




Herald of Health

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What More Could be Asked?

Sanitarium Bath and Treatment Rooms,
75, Park St., Calcutta

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Anaemia

The Editor

ANÆMIA is an impoverished state of the blood. The frequency of this condition in India is largely due to the long continued high temperature which results in a reduction of the blood cells, especially the red cells and the hemoglobin. The red blood cells may be reduced from five million, the normal number of red cells in one cubic millimeter of blood, to five hundred thousand. There are also marked changes in the blood marrow where the red cells are made, and the blood serum is reduced in amount and altered in quantity so that it loses much of its function as the channel of life to every organ, tissue, and cell of the body. The effect of this impoverished condition will be better understood by a study of the blood itself.

The blood is composed chiefly of water in which are dissolved the elements of the food which have been absorbed after having been transformed by the process of digestion, and certain minute round cells, red and white, which enter the blood from the bone marrow and glandular structures where they are made at the rate of eight million a second.

The food matter is carried by the blood to all the tissues of the body for their nourishment and repair of the loss sustained through their work. In return, it receives the waste, the rubbish, the old worn-out material of the tissues, which are very poisonous and

must be eliminated. In fact, health, and life itself, depends upon the rapidity with which this exchange of new and old material takes place through the medium of the blood. Stagnation and accumulation of the poisonous wastes through diminished activity interfere with the rebuilding of tissues and cause disease.

The Red Blood Cells

There are almost thirty millions of millions of red blood cells at work in the body of the average man; they are constantly playing between the lungs and the tissues. In the lungs they take on a load of oxygen about six times their own volume and deliver it to the tissues where it is required to support oxidation, which is the very fundamental process of life. This combustion in the tissues results in the production of poisonous carbonic acid gas which the corpuscles receive in exchange for oxygen and carry to the lungs whence it is eliminated through the expired air.

When the number of red cells is reduced as in anaemia, the result is an accumulation of carbonic acid, which has the same effect in the body as an accumulation of smoke in a stove, putting out the fire. Thus the carbonic acid in the body dampens the vital spark unless the condition is relieved.

The usual symptoms in this condition are pale skin; eye lids and lips are white; muscles are flabby; there

is great weakness; faintness; headache; dizziness; breathlessness and palpitation; the heart is weak, pulse rapid; the appetite poor; at times, fever is present.

Treatment

If the patient has resided for some time in a debilitating atmosphere, he should if possible be removed to a cool bracing climate. Cold air and a high altitude stimulate a rapid increase in red cells. Out door life, with graduated exercise and massage, is of special value.

The quality of the blood, its power to impart nourishment and eliminate waste matter, and the activity of the blood cells is very largely influenced by the nature of the food which it receives from the digestive organs. If together with the food matter there also passes into the blood poisonous substances such as result from food fermentation in the stomach and intestines, irritating pepper and chillies, or narcotizing poisons as alcohol, caffeine, and theine, these very decidedly interfere with the normal work of the blood. If the blood is to be made pure and improved in quality, it must be furnished with pure, nourishing food, pure air, and pure water. There is a popular belief that certain drugs purify the blood;

but this is a delusion, and the so-called blood medicines are worse than worthless, as they contain a large per cent. of alcohol or other equally injurious drugs.

In addition to these measures, maintain a clean bowel and establish an active circulation of blood throughout the body by regulated exercise; hot and cold applications to the spine and over the liver, also short cold frictions to the skin.

The use of the electric light bath is of great service in this condition; as the red blood cells are frequently increased by twenty per cent. after a single exposure of ten minutes.

As "the blood is the life" of the body, it should be our constant effort to keep it pure.

Mileage of Blood Circulation

The mileage of the blood circulation reveals some astonishing facts. It is calculated, for instance, that, assuming the heart to beat sixty-nine times a minute at ordinary pressure, the blood goes at the rate of 206 yards a minute, or 9 miles an hour, 221 miles a day, and 80,000 miles a year. If a man eight-four year years old could have one single corpuscle flowing in his blood all his life, it would have traveled in that time nearly 7,000,000 miles.—*Chicago Tribune.*

The Art and Science of Body Building

Tell Berggren, M. D.

SINCE time immemorial man has been striving after higher physical as well as spiritual ideals. Entire races—as the Greeks and some of the old-time Scandinavians—have idealized the body as the temple of the indwelling spirit—that vitalizing spirit which demands that the body be built of the choicest material, nobly and beautifully fashioned.

Individuals and religious bodies, especially during the Dark Ages, have taken an opposite view, despising the body as being unclean and of the devil. Like many another ancient superstition, these perverted views are still held by many. Still we are making headway. We are beginning to realize the superiority of the spiritual life and its intimate relation to the physical.

If we were living in an ideal spiritual atmosphere, surrounded by the most favorable climatic and social conditions, our bodies would naturally grow into a perfect state. But we are crippled by convention and deformed by perverted social as well as religious customs and superstitions, until scientific training has become necessary. This temple of ours must be scientifically rebuilt and renovated according to the divine plan of perfect harmony.

Certain master minds have invented various schemes and scientific systems more or less complicated by which the body may be, so to speak, forced into shape again. More than one hundred years ago the government of Sweden, stimulated by the king, succeeded in erecting the first institute to train teachers and evolve better methods for this particular purpose. The "Ling System," then more or less complicated and unidentified, lately has become perfected and simplified until it now forms the basis of all other scientific systems of gymnastics. Thousands have gone out on their mission, blessing a deformed and degenerate humanity by the enthusiastic and systematic application of their methods.

Dr. Lyman Abbot has said:—

"Beauty is the divine ideal. All schools of artists are but spelling it out, and every great artist is a flash of God on this dark world of ours."

Francis M. Steele has truthfully said that the "words of those who have given the subject of personal beauty particular study are best worth atten-

tion. In your efforts to make a lovely picture of yourself, you are allied to them as fellow-workers, if it is true that the highest thing they can do is to set before us the 'true image of the presence of a noble human being.' You are even at an advantage. You have instead of canvass and pigments, the real human being which you are striving to make fine."

"In Sweden health means something more than 'not sickness'; it stands for physical well-being, soundness, splendid vigour. Without for a moment neglecting medical precautions, it attacks the positive side of the question, How to insure to every Swede his natural birth-right of abounding vitality."

The answer to the question suggested is as everyone knows, exercise. Swedish gymnastics is therefore a really vital art. Its founder, Per Henrik Ling, was an artist in the highest sense of the word,—a poet and philosopher of rare ability, and a noble-minded individual who thought for himself. He reasoned according to natural laws and was therefore able to lay the foundation for a system of gymnastics curative as well as educational, which now is considered above criticism.

The Royal Gymnastic Central Institute will soon celebrate the one hundredth anniversary of its existence, and in the same year, 1912, the Olympic Games are to be held in Stockholm. No more appropriate celebration could be planned for its centennial.



Fruit As a Food in Health and Disease

D. H. Kress, M. D.

THERE are certain foods which are wholesome, of which we should eat sparingly; but not so with fruits. Fruits may be used freely. Nothing is so attractive as a luscious peach, a pear, an apple, or an orange. Children would often defy the cane in order to satisfy their craving for fruit. By choice, children would make this the chief part of their diet.

When fruit is not well masticated, or is eaten when unripe, or combined with vegetables, it causes trouble. This has led some to regard fruit as dangerous. Parents, to supply the desire of their children for the sweets found in fruits, purchase candies, cake, etc.; but the cane sugar which they contain is a poor and in fact a dangerous substitute for the sugar found in fruit. Fruit sugar is a natural food; cane sugar is not. Cane sugar is irritating to the alimentary tract. It is found only in minute quantities in man's original bill of fare, the grains, fruits, and nuts.

The free use of sugar is responsible for the prevalence of intestinal catarrh and many other ills. The rapid increase of diabetes and other derangements of the liver is due often to the free use of sugar. Many of the diseases of modern man might be prevented if fruit were given the place the Creator designed it should have in man's dietary.

The craving for sugar exists in all who do not make use of fruits. Fruit is best taken at or near the close of the meal. Science gives us the reason for it. The acids in fruits interfere with starch digestion if eaten before or with the meal, but both the acids and pectose in fruit aid the digestion

of the albumin and fats when taken at the close of the meal; it no longer interferes with the one, and it aids the other. Aside from sugar, fruits contain a considerable amount of pectose and valuable acids. All these acids aid stomach digestion. A small quantity of lemon juice, pineapple juice, orange or apple juice at the close of the meal is therefore one of the best remedies physicians can prescribe in hypochlorhydria, or slow digestion due to diminution of stomach acid.

Fruit is not merely a food; it is one of nature's best medicines. It increases the alkalinity of the blood, enabling it to dissolve and hold in solution for elimination the acid tissue wastes; it clears and cleanses the tissues and acts as a preventive of rheumatism, gout, and other maladies in the adult and prevents scrofula in children.

No remedy exists that is better than the free use of oranges, lemons, strawberries, grapes, apples, etc., for gouty subjects. The salts of potash and the acids found so plentifully in fruits are the chief agents in purifying the blood from uric acid poisons. The acids of fruits are oxidized in the body and converted into alkalies. Fruit acids are much better than the much advertised lithia and other alkaline waters. Fruit should be fully ripened, and should also be thoroughly divided by chewing. It should not be swallowed in lumps. Fresh fruits are always preferable to dried or canned fruits; but when fresh fruits can not be obtained in liberal quantities, the latter may be used.

The juice of fruit is valuable in disease, both as a nutrient and germicide. Usually beef extract is resorted to in

disease, under the supposition that it is especially nourishing and sustaining. This is a mistake. Dr. W. H. Riley says: "There is no nourishment in broth or the so-called meat extracts. Every one of the so-called invalid foods made from meat is a fake of the worst kind. Extract of meat is absolutely without value as a food. A dog fed beef extract for eleven days died of starvation. W. Gilman Thompson, M. D., in his "Practical Dietetics," says, "Liebig's extract of meat consists of the flavouring extractive matters; such as, creatin, isolin, decomposable hematin, and salts." These are excrementitious substances, and are eliminated chiefly through the kidneys. Anyone acquainted with chemistry will recognize creatin, isolin, and hematin as poisons formed in the body of the animal as the result of breaking down of tissue.

One cup of orange juice is equal in food value to five cups of the most nutritious beef tea, and one cup of grape juice is equal to eight cups of beef tea.

In most of the diseases, and especially in fevers, the saliva and the gastric juice are diminished and digestion is slow. In the absence or diminution of the digestive juices the food eaten naturally tends to decay. This accounts for the coated tongue and foul breath found in fever. Beef tea is therefore one of the worst things to give a fever patient; for instead of discouraging the growth of dangerous bacteria, it favours their increase, and consequently there will be an increased formation of the poisons which feed the fever. Many a fever patient has been killed by meat extractives.

Even milk affords a favourable culture for germs, and is not a suitable food when the temperature is high.

While meat juices encourage the growth of bacteria, fruit juices destroy germs of disease. Grape juice, even one part to one hundred of water, is destructive to typhoid fever germs in less than three minutes; while lemon, pineapple, or orange juice is known to be destructive to germs of cholera.

The fruit juices also contain properties which aid the digestion of protein. It is known by all that pineapple juice will digest meat fibre or the white of eggs. Other fruits contain this same property, but to a less degree. Where fever patients are fed on fruit juices, the coating on the tongue is absent, the breath is not foul, and the temperature is easy to control. When fruit juices disagree or cause flatulency it may be traced to the way they are taken. They should not be gulped down, but taken in small sips. They should be retained in the mouth sufficiently long to mingle the saliva with them. Usually if this simple precaution is observed the symptoms of flatulency will disappear. Fruit juices are the best foods to give fever cases, especially while the fever is high. Milk may sometimes be given if taken in small sips and well insalivated, but beef tea should never be given to fever patients.

In the fruits the nutritive elements are ready for the immediate absorption and assimilation, requiring little or no effort on the part of the digestive organs. Should fruits be more freely used, there would be much less sickness than there is; and should it be employed more freely by the sick, more recoveries would result.

Therefore in health and disease the intelligent use of fruit is indicated. See that the fruit is well ripened. Eat it chiefly at the close of the meal. Do not eat fruits at the same meal with

vegetables. Grains, breads, nuts, and fruits combine well.

Fruits must be well masticated or thoroughly divided into minute particles. This also encourages the free mingling of alkaline saliva with the acid, and lessens the irritation that would otherwise result from the acid and sugar. It also prevents fermentation.

Fruit juices should be eaten sparingly when taken with meals; as a

glass of fruit juice represents a good deal of fruit, and much liquid is not indicated when solid foods have been eaten. Each small mouthful of fruit or fruit juice should be retained for a time in the mouth, and the saliva should be well mingled with it.

If these precautions are observed, those who have supposed they could not eat fruits will find they can, and no disturbance will result from the use of fruits by the feeblest stomachs.

Horse Back Riding as Exercise

THE kind of exercise that hits the mark is the kind a man likes for its own sake; and the kind a man likes for its own sake has something of the play-spirit in it—the life and go of good game. It will give a chance for some rivalry, a definite goal to aim at, a point to win,—something, in other words, to enlist his interest and arouse his enthusiasm. You cannot look at such exercise merely for its effects on the neuro-muscular apparatus. It

reaches the man's very self. Its psychological value is as important as its physiological. The good a man gets out of a brisk horse-back ride in the park is something more than what comes simply from the activity of his muscular system, or from the effect of the constant jolting upon the digestive organs. There is the stimulus to the whole system that comes from his filling his lungs with fresh out-of-door air. There is the exhilaration of sunshine and blue sky, and of the wind on the skin. There is the excitement of controlling a restive animal. All this makes the phenomenon a complex one, something much larger than the mere term "exercise" would imply. A man could sit on a mechanical horse in a gymnasium and be jolted all day without getting any of these larger effects.—*Gulick.*



A FINE MOUNT



False Teeth and False Hopes

THAT the possession of a set of false teeth may tend to shorten one's life seems an absurd thesis, yet it is seriously maintained in *The Independent* (New York) by Dr. J. C. Bayles. According to the writer, "a battle royal between the physicians and dentists" may be expected to follow an investigation of this matter now being made under the auspices of some of the chief medical societies. We read:—

"The question under investigation is the influence of artificial teeth upon health and longevity. This demands a wide range of observation. Even with good care and conservative dentistry, it is unusual to keep natural teeth comfortable and useful much beyond the age of fifty. . . . The re-equipment of the mouth with porcelain substitutes is, for most people who are thus repaired, a practical rejuvenation. Primarily, they are greatly improved in appearance. The hollows in the cheeks are filled out, the mouth closes only as far as it should, and ugly gaps are made sightly. Nine in ten of those he meets are frank enough to say 'Why, you look ten years younger.' Among other agreeable sensations, the possessor of a new set of artificial teeth that fit fairly well rejoices in the conviction that he 'can eat anything,'—which may ordinarily be interpreted to mean that, as opportunity offers, he will eat everything. Then the trouble begins. The appetites of youth assert themselves and may again be indulged. Strong meats which, without teeth, could be eaten only when stewed soft or minced, once more appeal as substantial steaks and generous roasts, and are relished the more because of the long deprivation, recalled with im-

patience. Persons thus rejuvenated are very apt to eat a great deal too much and to include in their dietary many things they had better avoid. As a rule, the evil effects of such excesses are not immediately observed. The first symptom of overfeeding is likely to be stimulation. The victim of indulgence thinks he is building up his body and brain by a generous diet; as a matter of fact, he is raising his steam pressure with the safety-valve locked, congesting his fire-pot with obstructive clinkers, and banking ashes up to the grate-bars. That he 'never felt better in his life' possibly is true; but he probably does not know that every competent physician would recognize in the steady gain in his waist measure a most alarming danger signal. Soon an unexpected trouble begins, so insidiously that it is not clearly recognized. The plate which holds the upper teeth gradually loses its original fit. This is not because it changes its shape, but because the mouth does. All living tissue resents pressure and recedes from it. . . . To have a new plate made as often as this happens is costly, and for most people quite out of the question. So they tolerate the discomfort as long as it can be borne, and during this period it is much easier to neglect adequate mastication than to practise self-denial. The results are soon seen in acute indigestion, inflammations of the intestinal tract, constipation, malnutrition, perhaps appendicitis, and other serious and possibly fatal consequences. That a great multitude is killed every year by the excesses rendered possible by artificial dentition can not be doubted."

"The lessened capacity of the stom-

ach and its decreased muscular and nervous energy impose not only moderation in eating and drinking, but dependence upon foods easily digested and quickly assimilated, with abstinence from those which are found to be attended with evil results. The gastric juices and intestinal fluids are present in smaller quantity than earlier in life and are less energetic in action, and in the adequate and suitable nutrition of the elderly and old the usefulness of the teeth steadily diminishes. This is shown by the fact that a vast majority of those who attain very old age do without them."

"Even for one in as vigorous health as is possible after fifty or fifty-five, milk and eggs are the best of the animal foods, and most vegetables require thorough cooking. With the decline of physical and mental activity which characterizes declining years, there is decreasing demand for what are deemed 'heartly' foods. It does not follow, however, that the desire for improper and too abundant foods ceases when they become dangerous, or that years always bring wisdom in matters of

diet. . . . That artificial teeth favour such imprudences is undoubtedly true, and the conclusion is indicated that new teeth in old mouths are like the new wine in old bottles of the parable. It is to be regretted that artificial dentition so often tempts to imprudence, growing out of forgetfulness of the fact that one may look ten years and feel twenty years younger without having set back the hands of the dial one point.

"In this fatuous trifling with chronology lies the danger of false teeth, especially in the case of those who have so far advanced in senile decay that they have no other use for a double equipment of teeth than to deceive others and, still worse, deceive themselves. It is not the fault of the dentists that artificial teeth are abused, unless a dereliction of duty on his part is found in his failure to warn his patients that, after sixty, teeth are chiefly useful as ornaments, and will so remain until surgery has found a way to substitute new artificial viscera for organs worn out or incapacitated."
—*Literary Digest.*

The Influence of Sleep upon Digestion

THE influence of sleep upon digestion has been studied by Schule, of Fribourg. Two healthy persons were given test meals. One was allowed to go to sleep directly after the meal, the other kept awake. By means of a stomach tube the contents of the stomach were withdrawn and examined. Next the experiment was reversed, as regards the two subjects, and repeated many times. Schule found that the effect of sleep during digestion is to increase the acidity of the gastric juice and to decrease the motility, or muscular activity of the stomach. The

increased acidity of the gastric juice was believed by the investigator to be due to irritation resulting from the prolonged retention of the food in the stomach. Schule observed that resting in a horizontal position after eating encouraged digestion without an increase of acidity, but it was necessary that the patient remain awake, as otherwise the stomach became less active than normally, food was too long retained in the stomach, an excess of acidity was formed, and the stom-

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Salads

A LIGHT salad, when properly prepared, tempts the appetite without trying the stomach, and involves very little work. Many delicious and inexpensive salads can be made from various fresh, green vegetables, either cooked or raw, and served with salad dressing. Whether raw or cooked, the material from which the salad derives its name should never be combined with the salad dressing until both it and the dressing are cold.

Some of the various ways of preparing dressings are given below. Most dressings are prepared with olive oil, but to some persons the flavour of this is distasteful. If possible, they should try to overcome this distaste, not only because one is always likely to meet salads served with this oil, but also because olive oil is most wholesome, and in many cases a very desirable article of diet. The French dressing is lighter and more easily digested as well as more quickly prepared than mayonnaise, but is not so popular, nor is it possible to utilize it in as many salads. In another issue some receipts for fruit salads will be given.

French Dressing

Mix thoroughly three tablespoonfuls of oil, one tablespoonful of lemon juice, and one-half teaspoonful of salt. Beat well and then stir into the salad just before serving. This is usually served on lettuce, cabbage, or tomatoes.

Mayonnaise Dressing

To the yolks of two fresh eggs add a scant teaspoonful of salt; then beat

in slowly, almost drop by drop, a small cupful of olive oil. The mixture should become nearly as thick as butter. Then gradually beat in one tablespoonful of lemon juice.

Boiled Salad Dressing

Beat two eggs and add one tablespoonful of sugar, a pinch of salt, butter the size of an egg, and two tablespoonfuls of lemon juice. Set over boiling water and stir constantly until thick and smooth. Thin with cream.

Pea and Onion Salad

Drain all liquid from one pint of cooked peas, either tinned or fresh, and add to them a pinch of salt and one finely minced onion. Allow to stand for an hour or two, and then mix in enough mayonnaise to make the salad of the right consistency. Serve a spoonful of this on a leaf of crisp lettuce as an individual portion.

Cauliflower Salad

Separate the sprigs of cold boiled cauliflower, put into the salad dish a head of lettuce and cover it with mayonnaise. Arrange the cauliflower sprigs heads outward around the lettuce and serve.

Mixed Vegetable Salad

A large variety of vegetable salads can be made by using potatoes for the body, and adding other vegetables to give colour and flavour.

“Food should be combined as tastily as possible to bring out all the flavour.”



The Home

Influence of Pictures in the Home

Mrs. Margaret Shepherd

THAT we become changed by beholding, is true. It is generally acknowledged that what we see constantly before us must exert a great influence either for good or for evil. The pictures, therefore, that are always before us act an important part in the formation of the characters of the inmates of our homes.

This being so, what kind of pictures should we allow to appear upon our walls? All will agree that they should be only those that depict beauty and inspire pure thought.

Let us divide them into three classes for consideration,—wall decorations, books, and periodicals.

Concerning the first we shall not, as a rule, have much difficulty; paintings, crayons, portraits, sketches, etc., usually portray good subjects. Select those which give you distinct pleasure each time your eyes rest upon them,—the landscape that makes you wish to take a walk in the place portrayed, the animals that seem almost alive, fruit that looks good enough to eat, and flowers that remind us of the real handiwork of the Creator, richer than Solomon's robe.

Few can possess the rare works of art; but we can have the reproductions of them almost in perfection through the wonderful colour work that is done in this age.

An artist once invited a friend into his studio to show him a new picture.

After allowing him to look at it, he said:—

"Well, what do you see?"

"I see," replied the friend, "only a part of a rustic lane, but it seems to me I hear the nightingale singing."

"I am glad to hear your opinion," said the artist; "for I have tried to paint the song of the nightingale."

Pictures make a quicker and deeper impression than words, and until the child has reached maturity, and learned how quickly to banish evil things from the mind, he is likely to be indelibly impressed by obscene, evil pictures.

Encourage the liking for good pictures as for good books. If we allow only the best books in our homes, we need hardly fear the illustrations they contain; but if the trashy novel or paper is admitted, there will be spread out scenes of violence and crime such as help to send many boys and girls to prison in a few years.

There is one kind of illustration in some books of history that is especially hard on the nervous systems of delicate children. I recall an ancient work describing the tortures committed during the time of the papal persecution, such as quartering, stretching, and the use of the stocks. My mother had put it out of sight in the attic, but occasionally we came across it, and dared to glance at the horrifying details of torture shown there,

though we knew it would harrow our minds for hours.

In newspapers and magazines we come to a vast range of pictures, good, bad, and indifferent. Magazines contain much that is good in halftone cuts, so excellent that one almost feels that he had seen the people, places, inventions, and happenings portrayed. Here, also, lies a source of danger to many young people in the romantic age, who are charmed by the fame suggested by the pictures of actors and actresses.

Pictures of fashions also distract

the mind from better things, and turn many a foolish head. They need be consulted only often enough to insure being neatly, tastefully, and sensibly dressed.

Little eyes, and I fear sometimes older ones, are attracted by that which to them is queer and curious.

Pictures may suggest any phase of emotion,—peace, repose, anger, activity, joy, sorrow, the works of Satan, or the works of God. Which will be of the greatest good to you and your family? Which will you choose to have before you?

Big Trees

THE gigantic trees of the Mariposa groves of California belong to the wonders of the New World. There are nine of these groves at Mariposa and one at Calaveras, situated on terraces varying from 5,000 to 7,000 feet above the level of the sea. The tallest tree actually measured, is 325 feet high. One of these trees is more than 100 feet in circumference at the base.

A calculation of the age of the trees, by counting the actual rings, was made by the U. S. Geological Survey. A tree was felled by means of augers, etc., occupying five men twenty-two days.



The stump at six feet above the ground, had a circumference of about ninety feet. A careful counting of the rings gave its age as 1,300 years. As this tree was in full vigour, it may be fairly assumed that those which show signs of decay are much older. Forest fires have blackened and scarred these monarchs of the forest. One of the largest has a passage burned clear through the trunk, large enough to admit a man on horseback.

But, while California furnishes these wonders, it is reserved for Australia to overmatch the famed Mariposa

groves. It has been demonstrated that *eucalyptus amygdalina*, or giant gum tree, of New South Wales, reaches the greatest height of any tree in the

world. Confident statements have been made that this tree attains the height of 500 feet; the highest by official measurement is 471 feet.—*Sci.*

Malaria: Its Causes, and How to Prevent it.

[THE following matter is taken from a report of a lecture on the above subject by A. G. Newell, M. D., delivered in Lahore under the auspices of the S. P. S. K., and published in Indian *Public Health* of November, 1910.]

Malaria is caused by a one-celled animal parasite. This parasite reproduces itself in the red blood cell of man. The reproduction is both asexually by simple division and sexually by differentiation into sexual form. These latter are taken up by the anopheles mosquito, in which it develops and produces a large number of young parasites. These are shot into the blood when a person is bitten by the mosquito. In the blood these young parasites reproduce many others.

We will now inquire further into this. Let us start with the blood of man. As you all should know, we have two kinds of cells circulating in our blood streams. They are known as the red blood corpuscles and the white blood corpuscles. The red blood corpuscles are slightly red, and carry oxygen to our tissue cells and are most important to our health. The white blood corpuscles are the soldiers, so to speak, of our bodies, and eat and destroy lower forms of life that may invade the blood stream. Well, the young malaria parasite gets inside the red blood corpuscles, and feeds on the contents of the red cells, and grows to a size until the corpuscle breaks. But, by the time the parasite has grown to this size, it has been undergoing divisions into many smaller cells. When

the red cell breaks up, each of the division or segments of the malaria parasite emerges as a new parasite. These divisions are known as Merozoites. Each of these divisions or Merozoites makes a red blood cell and grows and reproduces others like the original parasite. This makes up the whole story of the asexual method of reproduction of the parasite in man's blood when he is infected with the parasite. As the whole stages are very short, it will be easily understood how in a short time a large number of red cells become infected with parasites.

When we remember that the destruction of the blood cells gives rise to what we call anæmia, we can easily understand how malaria causes anæmia. As the spleen is the organ where the new blood corpuscles chiefly originate, it follows when the red corpuscles in the blood are destroyed by the malaria parasite that the spleen has to do more work and so enlarges.

After the sexual method of reproduction has gone on for some days, some of the parasites instead of dividing up into smaller parasites become sexual forms, viz., male forms and female forms. These are distinctly recognized in the blood mainly by their definite shapes and the coarse pigment they contain. So far as we know, these forms undergo no further developments in man's blood, and if they remain there they die. Therefore, if these forms are to be of any use in the perpetuation of the species

they must be removed from the blood. This is done by the anopheles mosquito. When the mosquito bites a person with such sexual forms these are sucked by the mosquito into the stomach. In the stomach of the mosquito the red cells break and set free these sexual forms. The female form becomes a spherical body and from the male form three or four filaments project and break off. One of these filaments enters the female form and fertilizes it. The female form then becomes ovoid in shape with a pointed end and works its way out from the stomach into the general body cavity of the mosquito. Here by a process of division a large number of young parasites (Sporozoites) are formed. At maturity the female form bursts, setting free all these young parasites. These make their way to the salivary gland, which is situated at the base of the apparatus by which the mosquito bites. When the mosquito bites a person, these young forms go with the salivary secretion into the blood, where they carry on the process of reproduction I have already related. If you kill the infected mosquito before it bites, you can prevent this infection. It takes ten to twelve days for this full sexual development in the mosquito. The sexual forms which develop in the red cells of man cannot develop outside the human body, and the sexual forms which develop in the mosquito cannot develop in man.

The actual fever is due to the liberation of the segments or spores of the parasite and their poison on the bursting of the red blood cell containing them, so that the interval between the fever represents the number of hours it takes for the full development of the parasite. It is, however, only when a good number of our red blood

cells are infected with the parasite that we get a distinct rise of temperature (fever).

There may be any number between a few hundreds and ten thousand of spores in the salivary gland of an infected mosquito when it bites a person. Suppose we say one thousand tertian parasites have entered the red blood cells, and suppose we say that only ten out of every fifteen or twenty of the spores formed from each actually produce successive generations. Then the parasites will multiply in this order: 10,000 for the second day, 100,000 for the fourth day, 1,000,000 for the sixth day, and so on. It has been estimated that in the blood of a man of ten stone there are 15,000,000,000 red corpuscles. It can scarcely be imagined that either one parasite or 1,000 parasites would produce any marked symptoms. Ross estimates that it requires at least one parasite to every 100,000 red corpuscles (or in a man of 10 stone 150,000,000) to produce fever.

Mosquitoes lay their eggs on water. The anopheles mosquito mainly breeds in stagnant shallow pools and some in slowly running streams, but chiefly where there is grass, weeds, or jungle. Where jungle abounds by the sides of these streams or pools ideal haunts for mosquito breeding exists; as the jungle gives a hiding place, as well as food, to male mosquitoes. Thus anopheles are marsh mosquitos, and hence malaria was called marsh fever or "paludism." It is the female mosquito which seeks man's blood for the better nourishment of the young. The males are not blood suckers. From the egg the larva hatches out in a day or two, and it, after a week, passes into the pupa stage from which in two days emerges the adult mosquito. The eggs are boat shaped with a membrane on

either side (floats) and are usually found arranged in stars or triangular patterns. The larvæ have no long "breathing tube" like the culex larva. The adults generally have spotted wings and cling at an angle from the surface to which they attach themselves. The ordinary (culex) non-malaria bearing mosquito is hunch backed in appearance when resting on the wall. During the summer, mosquitoes can aestivate without breeding and during winter hibernate. The eggs have resisting powers to heat and dryness.

To prevent mosquitoes breeding, all stagnant water around the house should be avoided. Old tins in which water may collect should not be allowed to accumulate. All depressions should be filled up. Wells should be examined and if necessary treated by potash permanganate. Above all, jungle should be cut down. Irrigation is one thing; flooding is another. Kerosine oil, potash permanganate, pesterine, and cyllin are the cheapest and best killers of the larvæ of the mosquito. The female anopheles prefers to lay her eggs in shallow and clean waters with a certain amount of weeds. The most important natural enemy of the

mosquito is a small fish known as the "millions." It is a voracious feeder on the eggs, larvæ, and pupæ of mosquitoes. The full grown female is only 1½ inches long. It belongs to the species *Girardinus paeciloides* and is found in Barbadoes, which is free of malaria. It should be introduced into malarious tracts; as it is the best attack against the mosquito.

To prevent bites of anopheles mosquito, nets are useful. These should be tucked in under the bed and should be inspected from time to time to see that there are no tears. Eucalyptus oil and other scents temporarily used keep off mosquitoes. Mosquito wire netted doors to rooms will largely keep out mosquitoes from a home.

To prevent parasites developing in the blood from any chance infection, quinine should be regularly taken during malaria season (July to December). Quinine prevents malaria by killing any adult parasite—of this there is no possible doubt. If you have fever and it breaks with quinine, then it is malaria. This is to say that quinine diagnoses malaria, of which there is no shadow of doubt. But quinine does more than that. It also cures malaria, of which there is no doubt.

Some Stomachs I Have Known

Dr. Eugene Yates Johnston

A LONG acquaintance with stomachs has shown me that they have individuality, just like people. They can be petted and "spoiled" like children; they can acquire bad habits like young men and women; and they become weak and decrepit like old people. To me, therefore, a stomach is something more than a muscular pouch suspended in the left side of the abdomen just under the ribs,—something more, also, than an intricate piece of plumbing.

It is a living creature with whims and caprices, and it is one of the most helpless and most abused creatures in the world.

I often find it necessary to go to the relief of a stomach that has not enough acid to enable it to digest the food. When the food enters the stomach, the gastric juice pours out as usual, but it contains so little acid that the pepsin cannot act. The result is that the man has a feeling of heaviness as if he had

swallowed a hard boiled egg and it had lodged somewhere and would go neither up nor down. This is often accompanied by sour belching and by heartburn. Nature has made a wise provision in this instance. The air is full of germs that cause fermentation like yeast germs, and our food contains many of them. In health, the acid of the stomach kills them; but if the acid is weak, they increase and ferment, making an acid which partially serves the purpose of causing the pepsin to act. The fermentation is what causes the belching and heartburn, but as soon as the acid is formed, the digestion proceeds, and the man feels all right till the next meal. Because of this partial digestion, these people often look well and retain their weight for a considerable time, or until this artificial acid (which is an irritant) influences the stomach so that it will not act at all.

Too much acid is exactly the opposite condition. When the food goes into the stomach the gastric juice is poured out as usual, but it does not stop when the food is digested. Apparently the stomach has lost its power of knowing when enough acid has been made. The excess of acid irritates the lining of the stomach and makes it sore. The stomach, being irritated, does the only thing that it knows—it calls for food. When more food is eaten, it mixes with the acid and dilutes it. For a time the hunger pain passes off, but it returns as soon as the stomach is again empty; and so it goes on, causing the sufferer to keep the stomach full all the time. The symptoms are a burning pain about the end of the breast bone or "pit of the stomach," and frequently great tenderness, a feeling of emptiness, the "all-gone" feeling.

This condition may go on to a worse state, ulcer of the stomach produced by eating food containing rough particles, and when the churning or mixing motion of the stomach occurs these rough particles scratch the lining. It may be a tiny scratch, so small that it could not be seen by the naked eye, yet the acid makes it sore. It gets larger and sorer all the time; just as a scratch on your finger would be affected if you put vinegar on it daily and rubbed it in. Finally an ulcer forms and begins to bleed; the man may spit up blood and think that he has consumption. Sometimes there is only a slight pain, and no attention is paid to it until it suddenly becomes serious. Let me illustrate what I mean.

I was called to see a young lady at night. She had violent pain in the abdomen and was "all doubled up." After relieving her temporarily, I found that the symptoms were very much like appendicitis. A surgeon was called and an immediate operation was agreed upon. The appendix, however, was found to be perfectly normal. Looking further, we found a hole in the stomach about the size of a lead pencil, a clean cut round hole, as if a bullet had passed through. It was an ulcer of the stomach which had eaten through the wall. Up to that time there had been no pain or other evidence of disease.

This conclusion comes to those who are very nervous from any cause, shock, worry, grief, dissipation; from eating food too highly seasoned; and from excessive smoking or drinking.

Here are two cases which show what happens when the stomach suddenly goes on a strike. Some time ago I was called to see a young lady whose

(Concluded on Page Fifty-Two)

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Some Stomachs I Have Known

(Concluded from Page Fifty-one)

friends thought that she was dying. She had complained of feeling ill at a neighbour's and had started home, falling in her doorway. I found her heart very weak, and she was in great pain. She was just able to tell me what she had eaten, a saucer of strawberries at lunch and had afterward drunk a glass of ice-water. The result was a complete stoppage of digestion, with a congestion of the stomach. After emptying her stomach the worst symptoms were relieved. Evidently she had not eaten too much, but the sudden chill of the ice-water was sufficient to stop the action of the stomach.

A man past fifty who had stomach trouble became over-heated one afternoon. He cooled off rather suddenly under a fan, and went to his evening meal and ate heartily. Immediately after eating he drank a large glass of very cold water. In a very few minutes he had an acute pain in the region of his stomach. A doctor was hurriedly summoned and he found the man suffering greatly, very weak, and nauseated. In spite of all efforts to save him, he died of heart failure in a few hours.

Nervous indigestion is most peculiar. The man who has it cannot eat without trouble. Sometimes he has too much acid, and sometimes not enough.

Some days a meal will agree perfectly with him, and the next day the same kind of food will disagree. In desperation he leaves off one article of food after another until nothing is left; then he gets thin and cross and looks at life through dark glasses. Once in a while he throws caution to the winds and eats anything that he likes, and is much surprised to find that it does not harm him. Then he jumps at the conclusion that the last tablet or powder that he bought has cured him; he repeats the meal next day, and is dejected when he finds that he suffers as much as ever. Cases like this are a never failing source of revenue for the patent medicine maker, who puts up attractive signs in the street cars and says that you can eat all you want if you will only take his pills afterwards.

This is one of the hardest forms of stomach trouble to cure, and it taxes the most skilful physician to relieve it. It is caused by anything that weakens the body or lowers its vitality.

It is of course impossible to describe in one article all the different kinds of troubled stomachs; but it may be worth while to mention a curious condition due to swallowing air. I saw a case of a young man who was annoyed exceedingly by excessive and persistent belching. He tried all kinds of remedies without result. I found that he chewed his food with his lips open and drank a large quantity of water with his meals. He ate and drank rapidly, with the result that he swallowed more air than food. By regulating his eating, the belching stopped—and a source of revenue of patent digestives was cut off. Bicycle riders and automobilists who are exposed to strong drafts of air are extremely liable to have this condition unless they keep the mouth

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closed and breathe through the nose.

When a man's strength begins to go wrong, he starts on the down grade. If it were his watch or his automobile or his typewriter, he would at once call in a man who has spent his life mainly in repairing this particular kind of mechanism and not an ordinary blacksmith. Strange that the same man will allow almost any kind of a doctor to tinker with his stomach.

The Influence of Sleep upon Digestion

(Concluded from Page Forty-four)

ach was irritated and thereby damaged.

This interesting observation explains the frequency of catarrh of the stomach among those who eat hearty meals late at night. Eating the heartiest meal of the day at half-past six or seven o'clock, or even later, is unquestionably damaging to digestion, and a prolific cause of chronic gastritis and other digestive disorders. No food should be taken within three or four hours of retiring. This allows the stomach an opportunity to complete its work and empty its contents into the intestine. Sleep does not interfere with intestinal digestion.

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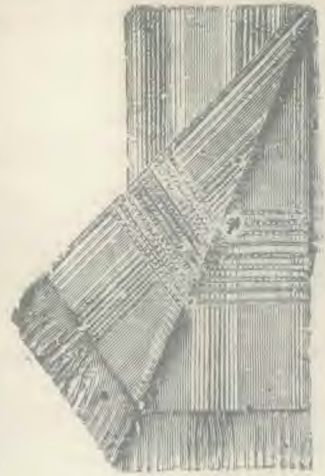
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