

Fundamental Principles of Health

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MOTHER'S MILK.

It is universally conceded that the most carefully bottle-fed infant has a smaller chance of escaping trouble and achieving health and life than a breast-fed baby of the most ignorant and slovenly mother.

Of course, when the child's artificial food is prepared and given by an intelligent person under competent advice, the baby may get through with a minimum of discomfort and danger from digestive disorders arising from bacterial contamination of its food from unclean cans, bottles, spoons, nipples, tubes and other utensils, devices and attachments intervening between the cow or the factory and its mouth; but granting that all sources of bacterial contamination are overcome, there still will remain the absence of an automatically adjusting physiological food supply, which no other than the human animal can furnish.

In composition milk is highly complex and variable. The important constituents are the fats, held in emulsion as minute oil droplets; casein, a nucleo-albumen which clots under the influence of rennin; milk albumen or lactalbumen; a proteid resembling serum albumen; lactoglobulin; lactose or milk sugar; lecithin, cholesterol, phosphoric acid, urea, citric acid, enzymes and mineral salts. The mineral contents of milk comprise appreciable quantities of sodium, calcium, magnesium, iron, phosphorus and choline, besides probably minute quantities of other elements not yet determined.

By reason of the fact that casein and milk sugar do not exist in the blood it is held that they are formed by the secretory metabolism of the gland cell under the action of a hormone (stimulating property). And the composition of the milk fat and the histological appearance of the gland cells during secretion leads to the view that the fat is also constructed within the gland itself. Bunge has called attention to the fact that the inorganic salts of milk differ quantitatively from those in the blood plasma and resemble closely the proportions found in the body of the young animal, thus indicating an adaptive secretion. The casein of human milk is smaller in amount, curdles in looser flocks than cow's milk and seems to dissolve more easily and completely in gastric juice. Human milk also contains relatively more lecithin and less ash, while cow's milk, on the other hand, contains less sugar and fat. Human milk, in short, is a complex compound no factory can even approximate to any appreciable degree.

Experience by poultry raisers proves artificial brooding to be lamentably inefficient; the best kerosene lamp, assisted by the most earnest human effort, making but a pitiable showing compared with the average results achieved by a sturdy old hen—and bottle fed babies are about at par with brooder chicks.

The absence of normal building material while the foundations of life are being laid insures a handicap the organism must carry all through life; hence every mother should recognize the ethical and racial obligations she is under to keep up a supply of milk through the period of normal lactation.

This brings up the question of how a poor or deficient supply of mother's milk may be increased or bettered and how it may be maintained through the period of lactation. Generally the physician is not consulted about the matter until a short time before the baby is expected, and then the best he can do is to recommend a nourishing diet. It is highly suggestive in this connection to note that practically every such recommendation includes some form of malt extract, and that practically without exception all proprietary compounds claiming to be good for nursing mothers are founded on malt. Experience proves that nothing appears more quickly to promote the secretion of milk than good malt extracts and many brands possessing various degrees of merit and grades of nutritive value are to be found in the market.

The experience of dairymen proves that it makes little difference what food is given a cow; the quality of the milk, so far as the fat content is concerned, will remain the same. Quality is inherent and essentially a matter of type and of breeding, but quantity can be developed. A cow will be born to give milk containing, for example, four per cent butter fat, and she will continue to give four per cent milk under all conditions, be the quantity much or little. An abundance of food and water coupled with kind treatment may increase the quantity of milk given, but it will not influence the quality; that will remain steadfastly at four per cent fat.

The cow is generally believed to be the most placid, calm and docile of animals; nevertheless she is highly sensitive to handling and under identical conditions of food and stabling one milker may be able to secure nearly double the quantity of milk from the same cow that another milker will pro-

duce, the difference in the results depending on the bond of sympathy established between the animal and the milker. Good food and equanimity then, are essential factors to an abundant milk supply. Inasmuch as all animal life is subject to the same laws it is reasonable to assume that, as the human being is more intellectual than the cow, mental irritation and anxiety may exert proportionately even a greater influence on the human milk secretion. But however that may be, obviously the full action of these two factors will not be attained by telephone conversations or by means of a written order on a drug store; on the contrary results can be expected only from a careful, comprehensive preparation and training on the part of the mother.

The absence of this training in the individual home constitutes one of the fundamental weaknesses in our civilization and is, to no small degree, responsible for our weaklings and the serious problems of intemperance and social unrest now confronting us.

MALT AND MILK.

It is perfectly obvious that the ultimate source of milk in all mammals must rest on the food intake. Consequently, wherever a mother suffering from a deficient milk supply seeks, from those qualified to advise, information as to how she may correct the unfortunate condition, she is invariably recommended to use a more nutritious diet. In other words, she is informed indirectly that the food she has habitually used is deficient in some important particular.

Almost without exception, the diet recommended to a mother includes some form of malt.

The word malt is believed to be derived from a Sanscrit word meaning soft, and having a reference to the fact that malt is raw grain made soft or tender by a process in which germination has been caused to proceed to a certain stage and is then controlled and checked by the gradual removal of the water and finally completely arrested by drying through the application of heat in kilns.

During this limited germination enzymes are developed and the constituents of the grain are so modified that the finished malt differs from the original raw grain in that the greater portion is split into simpler compounds that more easily dissolve. An enzyme is a complex organic substance, or an unorganized or chemical ferment, capable of effecting by catalytic action the transformation, splitting up or digestion of other compounds.

The changes effected by the partial germination and subsequent treatment of the grain are chiefly the conversion of the nitrogenous substances into diastase, the conversion of the starch into grape sugar by the action of the diastase, and the imparting of color and flavor to the malt in the kiln. Diastase is an enzyme of great physiological importance in that it is capable of converting starch and glycogen into sugar (principally maltose) and dextrins. It occurs in germinating seeds, in the leaves and in other parts of plants and also in various animal secretions, such as the saliva and the pancreatic juice.

A very common medical preparation in the form of a sirup of about the consistency of a heavy molasses is made by digesting sprouting malt in water, expressing the solution, precipitating it with alcohol and drying the precipitate.

Two new words have recently been added to our vocabulary—"hormones," by Starling in 1906, and "vitamines," by Funk in 1912. Investigations conducted since 1889 have fully demonstrated that some of our ductless glands play a role of vast importance in general nutrition, and this knowledge has proved very useful in widening our conception of the nutritional relations in the body. The conception that certain glandular organs may give rise to chemical products which on entering the circulation influence the activity of one or more other organs is finding application in the study of the digestive secretions.

The gastric and pancreatic "secretions" are regarded as examples of internal secretions. Chemical products of this kind which stimulate the activity of special organs are what Starling designates hormones.

Following a long series of investigations into the causes of beri-beri and similar diseases, Funk in 1912 isolated some highly complex nitrogenous bodies from the grindings from rice, from seeds, whole grains raw milk, fresh meat, yeast, fresh fruit juices, the yolk of egg and the like. Because these compounds were nitrogenous and proved to be absolutely essential to organic life—the absence of them is demonstrated to be the cause of death from polyneuritis—Funk named them "vitamines."

The vitamins are soluble in water and are destroyed by exposure for ten to twenty minutes to a temperature of 248 to 260 degrees Fahrenheit and by extreme dryness. So far as is known, animals are incapable of making vitamins; normally they are found in plants, and especially in their seeds, and in animals that eat fresh vegetable matter containing vitamins. Funk regards vitamins as the mother substance of ferments and the hormones, and of vital importance to the thyroid and other ductless glands; consequently, they are fundamentally the regulators of the genera' co-ordination of our bodies.

Obviously this all points to a reason for the effectiveness of malt on milk secretion and opens wide the question of nutrition in general.

Panama is considering the establishment of a national school of telegraphy.

ONE CAUSE OF EYESTRAIN

Glossy Paper Exceedingly Harmful—Cream and Pale Blue Tints Said to Be the Best.

It is said that the reflection of light from glossy paper is particularly hard on the eyes. Some persons have gone so far as to recommend that no calendered or coated paper be used in any schoolbooks, since glossy paper reflects light rays directly without diffusing them, to save the eyes. The public and the printers, on the other hand, have been demanding more highly glazed paper on account of its richness and fitness for half-tone work. To prove their point, the anti-glare societies have printed a number of pamphlets on mat and even bond paper. While the half-tone work is not so good, beautiful results can be obtained with the offset process, and the higher cost of the paper is compensated for by its lightness. From rough-surfaced paper the study has been carried to tinted paper. Cream and pale blue tints seem to involve less eyestrain than white paper, and if the tints are alternated throughout a book, each page brings a restful change to the eyes. The thickness of the paper and the presence of too much wood pulp has been considered, along with the question of size and legibility of type. The whole discussion has been brought about by the increase in eye trouble among school children.

COMETS AND SOLAR SYSTEM

New Suggestion Has Stirred Up Scientists—Existence of Gaseous Masses Now Believed.

It is suggested that some of the striking changes manifested by certain comets in executing their orbits are due to the fact that they encounter masses of gas in interplanetary space, and that they are not moving in a vacuum, says a writer in the Scientific American. If there are such gaseous masses, then in view of the inclinations and extent of their orbits, comets are peculiarly fitted to act as explorers, and there is every probability that they will sooner or later encounter such masses. The planets move in a narrow zone near the plane of the ecliptic, while the inclination of the cometary orbits is sometimes considerable, varying for the periodic comets from three degrees to 162 degrees. As a consequence, comets attain regions of the solar system, where no other bodies penetrate. Many phenomena seem to receive a satisfactory explanation if the existence of gaseous masses scattered through the solar system be admitted. These gaseous masses, probably of different chemical constitution, may be considered as the residue of the initial nebula, having escaped the phenomena of combustion which gave rise to the other members of the solar system.

The Practice of Kicking.

Kicking, like charity, should begin at home. It ought to be the duty of everybody at home to object, persistently and effectively, to the specific overcrowded street car, the badly paved road, the encroaching doorstep, the neglected yard, the malodorous cess-pool, the irresponsible motor car and the reckless railroad—especially if he have any personal part in the maintenance of similar abuses. If the tendency of these evils were rightly apprehended, if a part only of the effort that is expended, presumably, in objecting to generalized, foreign and futile subjects were bestowed on specific and tangible details, if we would forego the emotional pleasure of the impersonal "muckraker" to assail the evil at our very feet—especially if each one of us were careful to avoid offense in matters of the same kind—our country would surely be a much fairer one.—Unpopular Review.

Some New Ones.

In a recent school examination the following answers were given to questions asked:

How fast does the heart beat? Sixty times a minute.

What is the pulse? The pulse is some little muscle that bumps up and down.

What use is the pulse to physicians? The doctor feels it to see if he is better next time.

Name two breeds of dairy cattle and tell which is best milk producer. Answer: Bull and cow; the cow is best milk producer.

Name three countries in the Balkan peninsula and tell why they are of interest at present. Answer: Nicaragua, Yucatan and Turkey, and are of interest because they are trying to drive the turkeys out of Europe.

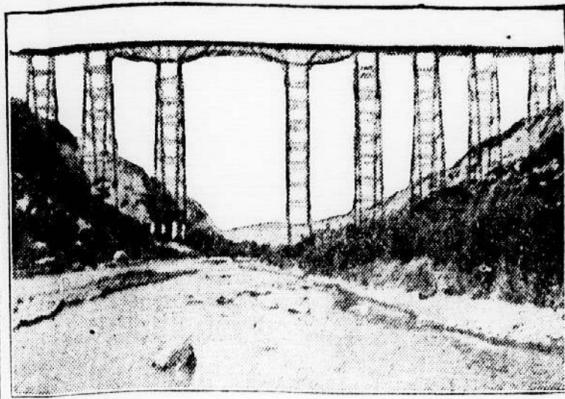
Never Got Through Beresford Book.

During the Boxer rebellion in China one of the missionaries was reading Lord Charles Beresford's book on "The Break-up of China" while the bullets of the Boxers were raining round.

He had not gone very far into the volume when the pages wooed him to sleep. The book lay beside him on the pillow. Biff-ff! came a Mannlicher bullet through the window, in a bee line for the man's head, but Lord Charles' book lay in the bee line. The bullet stuck in the book, but failed to penetrate it.

The missionary jumped up, gave thanks for his escape, packed up the book ready for the first parcel post, and addressed to Lord Charles Beresford with a polite note. He said: "My Lord—I think it only right to send you this copy of your excellent book . . . as neither myself nor the Boxers' bullets can get through it."

HIGH BRIDGE SPANNING WESTERN CANYON



Pecos River Bridge, One of the Highest Railroad Structures in the United States—The Distance From Bed of Stream to Tracks is 321 Feet.

One of the highest railroad structures in the United States is the bridge spanning the Pecos river canyon, 216 miles west of San Antonio, Tex. The distance from the bed of the stream to the track is 321 feet. The bridge is a light-appearing structure consisting of girders and deck trusses carried on lofty steel towers. The magnificence of the view from the deck of this bridge is said to be exceeded only by that of the Grand canyon, famed the world over.—Popular Mechanics.

NEW IDEA OF ECONOMY

RAILROADS AIM TO MAKE EMPLOYEES MORE CAREFUL.

Move Has Resulted in Cutting Down the Heavy Requisitions for Small Supplies—Better Than Old System Employed.

The railroads, the greatest spenders of the age, have recently been propounding to their employees the conundrum: "How long will a broom last?" writes George Ethelbert Walsh, in the Sunday Magazine of the Chicago Herald.

If the once-a-month broom can be converted into the two months' broom, the economical station agent saves for his railroad the cost of hauling one ton of freight 35 miles every two months; which, six times a year, means the cost of hauling a ton of freight 210 miles.

But the broom is merely taken as a symbol in the new railroad economy. Take lamp chimneys, several of which have to be used in each station. Every time one breaks a charge must be made against the railroad equal to the cost of hauling a ton of freight 10½ miles. Twenty lamp chimneys broken a year in a single station means that some poor locomotive must stagger under an extra ton of freight over 210 miles just to pay for them.

Even the lead pencil must not be despised. A requisition for a new lot of pencils can be made out in a few minutes; but a ton of freight must be hauled two miles to pay for each new one. The same is true of each track spike that works loose and is thrown aside. A track bolt is similarly treated as waste; but it is worth three and a half miles of haulage of a ton of freight.

The man who was responsible for working out these details of cost of ordinary trifles in railroad language was something of an economist. He had the idea that waste in trifles had something to do with the high cost of railroad operation. The monthly requisition for supplies of a trifling nature reached the huge sum of \$26,000, or \$300,000 a year, and he forthwith decided to cut down the cost.

After figuring out the freight haulage of the different items, he offered rewards ranging from \$100 to \$10 to every station agent who showed the greatest annual saving of general station supplies. He paid out \$500 in prizes, and cut the requisitions down from \$26,000 the first year. The second year the requisitions for lead pencils, brooms, lamp chimneys, lanterns, coal shovels, waste and pails decreased so generally that the suspicion was aroused that many of the agents were buying their own supplies in order to get in on some of the prize awards.

At one time railroad economy generally meant laying off a few men, cutting wages of others, and postponing the purchase of much needed new equipment and rolling stock. In the end this sort of economy resulted in more inefficient service, grumbling and strikes, and deterioration of tracks, roadbed and general equipment. Sooner or later the railroad had to pay for a policy that was about as economical as killing the old goose that laid the golden eggs.

An Impression of Gorky.

"Once when I was singing in Nijni early in the morning," said Chaliapine, Russia's greatest singer, "I looked out and saw Gorky standing at a window in the same hotel, and gazing silently over the city. The sun was shining on the towers of the churches, over the silver river and turning the roofs red. 'You are up early,' I said. 'Yes,' he answered. 'Come in my room for a moment.' When I reached his window I saw that he had tears in his eyes, and I did not understand. 'Look,' he said to me, 'how beautiful it is. Just the world and not a human being anywhere. The humanity which has made its gods and its laws, built its houses and its churches, all asleep and helpless as children, powerless to change or adjust all this that it has made.'"

"He spoke very softly and very sweetly, and for the moment he seemed to me the most perfect human being in the world. Truly one of Russia's flowers of genius."—From the Craftsman.

HER LESSON IN PROPORTION

Small Hearts, Too, She Found, Are to Be Found in Very Large Mansions.

There was a girl who was quite sure that when it came her turn to marry she could not live in a house any smaller than her father's. "Love in a cottage" was not her idea. Cupid, she thought, needed plenty of room to flap his wings and to practice his archery; he could not pine in a bird cage. So she must have an immense library with a fireplace that would take a six-foot log; there must be a drawing-room with parquetry flooring and thick rugs sliding about on it; the dining-room must be able to hold a large table with an imposing bowl of flowers. She visualized herself ruling a salon, hostess to a brilliant coterie of people who would help her social ambition and her husband's business.

A school friend of hers came to see her a year and a half after she had married and found her in a little frame house on a side street, ridiculously happy with her husband and her baby. The back yard was just about big enough to hold a whirling clothes frame and a narrow flower bed against the fence; the piazza was as snug as a sailor's hammock; the largest room was about the size of the vestibule of the bride's girlhood home.

"I know what you're thinking," laughed the proud little housekeeper to her guest. "You're wondering how I could make up my mind to live in this tiny piano box. But I've made a discovery. I've found that it isn't the size of the house that matters; it's the size of the heart, and the biggest hearts can live in the littlest houses."—Philadelphia Public Ledger.

CRUDE, BUT DOES THE WORK

Primitive System of "Wireless Telegraphy" in Use Among Tribes of Amazon Region.

In the Yumara region of the Amazon the natives use a crude system of wireless telegraphy, which, it is claimed, has been in operation for thousands of years. The transmitter found by an explorer was a hollowed trunk of a tree suspended from a horizontal pole stretched between two stumps. Inside the transmitter had been arranged much like a violin, and it was explained that when the instrument was struck smartly with a small rubber hammer a vibration was created that carried for miles over the hills. The receiver is very similar to the transmitter, except that it is placed on a hardwood platform, the base of the hollowed tree trunk being grounded on the platform. When the message is struck in the neighboring village, sometimes thirty miles away, this receiver catches the vibrations, causing a jerky, singing sound. The sound system, it is said, can be read by the members of the tribe, and in this way news of victories and other happenings are told throughout the countryside.

Impromptu Solo.

Pierre Garat, the singer and exquisite of Napoleonic France, was not merely a glass of fashion and a wonderful, self-instructed singer, but an artist devoted to his art. But in the following, asks Mr. Bernard Miall in his biography, an example of sincerity in art, or of love of attracting attention?

Coupligny had supplied him with a "romance" to be set to music. When over the two met, Garat replied, "I have not hit upon an idea as yet." One day Coupligny was walking down the Rue Neuve-des-Petits-Champs. Hearing a sound of some one running behind him, he turned; it was Garat, who seized him by the arm, dragged him up the stairs of a neighboring house, and, halting on the first landing, exclaimed, "I've got it!" At once he began to sing the romance through at the top of his voice. The inhabitants of the house began to open their doors; heads were projected over the banisters; finally they began to approach; but Garat, having finished, tore down the stairs like a monkey, dragging the bewildered poet with him.—Youth's Companion.

Only Worse.

A Philadelphia school teacher has lately been instructing her pupils in Grecian mythology. It is the plan to have the children read the tales aloud, and the next day recant them in their own language. One lad, to whom was given the assignment to render in his own language the story of the Gorgons, did so in these terms:

"The Gorgons were three sisters that lived in the Islands of Hesperides, somewhere in the Indian ocean. They had long snakes for hair, tusks for teeth and claws for nails, and they looked like women, only more horrible."—Pittsburgh Chronicle-Telegraph.

Unfamiliar to English.

Many of our names for common fauna and flora are unknown to an Englishman, save as strange Americanisms, e. g., raccoon, opossum, skunk, terrapin, chipmunk and moose; persimmon, chinquapin, alfalfa and yam. He seldom sees popcorn or an oyster stew; he knows nothing of oyster suppers, clam bakes and burgeo picnics. He doesn't buy either red lemonade or peanuts when he goes to the circus; the former he calls lemon-squash and the latter he doesn't know at all. The common American use of peanut as an adjective of disparagement, e. g., peanut politics, is incomprehensible to him.

EARLY TRAVEL ON THE LINE

Rules and Regulations That Made Passengers Toe the Mark Were in Force.

As a contrast to the traveling facilities which are now so universal, it is interesting to read a "Copy of the Rules for Travelers on the First Railway," a document still preserved among the archives of the company of the Manchester to Liverpool railroad, and which has been sent by A. S. Whitefield to Notes and Queries. The rules are as follows:

1. Any person desiring to travel from Liverpool to Manchester, or vice versa, or any portion of the journey thereof, must, 24 hours beforehand, make application to the station agent at the place of departure, giving his name, address, place of birth, age, occupation and reason for desiring to travel.

2. The station agent upon assuring himself that the applicant desires to travel for a just and lawful cause, shall thereupon issue a ticket to the applicant, who shall travel by the train named thereon.

3. Trains will start at their point of departure as near schedule times as possible, but the company does not guarantee when they will reach their destination.

4. Trains not reaching their destination before dark will put up at one of the several stopping places along the route for the night, and passengers must pay, and provide for, their own lodging during the night.

5. Luggage will be carried on the roof of the carriages. If such luggage gets wet the company will not be responsible for any loss attaching thereto.

NEW ALPINE ROAD BUILDING

Will Be the Longest Yet Constructed and Should Prove a Delight to Tourists.

The longest Alpine railroad in existence will run from Brieg, near the Italian border, to Disentis and will thus connect the former with the Federal Swiss lines. Beginning at the end of the Simplon tunnel, at 2,200 feet above sea level, this remarkable road passes directly over the Saint Gothard tunnel as a surface road at 4,700 feet above sea level and rises at one point to 7,100 feet. With a branch of an existing road, the new line will connect Brieg with Saint Moritz, between which points daily runs will be made each way and afford tourists a route of surpassing beauty through the hitherto remote and little known region of the upper Rhone and past the headwaters of the upper Rhine.—Scientific American.

Extending Use of Wireless.

For many years F. H. Millener, experimental engineer of the Union Pacific railroad, has been working on wireless telephone apparatus for direct communication with moving trains. He announces that his plans have been completed and a satisfactory system has been developed whereby he is able to talk with a moving train 100 miles away from the wireless transmitting station.

Cost of Locomotives.

It is impossible to state definitely the cost of a locomotive, as they vary so greatly in size and specification. One of the small two-wheel class, used for yard shunting and similar light service, costs about \$15,000 or \$20,000, while one of the huge, high-pressure passenger locomotives, known to the drivers as "hogs," might range from \$150,000 to \$200,000.

Credit for Lord Lister.

Sir Frederick Treves is said to have stated that Lord Lister won the Russo-Japanese war, and certainly the statistics revealed a surgical triumph over wounds and inflammations that was all-important when a small nation was fighting a large one. As an example of the aseptic and antiseptic plans followed it is reported that when any Japanese battleship was going into action the men were ordered to take a bath in disinfectant and to wear clean boiled underwear, thus insuring the cleanliness and easy healing of possible wounds, and a quick return of healthy men to active service.