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ORIGINAL ARTICLES.

MARINE-HOSPITAL RATION.

Read before the Section of Physiology and Dietetics, at the Forty-third annual meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

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The ordinary articles and quantities of subsistence supplies for ten thousand (10,000) full rations are:

Meat, fresh and salt,	8,000 lbs.
Fish, fresh and salt	2,000 lbs.
Milk	800 gal.
Butter	1,000 lbs.
Eggs	300 doz.
Lard	300 lbs.
Bread stuffs and other prepared farin- aceous food	10,000 lbs.
Vegetables	10,000 lbs.
Fruits, fresh and dry	1,500 lbs.
Tea	100 lbs.
Coffee	300 lbs.
Sugar	1,500 lbs.
Molasses or syrup	25 gal.
Salt	500 lbs.
Pepper	25 lbs.
Vinegar	25 gal.
Pickles	25 gal.

Meat, the first article on the list, especially beef, is the most nutritious of all animal foods. It is easily cooked, very digestible, and perhaps more extensively consumed than any other animal product. The composition of fresh beef—the relative proportions of water, nitrogenous matter, fat and salts—the mean calculated from Pavy's table of lean and fat beef, Yeo's table of three different examples of butcher's beef (very fat ox, moderately fat ox, and lean ox), and Parke's table for calculating diets, including meat of best quality with little fat, like beef steaks, uncooked meat of the kind supplied to soldiers—bone constituting one-fifth ($\frac{1}{5}$) of the soldiers' allowance, and uncooked meat of fattened cattle, and Rohe's table of animal foods, may be given approximately correct, as follows:

Water	69.99
Nitrogenous matter	19.40
Fat	8.57
Salts	2.04

It is proper to state, however, that the proportion of fat in a very fat ox is given as high as twenty-seven per cent. and Prof. Atwater, as quoted by Billings, places the difference between different parts of well fattened animals, as follows:

Beef, round	8.1
Beef, neck	14.3
Beef, sirloin	14.3
Beef, side	21.7

The first table may also be applied to and accepted as approximately correct for moderately fat mutton and pork, though the fat of both these articles of animal food varies from six to forty per cent.

Moderately fat or lean mutton is as easy of digestion as beef but very fat mutton is hard of digestion and unsuitable for invalids.

Pork is not included in the specified ration of the Marine Hospital, but is allowed in the supply table, and while hard of digestion and less adapted than mutton as a food for invalids, nevertheless serves a useful purpose; and salt pork and bacon, like other salt meats are not only popular foods, but from the small proportion of water they contain, also decidedly advantageous from an economic standpoint; and when used with other lean meats, such as rabbit, veal and poultry, and also with other articles rich in nitrogenous matter, as for example in the palatable dishes of bacon and eggs, liver and bacon, and pork and beans, they serve "to establish a proper proportion in the supply of nitrogenous and carbonaceous material" and the combination is founded on a rational principle.

It is claimed also that in some cases of dyspepsia, salt and smoked meats are comparatively easy of digestion, that they are not so likely to give rise to acid fermentation in the stomach, being less readily decomposed. Niemeyer mentions a remarkable case of this kind—the patient being obliged to limit his diet to lean and smoked ham, sea biscuit and a little Hungarian wine.

FISH.

There are many kinds of fish used as human food. They vary greatly in composition, nutritive value and digestibility. The eel, herring, mackerel and salmon contain large proportions of fat and are exceedingly nourishing to persons of good digestion, but the lighter kinds are, as a rule, more suitable for invalids and persons with delicate stomachs.

Dujardin-Beaumetz, according to Yeo, "divides fish from a nutritive point of view, into three classes, 1. Fish with white flesh, like the whiting and sole. 2. Fish with red flesh, like the salmon, and 3. Fish with greasy flesh, like the eel." The last he considers most nourishing, but least digestible.

The following table of mean composition of white-fleshed fish, including the sole, haddock, carp, white-fish and pike, compiled from different analyses represents in a general way the quality of fish used in the Marine-Hospital ration.

Water	79.90
Nitrogenous matter	17.57
Fat	1.06

Some kinds or varieties of fish are said to improve in flavor and tenderness by being kept for a short time, but as a rule, fish cannot be cooked or eaten too soon after being taken from the water; and salted fish is difficult of digestion and not very nutritious. Fish of all kinds are in the best condition for the dietary just before spawning; during that process, the flesh loses its edible quality and becomes watery and flabby.

The theory that fish is an "intellectual" or "brain food," because of the phosphorus it contains, does not receive much support from recent analyses—good beef being equally rich or *poor* in phosphates. But fish is more easily digested than beef, and, therefore, better adapted for *brain workers*.

Yeo states that Louis Agassiz spoke of fish as food "refreshing to the organism, especially after intellectual labor; not that its use can turn an idiot into a wise or witty man, but a fish diet cannot be otherwise than favorable to brain development."

MILK.

Milk is not only a perfect food, containing as it does in proper proportions the four classes or grand divisions of alimentary principles necessary for the support and development of the young of all mammalian animals, but it is the important fluid upon whose analysis the said classification was originally founded. It is the principal constituent of various diets, and is capable alone of sustaining life. It is the most serviceable food for invalids, and as Robert's Well says, "All plans of feeding the sick on liquid food, center round milk." It varies in composition—in the relative proportions of nitrogenous matter, fat, carbohydrates and salts, and is of course, largely composed of water, as shown by the following table of mean composition:

Water	87.20
Nitrogenous matter	3.57
Fat	3.68
Carbohydrates	4.84
Salts	.70

The above table is the mean of three analyses and corresponds closely to the report of the French commission, appointed by the Prefect of Police of Paris. From the analysis of milk, made in various countries the commission fixed the minimum standard of good milk at—

Water	88.50
Casein, extractives and salts	4.00
Butter	2.70-3.00
Lactin	4.50

Casein is the chief constituent of the nitrogenous matter (the albuminates) but differs from ordinary albumen in not being coagulated by heat. Its fluidity in fresh milk is due to the alkaline or neutral calcium phosphates with which it is combined; but the addition of any acid capable of decomposing or converting the alkaline phosphate into an acid phosphate will cause immediate coagulation or precipitation of casein, and the formation of the so-called curd—the fluid portion from which it separates is called whey. If milk is allowed to stand any length of time, spontaneous coagulation takes place by the development of lactic acid. Warmth hastens this process, and it is a common observation that milk "turns sour" very rapidly in the heat of summer, or during a thunder storm.

The salts contained in milk of average quality amount to about 0.7 of 1 per cent. Calcium phosphate is a considerable and important constituent. Milk also contains chlorides of sodium and potassium, phosphates of soda, magnesia and iron. Butter is another name for the fats or glycerides of milk obtained by the familiar process of skimming and churning, and will be referred to again further on. Lactin is the carbo-hydrate of milk and is known also as lactose or milk sugar.

SKIMMED MILK.

Milk from which the cream has been removed is, of course, less rich in fatty matter than fresh milk, and while more easily digested and useful in certain forms of disease, and as a *starvation* diet in the treatment of obesity, is, I believe, seldom used *intentionally* in the Marine-Hospital ration. It contains, according to the mean of three different analyses by Letheby, Bauer and Church:

Water	89.90
Albuminates (nitrogenous matter)	3.36
Fat	.84
Lactose	5.09
Salts	0.80

WHEY.

As before mentioned, whey is the fluid portion of milk from which the curd has been separated by coagulation. It is sometimes used as a poor substitute for milk and is readily made by adding a small quantity of lemon juice to milk, one or two teaspoonfuls to a pint, and boiling it. Whey contains only a small portion of the elements of the milk, but it is a pleasant drink and more or less useful in certain febrile and stomach affections, and is a popular "cure" at some of the alkaline and salt spring health resorts of Germany and Switzerland. The mean composition of whey, according to Bauer, is:

Water	93.3
Albuminates	0.82
Fat	0.24
Lactose	4.65
Lactic Acid	0.33
Salts	0.65

CREAM.

Cream is that portion of the milk which rises to the surface when the liquid is cooled and at rest. It varies in amount according as the milk is rich or poor, and also according to the means or carefulness by which it is separated. It varies in composition, and the range of variation of the relative quantities of its constituents is so great that no satisfactory table can be given. The mean of two different analyses gives:

Water	56.5
Casein	3.8
Fat	35.8
Lactose	2.6
Salts	1.1

According to Church, the variation of water alone is from 28 to 68 parts in 100. Bauer places the extremes at 22 and 83, and states also that the fat varies from 8 to 70.

BUTTER.

Butter is one of the most popular, agreeable and digestible of the animal fats, and while used almost exclusively as an accessory to other articles or as the necessary grease and flavor in the process of cooking various food products, is *alone* a very valuable food. It is made by the well known process of churning and varies greatly in quality and flavor. It contains a variable amount of casein which is taken up from the milk. Rancid butter is unfit for use, and butter is considered good or bad according, as it contains much or little casein. The rancidity of butter being due to changes in the fat, brought about by alterations in the casein.

The unpleasant and peculiar flavor or taste which some butter possesses is frequently due to the

strongly flavored food given to the cows, or which they find in the pasture—as for example, garlic. But another and perhaps the most frequent cause of strong or tainted butter, is the absorption of odorous vapors or volatile flavors from the atmosphere in which it is placed, as for example, the vapors from cheese and meat, and especially from any and every kind of decaying vegetable or animal matter; and these remarks apply to milk and butter alike. The following table shows the average proportions of the most important constituents of good butter, being the mean of four different analyses:

Water	10.4
Nitrogenous matter (casein)6
Fat	86.5
Carbo-hydrates (Lactose)	0.4
Salts (common salt)	1.1

BUTTERMILK.

The fluid portion of the cream that is left after the butter is separated by the process of churning is a nutritious drink and food. It is easily digested and well adapted for persons suffering from stomach disorders, especially gastric catarrh, and in the "Milk Cure" of albuminuria and diabetes it may be substituted for fresh milk. Niemeyer states that in some patients, fresh milk is not so well borne because it readily curdles in the stomach and forms large, firm lumps, while in the buttermilk, the casein is already curdled, but finely divided. He also quotes the prescription approvingly, "When the patient is hungry, let him eat buttermilk; when he is thirsty, let him drink buttermilk." The composition of buttermilk as shown by the mean of different analyses is:

Water	90.
Nitrogenous matter (casein)	4.2
Fatty matter (butter)	0.4
Lactine or lactose (milk sugar)	4.3
Lactic acid	

EGGS.

Fresh eggs, raw or lightly cooked, are very digestible and highly nutritious. They contain all the elements of the blood and are, like milk, almost a perfect food. The shell consists largely of carbonate of lime, but contains also a small proportion of phosphate of lime and nitrogenous organic matter. It is lined by a delicate membrane which encloses the white of the egg. The yellow or yolk of the egg lies within the white and is also enclosed in a thin membrane. Hard cooked eggs are not easy of digestion if eaten alone, but if taken together with other food and thoroughly masticated they are not very objectionable to a healthy stomach. According to Church "the average weight of a hen's egg, shell and contents is about one and three-fourths ($1\frac{3}{4}$) ounces. It becomes lighter by being boiled, losing a little water." Parkes places the average weight at about two ounces, and calculates ten per cent. shell 22.8 albumen and fat, and 67.2 water, and states that "if an egg weighs two ounces, it contains nearly two hundred grains solids. Pavy, quoted by Yeo, calculates that such an egg would yield 110 grains nitrogenous substance, 82 grains of fat and 11 grains of saline matter. The mean of several analyses shows that the white of an egg has the following composition:

Water	85.2
Nitrogenous matter	12.3
Fat	1.1
Carbo-hydrates	
Salts8

The yolk of the egg shows a higher degree of richness. It contains:

Water	51.1
Nitrogenous matter	15.6
Fat	30.8
Carbo-hydrates	0.1

The mixed whites and yolks of hen's eggs, according to Church (shells excluded) contain:

Water	71.7
Albumen and casein	14.
Oil and fat	11.
Membranes and extractives	2.
Mineral matter	1.3

BREAD.

Of all the various cereals used in making flour, wheat is of first importance and yields the best bread. Wheat bread is an acceptable and nutritious food and is more extensively consumed than any or perhaps all other vegetable products. Wheat, like all other articles of food, varies in composition, but the variations in the grain are chiefly limited to the relative proportions of starch and nitrogenous matters. The differences in composition are not only shown between the different varieties of the grain, as for example, the relatively small proportion of albuminoids in the soft, opaque grains of white wheat, and the large proportion in the hard, translucent varieties; but differences also appear in wheat of the same variety, accordingly as it is grown during a dry or wet season. Wheat grown during a fine, dry season contains less starch and more albuminoids than wheat produced in a wet season. The wheat grain contains a middle part or kernel and six thin coverings or coats. The several coats or coverings become thinner and whiter and probably more nutritious as they approach the kernel. Meal is produced by grinding wheat between millstones, and by sifting, winnowing and regrinding, the meal is separated into a number of different products. In some processes of milling the outer coat or fine bran is removed by a previous operation, and in roller milling the germ of the grain is also as a rule removed. In the older process of milling only three different degrees of fineness are recognized—flour, middlings and bran. In the new systems many different grades are produced. Fine flour, seconds flour, tails, sharps, pollards and bran are only a few of the numerous products. In this small classification the first three are considered *flour*, the remainder bran. The thin outside coat of wheat is very indigestible, being largely composed of silica. Bread made from the *finest* wheat flour is as a rule, very digestible, and is almost entirely taken up or absorbed in the process of digestion. It is, therefore, of the greatest value to persons or patients of weak digestion and looseness of the bowels. To obviate or counteract the constipating effect of such bread, bran, rye, cornmeal and molasses are frequently added, forming the different varieties of graham or brown bread. Bread, on the other hand, made from the coarser grades of flour is considered less digestible in proportion as the flour contains the outer or inner scales of the grain, the relative proportions of silicious matter and woody fibre becoming less and less as they approach the center. The indigestibility or low nutritive value of this quality of bread is due to the fact that its nutritive elements are hurried through the bowels by reason of the excessive irritation produced by the indigestible silica, etc., which may also carry away other nutritious

material before digestion has been completed, and thereby acutally lessen nutrition. For those who are over-fed and need a laxative, it might be of great value; but if this action is desired, it may be brought about more readily and agreeably perhaps by the use of the whole grain in the form of "cracked wheat" porridge with cream and sugar.

The mean of two different analyses shows that wheat contains approximately:

Water	14.
Nitrogenous matters	11.7
Fatty matters	1.4
Starch, with traces of dextrine and sugar	68.4
Cellulose (vegetable or woody fibre)	2.6
Salts, potash, soda, lime, magnesia, phosphoric acid, etc	1.7

WHEAT FLOUR.

Water	13.93
Nitrogenous matter	9.7
Fatty matters	0.9
Starch, etc	74.2
Cellulose	0.5
Salts	0.6

These tables are of necessity only approximately correct. In some of the harder varieties of wheat—especially those grown in Italy, the relative proportion of nitrogenous matter, gluten and soluble albumen, is greater; and according to Yeo, the proportion of starchy substances in different qualities of wheat ranges from sixty (60) to ninety (90) per cent. Besides the gluten (which is composed of several distinct substances) and the soluble albumen, another nitrogenous substance, termed *cerealin*, a form of diastase or ferment is found in wheat. Cerealin has very active properties, is capable of changing starch into dextrine, sugar, and lactic acid, and is therefore a valuable aid in the process of digestion. But as this substance is found mostly in the outer scales of the wheat grain it is a constituent of the bran and the coarser grades of flour, and the very white or *finest* flour is therefore deficient in this important element; and when in the processes of high milling, the germ of the grain, which contains the diastase proper, is also removed, the resultant flour is beautifully white, free from odor, and superior to any other quality so far as starchy or heat giving matter is concerned, but as a flesh former it must be regarded of less value. The germ is not only rich in nitrogenous matter, but it contains also a large proportion of fat or oil, and phosphoric acid.

"The following analysis," according to Church, "was made on a pure sample of flattened germs from a roller mill."

Water	12.5
Albuminoids, diastase, etc	35.7
Starch, with some dextrine and maltose	31.2
Fat or oil	13.1
Cellulose	1.8
Mineral matter	5.7

This analysis also showed that 60.6 per cent. of the mineral matter was phosphoric acid "so that the original embryos contained $3\frac{1}{2}$ parts per hundred of this valuable constituent of bone," and three times the proportion of nitrogenous matter and more than six times the proportion of fat or oil in the whole wheat grain. He adds, however, "that the albuminoid matter included little or no tenacious gluten, but a considerable quantity of the diastatic ferment. The composition of bran varies in proportion to the number of coatings or coverings removed from the outside of the grain.

The following table, also quoted from Church, shows the composition of "a rather coarse bran."

Water	12.5
Albuminoids and cerealin	13.3
Indeterminate nitrogen compounds	3.1
Starch, with some maltose	43.6
Fat	3.5
Cellulose	18.0
Mineral matter	6.0

The separation of this coarse bran from flour is certainly wasteful, but as an article of diet it is indigestible, not only on account of its mechanical condition, but also by reason of the large proportion of cellulose (woody fibre) and silicious matter it contains. But as before stated, the fibrous and silicious matter is found in the outer coverings of the grain, and if these are first removed and the decorticated grain is then thoroughly ground, the best (*not the finest, whitest*), flour will be produced.

Bread making may be regarded as the first process in the digestion of wheat flour. The flour is rich in nutritious elements, but in order to be at all palatable or digestible, it must first be mixed with water and salt, made into dough or paste and then baked into firm and porous bread. The porosity is produced by the development or generation of carbonic acid gas within the dough, or by forcing it in from without before the mass is placed in the oven. There are several ways of effecting the process.

First.—By the addition of *yeast or leaven* fermentation takes place and carbonic acid and alcohol are produced. Both of these products escape almost completely during the process of baking; but the carbonic acid gas in its evolution and dissemination through the lump, causes numerous bubbles, and these remain after the gas has escaped and thus the bread becomes porous.

Second.—By the addition of an alkaline carbonate or bicarbonate, the carbonic acid being generated or set free upon the application of heat.

Third.—By the use of *baking powder*.

Fourth.—By forcing the gas in from without, or mixing the flour with water highly charged with carbonic acid gas in an iron vessel under pressure. Bread made by the latter method is called "aerated." The advantages claimed for aerated bread over fermented or yeast bread, are its lightness and dryness and its freedom from the dangers attending the older process of allowing fermentation to proceed too far or not far enough before the *sponge* is placed in the oven, and thus obtaining a sour (acetic acid) taste, or on the other hand a *heavy* loaf. But here the baker's art must *leaven* the process.

Bread varies greatly in digestibility and nutritive value, as well as in chemical composition. The mean of three different analyses is shown in the following table:

Water	37.07
Nitrogenous matter	7.91
Fat	1.39
Carbo-hydrate (starch, dextrine, etc.)	50.14
Salts (including common salt added to the dough)	1.16

OATMEAL.

Oatmeal is a very nutritious food, the richest of all cereals in nitrogenous matters and fat. Its composition, according to Dujardin-Beaumetz, is:

Water	8.7
Fats	7.5
Starch	64.0

Nitrogenous substance	11.7
Salts	1.5
Cellulose and other substances	6.6

It contains a large proportion of indigestible cellulose, but it is easily cooked and is the best food product we possess for making porridge and gruel. It is also sometimes made into cakes, but it is not adapted for bread making, the nitrogenous matter not containing a sufficient amount of adhesive gluten

INDIAN CORN.

Indian corn is produced and consumed in immense quantities in different parts of the world, but principally in North America, the land of its nativity, and especially in the United States. Indeed, its chief preparations, johnny-cake, hoe-cake, mush and milk, and not forgetting hog and hominy are as indigenous as the plant itself.

The whole mature grain is sometimes used as human food, after having been parched and is said to be convenient and valuable to travellers in the Eastern countries. The whole grain is also used in the familiar form of "green corn" and if taken at the proper time and properly cooked, it is not only digestible and nutritious but, if eaten with good butter and salt, delicious.

Corn meal is much coarser than wheat flour and is not so readily cooked, but with proper care and sufficient cooking it can be made very digestible, the only indigestible part being the thin silicious skin or coving. It is not well adapted for making loaf bread on account of the difficulty of baking the central portion, but for Johnny cake, mush and milk, griddle cakes, fried mush and muffins, it is excellent; and when mixed with wheat flour in the preparation of these or some of these *good things*, they become even more palatable and digestible.

Hominy is a popular article of food in some parts of this country, especially in the Southern States. It is the mature grain from which the heart or kernal and skin has been removed. The finer meal corn-starch, is also extensively used and served in the form of *blanc-mange*. The various preparations of corn meal are suitable articles of diet for all persons of good digestion, but in persons with irritable mucous membranes, they are sometimes the cause of intestinal disorders and diarrhoea; while in some cases of torpidity of the bowels, nothing better can be prescribed.

The composition of corn, according to Church, is as follows:

Water	14.2
Albuminoids	9.0
Other nitrogenous compounds	0.3
Starch, etc	66.5
Fat	5.0
Cellulose	3.0
Mineral matter	2.0

According to Parkes the relative proportion of fat is 6.7, carbo-hydrate, 64.5.

RICE.

Rice is the main food of at least one-fourth of the human race. It is grown in nearly all parts of the world where the temperature is high enough for its cultivation. South Carolina is its chief source in this country.

Rice is of less nutrient value than corn, being comparatively poor in nitrogenous matter, and very poor in fat and mineral matter. It consists chiefly of

starch, and in composition is not unlike the potato. It is very digestible and is frequently prescribed for patients with weak digestions, and when properly steamed and eaten with milk and cream is nutritious and palatable.

It has the following composition (Church).

Water	14.6
Albuminoids, etc	7.5
Starch, etc	76.0
Fat	0.5
Cellulose	0.9
Mineral matter	0.5

BEANS AND PEAS.

The ripe seeds of many of the leguminosa are used as food; they are all rich in nitrogenous matter. This consists chiefly of vegetable casein or *legumin*, and in quality and nutritive value far exceeds the wheat grain. Beans and peas, owing to the large proportion of albuminates they contain should always be eaten with other foods rich in starch and fat or oil. They should be boiled slowly and for a long time, otherwise they will not be digestible.

The composition of beans and peas is about as follows:

BEANS

Water	14.0
Nitrogenous matter	23.3
Fats	3.
Carbo-hydrates	57.2
Salts	3.

PEAS.

Water	14.6
Nitrogenous matter	22.3
Fats	1.8
Carbo-hydrates	55.8
Salts	2.5

They also contain a small proportion of cellulose. The pods of beans when green and unripe are a popular food, and if properly cooked are very palatable and digestible. Unripe or green peas are also extensively used; they contain a considerable amount of sugar and are easy of digestion.

POTATO.

The potato grows in temperate climates: it is very productive and when properly cooked, palatable and digestible. It is eaten daily by millions of people and was until a comparatively recent time the chief support of a whole nation. It is deficient in nitrogenous matter and salts, but the starch of which it is largely composed is easy of digestion and when eaten with milk or rather buttermilk which is rich in nitrogenous matter, the potato forms a good and economical food.

Potatoes are said to be waxy, or watery, or mealy, according as they are grown in bog lands or in sandy soil; but the potato of sandy soil, and of the very best quality is not infrequently rendered *waxy* or *watery*, and indigestible through the ignorance or carelessness of the cook.

The juice of potatoes contains vegetable acids and their salts and a small quantity of albuminous matter, and the mealiness of the potato depends upon the coagulation of the albuminous constituents and absorption of the acid watery fluid. If the potato is not properly cooked, the granules do not take up the watery fluid, the cells do not become properly distended and separated and the consequence is a waxy, watery or soggy lump.

Potatoes should be boiled in their skins or jackets and in salt water. The boiling must be complete and

proceed slowly, otherwise, the starch will be undigested and the albuminates and cellulose will be hard. Steaming is the best method, provided the steam is not super-heated.

The composition of the potato as given by Church and which corresponds practically with the mean of three other analyses is:

Water	75.
Albuminoids	1.2
Extractives, as solanin and organic acids	1.5
Starch	18.0
Dextrine and pectose	2.0
Fat	0.3
Cellulose	1.0
Mineral matter or salts (lime, potass. soda)	1.0

Other roots, tubers, and bulbs used to a limited extent in the Marine Hospital ration are carrots, turnips, parsnips, beets and onions. They all contain about ninety per cent. of water and a relatively small proportion of nutritious substances.

The turnip is the least nourishing; it contains no starch and only 0.5 albuminoids. Its chief constituent is a jelly like substance of the *pectose* group. It contains 1.8 cellulose and 0.8 mineral matter (Church.)

The composition of carrots differs slightly from that of the turnip. The relative proportion of pectose etc., is higher and the carrot also contains a considerable quantity of sugar.

The parsnip is similar to the carrot in composition, but it contains less water, a little more sugar and some starch, the latter not being present in the carrot. The parsnip if properly cooked is a very palatable accompaniment to salt fish or beef.

The beet root contains more sugar and also more cellulose than any of the other roots mentioned. It is cooked in various ways and is largely used in salads and pickles.

The onion is remarkable for its strong smell and taste, due to a minute quantity of volatile oil and sulphur. It is not very nutritious, but more so than the turnip. It is used quite extensively however, both as a vegetable and flavor for other foods, and is a wholesome and palatable food. In its unripe or green state it is used as other green vegetables and also as a constituent of various salads.

The green vegetables, such as cabbage, cauliflower, spinach, tomatoes, lettuce, asparagus and celery, like some of the roots and tubers are of comparatively low nutritive value, but they all contain important salts. They are greatly improved by cultivation and if eaten in their young and tender state before the cellulose has hardened, are comparatively easy of digestion.

FRUITS.

Fruits are important additions to the dietary, their positive nutritive value is low, but they contain valuable salts, a considerable quantity of sugar (notably the grape) and a very small proportion of nitrogenous matter. Many fruits also contain a jelly like substance called *pectin*. Fruit is especially useful in the dietary of persons who have a tendency to constipation and to the gouty condition. The salts upon which their chief value depends are combinations of vegetable acids with alkalies, particularly potash. Fruits are also exceedingly valuable as antiscorbutics.

The popularity of fruits as an article of the dietary is due, however, rather to their refreshing taste

and the stimulus they give to weak appetites than to any nutritive value which they possess. Dried fruits are relatively more nutritious; they contain a larger proportion of sugar and less water.

Lemons, oranges, apples, peaches, prunes, raisins and currants are used in the Marine Hospital ration.

SUGAR.

Grape sugar or glucose is found in all sweet fruits, but the sugar contemplated in the food supply table of the Marine Hospital service is the more familiar kind derived from the sugar cane and known as cane sugar. Cane sugar is valuable as a food, but is chiefly used in addition to other foods to sweeten and render them more palatable. It is however not absorbed until through the process of digestion it is converted into grape sugar.

Molasses is the fluid portion left after the crystallized sugar has been separated from the juice.

Salt, pepper and vinegar are used as condiments. Salt (chloride of sodium) is the most important. It is not only useful and necessary as a condiment but it also aids digestion.

According to Church, it "suffers certain changes in the human body, and is not merely taken to be excreted. Its chlorine helps to furnish the hydrochloric acid of the gastric juice and the chlorine of the chloride of potassium found in red blood corpuscles and in muscle. Its sodium forms part of the soda salts, which are among the characteristic constituents of the bile, and of the phosphate of soda of the blood."

Vinegar is extensively used in sauces and salads of various kinds, and in the preparation of pickles.

TEA.

Tea is consumed in the form of an infusion, habitually or occasionally in nearly all civilized nations. It has very little nutritive value, but is a stimulant to the nervous system.

It contains an essential oil and an alkaloid (Theine) upon which its stimulating effect depends. Taken in moderation "a spoonful for each person, and one for the pot" in a weak infusion it proves a refreshing and wholesome beverage. A strong infusion has an inhibitory effect upon peptic digestion.

According to Yeo, "adding a little carbonate of soda, ten grains to one ounce of the dry tea leaf, has the effect of entirely removing the retarding effect on digestion."

Black tea according to Church, contains less theine, essential oil and tannin than green tea. Good average black tea contains

Water	8.
Albuminoids	17.5
Theine	3.2
Tannin	17.5
Chlorophyll and resin	4.5
Essential oil	0.4
Minor extractives	8.6
Cellulose, etc.	34.0
Mineral matter	6.3

COFFEE.

Coffee is not used in the raw state. It is first roasted and then made into an infusion or decoction. It is also sometimes prepared by the process of percolation. The choice varieties are Mocha and Java. Coffee contains an alkaloid, caffein, which is identical with the theine of tea, (by some authors the same term is applied to both) and an aromatic oil. This oil is developed by roasting, and, being volatile,

it rapidly changes or deteriorates; for this reason, coffee should not be roasted long before it is used, and the grinding should be done immediately before the infusion is made. Coffee is a nervous stimulant and strong decoctions are decidedly inhibitory to stomach digestion, and should never be taken after meals by persons inclined to dyspepsia; but in this like in all matters pertaining to diet, habit must be overcome gradually.

It is however, proper to add that Roberts in his recent work takes the ground that tea and coffee subserve useful purposes to the human economy; and he defends with a great deal of ingenuity his apparently paradoxical proposition that these beverages are consumed in part with the unconscious purpose of retarding digestion. Nevertheless, he says, "Differences of constitution and personal idiosyncracies have to be reckoned with; and there are frequently good, indeed paramount reasons why individuals should in some particular or other, depart from the general dietetic plan."

Coffee is a very common cause of insomnia, and is occasionally used as an antidote in opium poisoning. In the weaker infusion or decoction, especially if taken with cream and sugar, it is as a rule pleasant and agreeable and decidedly nourishing.

The composition of coffee and tea is very much the same, but they differ somewhat in the relative proportions of their constituents. Perhaps the most important constituent of tea and coffee as prepared in the diet table, is the water—the sterilized water. All articles of the dietary contain water, but an additional quantity is necessary not only as a carrier of food in the process of digestion and assimilation, but also as a solvent and carrier of waste products which have to be removed from the body. Water forms about two-thirds of the human body. The proportion of water to perfectly dry food, according to best authorities, should be as four to one. Vital action is impossible without water. Most drinking waters contain mineral matter or salts dissolved in them, chiefly carbonate of lime, but also sulphates, chlorides and nitrates of sodium and magnesium. These salts are also found in vegetable and animal food supplies, but the chloride of sodium in solid food is always deficient in quantity and must therefore be purposely added—while if found in any considerable quantity in drinking water it is evidence of sewage contamination.

In the chemical and physiological classification of food, water and the salts or mineral matter constitute the group of incombustible or oxidized compounds. The combustible or oxidizable group include the carbon compounds, such as starch, dextrine, sugar, and fat, and these are termed "heat givers" or "force producers." Gum, mucilage and pectose are of similar chemical composition though probably of less nutritive value.

The nitrogen compounds or albuminoids constitute another group known as "flesh formers." The chief members of this group are albumin, casein and myosin—also gelatine and chondrine from the animal, and gluten and legumin from the vegetable kingdom.

"One of the main functions of mineral nutrients is to aid in the transference, absorption and elaboration of the oxidizable nutrients—somewhat after the same manner that a scaffolding aids the construction of a building. The same or similar offices are performed in plants by the mineral matters they contain." (Church.)

With the foregoing named articles of subsistence and a few others not specifically mentioned, such as macaroni, vermicelli, sago, tapioca, gelatine, etc., the following diet table was adopted a number of years ago.

I.—ORDINARY DIET-TABLE—UNITED STATES MARINE-HOSPITALS.

Sunday.

Breakfast: Chocolate, 1 pint; bread, 6 ounces; butter, $\frac{1}{2}$ ounce; meat-stew, 4 ounces; fruit sauce, 3 ounces.

Dinner: Soup, 1 pint; beef roast, 6 ounces; potatoes, 8 ounces; other vegetables 4 ounces; rice or tapioca pudding, 4 ounces.

Supper: Tea, 1 pint; bread, 6 ounces; butter, $\frac{3}{4}$ ounce; mush and milk, 12 ounces.

Monday.

Breakfast: Coffee, 1 pint; bread 6 ounces; butter $\frac{1}{2}$ ounce; meat-hash; with vegetables, 6 ounces; stewed fruit, 3 ounces.

Dinner: Vegetable soup, 1 pint; beef boiled, 6 ounces; potatoes, 8 ounces; pudding with sauce, 4 ounces; bread, 4 ounces.

Supper: Tea, 1 pint; bread 6 ounces; butter, $\frac{1}{2}$ ounce; fruit sauce, 3 ounces.

Tuesday.

Breakfast: Coffee, 1 pint; bread, 6 ounces; butter, $\frac{1}{2}$ ounce; corned beef hash, with potatoes, 6 ounces.

Dinner: Beef soup, 1 pint; beef boiled, 6 ounces; fish, fresh 6 ounces; vegetables, 8 ounces; bread, four ounces; fruit 4 ounces.

Supper: Tea, 1 pint; bread, 6 ounces; butter, $\frac{1}{2}$ ounce; *fruit, stewed 4 ounces.

Wednesday.

Breakfast: Coffee, 1 pint; bread, 4 ounces; butter, 2 ounces; fish-hash with vegetables, 6 ounces.

Dinner: Mutton broth, 1 pint; mutton boiled, 6 ounces; potatoes, 8 ounces; rice pudding with sauce, 4 ounces; bread, 4 ounces.

Supper: Tea, 1 pint; bread, 6 ounces; butter, $\frac{1}{2}$ ounce; cooked fruit, 4 ounces.

Thursday.

Breakfast: Coffee, 1 pint; bread, 6 ounces; butter, $\frac{3}{4}$ ounce; meat-stew, 6 ounces.

Dinner: Soup (boullion), 1 pint; beef roast, 6 ounces; potatoes, 8 ounces; bread, 4 ounces; fruit, 4 ounces.

Supper: Tea, 1 pint; bread, 4 ounces; butter, $\frac{1}{2}$ ounce; fruit pudding, 4 ounces.

Friday.

Breakfast: Coffee, 1 pint; bread, 6 ounces; butter, $\frac{1}{2}$ ounce; fish-hash with vegetables, 6 ounces.

Dinner: Vegetable soup, 1 pint; meat-stew, 8 ounces; fish, 6 ounces; bread, 4 ounces; vegetables, 8 ounces; fruit, 4 ounces.

Supper: Tea, 1 pint; bread, 4 ounces; butter $\frac{3}{4}$ ounce; cold meat, 4 ounces.

Saturday.

Breakfast: Coffee, 1 pint; bread, 6 ounces; butter, $\frac{1}{2}$ ounce; mutton chop, 6 ounces; fried potatoes, 3 ounces.

Dinner: Barley soup, 1 pint; mutton boiled, 8 ounces; bread four ounces; vegetables, 10 ounces.

Supper: Tea, 1 pint; bread, 4 ounces; butter, $\frac{3}{4}$ ounce; rice with sauce, or syrup, 4 ounces.

* Fresh fruit may be substituted in season.

NOTE.—The tea and coffee prepared with milk and sugar. The quantities of the articles of diet indicate them as they are prepared ready to serve.

II.—EXTRA DIET.

Breakfast: Mutton chop or beefsteak, 6 ounces; eggs, 2.

Dinner: Chicken or game, 6 ounces; ale or wine.

Supper: Dry or dip toast, 4 ounces.

III.—MILK DIET.

Breakfast: Hominy or corn-meal mush, 14 ounces; milk, 16 ounces.

Dinner: Rice or tapioca (cooked), 12 ounces; milk, 16 ounces; syrup, 1 ounce; bread, 4 ounces; butter, $\frac{1}{2}$ ounce.

Supper: Cracked wheat or oatn-gritz, (when cooked) 14 ounces; toasted bread, 12 ounces; milk, 16 ounces.

In a note accompanying the ordinary diet table it is officially stated that this "table gives the four classes of solid constituents in substantially the following proportions:

Nitrogenous or plastic material, about one hundred and forty grams; fat, about sixty-two grams; carbohydrates, (starch, sugar, etc.,) about four hundred and fifty grams, and salines, about twenty-six grams; and with about two thousand and two hundred and fifty grams of water. Although these quantities are somewhat in excess of the estimates for "healthy adults at rest," they are none too great for convalescents in whom tissue metamorphosis is being carried on, not only in the interest of repair of present waste from use, but in the interest of repair of past waste from disease, a point which should not be overlooked in the construction of hospital dietaries. In making any changes from the above, the substituted article should be in such quantities and of such kinds as to furnish constituents equivalent to those of the articles replaced."

Recognition is made of the fact that climate and season may render modifications necessary.

In my own experience, substitutions are not so frequent as changes in the relative proportions of some of the articles, notably milk and eggs, which are consumed in greater quantity than given in the supply table, while a reduction is not infrequently made in the meat allowance.

But without regard to any change in the articles or quantities of subsistence, it is proper to state that the quality of the various articles of food supplies as given by the analyses quoted in the foregoing description of each, is probably better than that upon which the official analysis of the diet table was originally based. At any rate, careful calculation of the composition of the articles named shows even larger proportions of nutritive constituents than given in the official note.

REPORT OF FOUR HUNDRED CASES OF INTUBATION OF THE LARYNX, WITH PRACTICAL DEDUCTIONS.

Read in the Section of Diseases of Children, at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

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Intubation of the larynx has been so frequently and unfavorably compared with tracheotomy that I feel it my duty to report the cases coming under my observation, and to point out some of the reasons for unfavorable results.

It has been my experience, largely through the courtesy of my confreres, to have now operated on something over four hundred cases, with results that might well make any one an enthusiastic supporter of the operation.

It should be remarked that these operations were performed in private practice in a large city and its suburbs, *without selection*, upon all cases dying from laryngeal obstruction, without reference to age, malignancy of disease or unfavorable surroundings. It must be remarked also that a great many of these cases were experimental cases, and many could have been saved with the more modern instruments and with the judgment and skill coming with larger experience.

RECORD OF CASES.

Age (under) 1 year.	12 cases.	4 recoveries.	33 1/4 per cent.
1 " 52 "	12 "	22.07 "	" "
2 " 70 "	18 "	25.71 "	" "
3 " 69 "	27 "	39.10 "	" "
4 " 79 "	30 "	37.97 "	" "
5 " 39 "	18 "	46.15 "	" "
6 " 25 "	7 "	28. "	" "
7 " 25 "	10 "	40. "	" "
8 " 10 "	6 "	60. "	" "
9 " 6 "	3 "	50. "	" "
10 " 5 "	2 "	40. "	" "
11 " 1 "	1 "	100. "	" "
12 " 2 "	0 "	" "	" "
13 " 1 "	0 "	" "	" "
14 " 1 "	0 "	" "	" "
43 " 1 "	1 "	100. "	" "
20 " 1 "	0 "	" "	" "
60 " 1 "	0 "	" "	" "

400 cases 139 recoveries 34.75 per cent.

It should be observed that of these cases 134 were under the age of 3 years, with recoveries amounting to 25.37 per cent., an age at which tracheotomy is rarely successful. It will be observed that in the first hundred cases there were twenty-seven recoveries, in the second hundred thirty-four, in the third hundred forty, and in the fourth hundred thirty-eight. Improved instruments, improved methods of feeding, greater watchfulness and judgment in the management of cases, and the almost universal administration of the bichloride of mercury after the first hundred cases, undoubtedly accounts for the larger ratio of recoveries.

Why is it that we so frequently hear of unfavorable experiences?

1. On account of the difficulty of the operation.
2. Because judgment is not exercised in the selection of the proper tube.
3. Patients are frequently allowed to die from obstruction below the tube which in many cases can be overcome.
4. On account of the absence of careful nursing and the most watchful attention.

Undoubtedly this operation requires more delicacy of "technique" than almost any other operation in surgery. The operation is a far more difficult one than tracheotomy, and few there are who can properly do it without long and special training. It is an operation for the specialist, the expert and those especially dextrous, if best results are to be obtained. Too frequently operators without special aptitude and with no training whatever attempt the operation, the result is disastrous and after a few trials the operation is denounced. In every city this work should be done by one or two operators, who should spare no effort in becoming skilful, and by doing all these operations would soon acquire sufficient experience to insure splendid results. In country districts or in small towns where the operation is not often required, tracheotomy will be found to be far more satisfactory, as no one can become skilful or maintain confidence in doing the operation on two or three cases a year. The result will depend in no small measure upon the judgment displayed in the selection of the proper tube. To introduce a large and tightly fitting tube that cannot be expelled in case of obstruction below it, and to leave the patient in fancied security, is to cordially invite disaster. A loosely fitting tube should be employed, and no harm is done if it is expelled every day, providing the operator replaces it, as he should, gently, skilfully and with no injury. If a