to be derived from the abstraction of the small amount of fluid lost in this way. In patients with enfeeblement of the circulation, the drastic use of salines, so commonly practiced, cannot be too strongly deprecated. All this accounts for the observation made, at times, that a patient who at first seemed to improve on this treatment becomes more dropsical again on its continuance. All that can be said in favor of it is that a dropsical patient should not be permitted to become constipated; and that the gentle use of salines, enough to produce one or at most two liquid stools a day, might be recommended, alongside of moderate drink restriction. When watery bowel movements do not result, the administration of the saline should be stopped.

A note of warning should furthermore be sounded against the use of magnesium salts when there is a suspicion that they might be absorbed instead of being thrown out with the stools, as might occur not only under conditions just described, but also in case of ileus. If the patient cannot get rid of the dose in the usual way, it may, by its absorption, aggravate the existing intoxication and even contribute to a fatal result by the depression of the respiratory center and the curare-like action on muscles inherent in the magnesium ion. An extraordinarily high specific gravity of the urine (even 1.070 or 1.080) is suggestive of magnesium sulphate poisoning. In such a case, the antagonism between calcium and magnesium, demonstrated by Meltzer, might be of practical importance, as well as the hypodermic use of 0.6 instead of 0.9 per cent. salt solution to lessen the prevailing excess in osmotic tension. Sodium sulphate is much safer under these circumstances, as it would be less poisonous if absorbed.

One may well be skeptical that anything can be accomplished by saline catharsis in the way of diminishing the bulk of exudates, such as those of pleurisy with effusion. The most that can be said for the practice is that salines, in moderate doses and given in fairly concentrated solution, may be preferred to other cathartics to antagonize constipation. Exhausting purging is a display of poor judgment in these cases, as it can only do harm.

To reduce milk secretion in weaning or to lessen engorgement of the breasts in an otherwise healthy woman, drink restriction may be accompanied by use of saline cathartics for a day or two.

(To be continued)

New and Nonofficial Remedies

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION. W. A. PUCKNER, SECRETARY.

CHINOSOL.—Oxyquinolin Sulphate.—$(C_9H_7ON)_2H_2SO_4$.—A normal oxyquinolin sulphate.

Actions and Uses.—So far as experimental evidence and experience go, chinosol is non-toxic. It is a powerful antiseptic, somewhat stronger in this respect than mercuric chloride and considerably stronger than phenol. It has been found to exert an antiseptic action in solutions containing 1 part to 10,000. It is a feeble germicide, being weaker than phenol and much weaker than mercuric chloride. It is incompatible with alkaline substances (soap) and with salts of mercury and iron. Chinosol does not coagulate albumin or injure the mucous membranes or tissues. The sensitiveness of patients to its solution varies considerably. In some it produces a pronounced stinging when applied to mucous membranes even in dilute solutions (1 to 2,000), but it is claimed not to cause harmful irritation in any strength. It is claimed to possess marked analgesic power and to be an efficient deodorant.

Dosage.—For internal use 0.3 Gm. (5 grains) three times daily. As an antiseptic the average strength of solution used is 1:1,000; as a nasal spray or douche 1:3,000; as a gargle 1:2,000, and as an eye-wash 1:4,000, gradually increased in each case according to the tolerance of the patient up to 1:500. In gargles the strength may be increased to 1:250. As a vaginal douche the initial strength used is 1:1,000, increased to 1:100 if necessary.

Manufactured by Chinosol Co., Parmele Pharmacal Co., New York. U. S. patent No. 906,918 (Dec. 15, 1908; expires 1925). U. S. trademark No. 28,750.

Chinosol Tablets.—Each tablet contains chinosol ¼ Gm.

Chinosol is a yellow crystalline powder of saffron-like odor and burning taste. It melts at from 175 to 177.5 C. It dissolves readily in water, but with difficulty in alcohol and it is insoluble in ether. The aqueous solution has an acid reaction.

A drop of solution of ferric chloride produces in a solution of chinosol a marked green coloration. Barium chloride produces a white precipitate. Solutions of alkaline hydroxides precipitate from an aqueous solution of chinosol a white precipitate, consisting of interlaced crystalline needles, which, after filtration, washing and careful drying in a desiccator, should melt at from 73 to 75 C. On incineration chinosol should not leave a weighable residue.

DUBOIS' IODOLEINE.—Iodized Poppyseed Oil.—An iodine addition product of poppyseed oil.

Actions and Uses.—Dubois' Iodoleine may be used whenever iodides are indicated, its effect being more gradually exerted. See general article, Iodine Compounds for Internal Use, N. N. R., 1919, p. 143.

Dosage.—From 0.25 to 2 Cc. (0.3 Gm. to 2.5 Gm.) per day in capsules taken at meals of Dubois' Iodoleine containing 33