food. Here now follows the most marvellous transformations which are going on in every one of the million green corpuscles that exist in every leaf. The green corpuscles act as traps, and into this trap is collected the food

that I have mentioned above; the sunlight—or in other words the sun's rapid vibrations—then penetrate into the meshes of the chlorophyll, and tear under the carbon dioxide and water into their elements, carbon, hydrogen, and oxygen; and then these three elements, mixing again, in different proportions, with a little nitrogen, phosphorus, and sulphur, obtained from the earth's salts, form little granules of starch, the perfected food that is essential for all the life cells in every part of the tree.

So indeed it may be truly said that each granule of starch is a packet of stored energy captured from the external universe. Try to think of this marvel. All those numerous green leaves waving in the summer air are hard at work, storing food and life for the benefit of the great world of living things. I think it stands to reason that as green is the background of Nature, the human eye has got attuned to it, and therefore it is the best colour to shade our lights and candles with; certainly bright colours, such as red, are most painful. In these days of short sight and spectacles, this is important to note and act upon.

**How the Moth Escapes from the Cocoon**

The caterpillar, in order to preserve the life of the miraculous aerostat, a compact fat, which it accumulates from the vegetation on which it has lived, and then turns into a chrysalis, as a protection against enemies, and to continue living when winter has destroyed its food supply. By hibernating rest, living at a low vitality, the fat that it has stored is sufficient to keep it from death till the miraculous transformation takes place, and the seemingly lifeless pupa emerges from its imprisonment a full grown and beautiful moth.

The cocoon is built of silk, which in its raw state is a gummy substance, and is coiled in tubes extending from the head towards the tail, and in strings from an opening below the mouth. When exposed to the air, this glutinous silk material becomes hard and dry.

Amongst twigs, dead leaves, crevices, corners under ledges, the worker scatters a few threads that serve as a scaffold, in the centre of which the spinner builds mostly an oval-shaped cocoon, of so compact and hard a nature that in many cases it will turn the edge of a knife.

The soft-bodied egger and puss moths escape from their hard and compact shell by pushing off from the end an irregular piece of their cocoon, which looks as if it had been bitten off, although they do not possess any biting jaws. The manner of doing this was for a long time a mystery, and many were the amusing speculations suggested as an explanation.

Mr. Oswald Saltz conceived the brilliant idea of removing some paper from their cocoons, and wrapping each in a piece of blotting-paper, so that each pupa had to pierce the blotting-paper instead of its cocoon; and when in due course it did this, Mr. Saltz found that the point of escape was wetted; and by collecting a sufficient quantity he was enabled to analyse the moistened part, and found the moisture to be castor potash, a substance known to chemists as a powerful solvent.

As a confirmation of this, Mr. Saltz placed a few drops of castor potash inside several cocoons, and in three days they were dissolved into pulp. The head of the emerging moth is covered with a cap, which consists of the front part of the chrysalis shell that serves as a shield, and just behind this covering were discovered a couple of hard sharp points; so that now it is known that the moth first moistens its shell with castor potash, and then with these sharp points cuts an opening by which it escapes from its imprisonment.

**Can Girls Increase Their Strength?**

By "MEDICUS."

AN girls increase their strength? Undoubtedly they can, and in answering the question let me go even farther, and state boldly and without fear of contradiction from anyone, that the increase of strength will lie an increase of health, and therefore additional happiness.

Health and happiness! Why, surely these are prizes well worth trying for, giving as they do an extra chance of a long and pleasant life, mental repose of mind and freedom from care and worry. Health and happiness—well, I will not go so far as to say that these are synonymous terms, but it is a fact nevertheless that one cannot be long unhappy without suffering from derangement of the general health. On the other hand a healthful frame of body generates placidity of temper and evenness of mind. People who possess really good health may not go about their day's labour in an extra-fussy or bustling way, but what they do, they do as a rule do well, so that at least they have nothing to repent of, and can therefore place their heads on easy pillows and be certain of good refreshing sleep.

Moreover, health and strength are the deadly foes to all sorts of peevishness and nervous feelings that tend so much to the reduction of bodily vigour and the induction of early wrinkles, forgetfulness, or sallow complexions, and eyes that are the reverse of bright.

"Oh! I think I hear one of my gentle readers exclaim, "I should like to increase my strength, for indeed, Medicens, I am far from being either healthful or strong. Give me something to make me both, please."

Give you something indeed. No, you must not go that way to work. Lost health and strength are not to be won back in one day nor in twenty. And as for medicines for increasing strength, usually there are no secondary considerations.

"What then?" you ask, "shall I rush away and join a gymnastium?"

"No," again I answer, "nature shall not be rushed."

But in trying to rush nature many a girl lays the foundation of a feeble and weakly constitution, and injures herself irreparably. Gymnastiums are all very good in their way, and the training learnt and gone into at them is often of the greatest advantage, but it must be carried out with some degree of common sense and scientific method.

Take a hypothetical case. Miss Smith, let us call her, because that is a very uncommon name, and hardly to be found in the London Directory. Miss Smith, I say, is but a wee mite of a thing, hardly indeed is she the height divine, five feet two inches, although she has turned seventeen. Miss Smith's face is somewhat pale, so too are her gums, while the muscles of her arms are so soft and "dweeble" to the feel as a boiled beet, and the arm not much thicker. She does take exercise, however, but it is by fits and starts, for mentally considered she is somewhat purposeless and unsteady, and apt to take up fads and fantasies all of a sudden and abandon them in a week or two as tiresome and useless. The fact is that Miss Smith's mind is quite as "dweeble" as her body. I don't say that she is either ill or an invalid, though she has weary spells of it at times, tiredness towards evening, backache perhaps, and now and then a sleepless or dream-perturbed night which interferes materially with her appetite of a morning.

But it is said by her friends that Miss Smith has a deal of nerve and verve and go in her, and that she can walk quite a woodman's way if she determines to do so. No doubt of it, I
say, but to put it plainly it is all a flash in the pan. She is very clever, too, her friends tell us, and writes beautiful verses. These cost her a great deal of thought, and every line is learned and composed even tears. If she took to poetry-keeping versus poetry it would be better for herself, and the poor editor whom she pesters with her poems.

But Miss Smith is walking down the town one day when she meets her friend Miss Vivackers, who is looking as resy as a rising moon for a bit of news.

"Oh, Miss Smith," says Miss V., "you're looking almost ill. Do join our gymnastic class; it will make you well and strong in a week.

So to make a long story short Miss Smith does as Miss V. suggests, and joins the gymnastics.

And her flash-in-the-pan nerve takes charge of her when she sees the wonderful things that other girls can do there, and Miss Smith tries to emulate them. She does so after a fashion, but all this is taking too much out of her, and instead of doing her any lasting good the gymnastic training positively injures her, and luckily she consider herself if she is not every day.

Indeed I could point to cases of girls who have been injured constitutionally and for life, by what I may term this folly of rushing the gymnastic corner or debility.

Well now, I must suppose that you are somewhat like Miss Smith, my fair reader, and the gums gum, the better pale, your muscles rather flabby, and that you are not healthy as you ought to be from one five weeks end to another.

Do not let this go on and join a gymnastic class, however, without having undergone a preliminary training. A bother, is it? Well, I am sorry for you it so, but now it is too late for your advantage, and you will thank Medics yet for having pointed it out to you.

"To rush training," I have said in one of my books, "is like attempting to leap over a spiked railing that you do not feel certain in your own mind you are able to clear. If you do not clear it you come down, and the fall of Hasty-Dumpty is nothing to what you shall suffer."

Now then, let me be thoroughly practical. I have preached to you already in the columns of this paper the golden rules of health till I am not tired I ought to be, if I had any "tire" in me.

These rules must be remembered, and these natural instincts must be allowed to grow strong at all. I must give you a little encouragement, however, to begin with, by telling you that although you will feel restraint and trouble at first in obeying hygiene rules, if you persevere you will very soon become easy enough, and you will form good habits of living which, even while not appearing to consider the advantages that are involved in them, nothing would induce you to give up.

It is a most excellent plan to keep a notebook and write therein the rules you have to obey in keeping up your health and strength. You will always have these to refer to, and written out in this way they help one wonderfully.

So now we begin.

You have written out your rules. This will relate to many things or points in this your body. How do you feel? are you joining that gymnastics class till you feel strong enough to do something without gaping like an asthmatic bantam, not until your limbs are harder, and your heart harder—physically I mean. Do not forget that the heart is the great central force-pump which has to send the blood to nourish every portion of the body, that the heart in young folks can be strengthened, and make firm just as the biceps can, because like the biceps it is a muscle. But before the heart can be strong it must be supplied with good pure blood, and have plenty of same to nourish the body with. If you get these truths well fixed in your mind you have already got one foot on the first rung of the ladder of health.

1. Pure blood is most essential. It is a sine qua non in preliminary training. Have you pure blood in your veins? In asking that question I am referring to the least to say possible hereditary blood taint. Have you in those veins and arteries of yours good nourishing blood? You cannot make good blood from physic, though to some extent, as I shall presently show, this may help you. No, good blood is made from food and not from physic. You can put that in your notes.

But to acquire good blood, the food itself must be nourishing and good, and there are some things to be remembered concerning the eating thereof which you will do well to note. I will enumerate these alphabetically, and even dyspepsics may learn a little from my list.

A. —You must eat slowly so that the food may be well mixed with the digestive saliva.

B. —A dinner or breakfast should if possible be partaken of amidst pleasant surroundings. Mirth even aids digestion.

C. —Note what agree or disagrees with you.

D. —It is not what you eat but what you digest that gives you strength.

E. —Therefore never over-eat.

F. —It is folly eating one meal if the other is not digested.

G. —A glass of very hot water taken about half-an-hour before a meal often does much good, especially in the morning.

H. —Add therto the juice of half a lemon if your blood is inclined to be rachitic, i.e., acid.

I. —Sleppy food is not good in preliminary training. Nor are soaps as a rule.

K. —Good oatmeal porridge and milk—not eaten with sugar mind, porridge must have sugar—will sometimes help. But forget mind if, it turns acid or causes flatulence it is best avoided.

L. —Milk is excellent food if you can eat of do. Every cup of tea or coffee should be taken with toast or biscuit when you feel what it want. Oatmeal biscuits are best. This divides the milk so that it does not curdle all in a lump.

M. —Eggs are also good, especially duck's eggs. They should be boiled, poached, or "mushed," not fried. Bacon goes well with eggs for breakfast.

N. —If either eggs or milk seems to disagree you must of course avoid them.

O. —Too much meat is as trying to the stomach as too much sugar, and it would be a wise thing to be. Meat once a day is enough. Say for dinner.

P. —Meat for training: mutton or the tenderest of veal and mutton. Fowl, duck, or turkey, with a little curled bacon. Game of any kind.

Q. —Meat to be avoided: pork and veal, and any meat if not tender.

S. —Fish. Avoid all oily fishes such as plaice, mackerel, fresh herring, and even the salmon—canned ones are best, and oysters are most nutritious. A little pepper should be taken with the oysters, and the squeeze of a lemon with a slice of brown bread—no milk—no butter. The native oyster, not the large.

T. —Bread. This should be light and tasty. I am, however, inclined to leave the choice of the bread to yourself so long as you do not eat it new. Bread, I may add, cannot be too well baked. As regards procuring it really good, I may say happy are they who live in towns and cities. Badly-baked bread and adulterated bread not only produces dyspepsia in the weakest of forms, but actually reduces the strength of our bodies, which it was eaten in order to maintain.

2. Meat is good, that is, if it be least made from pure, undiluted, well-baked bread. It should not be too thick. It must be toasted very gradually so as to be done through and through. Grilled beef is excellent. Veal or chicken is good. Cauliflower is also good. Not too many potatoes, they should be perfectly mashed, no lumps being left. Carrots, parsnips, and artichokes may or may not agree. They need watching as to their digestive effects.

V. —Pastry and sweets are as well avoided. So is cheese; but in summer a nice salad is excellent. Tomatoes, if ripe English ones, not pale, siddy-looking Frenchmen, I cannot speak too highly of.

X. —Yeast, fruits, especially apples and pears, pears, grapes, strawberries are good, but avoid all fruits of all kinds. Just ripe enough, you know, not under nor over the mark. Oranges and lemons are good for blood and complexion. Never eat them, if you are quite certain you can digest them.

Y. —Tea and toast at five, but not strong to.

Z. —A light but not a sappy supper. Sauces, I may add, and nearly all condiments except black pepper, mustard, and good cayenne are best avoided.

So now, I see, I have given you a complete food alphabet. Pray study it. Every sentence of it might be expanded into a long and instructive sermon on health.

From my training. You cannot keep the fact too clearly before your mind's eye, that in getting up your strength by the means I am trying to describe to you you must do things systematically. I am not rushing you. I do not want you to attempt to run up the ladder of health, but to go step by step. If you do a thing one day and neglect it for the next you must remain the pale-faced, interesting but flabby little thing you are.

3. The girl suffers from a slight inclination to emaciation, I have given him this subject before now, but I may in my next paper tell you something new perhaps.

Well, it is your own will power that is called upon to take the morning tub as cold as possible, the exercise that you get during the day will do you a deal more good.

In this article you will observe I am only leading up to my plan for making you really strong, happy, and hearty—it is merely preliminary, in fact. I prescribe therefore walking exercise for a month, and nothing else. Begin by taking a walk twice a day of a mile at least, "there and back," I can't tell you where "there" is, but "back" means your own house, and you must not dawdle there, but go in at once and change whatever is damp on you.

Increase your two walks till "there and back" becomes two miles in the morning or forenoon, and three miles in the evening.

The stop not to stare in at shop windows, but walk as if you meant doing something.

Next month you will, I trust, in a state fit to undertake a little gymnastic training. If you consent I shall find you, or call you, sets of your plan, and I shall not fail to speak.