

vegetable foods, in that they contain no nitrogen. They are digested in from one to two hours. They are largely used in the preparation of diets for the sick, but are insufficient in themselves to maintain for any considerable period the vital functions. Hence they are prepared and eaten with sugar, milk, cream, butter, and aromatics.

Turnips, Parsnips, Carrots, Onions, Asparagus, Beets, Cauliflower, and Cabbages, are but rarely prescribed for the sick. Nevertheless, some information in regard to their composition and digestibility may not be misplaced. According to Smith, the following represents the composition of

Turnips.	Carrots.	Parsnips.
Water..... 91.0	Water..... 83.0	Water..... 82.0
Sugar..... 2.1	Sugar..... 6.1	Sugar..... 5.8
Nitrogenous matter... 1.2	Nitrogenous matter.. 1.3	Nitrogenous matter... 1.1
Fat..... —	Fat..... 0.2	Fat..... 0.5
Starch..... 5.1	Starch..... 8.4	Starch..... 9.6
Salts..... 0.6	Salts..... 1.0	Salts..... 1.0

Beets differ from the above chiefly in the quantity of sugar. The following is the analysis of Payen :

Water..... 83.5	Nitrogenous matter..... 1.5
Sugar..... 10.5	Pectose, etc..... 0.8
Salts and pecten..... 3.7	

All of the members of this group are deficient in nutritive value, and are besides slow and difficult of digestion, requiring from three to five hours for complete solution.

Ripe fruits, as grapes, apples, pears, peaches, oranges, lemons, etc., possess but little nutritive value, as they contain only about 10 to 15 per cent of solid matters. In composition they are represented by sugar, free acid (tartaric, citric, etc.), nitrogenous matters, and salts. They differ, of course, in the peculiar flavoring matters which give to each fruit its special taste. Dried fruits, as dates, figs, and raisins, are relatively much more nutritive, because they contain a larger percentage of sugar. Under the head of dietetic management of diseased states, some further remarks will be made on the use of the fresh and dried fruits.

SPECIAL PLANS OF DIET.

The food-supplies to the organism may be so managed as to secure very definite therapeutical results. By increasing or diminishing the whole amount of foods ingested, by variations in the quality and character of them, and by the employment of some special and restricted methods of feeding, cures are effected not attainable by medicinal treatment.

DENUTRITION.—The amount of food necessary for bare subsistence has been pretty accurately determined. During the siege of Paris the

daily ration was at one time reduced to less than ten ounces of bread and one ounce of meat daily. Dr. Edward Smith ascertained that the daily amount of food barely sufficient to maintain life among the factory operatives must contain 2.84 ounces of nitrogenous matter, and 19.25 ounces of carbonaceous. Pettenkofer and Voit give, as the necessary amount of food required by an adult when at work, 5.22 ounces of nitrogenous and 22.38 of carbonaceous matter. Letheby furnishes the following table as the result of his investigations on this point :

Daily diet for	Nitrogenous, ozs.	Carbonaceous, ozs.
Idleness.....	2.67	19.61
Ordinary labor.....	4.56	29.24
Active labor.....	5.81	34.97

The ration of the United States soldiers imprisoned at Andersonville consisted of one third pound of bacon and one pound and a quarter of unbolted corn-meal. This amount and quality of food were insufficient to maintain the bodily functions in a healthy state, and hence vast numbers died of scorbutus, diarrhoea and dysentery, and hospital gangrene. From these data we are enabled to form an estimate of the amount and kind of food necessary to maintain life in those cases of disease in which it is desirable to apply the method of denutrition.

Physiological Effects of Insufficient Food.—Intestinal uneasiness, more or less pain, borborygmi, and a feeling of hunger, are among the first symptoms of an insufficient supply of food. The secretions of the intestinal canal diminish, digestion becomes difficult, and constipation results. The respiratory movements are diminished in frequency and volume, and the exhalation of carbonic acid notably declines. According to Dr. Edward Smith, while under an ordinary diet the daily excretion of carbonic acid amounts to thirty-four ounces, under an almost complete abstinence it falls in twenty-four hours to twenty-two ounces. The blood suffers a notable diminution in its amount; the quantity of water augments, and the number of blood-globules greatly diminishes. Meanwhile the blood loses its plasticity, and a tendency to hæmorrhagic extravasations is developed. The urinary secretion also lessens in amount; the urea and uric acid diminish, but the hippuric acid rather increases; the chlorides after some days almost disappear, but the sulphuric and the phosphoric acids persist. As a result of the very obvious decline in the function of assimilation, the temperature of the body falls some degrees below the normal. The functions of the nervous centers undergo a marked derangement. Giddiness, vertigo, hallucinations, ensue, and are coincident with a fatty degeneration of the cells of the gray matter. The subcutaneous fat disappears; the muscles lose a considerable part of their substance. The muscular substance of the heart diminishes proportionally. The

bones do not suffer much loss. The extreme degree of loss attainable with safety is from 40 to 50 per cent of the average weight.

Therapy.—Diminution in the gross amount of aliment and a rearrangement of its constituents are of the first importance in the treatment of *obesity*. The tendency to obesity may be hereditary or acquired. In the former it is cured with difficulty; in the latter a suitable regimen will accomplish much. The fat accumulates under the skin, in the visceral cavities, and in the interstices of organs. Two doctrines have been held by physiologists with regard to the mode of production of fat in the organism: one, that the fat received in the food is simply stored up; the other, that it is also produced by the transformation of some of the other constituents of the food. If the first theory contained the whole truth, it would be necessary only in the treatment of obesity to withdraw from the patient's aliment all fatty substances; but it is found in practice that this is insufficient, and that fat is created out of the starchy and saccharine elements of the food. Hence it is necessary in the treatment of corpulence to interdict not only fats, but the starches and sugar. This was the method of Hippocrates; but it has been revived in our generation by Mr. Banting, and is now usually called *Bantingism*. As a guide to this method of treatment I quote the rules of Mr. Banting:

"For breakfast, at 9 A. M., I take five or six ounces of beef, mutton, kidneys, broiled fish, or cold meat of any kind except pork or veal; a large cup of tea or coffee, without milk or sugar; a little biscuit or one ounce of dry toast; making together six ounces of solid and nine of liquid. For dinner, at 2 P. M., five or six ounces of any fish except salmon, herring, or eels; any meat except pork or veal; any vegetable except potato, parsnip, beet, turnip, or carrot; one ounce of dry toast; fruit out of a pudding not sweetened; any kind of poultry or game, and two or three glasses of good claret, sherry, or madeira—champagne, port, and beer, forbidden; making together ten or twelve ounces solid and ten liquid. For tea, at 6 P. M., two or three ounces of cooked fruit, a rusk or two, and a cup of tea without milk or sugar; making together two to four ounces solid and nine liquid. For supper, at 9 P. M., three or four ounces of meat or fish, similar to dinner, with a glass or two of claret or sherry and water, making together four ounces solid and seven liquid."

Sugar, Mr. Banting finds, is one of the most active of fat-forming foods. His method consists in the avoidance of sugar, fat, and farinaceous substances—in fact, all roots or vegetables grown underground. Although this system was pursued by Mr. Banting with success, it can not always be persisted in without danger. The dietary is wanting in the amount both of carbonaceous and nitrogenous constituents necessary to the healthy action of the organism. Therapeutically it is adapted to the end in view—the denutrition of the body; but it is,

physiologically considered, unsafe to be long persisted in, because insufficient for the work of the body.

Aneurism.—A low diet, with absolute rest, is of great value in the treatment of internal aneurisms. The diet should be only sufficient to maintain life. The method of Valsalva consisted in such a diet and frequent and free bleedings, with rest. Mr. Tufnell's plan of diet, which has proved very satisfactory in this disease, consists in two ounces of liquid and four ounces of solid food morning and evening, and four ounces of liquids and six ounces of solids at noon, and with this dietary is associated absolute repose in the recumbent posture.

To diminish the Volume of the Fœtus in cases of Dystocia has been suggested by Merriman, Baudelocque, and Moreau, and was successfully practiced in two cases by Depaul. The method consists in free abstraction of blood, and the lowest diet consistent with the existence of life. At the present time the methods of inducing premature labor have been so perfected as to quite take the place of the practice of Depaul.

Syphilis.—It is certainly an eminently rational expedient to relieve the organism of a virus by a continuous and gradual molecular destruction and a renewal of the anatomical elements. Such is the hunger-cure of syphilis, an Arabic method of treating that disease. Very satisfactory results have been attained by this means; but the self-denial and even suffering which it requires render it exceedingly unpopular with patients.

DRY DIET.—This consists in a decided diminution or a temporary total suspension of liquid of all kinds. It is well known that water constitutes about two thirds of the gross weight of the adult body. The quantity of water daily lost from the body has been estimated at about four and a half pounds. Dalton thinks that fifty-two fluid-ounces is the quantity required by a man in full health exercising in the open air. The difference between this and the amount of loss is made up by the water contained in food, especially in the succulent vegetables. Indeed, it is quite possible for the vegetarian, whose diet consists of fruits and vegetables, to receive sufficient water in this way for the purposes of his organism.

Physiological Effects of Dry Diet.—Besides the tormenting sensation of thirst, the food is swallowed with difficulty and the appetite is lost. Absorption of the interstitial fluids takes place, and the volume of the organs undergoes diminution. The subcutaneous veins flatten, and the pulse loses in tension and amplitude; the saliva becomes viscid; the urine reddens and deposits a sediment; constipation ensues, and a rapid emaciation takes place (Fonssagrives).

Therapy.—As the withdrawal or decided diminution of fluid causes rapid absorption of the interstitial water, this method of treatment may be resorted to with advantage in cases of *dropsy*. It has been

used with success in dropsical accumulations of the serous cavities, and is adapted to the treatment of *hydrothorax*, *hydrops pericardii*, and *ascites*.

Fonssagrives reports two cases of *diabetes insipidus* (polyuria) decidedly benefited by the dry diet. This method of treatment is indicated in the first stage of fibroid kidney, in which disease the thirst is excessive, the stomach rather intolerant of fluid, and the flow of watery urine excessive.

Dilatation of the Stomach, besides other appropriate treatment, is benefited by water-free food. That form of dyspepsia and dilatation of the stomach produced by excessive beer-drinking is much improved by abstinence from drinks of all kinds. *The ice-water dyspepsia*, a malady quite common during the summer months of this country, may be entirely relieved by dry diet.

VEGETABLE DIET.—The special indications for the use of vegetable food are reserved for the sections on diet in special diseases. It is necessary, however, to say something here of the *grape-cure*, a method of treatment much in vogue in some parts of France and Germany.

The *grape-cure* consists, according to Carrière, of a diet exclusively of grapes. They are taken many times a day to repletion. It is usual to commence with a pound, and progressively to increase the amount to two, three, six, and eight pounds, a limit which is not exceeded. The first grape-repast, which may be the most abundant, is in the early morning, but not as are the others, eaten in the vineyard. Another is taken at the time of the morning meal (corresponding to our breakfast); the next after the morning walk at the time of the *déjeuner* (noon), consisting of bread and water; another before the usual dinner-hour (evening), and finally before retiring. The treatment is continued during the five or six weeks of the duration of the grape-crop.

The grape-cure is used with success in *plethora of the portal circulation*, *diarrhoea*, *dysentery*, *hæmorrhoids*, and *engorgement of the spleen*. It renders much service in the principal dyscrasias, as *scrofula*, *tuberculosis*, and *phthisis*, *gout*, and *cutaneous diseases* (Carrière). The influence of change of air, of new scenery, and of the hygienic rules enforced at these resorts, should not be ignored in an estimate of the value of this method.

The composition of the ripe grape is, according to Smith, as follows:

Soluble.		Insoluble.	
Grape-sugar.....	13·8	Skins, stones, etc.....	2·6
Tartaric acid.....	1·12	Pectose.....	·9
Nitrogenous matter.....	·8	Mineral water.....	·12
Gum, fat, etc.....	·5		
Salts.....	·36		
Water.....	79·8		

The quantity of nitrogenous matter is insufficient for the needs of the

organism, hence the addition of bread and water to the diet of the grape-cure.

ANIMAL DIET.—The more or less exclusive use of animal food improves the quality of the blood by increasing the number of the red corpuscles. The urine rises in specific gravity, and the urea and uric acid are increased in amount. According to Liebig, force in excess is developed from a diet of animal food, whence a nation of animal feeders must be a nation of hunters, possessing a savage disposition. Those who consume largely of animal food are not fat, but have a high degree of muscular activity. They are tormented by imperious venereal desires, and are irritable in temper.

Therapy.—A diet of animal food is specially indicated and of great utility in *diabetes*. As the vegetables and fruits contain sugar, and starch which is readily transformed into sugar, they are interdicted in this disease. A method of treating *diarrhoea* long practiced in Russia, and popularized by Trousseau, consists in the use of a pulp of raw meat. A bit of fillet of beef is deprived of all fat and aponeurotic fiber, minutely divided, and beaten in a mortar until all traces of fibers have disappeared. It is then pressed through a fine sieve and mixed with sugar, conserve of roses, or suitable aromatics, or seasoned with salt and pepper to the taste. It may be administered in this form with fruit-jelly, or spread on thin pieces of bread. A beefsteak hastily broiled on a hot fire, so as to retain its juices, may be treated by the same method, or the raw beef scraped to a pulp, rejecting the fiber, may be thrown on to a hot skillet for a few seconds to give an odor and appearance of cooked meat. This method, which has been used especially in the treatment of diarrhœal diseases of early life, is equally efficacious in the *chronic diarrhoea* of adults. The chief objection to this mode of alimentation is the great frequency with which tape-worm follows.

In states of debility arising from any cause in which it is necessary to supply an easily-digested nitrogenous aliment, raw beef may be used in this way.

Blood is so rich in the elements of nutrition that its employment as a food in wasting diseases need not excite surprise. Within a few years it has been much used in the treatment of *phthisis*, the patients resorting to the butchers' shambles to quaff the blood as it flows away. On the part of the patients, it is supposed to possess some special curative power; but it is only as a nutrient that its use is justifiable. Besides the unpleasant associations which must necessarily be connected with blood-drinking, there is danger of swallowing parasites. That it improves nutrition, often to a remarkable extent, is undeniable. It must therefore remain a question to be decided by the patient whether he will incur the risk of infection by parasites, to be benefited by drinking a valuable nutrient.

As the serum of the blood contains the most important of the nutritive elements of the blood, the use of this has been proposed in lieu of the latter, administering one ounce three times a day. Blood-serum is said to be an efficient vermifuge. It must be taken fasting.

MILK-DIET.—The numerous and important applications of milk-diet in the treatment of certain forms of disease render it necessary to devote considerable space to the consideration of this subject. Milk is a food already prepared, and therefore needs no intervention of unskillful cooks; it can be obtained everywhere; few patients are disinclined to take it.

Physiological Effects of Milk-Diet.—In the use of a diet for a long time exclusively of milk, great difficulty is often experienced in overcoming the repugnance of the patient. Although as a rule it is taken with readiness at first, after a time it begins to pall upon the appetite, and the greatest resolution is necessary on the part of the patient in order to continue it. A distressing sense of emptiness is experienced at the epigastrium. The mouth becomes pasty, and the tongue is coated with a thick, whitish fur. Constipation, sometimes exceedingly obstinate, occurs, and the stools are hard and of an ochre-yellow color. Occasionally diarrhœa is produced, but this is due to the fact that the milk disagrees and is not digested. The urinary secretion is increased in amount, but this is due simply to an increased flow of water. Although milk contains all the constituents necessary for the nutrition of the body, when it is used as an exclusive article of diet in the case of those accustomed to a full mixed diet, a decided diminution in the weight of the body takes place. After a time, however, the waste ceases, and the weight continues at a uniform level. The interference of a milk-diet with nutrition is more decided when skimmed milk is used—a form in which it is more usually administered in intestinal disorders. The pulse is quickened and the arterial tension lowered; but a fall in the pulse-rate takes place when the body ceases to lose weight. A marked degree of debility is experienced by some persons, so that they are unable to take exercise. In two cases in which I used this method with signal success—chronic eczema, and chronic ulcer of the stomach—the patients, both females, experienced vertigo and faintness, and Mitchell mentions a case in which from the same cause he was compelled to discontinue the milk. Ordinarily, however, nothing more than weakness is experienced.

Therapy.—Pecholier, Carel, Mitchell, and all who have treated of the milk-cure, insist upon the suspension of all other food and drink. The quantity to be taken will vary with the constitutional peculiarities, habits of life, and probably the mental condition of the patient. As milk requires about three hours for its complete digestion, this furnishes a rule for its administration. One gill, or four ounces, every three hours, beginning on rising in the morning, is the rule which I

have followed with success. As soon as the patient can take a sufficient quantity, one or two tumblerfuls four times a day may be ordered. From a quart to two quarts is the daily amount which will be taken usually by the patient. It is better administered slightly warm.

In many cases of stomach and intestinal disorders, it is better to give skimmed milk. The milk should stand for twenty-four hours in a cool place, and then all the cream which has risen should be carefully removed. Sometimes, says Pecholier, when crude milk disagrees with or is disgusting to the patient, it may be boiled. The digestion of the milk, says the same authority, when it is poorly borne, may be aided by the addition of lime-water, bicarbonate of soda, and other alkalies. Mitchell has added lime-water for the first few days under the same circumstances, and, in order to overcome the patient's repugnance to the taste, has faintly flavored the milk with a little coffee or caramel; but he prefers to give it alone as soon as possible. My own observation has been, that milk is better borne when given for the first few days with lime-water, in proportion of one fourth of the latter.

For the *nourishment of infants* deprived of their natural food, no substitute is better than cow's-milk diluted with about one third of water and sweetened with sugar, in order more closely to assimilate it in composition to the human milk. This should be given at a temperature of 100° Fahr., and at intervals of three hours. No other food than milk is proper for infants up to the eighth month of life, for their digestive organs are not adapted to the digestion of the farinaceous foods so commonly supplied them. If the milk be rejected, the addition of lime-water may enable the infant to retain and digest it.

In the treatment of disease in the adult with skimmed milk, the time for suspension of the diet depends on several conditions. Carel begins to make additions after two or three weeks; Pecholier when the effects sought for in the treatment are obtained. Mitchell formulates his method as follows: "My own rule, founded on considerable experience, is this: Dating from the time when the patient begins to take milk alone, I wish three weeks to elapse before anything be used save milk. After the first week of the period, I direct that the milk be taken in just as large amount as the person desires, but *not allowing it to fall below a limit which, for me, is determined in each case by his ceasing to lose weight.* Twenty-one days of absolute milk-diet having passed, with such exception as I shall presently mention, I now give a thin slice of stale white bread thrice a day. After another week I allow rice once a day—about two tablespoonfuls—or a little arrow-root, or both, as circumstances may dictate. At the fifth week I give a chop once a day; and, in a day or two, another at breakfast; and after the sixth week I expect to return gradually to a diet which should still consist largely of milk for some months." My own rule

has consisted in the gradual addition of other diet after the cessation of symptoms for which the milk-treatment was instituted.

To overcome the obstinate constipation which sometimes attends the milk-cure, a variety of measures have been proposed. Carel advises coffee in the morning. Mitchell recommends a half-grain of aloes at night, and Saratoga-water in the morning. I find that fifteen drops of the tincture of physostigma at night will often succeed, but more frequently prescribe with success a teaspoonful of Epsom salts dissolved in a half-tumblerful of ice-water to be taken on rising.

The milk-cure is especially adapted to the treatment of obstinate stomach affections. It has succeeded admirably in the treatment of *dyspepsia*, *gastric catarrh*, *gastralgia*, *gastric ulcer*, and has procured marked amelioration in cases of scirrhus of the stomach. In *chronic intestinal indigestion*, obstinate and persistent *enteralgia*, *chronic diarrhoea*, and *dysentery*, it has proved very efficacious.

The treatment of *ascites* by a milk-diet appears to have been of ancient origin, for Hippocrates distinctly refers to it, but the revival of the practice in modern times is due to Chrestian, of Montpellier, who demonstrated the utility of this practice in a number of cases (Fonssagrives). Pecholier and Chairon also report cases of success treated by this method. In cases of *ascites* the result appears to be due to the profuse alvine and urinary discharges which are caused by the milk-diet in this disease. Pecholier also reports cases of general *anasarca* due to cardiac disease, much benefited by this treatment. In England, Donkin has issued a monograph on the skim-milk treatment of *albuminuria*, with successful cases. This method has also been extended to *diabetes*, and reports of cures are not wanting.

Eczema, connected with acid indigestion, has been successfully treated by an exclusive skim-milk diet in my hands, and Mitchell reports an analogous case. *Gout* and *gouty affections* have also been much improved, and the diathesis apparently removed, by a persistent use of the milk-cure. Lastly, *aneurism* and *cardiac disease* (irregular and tumultuous action due to valvular lesions) have been benefited by a milk-regimen.

WHEY-CURE.—This mode of treatment is conducted in the mountain health-resorts of Switzerland and Germany, and is usually connected with the grape-cure. As whey contains so little of the nutritious elements of the milk, we may conclude with Lebert that the hygiene and climate of these mountain-resorts do everything for the patients, and if they improve they do so in spite of the whey.

KOUMISS-CURE.—Koumiss differs from whey in containing the nutritive constituents of milk, and from milk itself in the important respect that it is in addition an effervescent alcoholic fluid. Koumiss possesses great value in the treatment of *phthisis*, *chronic bronchitis*, *the low stage of fevers*, *the stage of convalescence from acute diseases*, and in

fact in all adynamic states in which the combined effect of alcohol and nutrients may be desirable.

BUTTERMILK-CURE.—To the efforts of Dr. Ballot, of Rotterdam, is due the knowledge we now possess of the value of buttermilk as a food for infants. The relative composition of buttermilk and mother's-milk is given in the following table :

CONSTITUENTS.	Buttermilk.	Mother's-milk.
Casein.....	43.8	34.3
Milk-sugar.....	23.6	48.2
Butter.....	2.0	23.3
Salts.....	5.6	2.3
Water.....	921.75	883.6
Total solids.....	78.25	116.4
Lactic acid.....	2.75	nil.

It is probably in consequence of the presence of lactic acid, as Dr. Ballot suggests, that buttermilk is easily digested. His manner of preparing the food for infants is as follows : To a pint of buttermilk is added a spoonful of wheat-flour. This is boiled a few minutes. The pap must be thin. To this quantity of buttermilk, after it is boiled, is added half a drachm of sugar. It should have a sweet taste.

In the beginning some teaspoonfuls are given to habituate the infant to the smell and taste, but as soon as possible it should be administered in a nursing-bottle. The temperature should be about 96° Fahr. When the infant acquires a taste for the preparation, it may be given *ad libitum* twice a day.

Buttermilk-cure may be substituted for the milk-cure in cases of *stomach disease*, in which the former has proved so successful, and in cases of *albuminuria* and *diabetes*. In consequence of the large proportion of lactic acid which it contains, buttermilk is more especially indicated in *diabetes*.

INFANT-FEEDING.—It has already been stated that fresh milk of the cow is the best substitute for the mother's-milk. Some additional observations as to the management of cow's-milk, and as to the substitutes therefor, may, however, be necessary. There can be no doubt that cow's-milk is better than goats' or asses' as a rule, although there are infants who thrive on the two last-named better. In the large cities where it is impossible to procure fresh milk, condensed milk is an efficient substitute. As in the preparation of this the temperature is raised to near the boiling-point of water, it undergoes no change, and can be used when fresh milk is not to be procured, or can not be preserved. Condensed milk is ready for use by mixing it with water in the proportion of one teaspoonful of milk to seven of warm water. When the addition of lime-water is desirable, it can be added in proper proportion. In the author's experience, children, with few exceptions, do well on condensed milk.

Casein is that constituent of milk which is most likely to disagree with infants. Dilution with water, lime-water, barley-water, etc., is not unfrequently effective in securing the digestion and absorption of the casein; but some infants are unable to digest it at all. Various expedients are resorted to when the casein fails entirely of digestion. Cream diluted with barley-water sometimes succeeds extremely well. The indigestion of the casein of a given specimen of milk may be due to an insufficient quantity of cream; this defect can be obviated by adding it artificially. When the infant is not nourished sufficiently, and yet does not pass undigested casein, the proportion of cream is probably too low. To assist the digestion of casein, Jacobi recommends that a little well-sweetened oatmeal-gruel be given the infant before taking the bottle, or be mixed with the milk. His method of preparing the food is as follows:

"A teaspoonful of either oatmeal or barley is boiled in from three to six ounces of water, with some salt, for twelve or fifteen minutes, the decoction to be quite thin for very young infants, thicker for later months, and then strained through a linen cloth. Infants of four or six months are to have equal parts of this decoction, which ought to be made fresh for every meal; and boiled and skimmed cow's-milk and sugar are to be added. At an early age, the thin decoction; at a later, the milk ought to prevail in the mixture, which ought to be given at a temperature of 80° to 90°; ought to be neutralized, when acid, with a few grains of bicarbonate or carbonate of potassa or soda, and, until infants are eight or ten months old, thin enough to be taken through a nursing-bottle."

Various substitutes have been proposed for cow's-milk; but they are at best constructed on doubtful principles, and vary greatly in composition. Liebig's preparation has had the greatest celebrity, because of the reputation of its inventor, rather than of its intrinsic merit. It is prepared as follows: An ounce of wheaten flour is mixed with ten ounces of milk; it is then boiled for ten minutes, removed from the fire, and allowed to cool to 90° Fahr. An ounce of malt-powder containing fifteen grains of potassium bicarbonate, and two ounces of water, are then stirred into it, and the vessel, covered, stands for an hour and a half at a temperature of 100° Fahr. It is boiled for a few minutes again, and then strained, when it is ready for use. The object of the malt is to transform the starch into glucose.

Chambers recommends the following when the artificial feeding of the infant begins: "Cow's-milk should at first be mixed with half its bulk of soft, pure, tepid water, in each pint of which has been suspended a drachm of sugar-of-milk, and two grains of phosphate of lime, finely powdered. If the milk has been partially skimmed, as is often the case in cities, then a tablespoonful of cream should be added

to each pint." Smith, whose authority in questions of infant therapeutics is admitted, also advises the addition of cream to ordinary cow's-milk, and carbonate of potassa or lime-water. At the expiration of six months the milk should be given undiluted. An infant's food should always be raised to the temperature of 95° Fahr. Regularity in the time of feeding is of very great importance: for the first six weeks, every two hours, and subsequently, every three hours.

ALIMENTATION IN DISEASES.

ALIMENT IN ACUTE INFLAMMATIONS AND FEVERS.—The febrile state induces serious changes in the constitution of solids and liquids. The interstitial fat disappears from the tissues, which become soft and watery. The muscles become flabby and pale, and decline in contractile energy. Digestion is feeble, or suspended or abnormal, and the food supplied is either rejected or enters the blood in an imperfectly-prepared state. The blood suffers material alterations; the red corpuscles diminish in number; the fibrin increases, and the products of imperfect tissue-metamorphosis accumulate. The urine is usually scanty and high-colored, and loaded with uric acid and urates. The chlorides more or less diminish in or disappear from the urine, but accumulate in the inflamed tissues. The excretion of phosphates is increased. In the tissues, the seat of organic alterations, rapid but imperfect metamorphosis ensues, and on the one side pathological materials crowd the interstices in the anatomical elements, and on the other the products of waste struggle for elimination. Avoiding further speculation as to the fever-process, it will suffice to state that an enormous increase of the urea-discharge takes place, and that the organs and tissues of the body undergo a granular disintegration, which has been designated "parenchymatous degeneration"; or, as it may be stated, the increased temperature of fever represents an enormous consumption of the nitrogenous elements. The higher the range of temperature, as a rule, the more extensive the parenchymatous degeneration.

In *fevers* and *inflammations* not of the digestive tract, the most useful aliments are milk and beef-tea. These should be given at intervals determined by their rate of digestibility, usually about every three hours. Fresh milk only should be used, and, if the stomach be irritable, it may be diluted with one half to one fourth of lime-water. It has been conclusively demonstrated that fresh milk is the most suitable aliment in *typhoid*, and it may be depended on wholly (Johnson). It is equally applicable as the aliment in *scarlatina*, partly as a nutrient, and partly as a diuretic, for in this disease one of the chief dangers is from arrest of the urinary secretion.

The author is convinced that beef-tea and beef-essence are too exclusively used in the treatment of the fevers and inflammatory dis-