BENNET'S
ART OF SWIMMING

THE

ART OF SWIMMING,

EXEMPLIFIED BY DIAGRAMS,

FROM WHICH BOTH SEXES MAY LEARN TO SWIM AND FLOAT ON THE WATER;

AND

RULES FOR ALL KINDS OF BATHING,

IN THE

PRESERVATION OF HEALTH,

AND

CURE OF DISEASE:

WITH THE MANAGEMENT OF DIET FROM INFANCY TO OLD AGE,
AND A VALUABLE REMEDY AGAINST

SEA-SICKNESS.

NOTITIA EST POTESTAS.

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THE ART OF SWIMMING.

GENERAL REMARKS.

Swimming is the art of sustaining the body in water while making headway by the action of the hands and feet. The frog presents the most perfect example for human swimming.

This art, which is common to both savage and civilized nations, and which has been in use in all ages, is, notwithstanding, not well understood by those who most practice it.

The ancients used to characterize the uneducated, by saying—"neque literas, neque natare didicet"—*he can neither read nor swim.*

Swimming has seldom been a regular branch in the education of youth, and almost all persons who practice it, and even those who most excel in it, have been self-taught, and their eminence in it has been the result of practice, and not of fixed rules. A person, therefore, who has acquired this eminence, if capable of writing, must be best qual-

ified for giving instructions to those who cannot swim, as well as to such as wish to become real proficients in the art.

Although the nature and principles of good swimming have not had their due consideration, yet the art is not recondite or difficult to understand. The greatest difficulty is in the first attempts, and in persuading the individual that if he is calm, and will keep a certain position in the water, and perform certain motions with his hands and feet, he will be sure not only to remain on the top of the water, but to go ahead. This difficulty can be surmounted only by experiment and practice, which will give the individual confidence the oftener he tries to succeed. The learner must always bear in mind, that his body, while he can breathe, is lighter than water, unless he is uncommonly thin in flesh, when it will be about the same specific gravity, or weight of water, bulk for bulk. A very fleshy person is much lighter than water, on which he can float like a log.

We learn from the Philosophical Transactions, that a variety of experiments on the gravity of the human body, have been tried in Europe. That in comparing the weight of ten different individuals, with that of the water each displaced, the following results were ascertained, viz: "Excepting

two, each man was lighter than his equal bulk of salt water." This holds good with regard to the whole body; but if we cut off a human foot and throw it into water, it will sink. So of the whole leg, to the knee. And so of the whole leg and thigh, unless it be a female or male thigh, uncommonly fat, when in this case the whole foot, leg, and thigh, will be about the same weight of the water they displace, even after the arteries have been filled with this fluid. The human head will also sink in consequence of the large quantity of brain and bone composing it. So will the hand and fore-arm, but the arm to the shoulder of a very fat female, will not sink, as the bone is not in proportion to the spongy flesh. Thus, then, when we divest the human body of all its members, and leave but the trunk, if we throw it into the water, it will float like a log, and will require a weight to sink it. These experiments have all been tried.

Another experiment was: They plugged up the nose, and put an adhesive plaster on the mouth of a man just accidentally killed, so as to prevent the access of water to the lungs and stomach, and then launched him into deep water, where he floated in an upright position, with a portion of the head out, from the eyebrows upwards.

It will then be seen from these experiments, as well as from the experience of every good swimmer, that it requires but little well directed action to keep the human body afloat, as well as give it headway in the water. But although the action of swimming is very simple, yet as regards mankind it has to be acquired, for if left to his own uncouth struggles he will be sure to drown. Throw almost any of the young inferior animals into water, and it will swim; whereas, if we throw in an infant, it will drown. Man, therefore, is not a swimmer by nature, but must become so by art.

Doctor Franklin's opinion on the gravity of the human body when compared with water, is well known. He thinks that the legs, arms, and head, are specifically heavier than fresh water, but lighter than salt water. Experiment has shown, however, that the legs, arms, and head, are heavier than either fresh or salt water, and that the *trunk*, in consequence of the air in the intestines, stomach, and lungs, is much lighter than either salt or fresh water. When Doctor Franklin wrote, the experiments were not tried, and of course he gave merely an opinion.

The Doctor also states that clothes give little additional weight in the water. This, however,

depends on their kind, for woolen clothes, when wet, will immediately sink, while cotton clothes are buoyant. But clothes of any kind are extremely incumbersome to the swimmer, and if possible he should throw them off.

A good swimmer can very readily throw off his coat and vest by turning on his back, and indeed can wholly strip himself in the water, if his boots be not too tight, for while he strips one foot he can kick with the other—can open the knots on his draws, and do all other acts necessary to strip. He can then tie up and carry them to land, if within reach. And if he should become fatigued in these exertions, all he has to do is to throw himself back on the water, with his head under, all but his mouth and nose, and his arms, either under his back, projected above his shoulders, or out from his sides, under water, and then float at his ease as long as he may think proper. A good floater might throw himself into the Hudson at the city of New-York, and float on his back with the tide out of the Narrows, seven miles, or even to Sandy Hook, twenty miles. With a flask of good port wine, and a few crackers, the author of this little book would not think much of the feat, the water being sufficiently warm.

Fat persons who cannot swim, are much more

fortunate than lean ones in the same predicament; for if they but lie straight on the water, and keep the back part of the head with the arms, under, they might take a comfortable nap, and not know they were out of bed. A fat man or woman must be both extremely cowardly as well as clumsy, to get drowned at all, if not injured when falling in.

A person with his face to the water, is more buoyant than when on his back, but swims with less ease to himself, because the air in his lungs is nearer his breast than his back. The distress is occasioned by the weight of his body pressing on his lungs on one side, and the water on the other, whereas on his back there is no pressure whatever.

When at rest in the water, the feet and legs sink first; and when on the back it is necessary, in order to float, to get the balance of the body by throwing the head back under the water, so as to have the air of the lungs and intestines support the lower extremities. Some persons attempt to float by holding in their breath as long as possible and discharging it in as short a time as possible, keeping the air for the greater part of the time in the lungs; but this is somewhat distressing, and need never be resorted to excepting by very thin persons, whose bones make the greater part of their weight. Ordinary breathing will be sufficient;

for at every inspiration the body rises a little, and at every expiration sinks a little—I think about an inch—the equilibrium remaining the same.

But the great difficulty with the untaught, is to maintain this equilibrium of the body. The first act of faith must be that the body is lighter than water, and will float; and the next must be courage, or the absence of fear at least. A person who will not stretch himself out perfectly straight on the water, cannot float, as he cannot throw the centre of the gravity of his body on the air in his lungs, and you can hardly persuade him to put his ears under water. There is a cowardly drop in such persons, who have often vexed me to see their stupidity. There is nothing so contemptible as cowardice in the human race.

To a novice in the art, it is almost incredible to what perfection swimming can be brought. A good swimmer can propel himself forward to a distance equal to the length of his body at each stroke, and can go at the rate of three miles an hour without artificial means applied to his hands and feet; and by floating, to rest, can remain two or three days and nights in the water.

Thirst and hunger are less severely felt than on land, owing, it is probable, to the bracing and cooling effect of the water.

Persons have been known to have performed the extraordinary distance of thirty miles on a stretch; and it is recorded that Nicolo Pesce, a famous Neapolitan diver, performed the incredible distance of fifty miles on the coast of Calabria; and that water had become almost as well suited to his nature as the land on which he was born. He is said to have remained five successive days and nights at sea, with the most perfect impunity; and that he was web-handed, and web-footed, like a duck. Bernardi's pupils, it is said, were able to perform, on the eleventh day of their instruction in swimming, a circuit of six miles.

There are many fanciful positions and motions practised by persons who are masters of the art, besides common swimming and floating; such as holding one toe and spinning round like a top: swimming on the back, by throwing the hands at every stroke out of the water and seizing on the fluid in advance of the head, like oars: by swimming very fast, and then throwing a somerset out of the water: by walking the water with the hands folded on the breast: by swimming on the back and moving feet foremost, the toes being over water: by swimming with artificial fins on the hands and feet.

Diving, or the power of descending in water ei-

ther obliquely or perpendicularly, is also a kind of swimming. It is astonishing to what perfection it can be brought by constant practice. No people perhaps, in the world, are equal in this respect to the inhabitants of Otaheite. These divers have caught a British shilling, when thrown into the sea, before it reached the bottom. Pearls and shell-fish are brought from the bottom of the sea by expert divers, and in ancient times, divers were employed to destroy the ships of the enemy at sea. All good swimmers can dive less or more, but great expertness can be attained only by constant practice.

The safest way of going into deep water from a height, is feet-foremost, as has been proved by the celebrated Sam Patch, who jumped into the Passaic, the Niagara, and the Genesee Falls, at which last place, being in liquor, he lost his life, by losing his balance going down; but those who dive head-foremost should always go in with the hands and arms extended above the head, the hands and head entering first, the feet last, the whole person being perfectly straight. When swimming under water, the eyes should always be kept open, so as to be able to see any object that may be in the way. When the sun shines, it is really beautiful to look round you in clear water. At the first attempt at keeping the eyes open, it

will be found somewhat disagreeable, but after a few times it will not be noticed. The water, too, pressing against the external membrane of the ear, is sometimes annoying, and, in fact, is injurious to some individuals; but this can be avoided by plugging the ears with a little cotton wool.

Man does not appear to be intended by nature for diving, or at least for remaining any great length of time under water, regular respiration being so necessary for the maintenance of life. By the greatest inspiration he cannot carry down with him a larger quantity of air than will supply his blood for two minutes. This we learn from the physiologists, but we think two minutes more time than any ordinary diver can remain under water. At half a minute, I myself begin to feel a little uneasy; at three quarters of a minute, very much so; and at a full minute, almost suffocated; and this is longer than most persons can remain under water, but I acquired it by constant practice, and found too, that when a student on vegetable diet, I could remain longer than in after life, when living more on animal food. The divers in the Archipelago take down oil in their mouths, and discharge it to calm the surface of the water, that they may see the better the objects for which they are in search. Oil spreads itself on the surface,

and will calm all the ripples and waves in a very short time. A barrel of oil will calm an immense surface of the sea.

There is, however, another difficulty attending divers in very deep water, which is its immense pressure on the chest. It does appear to me that this pressure increased in thirty feet water, in which I used to dive, in arithmetical progression. It appeared like winding me in a rope.

Many speculations have been entered into with regard to the relative natural aptitude of man for swimming, when compared to other animals. Man, it must be confessed, labors under considerable inferiority in this respect, merely from his physical construction, for if he had a long neck like a horse, so as to be able to keep his nose out of the water, he would be supported by the air in his trunk, and could swim by merely pawing like that animal, as this is one of the fanciful methods practiced by good swimmers. But by practice man can exceed all the other animals in this art. There is no animal, not even a fish, that has ever attempted to swim on its back, while a strong human swimmer can not only do this, but jump out of the water like the trout or salmon, falling in again head-foremost. The shark turns on his back when about to seize his prey, but does not swim so.

Fish swim not by means of their fins, which mostly serve to balance them in the water, but by a stroke of their tails, first one way, then the other; and those with horizontal tails make an undulatory motion, as the others make a lateral motion, first to one side then to the other. At most the fins have very little propelling power. But fish of all kinds possess natural abilities for swimming, such as the air-bladder, or bodies, flat or thin, or long and flexible. Water, however, is their natural element, and they swim in it and not on it. Some of them when chased by an enemy, will leave the water and fly through the air. The author of this little book saw two of these flying fish, in 1810, spring from the water, in the Atlantic ocean, and fly through the air, describing an arch, the chord line or distance on the sea of which, was at least half a mile, and the height or versed sine of which was between two and three hundred feet. It is said that they can fly as long as their fins remain wet, but this has not as yet, he thinks, been established as a fact.

The brute creation, though incomparably inferior to fish in this respect, are yet superior, at least while young, to the human race. They are, in the first place, it is said, incapable of fear. But this, as regards some of them, may be doubted;

for we know that the horse is afraid both before and after he is in the water.

Bernardi states it as a reason why the inferior animals swim so well, because their heads are so light, in proportion to their bodies. This does not hold good with respect to the horse, for his head being nearly all bone, is as heavy, or nearly so, in proportion to his body, as that of man, yet he is an excellent swimmer. If the horse had a neck and face like a man, he would drown in five minutes, and so would most of the other inferior animals.

It may be interesting as well as instructive to some of my young readers, to hear how the author, now their teacher, learned to swim.

When about seven years old, he was in the habit, with other boys, some who could swim and others who could not, of resorting to a small brook after school hours, with a view of taking a wash. The water was in places from three to six feet deep, with a fine sandy bottom.

One afternoon we were down as usual at the brook, all stripped, and the large boys who could swim in the water, when a young man, a neighbor, came along, stripped and plunged into the deep water also. He immediately came out, stepped up to me, and said, "James, I will show you how to swim; get on my back, my boy, and put your hands

round my neck." This I did, nothing fearing, for I was on the back of the best swimmer I have ever seen from that day to this. He then took both my hands in one of his, and plunged in head fore-most, and carried me under water about a rod. Although somewhat frightened, I soon found that there was no harm done, yet I did not like the experiment repeated, as I had swallowed some water against my inclination, but he having hold of my hands said, "shut your mouth and hold your breath," which I did, when he suddenly went to the bottom, and crossed the brook again like a shark with his prey. "Now," said he, "James, you will be a swimmer."

The name of this young man was Thomas Taylor, who afterwards became a distinguished Methodist preacher.

"Now," said he, "if you promise not to be afraid, I will show you that you can lie on the water like a log, and will not sink if you obey my directions." The boys all knew him to be so good a swimmer that none feared drowning in his presence. This also gave me courage. He then took me in his arms, laid me on my back in the water, and told me to make myself as straight as possible, with my feet a little apart. He then placed his hand under the middle of my back, and told me to extend my arms out

from my sides under the water, which I did. "Now lay your head back quite low in the water, over the ears, and keep perfectly straight;" this was also done. "Now, draw in your breath for a moment," was the next command; at that instant he withdrew his hand from my back, with the caution not to stir. I obeyed, and to my great delight floated like a piece of wood. Seeing me distressed for breath, he placed his hand again under my back and enabled me to breathe a few times, when he again left me to myself, when I floated as before; and although I could not yet swim, I have been able to float from that day to this, and never had but this one lesson.

"Now," said Mr. Taylor, "since you have been so fearless and obedient, I shall show you how to swim." He then took me out of the water, and closing the fingers of his right hand, and bringing his thumb close to the forefinger, forming a hollow in the hand, "do that" said he; which I did. "Now, with the other hand" said he. This I also did. "Now, put your thumbs and forefingers together, thus, with the palms of your hands downwards. Now bring your hands up to your breast, thus, with your elbows close to your sides. Now extend your hands out before you in that position in front of your breast as far as you can." This was

done. "Now stoop and separate your hands by making a slow stroke outwards and backwards, thus. Very well," said he; "do it again,—and and again,—and again." After exercising me in this way for sometime, he said, "stand on the bank, and see me kick like a frog in the water." He then went in, and after seeing his motions I felt quite sure that I could swim.

But on trial, I began to strike so fast, that I would have sunk, had Mr. Taylor not supported me, and at the same time scolded me for not striking slow and wide, as he had directed. I then made the second trial, and succeeded. I now enjoyed the most exquisite pleasure, to think that I could both swim and float, after a lesson of less than half an hour. This same Thomas Taylor, by a peculiar action of his hands and arms, would roll on the water like a barrel on the ground, first to the right and then to the left.

When the stroko is made in swimming, each of the hands must describe the quadrant of a circle, at least; but the best swimmers take in a sector of one hundred and thirty degrees, one of the semi-diameters commencing at the breast, and terminating in front of the head, the full length of the hand and arm, and the other terminating the effectual stroke, and meeting the first at the breast.

When the stroke with the hands is making, the legs must be drawn up, and when the hands are returning in front, the kick must be made, the feet being kept by a grown person about two feet apart, or more. The kick must be made obliquely downwards, and as strong and quick as possible.

Boys when learning to swim, should always do so in calm, shallow water, not more than three or four feet deep; and to enable them to learn how to strike and kick, they may use a pair of hog's bladders or India-rubber globes, on a short string under their arms, or cork wood will answer this purpose quite as well. They can also learn to float, by placing either of these articles under the lower part of the back, or at such a point as will maintain the equilibrium of the body in the water; but by most learners none of these articles will be required.

The floating baths in cities are most excellent and safe places for both men, women and boys to learn to float and swim. Every human being with perfect limbs, or who is capable, should learn to swim and float; for floating is quite as useful as swimming. By it you can rest when tired; and, with a few crackers and flask of wine or water, you can swim almost any distance, particularly in deep, warm salt water. The person who cannot float, soon tires, and if far at sea must be lost, unless picked up.

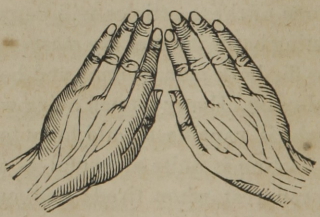
Practice of the Art of Swimming.

Notwithstanding the foregoing general remarks, we think proper to treat this important subject in a more systematic manner. The learner is, therefore, called on to notice

DIRECT SWIMMING.

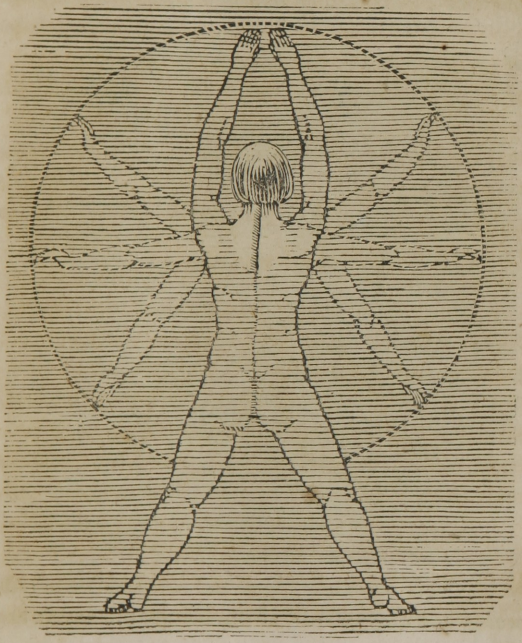
1. That the fingers of the hands must be kept close together, the thumbs pressing close to the fore-fingers, forming a cavity within the palm.

2. That when about to commence swimming, the hands must be brought up to the breast, with the thumbs and fore-finger touching each other, and the palms towards the water, thus:



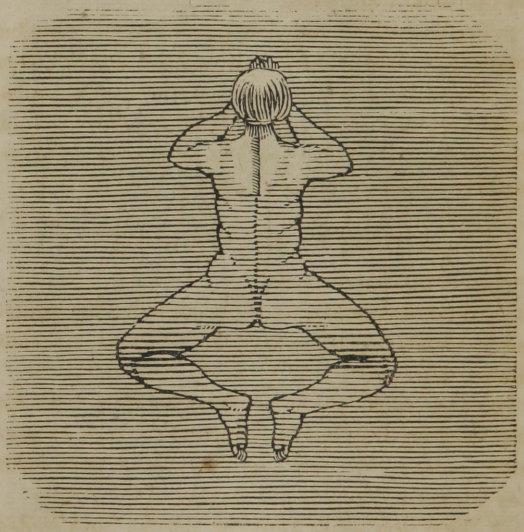
3. That before making the stroke, both hands in the last position must be extended in front of the breast, as far as possible.

4. That the stroke must be made by sweeping the hands as far round as you can, in an outward and obliquely downward direction, the thumbs downwards, and the hands maintaining an angle during the stroke, of about twenty degrees from the surface of the water, thus :



5. That at the termination of the stroke, the hands are to be brought quickly in under the breast to their first position, to be ready for another effort.

6. That while the stroke with the hands is making, the legs must be brought up for the kick, with the knees open, and the feet pointed back, to prevent the resistance of the water.



7. That the kick must be made a little outwards and downwards, at the instant the hands are

returning to their position for a stroke, and the inside of the feet nearly parallel with the bottom.

8. That while the kick is making, the feet must be at right angles with the legs in their potion as standing.

9. That the head must be thrown back, and the chin projected upwards to keep the water out of the mouth and nose.

10. The efforts with both hands and feet must be made as far distant as possible, and moderately slow.

These rules being observed, the learner must most certainly swim, if he keeps himself void of that puny fear, which the love or care of mothers usually communicate to their sons.

SWIMMING ON THE BACK.

Let it be observed—

1. That swimming on the back is mostly effected by kicking with the feet, the hands being folded across the breast, but

2. That some assistance may be given to the headway by drawing the hands as far back as possible, close to the sides, and making a push with the fingers pointed to the surface of the water.

3. That the head must be thrown back under the water, and the whole person kept straight, as in floating.

4. That to make rapid headway on the back, the hands must be raised out of the water, with the thumbs uppermost, when the arms are extended by the sides, and thrown obliquely back of the

shoulders into the water, taking hold of the fluid as oars, the back edge of the hand entering first, and the stroke made in that position towards the

feet, and brought up again edgewise for the next stroke.

5. That this may be done in fanciful swimming, first with one hand and opposite foot, and then with the other.

6. That in all these motions the knees must be kept wide apart, and the toes pointing obliquely outwards.

7. That the swimmer may put his hands down deep in the water, as far as he can put his arms back, and make a strong quick stroke under him, with the palms of the hands facing his feet, or even strike farther out from the body.

8. That the hands are then to be drawn back rather slowly, edgewise, so as to effect the next stroke.

9. That the effort with the feet is to be made in any of these cases when the hands are returning.

10. That a person who cannot float can rest himself much by lying on his back in the water and kicking moderately with his feet, just so as to keep himself up, his hands either in the water or resting on his breast.

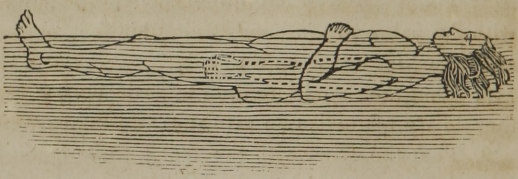
FLOATING ON THE WATER.

In my description of Thomas Taylor's instruction to me in the art of floating, when a boy, I have given a most excellent lesson to any one who will

take the instruction as I did, yet I think it will not be quite lost to repeat it here in order.

1. When you turn on your back to float, if you are a thin person, throw your arms obliquely above your head, with your hands and arms under the water.

2. Lie back quite straight on the water with your head under as far as you can, leaving your mouth and nose out. See the diagram.



3. Your legs may or may not be kept apart when your hands are thrown in advance of your head, as your balance in the water will be readily produced either by dropping one leg or by opening both legs, which shortens your length the same as when standing.

4. If you are a fat person, your hands may either be placed under your back, alongside you in the water, or folded on your breast.

5. No person will ever float who pulls up his

knees, for the instant that is done the weight of the bones in his legs and thighs is brought to bear on his pelvis or hips, which sends that part down, and consequently the head up, then the weight of the head will send all down.

6. Thin persons may find much assistance in floating by waving the hands gently alongside, under water, after the manner of *sculling* a boat, first from you, with the little fingers inclined up, then towards you, with the thumbs inclined up. This motion will enable them to breathe freer, whereas, fleshy persons need no such assistance.

7. Floating looks best to a bystander when the toes are shown over water, and in a thin person who finds it necessary to keep his hands under water.

8. *To turn round and swim in an opposite direction.* If floating or swimming on your back, the shortest way is to let your feet down, and turn your face to the water, or you can bring yourself round by striking one hand and both feet, either one way or the other. If swimming face downwards, and you wish to take the opposite course, let your feet down and turn on your back, then turn instantly over, if you wish to assume your former position, or you can get round to any direction by using

one hand more than the other, but not quite so easily as the other way.

DIVING, AND SWIMMING UNDER WATER.

1. Inhale all the air you can by taking what is called a long breath; and if swimming when you are about to dive, stoop your chin to your breast, when at the same moment throw your feet up, and strike backwards and upwards with your hands, kicking at the same time until you arrive at any depth you think proper, then you may swim in any direction, or creep on the bottom with your eyes open.

2. In returning to the surface of the water, you will, of course, make the shortest cut right upwards, using both hands and feet, as in common swimming, or by pawing.

3. As the quantity of air taken down will not supply the blood for more than a minute in ordinary persons, without suffering great pain, and perhaps death, your motions under water must be very rapid.

4. As the air in the lungs has a tendency to bring you up and bring you to the surface, the palms of your hands must be always facing your feet, and the stroke made backwards and upwards to keep you down.

5. When you dive head-foremost from a height, place both your wrists on your head, with your hands open, in the attitude of swimming, and dive with your knees perfectly straight and stiff, otherwise you may receive injury.

6. Never fall flat on the water from any great height, or you will be killed almost as quick as on land. You may dive obliquely, but the angle your body makes with a perpendicular should not exceed seventeen or twenty degrees.

7. When you leap into the water feet foremost from a moderate height, you may place your hands flat and close to your thighs, with your arms as close as possible to your body; but I prefer leaping in with my arms extended as high as possible over my head, and keep them so until the force of the plunge is broken by the water, or at least until I am well under the water.

8. In leaping from a very high place into deep water, *a la Sam Patch*, your hands and arms should be extended above your shoulders at an angle of forty-five degrees with the horizon, for the purpose of keeping your balance in the air, but when you approach the water, throw them up close to your head, to prevent their injury by entering the water.

9. In leaping into the water, you must always

keep your feet and knees close together, for if open you will suffer by it.

FANCIFUL SWIMMING.

1. *To swim on the back feet foremost.* First float with the feet together, and the toes over water, keeping your hands with the palms downwards, or out along your thighs, then make a bold stroke with both hands either directly under you downwards and outwards, returning your hands slowly to their first position for a new effort, and you will move moderately quick feet foremost. This kind of swimming appears extremely handsome to persons looking on who are not themselves adepts in the art of swimming.

2. *Rolling over in the water like a barrel on shore.* This fancy touch can be done only while you hold your breath, because your face will come into the water every time you go over, if the feat be handsomely done, but some swimmers can catch their breath and continue for a longer time.

Suppose you wish to roll to the right, first float, keep your hands along your thighs, the left near the surface of the water, with the palm downwards, the right hand deeper, with the palm upwards; then strike with the right hand up and the

left hand down, and you will go handsomely over to the first position, when you can repeat your motions and keep it a-going.

3. *To spin round like a top.* Take hold of your right big toe, with your left hand, then kick with your left foot and strike the water backwards with your right hand. We never thought this much of a feat.

4. *Walking the water.* Either fold your arms across your breast, or throw them up out of the water, to show the bystanders that you really walk the water; then, either with your breath retained or not, you can make quick headway, with your shoulders over water, at the expense of much muscular exertion. A very active, strong person can make this a beautiful feat, as he can keep himself much higher out of water, but ordinary persons can only keep the head over water. You must kick with one foot after another, something like the effort to run.

Leaping out of water, like a Trout or Salmon. This feat can be accomplished well only by an extremely strong and rapid swimmer, and even then it must be done from a dive, as you are coming up. In fact, the water is not entirely cleared, but as the person goes over, head-foremost, his feet coming up after him, his second dive makes

it appear as though he really did leave the water. It is possible, however, to bring up the thighs in such a bowed way as to clear the water, going over.

6. *Letting yourself to the bottom slowly in a standing position.* While walking the water, cease the action of your feet, keep your elbows close to your sides, then strike with your hands upwards, and return them to their position for the next stroke edgewise. You must take down with you all the air you can, as you may go handsomely down in twenty feet water, or more, if very alert, for your return will be extremely quick.

7. *To turn a somerset in the water.* When swimming on your back, and going as fast as you can, throw your hands out of the water in advance of your shoulders, and take a strong rapid stroke towards your feet, at the same moment bending your head back as much as possible, and bring your knees up to your breast, when you will turn over easily in consequence of the water's resistance against your face and breast, caused by the headway you are making. You will immediately find yourself on your face and swimming in your natural position; when, if you wish to repeat the feat from direct swimming, you must again put on speed, and taking a deep hold in the water with your hands, and pressing your chin on your breast,

make a powerful stroke as in the act of diving, at the same time throwing your legs back on your thighs, but keeping your thighs straight with your body, and you will instantly find yourself over on your back. When about to perform this last part of the feat, you must take in all the air you can, to make your breast as buoyant as possible, so that your legs may descend quickly in the water; otherwise, if not an adept, you might kick yourself down in the water instead of up, as we ourself did the first time we tried it, and got almost drowned; but there is not the smallest danger if you take this precaution, and do not kick with your feet until you legs are lower than your breast. These two somersets can be kept going one after the other in quick succession, so as to seem quite curious, and even astonishing to a novice in the art of swimming.

I must here warn all swimmers against remaining too long in any kind of water, but more particularly so in cold water, as *debility* and consequent *cramp* are sure to follow. The best of swimmers are very frequently drowned from this very cause, more than from all others put together.

8. To practice swimming with one hand is very useful, with a view of saving persons who cannot swim. But the best way of holding a

drowning person, is when on your back, as you can keep him from seizing hold of you at a proper distance. You can keep yourself up by using the other hand and kicking with your feet. Every person should know that when in the water he should not attempt to seize on the person who attempts to save him, as then both must drown. Two persons can very easily save a third, who cannot swim, even if he cannot be persuaded to float. But we hope that by means of this little book, many lives may be saved, and many learn to swim. All should know how to swim, women and men, and girls and boys.

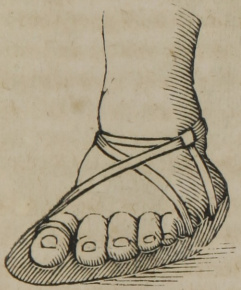
9. *To swim like a Dog or Horse.* Strike deep, first with one hand and the opposite leg, then with the other and opposite leg, or throw each hand alternately out of the water, and strike back from the surface, which will give a more easy and curious motion.

SWIMMING BY MECHANICAL MEANS.

The ancerine tribe of birds, such as the duck and goose, with many others, are formed by nature for swimming in or on the water, as is shown by the young taking to the water the minute they can walk, and by the web that unites their toes together. When diving under the water these birds

use their wings in swimming as other birds use theirs in flying. A man may, therefore, imitate them, and use for the same purpose artificial hands and feet. All he has to do, therefore, is to enlarge the surface of both hands and feet, so as to take a greater hold of the water; but these surfaces must not be too large, or they will become an encumberance to the swimmer, instead of an assistance in swimming or diving.

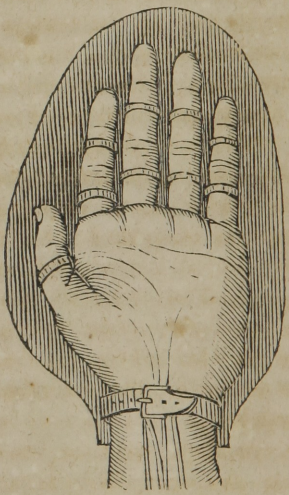
Take a piece of thin board, mahogany, oak, or other wood, and make it exactly the shape of the foot by laying your naked foot on it, from two to two and a-half inches larger all round, except at the heel. Round it off a little from the foot to the edge,



and make it a little hollow on the under side. When you have got the shape and size of one, the other may

be readily made by it. Fasten them on the feet exactly after the manner of a skate, with soft straps and buckles, by making holes or slits in the boards and passing the straps through them. They must be put on so as not to move, to give the hands and feet perfect command of them.

Those for the hands are to be shaped in the



same way, and must come up to the joints of the wrists, but as there is more motion in the hands and less strength in the arms than in the feet, they

must not be as large in proportion. One and a half inch all round larger than the hand will be a full allowance. These must be more hollowing than those for the feet, to suit the shape of the back of the hand when formed for swimming, for the hands must be on the inside instead of the outside when used. They must buckle with straps round the wrist, and have places formed for the fingers and thumbs by putting on, with screws, small pieces of thin leather the size of each finger, two on each finger at the joints, and one on the thumb, so that the fingers and thumb may go in tight.

All your actions with these appendages on will be exactly the same as without them, only much slower, until you acquire a perfect command of them, as they will be quite awkward at first. But when you acquire full command you can swim and dive like a fish. You can walk the water with these on, so as to place your person above your balance, and you would of course fall over, but then you can use less action and walk the water waist high or breast high at your ease.

Let it be recollected, that the use of these appendages, like skating, has to be acquired, but it is not half so difficult to acquire it, as that of skating. It is not desirable to form these artificial hands and feet of very light wood, particularly those of

the hands. In bringing up the legs and feet for a kick, the toes must be pointed back as much as possible, to prevent the resistance of the water, as the heel must come up first, and the knees and feet wide apart, both in bringing up and striking out.

When the foot is pressed naked on a board, it will be wider across the toes than at the heel: in marking out your artificial foot, you must, therefore, follow this increased width, so that it will be considerably wider before than behind. I am of opinion that the effect would be better to shape it off much narrower from the centre of the foot to the heel, and have it even shorter behind the heel, so that there will be but little resistance in returning the foot for the kick.

I have also had artificial feet which opened and shut like those of a duck, but could not succeed in consequence of the quantity of back water they drew after them in returning for the kick: whereas, the stiff wooden ones are not subject to this objection. This grows out of the length of the human heel. Ducks and geese have no such obstructions, as they have no *os calsis*, or bone forming a heel like man. See the diagrams.

Note.—Those who swim with draws on should have them fit close to the skin every where, ex-

cepting at the knee joints and hip joints. A pair of loose draws fills with water on the inside, and become very encumbersome as well as uncomfortable.

To the Reader.—The article which follows, on bathing, has been selected from various sources of the best authority, embracing several of our own notes which we took when attending the Medical College in New York; the whole being so modified as to suit our present purpose; and we are not afraid to challenge the English language for any article on this most important subject, that conveys more valuable information and advice on bathing, in so condensed a form, than the one here presented for the most attentive perusal of all those who may find it necessary to resort to any of the baths, either for health or pleasure.

Of that part of the work on swimming, it is unnecessary to say much, as it will either condemn or recommend itself: yet it may be proper to add, that the author has, perhaps, exercised as much in the useful art of swimming, between seven and forty years of life, being now fifty-seven, as any other person in America. He has never seen but one man whom he thought a better swimmer than himself, and that man was the Rev. Thomas Tay-

lor, the Methodist preacher, his only preceptor in the art.

One of our feats, which, in some measure, grew out of necessity, was performed about twenty-five years ago, with Captain French, in the middle of the Atlantic ocean, for about the distance of ten miles. Having challenged the captain, who was a most excellent swimmer, to take a swim in a perfect calm which then prevailed, in we dashed and off we went in a south-easterly direction for a distance of probably two miles, when we turned to float. After lying sporting for some time on the mighty deep, we heard a shot fired from the ship, when we immediately perceived that a wind had sprung up from the south, which was bending a sail almost over that was ahead of us. We instantly made for the ship, when we saw the jolly-boat on the water, but the blow became so violent in an instant on us and the boat, that the latter was blown back like a feather, and the ship Union under full headway for New York. We remained in the water about two hours before we were picked up.

BATHING.

Bathing, or the act of applying water under various states and modifications to the surface of the body, is a subject of such acknowledged importance and such general interest, as to demand a much fuller consideration than it has usually obtained, even from Professors of the Institutes and and Practice of physic, in the Medical Colleges.

The best practical hints we have ever heard on this important subject, were given by the late Dr. David Hosack, Professor of Medicine in the College of Physicians and Surgeons of the State of New-York, when we ourself were a student of medicine at that Institution.

Our old friend and preceptor, the late Dr. Macnevin, Professor of Chemistry in the same institution, and in whose office we studied about five years, was also a great advocate for cold and warm bathing, when regulated by medical advice, and so were Professors Francis and Mott, two shining lights in the profession.

We propose to consider the several *varieties* of baths, and the effects which each produces on the human body in its natural healthy state. Secondly, to deduce from these some practical conclusions and precautions on the use of bathing, in the preservation of health and the cure of disease. And thirdly, to conclude with a brief historical sketch of the practice of bathing among various nations, in ancient and modern times.

The term *bath*, has by many writers been employed in a very extensive sense, as comprehending every kind of liquid in which the body can be immersed; *air*, *earth*, *sand*, and other dry materials by which it can be surrounded. Thus we hear of baths of *milk*, *whey*, *broth;* and if we may credit the fables of mythology, and the legends of monkish superstition, even *human blood* has been employed in this capacity.

When the naked body is exposed for a considerable time to the cold air, this is termed an *air-bath*; a practice recommended by Dr. Franklin and others, as a substitute for bathing.

When the naked body is surrounded with sand; or, half-buried in the earth, as has been practised on various occasions, both by regular physicians and *empirics,* it is said to be placed in

a *sand bath*, or an *earth bath*. However convenient these terms may be in a medical point of view, they are not suited to the general purposes intended by us; we shall therefore confine ourselves wholly to those species of bathing, in which water, under some form or other, is the agent employed.

The water of which baths are composed, may be nearly pure, or it may be naturally impregnated with various mineral substances; or it may be possessed of very different degrees of temperature, from near the freezing point, thirty-two degrees Fahrenheit, to a heat considerably above that of the human body, which is ninety-eight Fahrenheit, or it may be applied universally to the whole surface, or partially to particular spots.

These circumstances constitute the different varieties of baths which we are now to consider.

The water which flows in small rivers, creeks, and brooks, or which fills ponds, lakes or canals, and to which recourse is very commonly had for the purpose of bathing, may be regarded as nearly pure, for it contains but little mineral impregnation. Its action on the surface, when of a medium temperature, is therefore little more than a *detergent* or *cleanser*. Sea water, which is so commonly used for bathing, contains, besides *sea-salt*,

a considerable quantity of other saline ingredients, as *muriate of magnesia* and *sulphate of lime*, the saline matters forming more than one-thirtieth of the whole weight.

Many other mineral waters are occasionally used for bathing; such as those of Saratoga in the State of New-York; Bath, in England; Vichy, in France, and Pyrmont, in Westphalia; all of which are *chalybeate;* and several springs in the United States; Harrowgate, in England; Moffat, in Scotland; Aix-la-Chapelle, in Germany, and *Barege*, at the foot of the Pyrenees, which are all *sulphureous.* The effects of these baths will depend in some measure on the nature of their impregnations.

By far the most important variety of baths are those in respect of *temperature*, as from the power of conducting or transmitting heat possessed by water, and the large volume in which this element can be applied, its effects in increasing, and more especially in diminishing the temperature of the surface, and hence that of the whole body, must be very great. We are aware that chemists are not fully agreed respecting the manner in which heat is transmitted through fluids, some attributing this transmission to a conducting power possessed by the fluids, while others explain it on the

principle of intestine motion in the fluid, by which its particles carry heat to each other; but this is not part of our subject.

Most modern writers, as well as professors, refer the whole effects of bathing to the temperature of the bath and the manner and circumstances under which it is applied; and though in this they generalize too much, it must be allowed that the effects ascribed to impregnation are very trifling when compared to those which depend on change of temperature. In this respect, baths were formerly divided into *cold* and *warm*, but since the use of the thermometer has become more general, four degrees of temperature have been marked in baths, now distinguished into *cold*, *tepid* or *temperate*, *warm*, and *hot*.

THE COLD BATH.

The cold bath is that which possesses the ordinary temperature of the atmosphere in a temperate climate, varying from about thirty-two to sixty-five, Fahrenheit's thermometer. Between these degrees we may estimate the temperature of most of the natural waters employed in bathing. The water of pools and small brooks sometimes exceed sixty-five, while that of the sea between New York and Boston is seldom below forty. The tempera-

ture of most springs in the United States is not far from forty, at which point water is considered at its maximum density. They sometimes, however, reach forty-five, but the well-water of thirty or forty feet depth is uniformly, winter and summer, about forty degrees, Fahrenheit.

THE TEPID BATH.

The tepid, or temperate bath, is variously defined by authors and professors. Some authors fix the medium temperature of the tepid bath at ninety degrees, while others think it cool between sixty-five and eighty-five degrees. The temperate bath is usually artificial, but there are several natural springs of celebrity that possess a temperature between sixty-five and eighty-five degrees, and are employed as tepid or temperate baths. Such are the springs of Matlock, Buxton, and Bristol hot-wells, in England. Of these, the coolest is Matlock, sixty-six degrees, Bristol, seventy-four degrees, and Buxton, eighty-two degrees.

THE WARM BATH.

The range of the warm bath is from eighty-five to ninety-seven degrees. On the continent of Europe there are several baths of this description, but that of Pyrmont, in Westphalia, is the most

celebrated. Crossbath, at Bath, in England, is about ninety-four degrees. We are not aware of any springs of this temperature in the United States.

HOT BATHS.

When baths exceed the ordinary temperature of the human body, ninety-eight degrees, they are called *hot baths*. It is scarcely possible to assign the highest limits of these baths in point of heat, as this must depend much on the sensations of the patient.

An artificial hot bath seldom exceeds one hundred and five degrees, but the heat of natural springs, when used for hot bathing, is very great. The waters of the King's bath, at Bath, in England, are at a medium of one hundred and sixteen degrees. Those of Vichy, in France, one hundred and twenty; of Aix-la-Chapelle, in Germany, about one hundred and forty; while those of the Caroline baths, at Carlsbad, in Bohemia, are one hundred and sixty-five degrees. The heat of the baths at Baden, in Switzerland, is also very great: but those of Pisa, in Italy, do not exceed one hundred and four degrees, and are we think the coolest of the natural hot baths in Europe.

According to the mode in which baths are

employed, they are usually distinguished into *general* and *partial;* and of these there are several varieties. The term *bathing* is most strictly applicable to those cases where the whole body is plunged or immersed in the water. This is the ordinary mode of employing both the cold and warm baths. But frequently the water is thrown over the body, either from a bucket, or by means of an apparatus which causes it to descend on the head in a shower, constituting what is called the *shower bath.* This method is by medical men and medical writers called *affusion,* and is practised both with cold and tepid water, with the best effects. When the *feet* are immersed in warm or tepid water, the bath is professionally called *pediluviam.* And when the *lower* half of the body is immersed in a similar bath, it is called *semicupium.*

THE VAPOUR BATH.

The *vapour bath* is a modification of the *hot bath,* and may be employed either universally or partially. It consists in the application of steam, brought by pipes from a vessel of boiling water, and either admitted to the whole body, placed in a small room, fitted up for the purpose, or to any particular limb enclosed in a proper apparatus. Sometimes this consists of a close box, made of

tin plate, communicating with a common boiler, by means of a tin tube, proceeding from a head resembling that of a still; but in partial cases, the box has adapted to it an air-pump, for the purpose of exhausting or rarifying the air of the vessel, before or after admitting the steam. See the Edinburgh Medical and Surgical Journal, vol. vi. p. 313.

THE SHOWER BATH.

The *shower bath* may be considered pretty much the same as the *cold bath*, yet water of any of the usual temperatures may be used in it. It is nothing more than a kind of box, composed of wood or sometimes of tin, with four tin columns, standing on a square or round tin pan at the bottom, to recive the water when it falls on the person bathing. The water is contained in a tin, or other vessel at the top, suspended in such a manner as to be turned over into another vessel perforated with many holes, by a string, at the pleasure of the person about to receive the shower and shock. When constructed with columns, it is usually enclosed in a curtain, which goes all round it. A small quantity of water let down slowly will make the bather much cooler than a large quantity let down suddenly. No person should ever enter the

shower bath unless quite warm; if in a perspiration, not from disease or debility, however, so much the better; nor should he receive, at one time, more than one rapid shock, unless in the highest state of health, when a second or third may be taken, until he becomes quite cool; and when dressed, or in bed, if no glow follows, it has not only been over-done, but is absolutely injurious, on the same principle of too long continuance in cold water.

The greatest recommendation of the *shower bath* is its convenience as a *cold bath*, for jumping into cold water will give the shock equally well. Some medical men object to its use, but we can see no valid objection, but would rather recommend its judicious use, having found it beneficial in our own person, and have known it so in others. We consequently on this head will make no further remarks.

Having now examined the general nature of *baths*, and recommended the most important varieties, we proceed to describe the effects which they produce on the human body, in its ordinary state of health and vigor, and to point out how these effects may be advantageously employed, in the prevention or cure of disease.

The effects of bathing will depend partly on the quality and composition of the water employed, and partly on the quantity and mode of application, but more especially on the temperature of the bath.

Immersion, even in simple water, of such a temperature as to affect the body with no striking sensations, either of heat or cold, is attended with several advantages. It is, however, proper to remark, that the sensation of heat or cold which a person may feel on immersion in water of a medium temperature, will depend on the degree of heat or cold to which the body has been previously exposed; so that a person much chilled will, on entering the bath, feel the water *warm*, while another who has been much heated by exercise, etc., will find it sensibly cool. This can be proved by immersing one hand into very cool water and the other into water up to one hundred and five degrees, or more, and then plunge both at the same instant into *tepid* water. The cooled hand will feel the water warm, while the other will feel it cool.

The surface of the skin is, however, by bathing and washing in tepid water, freed from that scaly *sorcles* which always collects more or less in the healthiest persons; and hence the pores of the skin

are opened and relaxed, and the natural perspiration promoted. The limbs are also rendered supple, and any stiffness which may have been produced by great exertion or fatigue will be removed. Such an immersion has been found to alleviate thirst, which is a clear proof, in the opinion of most physiologists, that a quantity of the water is absorbed or enters through the skin into the circulations; but we think that thirst is allayed by the abstraction of heat, and not by the absorption of the fluid.

If, instead of immersion in *tepid* water, *affusion* be employed, the general result is much the same, except that, if the body be continually exposed to the air after affusion, a sensation of coldness will be produced, and this in proportion as the air is more favorable to evaporation, and consequently to the removal of the caloric or heat from the moistened surface.

When water of the same medium temperature, but impregnated with some mineral substance, is employed, it is generally supposed that the impregnating matters produce on the system effects similar to those which would follow their internal exhibition. That this is the case in some instances we shall not deny, but in most cases the effect is very trifling, and in some scarcely perceptible.

Immersion in sulphureous tepid waters commonly produces an increased perspiration: and a similar use of chalybeate waters, especially if these contain any alumenous substance, is followed by a corrugation of the skin and an increased action of the vessels.

These effects we can readily explain from the absorption of the sulphureous gas in the former instances, and the corrugating effect of the alum and chalybeate acting as an astringent on the skin, and thus producing pressure, and consequent contraction, or acceleration of the fluids in the vessels near the surface. Indeed, that they are not absorbed, is evident from the circumstance, that even sea water will allay thirst merely by wetting with it the surface of the body. We conceive that thirst is produced by heat, and the removing heat from the surface will remove it from the internal parts, from the distributing tendency of caloric, which even tends to produce an equilibrium.

We are, therefore, disposed to think that the advantages of sea water over fresh, as a bath, used rather for health than for exercise and recreation, have been much exaggerated. In some cases, the salt may act as a gentle stimulant on the surface, and this effect will be increased by heat, friction, or long immersion, but in cases where the

immersion is only momentary, as in the shower bath, or by affusion, and the body immediately dried, salt water can have little more advantage than that of convenience, if fresh cannot be had.

EFFECTS OF COLD BATHING.

When a person in the ordinary state of health is immersed in a cold bath, when its temperature does not exeed sixty-five degrees, he first feels a general sensation of cold; but in a few moments, what was almost unbearable, becomes not only quite bearable, but moderately comfortable. If the immersion be sudden and momentary, and the body immediately dried and covered from a cold air, an immediate agreeable glow of warmth will come over the whole person, when he will feel refreshed and invigorated; and, under favorable circumstances, the natural perspiration is increased. If, however, the immersion be continued for a considerable time, and the water not near the highest range of the temperature, that is, sixty-five degrees Fahrenheit's thermometer, instead of the glow of warmth, the immersion will be followed by numbness and shivering. The skin becomes pale and contracted; the vessels near the surface are evidently diminished in diameter, and their contents are either lessened in volume, or propel-

led with greater force towards the internal parts. The person feels drowsy and inactive; his joints become rigid and inflexible; his limbs are affected with pains, and often with cramps; his respiration becomes quick and irregular; and generally a copious discharge of urine takes place.

If the immersion be still continued, and the water very cold, the pulse gradually ceases at the wrist; the action of the heart becomes weak and languid; a sensation of faintness, and coldness of the stomach is experienced, followed by a rapid dimunition of the whole animal heat, and at length delirium and torpor come on, and the person is carried off by a fatal apoplexy!

In the preceding description we supposed that the patient had been put suddenly into the water, head-foremost, or suddenly any way; but if, as often happens with weak or timid people, he enters the bath slowly, and if the water be much below sixty degrees, the sensation of cold is more striking; a shivering is produced, and as the person advances, so as to make the water rise on his person up to the breast, a shuddering and convulsive sobbing takes place, sometimes attended with sickness and head-ache.

When the cold bath is applied by way of affusion, as in the shower bath, or throwing on water

from a pail or watering-pot, its effects are perhaps somewhat more sudden and more transient, although by repeated showers or affusions, the effects may be increased or prolonged to almost any required extent. The degree of re-action and warmth in this case, will depend upon how long the affusions were continued, or to what extent the heat of the person was carried off, and to the immediate application of clothing.

It is generally thought by medical men, and entered on record in medical books, that the increase of heat, which will always follow the true point of bathing, is to be ascribed to that reaction of the system which enables it to resist an external impression by which it might be injured.

This, according to my view of the matter, is an unphilosophical explanation; and although this is the first time, perhaps, the explanation I shall offer was ever given to the world, yet I shall venture my bread on the waters, even if I should not see it after many days.

My explanation is this :—On plunging into the cold water it will attract a great portion of the heat near the surface, and by remaining in, it will continue to abstract all that approaches the surface, to supply the equilibrium of temperature of the

whole person, so that, if too much has not been removed by the water, the remaining heat in the body approaching the surface, which is still cold, will give all those sensations of relative heat which we experience, after being just the proper length of time in the bath; for when too much of the caloric or heat is carried off, there will not be enough left to produce a comfortable, equal degree of warmth all over the person, and of course a shivering comes on, and a head-ache follows, from the contraction of the vessels of the brain, or perhaps from an affection of the stomach.

It is this re-action of the heat of the system, which enables the body to derive advantage from the application of the cold bath; and when the re-action or glow of warmth does not take place, or only in a small degree, the cold bath has been excessively and injudiciously employed; for when after the use of a cold bath a person feels heavy, inactive or chilly, or afflicted with head-ache, or tightness across the chest, it is evident either that it does not agree with him, or that he has remained in too long a time.

Hence when the system has been debilitated by long continued exertion, or disease, when the temperature of the body is below the natural standard, ninety-eight degrees, or where a profuse

perspiration has come on without action or exercise, cold bathing should be avoided.

From what we have now stated, it appears that the cold bath is attended with three principal effects; a sudden and powerful shock given to the body on the first application; a sudden abstraction of heat from the surface; and the re-action of the remaining heat of the system, to restore the equilibrium of the temperature, which coming to the cooled surface, causes the glow. In its general and primary effects, therefore, the cold bath acts as a powerful stimulant to the whole system, and to this effect its advantages as a remedy are to be chiefly ascribed.

It has been very commonly supposed, even by medical men, that immersion in the cold bath, when the body is considerably heated with exercise or from the temperature of the weather, is a dangerous practice; and consequently, it is a general custom with bathers who find themselves over-heated, to wait till they are cool before they plunge into the bath. This opinion and practice have been examined by some of the ablest medical writers, and ably controverted. They have shown both from theory and practice, and we ourself know by experience, that the opinion is erroneous and the practice injudicious. It is proved that

while the body preserves a temperature above the natural standard of ninety-eight degrees, and the strength is not exhausted by perspiration or fatigue, the immediate use of the cold bath is not only safe but salutary. Some medical men advise their patients to take such a degree of exercise before going into the cold bath, as will excite the vascular system, and increase the animal heat of the body. See the British Medical Reports, v. 1., p. 111.

From the effects of the cold bath on the healthy body, we may deduce the following conclusions respecting its employment in the case of disease:

The principal advantages of cold bathing, in a medical point of view, are the reduction from the surface of excessive heat, and the producing a salutary re-action of the system by the distribution of the remaining heat equally over the body. In the former way it will prove beneficial in all those cases where the temperature of the body continues steadily above the natural standard; as is evident in fever, the hot stages of intermittents, the yellow fever of the West Indies, and in several febrile diseases; as in the early stages of scarlet fever, measles, and in the small pox, so long as there is no appearance of eruption.

The mode of application in these cases will depend on the strength of the patient; but in gene-

ral, affusion is more advisable, and more efficacious in reducing the morbid temperature, than immersion. Immediately after bathing, unless in cases where the heat is much above the natural standard, the patient should be placed in bed and covered lightly with a blanket. But the bath, when such excessive heat exists, should be repeated until the temperature is reduced to the natural standard, or somewhat below it.

In cases where the patient is much debilitated, it will be proper to defend the body by flannel from the action of the cold.

As producing a salutary re-action of the system, cold bathing has been employed with advantage in *Tetanus*, or locked-jaw; in those convulsions which so commonly affect young children; in *insanity;* and in several chronic diseases.

Cold bathing is advisable chiefly in summer and autumn, and except in those cases where swimming has become habitual, and is borne with impunity, the time of immersion should not exceed a few minutes, and in most instances, if the water be very cold, not more than one minute—a mere plunge. Daily bathing in very cold water, in time of an epidemic, has been known to prevent, and even cure the yellow fever.

The cold bath in all its forms is inadmissible in

all those cases where the heat of the body is less than natural; when profuse perspiration has from debility come on: where there is any considerable degree of *plethora*, or unusual fullness of the blood vessels; where the person is subject to inflammatory affections of the lungs, or any considerable determination of blood to the head; or where, from constitutional weakness or unconquerable dread of the bath, the use of this powerful remedy might be productive of unpleasant feelings or consequences.

EFFECTS OF THE WARM BATH.

In entering a bath of a temperature between eighty-five and ninety-seven degrees, an agreeable sensation of warmth is experienced, and this sensation is more striking as the body has been previously cooled. If, however, the water has not been kept near the highest point of warm temperature, the sense of increased heat soon diminishes, leaving only a pleasant feeling of a moderate and natural temperature. The frequency of the pulse is always diminished, and this very remarkably in those cases where, before immersion, it was preternaturally increased. This diminution of the pulse goes on during a continuance in the warm bath, although the water be preserved at nearly its original tem-

perature, insomuch, that a natural pulse has, after the immersion of an hour and a half, been reduced by nearly twenty beats in a minute. The respiration is rendered slower, and the animal heat is in most cases diminished. The absolute weight of the body after an immersion in the *warm bath*, is said to be increased, notwithstanding the perspiration that may have taken place during immersion, and the patient feels a peculiar languor and desire of repose, though the spirits are exhilarated, and all previous irritability allayed.

It has been generally thought that one constant effect of the warm bath is to relax and debilitate the body, and accordingly it has been most employed in cases of preternatural rigidity and contraction. It is an observation founded on experience, that moist warm air produces a relaxation and debility of the living body; and hence it was natural to conclude that the warm bath should be productive of the same effects; but the experiment of many eminent physicians seems to prove that these preconceived opinions are founded in error. Warm bathing has been employed in a great variety of cases, where the patients were either naturally of a weak habit of body, or had been debilitated by disease; and none of them experienced any debilitating effect, but on the contrary all of them

felt stronger on the days when they used the bath, and most of them were restored to their former strength.

In a few cases, however, relaxation and debility have followed the use of the warm bath, but these are perhaps to be attributed to the heat of the bath having been too great for the constitution of the patient, or the immersion having continued too long. See Marcard. De la Nature et de l'Usage des Bains, p. 14

The affusion of warm water, whether from the shower bath or otherwise, is more effectual than immersion in the warm bath, in diminishing a morbid increase of temperature. It also diminishes the pulse and respiration, and produces a tendency to sleep and repose ; these effects, however, are more transient than those which follow general warm bathing.

On the whole it appears that the stimulant effects of the warm bath are very inconsiderable, and that it is used chiefly in allaying irritation, diminishing morbid frequency of the pulse, and relaxing and purifying the skin.

Hence the warm bath is likely to be attended with advantage in those cases of fever where the heat is preternaturally great, but where from some affection of the lungs, or other unfavorable symp-

tom, cold bathing is inadmissible; in the paroxysms of hectic fever; in several eruptive diseases attended with increased heat and dryness of the skin; in most chronic eruptions of the skin, when it acts chiefly as a detergent and sudorific; in atonic gout and rheumatism, accompanied with stiffness and swelling of the joints, but in this last complaint the greatest care must be taken to wrap in flannel on leaving the bath, and to avoid all exposure to cold; in chlorosis; in slight cases of palsy; in scrofulous swellings; in some spasmodic and convulsive affections, when the cold bath might prove too violent, especially hydrophobia, as a soother of suffering; in all those affections of the bowels that seem to depend on an irregular or diminished action of any part of the alimentary canal; and in cases of debility attended with nervous irritation.

When this remedy is intended to produce increased perspiration, it will be best employed in the evening, when the immersion should not be long continued, and the patient should be removed from the bath to a warm bed. The sweating will succeed his leaving the bath, for while in the bath those parts only that are exposed to the air will freely perspire.

When, however, it is not intended to excite

sweating, the most proper time for bathing is about two hours after breakfast, or about 10 o'clock in the forenoon. In these cases the bathing may be protracted to 20 minutes or longer, according to the feelings of the patient, and after bathing, gentle exercise in the open air in mild weather, should be employed, but in no case to suffer a sudden check or re-action from the cold.

The warm bath is of incalculable benefit while under a mercurial course, for the cure of *syphilis* or *hepatitis*, but the greatest care must be taken against cold.

Those cases to which the warm bath is less applicable, are principally affections of the lungs, accompanied with great difficulty of breathing, and some organic affections of the internal parts.

EFFECTS OF THE HOT BATH.

The effects of the hot bath differ in several particulars from those of the warm bath. The sensation of heat experienced on entering a bath of about 98 degrees, is in general very striking and permanent. The pulse is increased in frequency and force; the superficial veins become turgid; the face is flushed; the respiration quicker than natural, and sometimes hurried and laborious. If

the heat of the bath much exceeds blood heat, 98 degrees, or if the immersion be continued beyond a few minutes, the determination of blood to the head is greatly increased; the arteries of the neck and temples throb violently; a sensation of anxiety at the breast, threatening suffocation, comes on; the person grows giddy, and feels a fluttering at the heart; and, if these warnings of approaching danger be not attended to, he soon becomes insensible, and will expire of apoplexy.

Water of this high temperature is scarcely ever applied in the way of affusion from the shower-bath or otherwise; nor is such an application likely to be attended with advantage, except in in some paralytic affections of the limbs. In these cases it is not unusual to pump the hot water on the affected limb. By this *dry pumping*, as it is commonly called, the water can be applied to the affected parts under a higher temperature than when used for immersion.

There can be no doubt that the *hot bath* is a most powerful *stimulus*, to be applied only in a few cases when the ordinary *stimuli* are found to be ineffectual. Accordingly it is but seldom resorted to in medical practice, and almost the only cases in which the general hot-bath is employed, are those of confirmed and obstinate palsy, yet it

might be found highly beneficial in recent affections of that complaint.

In the use of the hot bath, much caution is required. The patient should begin with the lowest temperature of such a bath, or about ninety-nine degrees, and gradually increase the heat at each successive bathing, according to its effects. The time should be short, not over a few minutes, and in leaving the bath, the greatest care should be taken against cold. In some cases, attended with fulness of habit, it may be necessary to bleed or purge before entering the hot bath.

EFFECTS OF THE VAPOR BATH.

Although the *vapor bath* may be regarded as a modification of the hot bath, yet its effects are much less violent; and as it has been employed with considerable success in cases where the *hot bath* would be attended with danger, it requires our particular notice.

The usual mode of employing the *vapor bath*, is, as we have already said, to expose the naked body in a small apartment, to which the steam of hot water is to be admitted. The apartment is generally heated to a temperature considerably above that of the atmosphere, and the body is for some time permitted to remain in this heated air;

the common effect of which is to increase its temperature, and accelerate the circulation of the blood. After some time, the steam, now usually mixed with aromatics, is admitted, when the former symptoms are removed, and a profuse perspiration is produced. This is usually promoted by friction, and removal to a warm bed, but in no case must the patient be exposed to even a moderately cold air, especially if rheumatism be his complaint; but we much doubt its benefit in this disease.

The general effect of this process is to relax the body, remove obstructions of the skin, alleviate pain and spasmodic contractions, swelling and stiffness of the joints in rheumatism and gout, and to promote sleep.

In the *vapor bath* the stimulant power of heat is much modified and tempered by the moisture diffused through the air; and as the elastic vapor, like air, is a less powerful conductor of heat than water, the effect of vapor in raising the temperature of the body is much less than that of the hot bath. Its heating effects is also much diminish ed by the copious perspiration which ensues.

THE AIR-PUMP VAPOR BATH.

The air-pump vapor bath was contrived for the

topical application of steam to the greatest advantage. The apparatus consists of a vessel of strong copper, lined on the inside, for enclosing the part of the body to which the vapor is to be applied, and having attached to it a bladder for the purpose of securing it, so as to be air-tight. To one end of the machine is fitted a pipe, that communicates with a portable boiler, in which the water is heated by means of a spirit lamp.

There is also a small air-pump for exhausting the machine when the application is to be made in rarefied air, or after it has continued for a proper time. A thermometer is also adjusted to the apparatus, for showing the temperature of the enclosed air.

This apparatus acts on the principle of removing the pressure of the atmosphere from the part affected, while moist and heated air or vapor is applied to it; hence it combines the actions of dry cupping and fomentation, each of which is occasionally employed with advantage in several morbid affections.

The cases to which this vapor bath, therefore, seems best adapted, are chiefly *gout*, both *acute* and *atonic;* acute rheumatism; palsy; several affections of the skin, as leprosy and ulcers, and white swellings of the joints. It is also recom-

mended in female obstructions, chilblains, tetanus and dropsy, and has proved highly efficacious in inflammations of the stomach and bowels. The usual mode of application is to foment the part affected by means of the steam admitted into the body of the machine, for a time proportioned to the nature of the case, commonly from half to three quarters of an hour, and then to exhaust the machine by means of the air-pump, which generally occupies another quarter of an hour.

In the employment of the general *vapor bath*, it is evident that its first effects would be attended with danger in a plethoric state of the body, or where there is much determination to the head. In such cases, previous steps should be taken to remove plethora, and relieve the head, by the lancet or purging, or bath.

HISTORY OF BATHING.

Although the external uses of water for the purposes of cleanliness and healthy exercise, must have been common among all nations, and in every age, yet the practice of bathing as a luxury, or a remedy, appears to indicate considerable refinement and civilization, and has been almost entirely confined to the polished nations of Asia and Europe. In the earliest records of antiquity, indeed, mention is made of bathing, either as a religious ceremony, or, as the means of fortifying the body against the fatigues of war; and with these views, the cold bath, alone, appears to have been employed.

The practice both of general bathing and partial ablution, formed a part of the *Mosaic Institution;* and the precepts delivered on that head, were evidently intended to promote cleanliness among the people, who seem to have been peculiarly subject to leprosy, and other diseases of the skin.

Washing the hands and feet before and after meals, was an established custom among the Jews, for we find Jesus reproved by the Pharisees, for sitting down to meat with unwashed hands. On various occasions, bathing is mentioned in the Scriptures as a remedy for diseases; and it is probable that the famous pool of *Bethesda*, in which so many lame and diseased persons are said to have been healed, was nothing more than a natural warm bath. It is certain that in the days of David and Solomon, the custom of bathing had become a luxury among the Jews, though it was probably never carried among that people, to the height to which it was known among the Greeks and Romans. It appears also from a passage in the second book of Kings, that the practice of bathing as a remedy for cutaneous diseases, was common among the neighboring nations of Judea, and that certain waters were celebrated for their medicinal properties in this respect; for Naaman, the Syrian, when told by Elisha to bathe in Jordan, for the cure of leprosy, Naaman replied, "Are not Abana and Pharpar, rivers of Damascus, better than all the waters of Israel? May I not wash in them and be clean?"

Among the Greeks, bathing was practiced even as a luxury, before the time of Homer, or in what

have been called the heroic ages. Frequent allusions are made in the works of that immortal poet to this luxury, and it appears that the baths were supplied chiefly with warm and tepid water, which in most cases was poured on the body by attendants. Thus *Venus* is described in the Odyssey, as flying after the public disgrace she had sustained in the discovery of her amour with *Mars*, to the groves of *Paphos*, where she was *laved* by the *Graces*, and the improvement produced by the bath on the native beauty of the Goddess, is particularly commented on.

While at the court of Alcinous, Ulysses is described as *laved* by attendant nymphs, and in the tenth book of the Odyssey, the whole process of bathing that hero at the court of the enchantress *Circe*, is minutely described. It also appears from this passage, that in those early ages it was the custom to anoint the body with oil, or unguents, after immersion in the warm bath.

Among the Spartans, cold bathing was practiced to great extent; and bathing and swimming formed a part of the gymnastic exercises inculcated on the Spartan youth by the laws of Lycurgus. It is probable, however, that in later times the Spartans also used the warm bath, as the term *laconicum*, applied to the stove used in the warm

bath room, among the Romans, is derived from *Laconia.*

Cold bathing and swimming were practiced by the Roman youth, as part of their exercises in the *Campus Martius*, and the latter commonly terminated the foot-race. The youthful candidates for the prize, in this exercise, directed their course towards the banks of the Tiber, and after the violent exertion of running, plunged head foremost into the stream. This they were accustomed to cross twice before the contention ended. It was usual to anoint the bodies of the swimmers before the contest, with a view of diminishing the action of the cold. See Horace's Odes, lib. 1, Ode 8.

This custom of anointing the body with oil, would not be amiss in our time, where the swimmer intends to take a long journey, or when he is to dive a great depth under water.

In the later periods of the Roman Empire, when refinement and luxury had arrived to the highest point, the custom of warm bathing generally prevailed among those citizens who could afford it; and the most magnificent and extensive apartments for the exercise of this luxury, were constructed by the emperors and nobles. Many remains of these splendid edifices still exist, and

afford us admirable specimens, both of the architecture and refinement of the Roman people.

In the public baths, there were sometimes six apartments, and seldom fewer than five. The first of these was called *apoditerium*, where the bathers undressed and left their clothes, whence it was also called *spoliatorius*. In the common baths this apartment was wanting. The second room was called the *frigidarium*, or apartment for the cold bath, where there was no *apoditerium*. The bathers undressed in this room, whether they intended to use the cold or warm bath. The third apartment was *tepidarium*, so called, not because it contained the warm baths, but because it was warmed to a moderate temperature, to serve as an intermediate room between the warm and cold baths, thus diminishing the danger of sudden exposure to air, after warm bathing. In the fourth room, called *laconicum*, was placed a stove for heating the air, and here those who were to use the warm bath, remained for some time before immersion, and were anointed before entering the cold bath. The fifth apartment was the proper *balneum*, or warm bath, and was usually made sufficiently large to contain several bathers at the same time.

It was furnished with a gallery, where those

who waited for their turns to bathe might walk, and was lighted by a single window, placed immediately opposite the *alveum*, or receptacle for the warm water. The sixth and last apartment was called *unctuarium*, which was a kind of closet for holding the oils and unguents. Below the building was a furnace for heating the several apartments.

These structures were called Thermæ, and were very numerous at Rome, but the construction of public baths appear to have been commenced under Augustus, and introduced by *Mecænas*, his favorite.

The erection of baths, where the people might enjoy this luxury *gratis*, became an established and successful method of gaining their affections; and even at this time, in this republican country, our political men and legislatures would gain great *eclat* and popularity, by erecting at the public expense, baths to accommodate the masses in our large and populous cities.

According to *Fabricius*, there were in Rome not fewer than 856 public baths, some of which were sufficiently large to contain 1800 persons. The most celebrated of these were the baths of Caracalla, Dioclesian and Titus, the remains of which still exist to testify to the magnificence of

their founders. Vitruvius and Lucian, give an account of the baths of ancient Greece.

We have denominated the thermæ of the Romans *warm* baths, but it appears from many passages in Seneca and Martial, that their temperature was so high as to entitle them to the appellation of *hot* bath. These hot baths had become excessively in use during the reigns of Adrian and Severus, but about the time of Galen they had fallen into disrepute.

Bathing at a very early period appears to have been an established custom as an article of luxury among the Asiatics; but it became universal among the followers of Mahomet, after the promulgation of the Koran. The precepts on this head, like many others of the Arabian prophet, appear to have been borrowed from an antecedent code, and they were readily adopted from their congeniality with the manners of his disciples.

Joseph, the Mormon Prophet of the Western Empire of Saints, has also, we are assured, recommended ablutions and bathings to his disciples, if he has not enjoined it as an article of their religion. There is a great *font*, supported by a number of carved bulls, under the Mormon Temple at Nauvoo, Illinois, where the elders baptise

for the dead and immerse the living. We think it a most excellent institution.

The Mahometans view bathing as one of the necessaries of life; and besides the numerous public baths erected in their cities, and even villages, almost every family of distinction has bathing apartments within its own dwelling.

The Arabians or Moors, who conquered Spain and other parts of Europe, carried with them their predilections for warm bathing; and Moorish antiquities still exist in these countries, notwitstanding the rage for destroying them, which exhibit some excellent models for artificial baths. In particular, the Palace of Alhambra, in Granada, contains a magnificent basin, which might be used either for cold or warm bathing, besides smaller apartments for odorific fumigations.

In Russia, according to Dr. Sanches' account, all ranks enjoy the luxury, at the public expense, of what they call the sweating bath, which much resembles the *hot baths* of the east.

Cold bathing, in the sea, we are assured by McGill, in his travels, is also much practised by the Russians, where he asserts both sexes may be seen enjoying this favorite recreation, quite naked, as they came into the world, without feeling any shame on the one side or the other.

Few of the nations of modern Europe, have practised warm bathing to any considerable extent, prior to the seventeenth century, nor has it been used even among the rich in England, to warrant its notice, until within the last fifty years. At this time, however, the cities both of Europe and America are mostly supplied with public warm baths, or rather warm baths for the public, got up by private enterprise, and used by a small portion of the people at a most enormous cost. The writer has paid four shillings sterling, in England, and two shillings sterling in New-York, for the privilege of taking at each a twenty minutes luxury in a warm bath. Why does not John Jacob Astor immortalize his name as a public benefactor in establishing in New-York, from part of his princely fortune, a free public bath, like that of Caracalla, for the benefit of succeeding generations, who would sing praises to, and call blessings on the name of the munificent founder of THE ASTOR BATH? As the Astor House has been converted to a private, mercenary purpose, it will not stand as a *monument* of generosity, reflecting honor on its founder and builder; nor will the donation of the *Library Fund*, be of much more consequence, as that will be monopolized by the literary few; but a magnificent *free bath* for the

benefit of the people, would fix his monument, like that of Washington, the father of his country, in the hearts of many and remote generations to come.

DIETETICS.

ADAPTATION OF DIET TO CONSTITUTION, AGE, SEASON, AND MODE OF LIFE.

Food to be adapted to constitution and circumstances—Diet must vary with time of life—Diet in infancy—The mother's milk the best; substitutes for it—Over-feeding a prevalent error—Diet after weaning—Too early use of animal food hurtful—Diet of children in the higher classes too exciting; and produces scrofula—Mild food best for children—Incessant eating very injurious—Proper diet from childhood to puberty—It ought to be full and nourishing, but not stimulating; often insufficient in boarding schools—Diet best adapted for mature age—Regimen powerful in modifying the constitution, mental as well as physical—Farther investigation required.

In practice, a distinct modification of diet ought to be adopted for every marked variety of constitution, as, unless a proper relation subsists between the qualities of the food and the nature of the system which it is intended to nourish, due advantage cannot be obtained from its use. For example, the highly concentrated and stimulating food which is found necessary for the proper sustenance of the trained pugilist or sportsman, whose muscular frame is in high development and constant exercise, would prove far too exciting to the slender and irritable constitution of a person whose characteristic feature is the predominant activity of the brain and nervous

system. In like manner, the generous and stimulating diet which suffices to merely rouse a phlegmatic organization to ordinary energy, would prove by far too nutritive for a person of a florid and sanguine temperament, whose predisposition is already toward inordinate activity.

Viewed in this light, the necessity of adapting the diet and regimen to the individual constitution and mode of life, becomes so obvious to reason as to excite surprise that it should ever have been neglected. But, strange to say, although the ancient writers attached much importance to the subject, the relation between diet and constitution, as a practical consideration, has, of late, been so entirely overlooked, and sound physiological principle has been so little consulted in the proper adaptation of the one to the other, that we are at this moment in possession of very little information of any value regarding it, and a long time must elapse before more can be supplied.

Where the constitution is of a mixed nature, or a compound of two or more of the temperaments already described, a diet composed of animal and vegetable aliment in nearly equal proportions is, under ordinary circumstances, the best. But where any one temperament predominates, the diet ought to be modified accordingly. Where, for example, the sanguine constitution prevails, characterized by a florid complexion, great activity, strong action of the heart and blood vessels, and a consequent liability to diseases of excitement and inflammation, the food ought to be habitually of a kind calculated rather to soothe than to stimulate. Red meat, spices, wines, and fermented liquors ought to be used sparingly; and the principal support to be derived from refreshing soups, fish, fowls, mucilaginous vegetables, acidulous fruits, and diluting drinks. In the case of lymphatic persons, on the other hand, where the circulation is weak and slow,

and all the functions are feeble, the system is benefited by the stimulus of a larger proportion of animal food, especially red meat and game; while vegetables, soups, and fluids of all kinds prove relaxing and hurtful. Aromatics and spices, however, are useful, as is also wine in moderation, and conjoined with adequate exercise.

If, again, the individual presents a highly nervous temperament, characterized by delicacy, unusual sensibility to impressions, and great excitability, without proportionate strength, such as is often seen in females and in men of genius, care ought to be taken not to make use of a heating or stimulating regimen. White meat, such as fish and fowl, are more suitable than the kinds in ordinary use. Spices are also hurtful, but farinaceous and mucilaginous aliments, and ripe fruits, are generally admissible—always supposing that moderation in quantity is attended to, and that the mode of life is, in other respects, regular and rational.

Where the dark energetic bilious temperament predominates, and much bodily activity in the open air is enjoyed, more latitude in the choice of food is admissible than in any other constitution. If, however, much and continued exertion be required, a full supply of animal food becomes indispensable for the due support of the system, and the strength cannot be adequately supported on vegetables alone. In such circumstances a moderate allowance of wine or other stimulus is borne with less detriment, if not with more advantage, than where the temperament is essentially nervous.

On this subject, however, there is still so much need for inquiry, that I shall for the present only refer the reader to the general principles, and urge upon him the necessity of rendering our knowledge more complete, by diligent and discriminating observations.

There is no kind of alimentary substance of which it can

be said absolutely, that it is always proper for the sustenance of man. To be serviceable, the food must, as we have seen, be adapted, not only to the constitution, but to the age, state of health, and mode of life of the individual, and to the climate and season of the year. The same diet which, administered to an adult, is healthful and nutritious, may prove irritating and injurious to a child; and, in like manner, the stimulating animal diet which in winter is highly grateful to the system of a hard-working unexcitable laborer, may prove utterly destructive of health when indulged in during summer by an inactive and excitable female. It becomes, therefore, an object of deep interest to determine the principal causes and states of the system which render modifications of diet necessary.

Among these modifying causes, *the varying state of the body at different periods of life* ought certainly to be considered as one of the most influential. The differences observed in the constitution of the same person at different ages are at least as great as those subsisting between different individuals at the same age, In infancy the lymphatic and nutritive functions greatly predominate over the muscular; and if the highly animalized food which suits the latter were then freely administered, it would infallibly induce disease, and fail to afford the requisite nourishment. In manhood, again, when muscular activity and nutrition are at their height, the lymphatic system in abeyance, and the porson subjected to laborious exertion, the mild food of infancy would be equally misplaced. In advanced age another change of constitution occurs. The soft tissues of early life have disappeared, and the whole frame is dry and wasted—a condition which, in its turn, requires food of a different kind from that fitted for either of the preceding stages.

I may, however, remark, that even the state of the diges-

tive organs at different ages is sufficient to indicate a corresponding modification of diet to be proper for each. In early infancy, for example, when no teeth exist, and the muscles which move the jaws are still small and comparatively powerless, and mastication is consequently impossible, milk, from the mother's breast, is manifestly the only food intended by nature for its use; and, so long as it can be obtained of healthy quality and in sufficient quantity, no other ought to be substituted in its place.

The appearance of the first incisor teeth, however, is an indication that the digestive organs have now become sufficiently developed to admit of small portions of barley water, panada, thin arrow-root, or milk and water, being given two or three times daily in addition to the nourishment drawn from the mother's breast, if the latter be at all deficient. But great care must be taken neither to exceed in quantity nor to give the food too rapidly; for otherwise the stomach will become too full, and be weakened by the efforts it is obliged to make. I have already pointed out the importance of attending to this rule; and, in accordance with it, Nature, by arranging that the milk shall flow only by slow degrees, has taken care that, in suckling, the child shall receive its food very gradually. The very appearance of the teeth indicates a preparation of the digestive functions for more substantial aliment; and by beginning cautiously the use of small quantities of such simple articles as those above-named, and gradually increasing them according to the wants of the system, an excellent preparation will be made for the process of weaning, which would otherwise, by its suddenness, be attended with serious risk to both parent and child.

After the child has been weaned, panada, gruel, thin arrow-root, tapioca, sago, rusk, or crust of bread may be allowed along with the fresh milk and water and sugar, which

ought still to constitute the principal part of the food; and one or other ought to be preferred according to its effects. When these are given in moderate quantity, and not too frequently, they generally agree well; but in some delicate children they cause acidity, flatulence, and griping. In this case a proportion of weak chicken broth, or beef tea freed from fat and thickened with rusk, soft-boiled rice, or arrow-root may be added.

The same kind of food ought to be continued till after the appearance of the canine or dog-teeth. When these have fairly protruded, a portion of soft-boiled egg may be given as an introduction to the use of a more completely animal diet. In general, solid animal food ought not to be allowed in any quantity till all the teeth have appeared and the digestive powers be fully adequate to its assimilation.

In this respect there are two errors which ought equally to be avoided. If animal food be given too early or in too great quantity, the system becomes excited, and diseases of irritation are apt to be produced, which impede nutrition, and lead ultimately to the production of scrofula and other organic changes in the glands and bowels, and not unfrequently also in the brain and lungs. In these instances the child generally eats heartily, but, nevertheless, continues thin, and is subject to frequent flushing and irregularity of the bowels, headache and restlessness. His mind partakes of the general irritability of the system, and peevish impatience takes the place of the placid good-humor natural to healthy childhood. In this state the ordinary diseases of infancy—measles, scarlet fever, and hooping-cough—are often attended with an unusual and dangerous degree of constitutional disturbance; and, when inflammation takes place, the necessary depletion is borne with difficulty, and the system does not easily rally.

The consequences now enumerated, and the error from

which they spring, are most frequently met with in the middle and higher classes of society. Aware that animal substances contain the largest proportion of nutriment in a given bulk, but ignorant of the relation subsisting between particular kinds of food and particular states of the system, and which, in practice, can never be safely overlooked, the fond parent naturally imagines that the more nutritious the food and the larger the quantity administered, the stronger and healthier will the child become. No suspicion is entertained that strong diet may overpower weak organs, and thus induce the very evils which it is sought to avoid; whereas, by adapting the quality and quantity of the food to the condition of the system, the assimilating powers may be gradually invigorated, and healthy nutrition be completely insured.

Among the wealthier classes imperfect nutrition most generally arises from excess in quantity, or a too stimulating quality, of food; but among the lower classes from deficiency in quantity or quality, added to scantiness of clothing, want of cleanliness, and imperfect ventilation. And hence Sir James Clark, in treating of the prevention of scrofula and consumption in early life, lays great stress on the proper regulation of diet, and shows that, even in families free from all hereditary taint, a morbid condition of the system extremely favorable to the production of both diseases, is speedily brought about by continued mismanagement of diet; and both the public and the profession are deeply indebted to him for drawing attention to the extensive influence of dyspeptic ailments in paving the way for the future inroads of a deadlier disease. It is true that it has long been the fashion to ascribe all bodily and mental disorders to bile, indigestion, or the state of the bowels; but the rationale of the result has seldom been perceived, or turned to any good account in improving preventive or remedial treatment. Sir

James Clark's treatise, however, presents a remarkable exception, and may be referred to as a most instructive specimen of cautious and discriminating medical inquiry.

But although the premature use of animal food is thus injurious, a certain proportion of it becomes essential to health after the organization has become sufficiently developed; because the instruments of mastication are now fully adequate to their office, and the stomach is no longer oppressed by the effort of digesting it. To make it safe, however, even at that age, ample exercise and exposure to the open air are indispensable. By undue confinement to the house or to school, and deficient exposure to the air, a degree of general delicacy may be kept up, which is incompatible with the daily use of a stimulant animal diet. The waste occasioned by bodily action being then too limited to require the copious supply of any very nutritious substances; if these be freely allowed, they serve only to oppress the digestive functions and impair the health.

The prevalent and pernicious custom of tasking the minds and confining the bodies of children for many hours in succession at home and in schools, at a time of life when the growth of the body and the welfare of the system require frequent and playful exercise in the open air, and perfect freedom from care and excitement of mind, is the fruitful source of much future bad health, and is eminently calculated to defeat the object aimed at by parents, namely, the mental excellence of the child. The premature exertion of intellect to which it is stimulated by the constant excitement of emulation and vanity, far from strengthening, tends to impair the health and tone of the brain, and of all the organs depending on it; and hence we rarely perceive the genius of the school manifesting in future years any of the superiority which attracted attention in early life; but we find him, on the contrary, either sunk

below mediocrity, or dragging out a painful existence, the victim of indigestion and melancholy. On the other hand, some of the most distinguished men who ever lived were in childhood remarkable only for health, idleness, and apparent stupidity. The illustrious Newton was, by his own account, an idle and inattentive boy, and "very low in the school," till he reached twelve years of age; and the young Napoleon himself is described as "having good health, and being in other respects like other boys." Adam Clarke was considered "a grievous dunce" when a boy, and was seldom praised by his father, except for his ability *in rolling large stones*, which his robust frame and good health enabled him to do. Shakspeare, Gibbon, Byron, Scott, and Davy were in like manner undistinguished for precocious genius, and were fortunately allowed to indulge freely in those wholesome bodily exercises, and that freedom of mind, which contributed so much to their future excellence. The mother of Sheridan, too, long regarded him as "the dullest and most hopeless of her sons."

Among the many who give great promise in early life, and whose talents are then forced by ill-judged cultivation into precocious maturity, how few live to manhood to reap the reward of their exertions, and how few of those who survive preserve their superiority unimpaired! Tasso was early distinguished, and wrote his immortal epic at twenty-two years of age, but his life was miserable and his reason disordered, and he died at fifty-one. Pascal is another example of the same result, and Kirke White and many others might be named were it necessary.

Experience, indeed, amply demonstrates that precocious and excessive activity of intellect and vivacity of feeling are most powerful impediments to healthy and vigorous digestion, and, consequently, to a sufficient nutrition. In early life,

therefore, when not only health but future usefulness depend mainly on the completeness and vigor with which the system shall proceed towards its full development, the preservation of the digestive organs by suitable diet, exercise and regimen, ought to be a primary object of attention with every sensible parent. Even as regards superiority of mind, the healthy development of the body is of essential importance, as the only sure foundation on which mental excellence can be built; because, so long as mind and body are intimately connected with each other, the former must continue to be affected by every change in the condition of the organization on which it depends. We enjoy acuteness of vision by preserving the eye in high health, and exercising it regularly and moderately; and, in like manner, we can obtain and preserve intellectual power only by preserving the health of the brain, and exercising it in conformity with its natural constitution.

Instead, then, of feeding the closely confined and excitable children of the middle and higher classes from early infancy on quantities of stimulating animal food, and even giving them wine and fermented liquors, we shall act more in accordance with the laws of Nature by restricting them, during the three or four earliest years of childhood, chiefly to a mild farinaceous diet, with a small allowance of meat on alternate days; and by seeking to increase their digestive power and bodily vigor by constant exercise in the open air, before giving them a more solid diet. By these means the development of the organization, the keenness of appetite, the tone of digestion, and the desire of, and fitness of the system for, animal food, will increase in regular proportion, and a free supply of that species of aliment will even become necessary to carry on the growth. In short, it must ever be remembered, that strength is to be obtained, not from the kind of food which contains most nourishment in itself, but from that

which is best adapted to the condition of the digestive organs at the time when it is taken.

Children who are prone to bodily exertion, and live almost entirely in the open air, as many of those of the lower orders do, and who display no unusual sensibility or activity of mind, or, in other words, no unusual irritability of the nervous system, not only bear but require a larger proportion of animal food than their more delicate and sensitive companions. Not only is their digestion more vigorous, but the waste going on in the system is much greater and the nutritive functions are more active; the need, consequently, for nourishing food, and the desire to procure it, are proportionally increased. Hence it happens that, in the wealthier classes of society, young children suffer most from over-feeding; while in the poorer classes they suffer chiefly from the opposite cause. In both, defective nutrition is the result; but the modes in which it is brought about are very different.

One of the most pernicious habits in which children can be indulged is that of almost incessant eating. Many mothers encourage it from the facility with which, for a time, the offer of "something nice" procures peace. Even from infancy the child ought to be gradually accustomed to eat only when hungry, and when food is really required. After two years of age, an interval of four hours between meals will rarely be more than enough; and to give biscuit, fruit, or bread in the meantime, is just subtracting from the digestive power of the stomach. Like almost every organ of the body, *the stomach requires a period of repose after the labor of digestion;* and, accordingly, in the healthy state, the sensation of appetite never returns till it has been some time empty. To give food sooner, therefore, is analogous to making a weary traveller walk on without the refreshment of a halt.

It is a great mistake to suppose that children would not be quiet or contented without such indulgence. On the contrary, they would be healthier and happier were the *opposite* system steadily pursued. The greatest obstacle to be encountered is the ignorance of the nurse or mother, and her want of resources for the entertainment and exercise of the child's bodily and mental faculties. If these be duly attended to, the child will not think of eating till the return of appetite enforces the demand; whereas, if it be left idle and neglected, every thing will be carried to its mouth, as its only remaining resource against absolute inanity. So true is this, that I should regard that nurse as unfit for her employment, who should complain that her charge, otherwise in good health, is incessantly craving for something to eat. In this respect children are like adults. Give them something to do and to think about, and they will seek meat only when hungry. But leave them idle and listless, and eating will become their chief subject of contemplation.

In a matter so important as the rearing of children, one would imagine that every mother and nurse would be anxious for instruction on the nature, functions, and wants of the being committed to their fostering care. And yet it is notorious how rarely either one or other of them possesses any but the crudest notions of the animal economy, or can give reasons for the practices they recommend, or modify them in any degree to suit modifications of circumstances and constitution. In reality the wonder comes to be, not that so many children die, but that so many survive their early mismanagement.

From the age of six or seven years up to that of puberty, when the animal activity is at its height, growth in full progress, and the nutritive functions in their greatest vigor, a larger proportion of animal food and a more generous diet become necessary to the enjoyment of health and vigor; but

they must still be accompanied by ample exercise and free exposure, otherwise they will tend only to clog and impede the functions of life. At that age the teeth and other organs concerned in digestion have become developed and fit for the assimilation of a richer aliment, and the rapid growth which takes place renders an abundant provision of the latter in a manner indispensable. It is then that the healthy youthful appetite demands quantity as well as quality, and that digestion goes on with an ease and vigor which the dyspeptic parent contemplates with a covetous and regretful eye.

At that age, indeed, the nutritive functions are so predominantly active for the purpose of carrying on growth, and supplying the rapid waste caused by youthful activity, that if the natural craving for exercise in the open air be freely indulged, and due attention be given to the development of the bodily frame, the young may be very safely left to choose for themselves both the quality and quantity of their food. In such circumstances the natural taste inclines so essentially to the preference of plain substantial nourishment, that there is very little risk of excess being committed. But where the parents are intent only on the intellectual advancement of their children, and accustomed to subject them daily to many successive hours of confinement and study, with only an hour or so of relaxation in the open air, as is too commonly the case both with those educated at home and in boarding-schools, an artificial state of being is induced, which makes the rule no longer applicable, and renders necessary a more careful attention to dietetic regimen.

Among the higher classes of society the unrestricted use of the most exciting kinds and preparations of animal food, and the daily use of wine, are the means generally resorted to for the removal of the delicacy thus engendered; but when we consider the real state of the case, no remedy can

seem more preposterous. The evils to be corrected are imperfect nutrition and the want of strength. The imperfect nutrition, however, is caused, not by deficient food, but by impaired powers of digestion and assimilation, and these suffer only because the lungs are denied the free air, the muscles their necessary exertion, the brain its cheerful recreation, and the circulation the healthy stimulus which these united conditions infallibly produce. Instead, therefore, of oppressing a weakened stomach by administering stronger food than it has the power of digesting, the natural way of proceeding would be to prescribe at first a milder and less stimulating diet—to improve the tone of digestion by fulfilling the conditions above referred to—and then, in proportion as the stomach was strengthened, to adopt a more nourishing diet, suited to the increased efficiency of all the animal functions.

By running counter to this method, and using highly stimulating food improperly, many young people of the wealthier classes incur as much suffering from imperfect nutrition, and the diseases to which it predisposes, as if they were really the victims of an impoverished diet. Sir James Clark, after making some very judicious remarks on the influence of bad digestion in inducing the consumptive constitution of body, expresses himself strongly on the evils to which I have just alluded. "Food in excess," he says, "or of a kind too exciting for the digestive organs, may also induce tubercular cachexia—a circumstance which is not sufficiently attended to—I may say, not generally understood, even by medical men; nevertheless, I hold it to be a frequent cause of scrofula, and believe that it produces the same effect on the system as a deficient supply." "The imperfect digestion and assimilation in the one case, and the inadequate nourishment in the other, being equally injurious; the forms and general characters which the disease assumes may differ, but the ul-

timate result will be the same in both cases. The adaptation of the food, both in quality and quantity, to the age of the individual, as well as to the powers of the digestive organs, is too little considered; and the evil consequences of this neglect are often evident in the children of the wealthy classes of society, who are allowed an unrestricted use of the most exciting kinds of animal food."*

The opposite error, of not providing a sufficiently nourishing diet for the young, is, often from kind but mistaken views, much more prevalent than it ought to be, particularly in female boarding-schools, where, as already mentioned, the system of diet is frequently insufficient for due sustenance and growth; and where, consequently, the natural expression of impaired health, if not actual disease, is a marked feature in the aspect of most of the pupils. So defective, indeed, is the common school management in this and other respects, that we have the best authority for considering it as a rare exception for a girl to return home in full health after spending two or three years at an ordinary boarding-school.

It is true that much of this result is owing to excessive confinement, neglect of cheerful exercise, ill-ventilated sleeping apartments, and other depressing influences; but to these, that of an insufficient diet may often be added; and when it does exist, it acts with double force from the impaired digestion, which seldom fails to ensue where the laws of health are so widely outraged.

I have seen some striking instances of incurable scrofulous disease, induced by the depressing influence of misfortune added to the want of a sufficient supply of nutritious food. After the mercantile disasters of 1836—7, many cases of this kind occurred, especially in families whose sensitive feelings induced them to shrink from public observation, and to suffer

* Clark on Pulmonary Consumption and Scrofula, p. 230.

the severest privations rather than allow their situation to become known. In these cases the tone of the general health first became reduced, and then local disease was easily excited by any trivial cause. In one, the structure of the bones and joints became disorganized, and amputation of the limb preserved life, but could not prevent other parts of the osseous system from being attacked. In another, caries of the bones of the foot ensued, but the constitution itself was so thoroughly tainted that no operation could be performed with even momentary success, and, after much suffering, the patient died. The same causes undermined the health of another member of the same family, and led to his death, from consumption, at an early age.

In regard to the diet best adapted to different constitutions in mature age, I have already confessed that I have little new information to offer. In determining the question, several other circumstances besides the mere temperament require to be considered. A more or less laborious mode of life, for example, will require a more or less nutritious diet, whatever the original habit of body may be. In like manner, if any temperament be in excess, and we wish to repress its predominance, the same kind of food which is suitable for it in a lower degree, will no longer be applicable. Thus, when the lymphatic constitution is predominant, and our object is to diminish its ascendancy and stimulate the system to greater vigor, a larger proportion of solid nourishing food, combined with increased exercise, will be proper than if there were no such excess. Where, on the other hand, the nervous or sanguine temperament preponderates, a plainer and less exciting regimen will be necessary than where the constitutional tendencies are more equally balanced.

The power we possess of modifying the constitution by well-directed regimen is very great, and only requires to be

sufficiently investigated to have due importance assigned to it in conducting physical education. This is well exemplified in the art of training, where diet and exercise are reduced to a practical science for the attainment of certain results, and with remarkable success. In the hands of a trainer, the breathless and oppressed frame of a person overburdened with lymph and fat speedily becomes converted into an active, firm, and well-conditioned organization, exhibiting a promptitude of action of both mind and body the very opposite of its former manifestations; and if such a change can be effected, by rigid adherence to rules, in the course of two or three months, we may easily conceive the degree of improvement which would follow the uniform observance of proper regimen and dietetic precepts in ordinary society. In improving the moral and intellectual as well as physical condition of the working-classes, the influence of food, air, and exercise will soon be discovered to possess a degree of importance of which at present scarcely a suspicion is entertained. They constitute, in fact, the very foundation of systematic education; and mere intellectual cultivation will fail to produce its full beneficial results, till the organization by which the mind operates be itself improved by a treatment in harmony with its own constitution.

If it be impossible for me to communicate sufficient information to enable each of my readers at once to determine beforehand the kind of diet which is likely to suit him best, it will give him at least some satisfaction to know that the fulfilment of the conditions of healthy digestion, already explained, is of even greater importance than the selection of the proper kind of food. By observing personally, however, what kind of food agrees best with the stomach and constitution, and at the same time attending to the laws of digestion, the probability of causing mischief by an ill-selected diet will

be greatly diminished. When we refrain from eating too much and at unreasonable hours, and are not conscious of any undue oppression or discomfort after our meals, but on the contrary, feel light or refreshed, and, after a time, ready for renewed exertion, we may rest assured that the food which we have taken is wholesome and suitable for us, whatever be its nature and general effects. Whereas, if, without committing any excess or other dietetic error, we experience the opposite sensations of oppression, languor, and uneasiness, we may be just as certain that our food, whatever its general character for lightness and digestibility, is not wholesome or suitable for us under our present circumstances. So that, with a little care and trouble, we shall rarely be at any loss to find out what we ought to eat and what to avoid; and, accordingly, it is notorious that indigestion from a wrong choice of food is induced at least nine times by *wilful* indulgence, for once that it occurs from errors orginating in *ignorance* alone. If the proper *quantity* of food be not exceeded, and the other conditions of digestion be carefully fulfilled, no serious consequences will result from any accidental mistake in its selection.

I need hardly add that, although there are very few articles of diet which a person in health, and leading a sufficiently active life, may not eat with impunity, there are, nevertheless, some which ought to be preferred, and others which ought to be avoided, by those *whose digestion is impaired.* Thus, vegetables are, generally speaking, slower of digestion than animal and farinaceous aliments, and, consequently, when digestion is feeble, are liable to remain in the bowels till acetous fermentation takes place, and gives rise to acidity and flatulence. Fat and oily meats are nearly in the same predicament, and hence both form unsuitable articles of diet for dyspeptics. Soups and liquid food are also objectionable,

both because they are ill adapted for being properly acted upon by the gastric juice and by the muscular fibres of the stomach, and because they afford insufficient nourishment. From the former cause they frequently impair the digestive functions; and from the latter they induce diseases of debility which it is difficult to subdue. Daily experience furnishes examples of stomachic disorder from eating soups, especially as preliminary to an otherwise substantial dinner; and the fatal epidemic which prevailed a few years ago in the Milbank Penitentiary, in England, was distinctly ascertained to have been partly caused by an insufficient and too liquid diet. It is common, indeed, to see heart-burn and indigestion of recent origin cured simply by giving up soups and vegetables, and diminishing the quantity of liquid taken at breakfast and tea.

When, from the state of health, or other causes, chicken tea, beef tea, veal broth, or other kinds of soup require to be given, their digestibility will generally be promoted by the addition of bread or rice to give them consistency, and by taking little or no other food along with them. Even vegetables, when taken alone, are sometimes digested without difficulty, where, if mixed with other substances, they disorder the stomach. Dr. Abercrombie mentions a very remarkable instance of this kind in a gentleman who "had been for many years a martyr to stomach complaints, seldom a day passing in which he did not suffer greatly from pain in his stomach, with flatulency, acidity, and the usual train of dyspeptic symptoms; and, in particular, he could not taste a bit of vegetable without suffering from it severely. He had gone on in this manner for years, when he was seized with complaints in his head, threatening apoplexy, which, after being relieved by the usual means, showed such a constant tendency to recur, that it has been necessary ever since to re-

...n to a diet almost entirely of vegetables, and in very ...derate quantity. Under this regimen, so different from his former mode of living, he has continued free from any recurrence of the complaints in his head, and has never been known to complain of his stomach."* In this case, however, both the *very moderate quantity* of vegetable food to which the patient restricted himself, and possibly also the gradual adaptation of the gastric juice to the nature of the food, had no small share in the subsequent improvement of his digestion.

Dr. Beaumont mentions, as a general result from his experiments on St. Martin, that vegetable food is slow of digestion; but it is much to be regretted that he gives the particulars of only one or two trials, which lead to no very important results. In one of these St. Martin ate "nine ounces of *raw, ripe, sour* apples at 2 o'clock 35 minutes. At 3 o'clock 30 minutes the stomach was full of fluid and pulp of apples, quite acrid, and *irritating the edges of the aperture, as is always the case when he eats acescent fruits or vegetables.*"† In another instance ten ounces of *raw cabbage* were given, and in two hours not a particle of it was to be found in the stomach; while, on a third occasion, half a pound of *raw cabbage*, cut fine, and macerated in vinegar, disappeared in little more than one hour and a half! If in the latter experiments the cabbage were really digested, and not merely propelled out of the stomach into the intestine, we shall be forced to admit that we have still much to learn concerning the digestibility of different kinds of food, for the result is contrary to all generally received opinions. When vegetables are allowed, great stress is commonly laid

* Abercrombie on Disease of the Stomach, &c., 1st edit., p. 73.

† Beaumont's Experiments and Observations on the Gastric Juice and the Physiology of Digestion. Reprinted with Notes by Andrew Combe, M.D. Edinburgh, 1838, p. 259.

upon the necessity of their being thoroughly cooked; and yet, according to these experiments, *raw* cabbage is very nearly as digestible as soft-boiled rice or sago! It is strange that Dr. Beaumont should not have remarked this anomaly, which he seems not to have done, since he neither attempts to explain it, nor alludes to it as anything extraordinary. My own suspicion is, that the cabbage was not entirely digested, but had merely passed through the pylorous into the intestine.

Dr. Beaumont's testimony in favor of farinaceous vegetables is, however, more precise and satisfactory. In some of his experiments St. Martin digested completely a full meal of *boiled rice*, seasoned with salt, in a single hour. *Soft custard* and *boiled rich sago*, sweetened with sugar, and taken in quantities of a pint each time, were disposed of with nearly equal despatch, and "there was no acrimony of the gastric contents, or smarting of the edges of the aperture, during their chymification, as is usual in most vegetable and farinaceous aliments;" on the contrary, the sago "seemed peculiarly grateful to the surface of the stomach, rendering the membrane soft, uniform, and healthy."† In these instances, it ought to be remarked, nothing else was eaten at the same time; so that the stomach was not oppressed by *quantity*.

In early life, when digestion is vigorous, the system excitable, and the habits peculiarly active, a full proportion of vegetable and farinaceous food is proper and salutary. Morning and evening meals of this description, prepared with milk, or taken along with it, are very useful—animal food being reserved for dinner alone. But as age advances and excitability diminishes, and perhaps also as habits of activity and exposure to the open air are changed, the same proportion

† Beaumont's Experiments and Observations, &c., p. 267.

of vegetable and farinaceous food can no longer be digested so easily, and, therefore ought not to be continued.

Pastry, rich cakes, puddings, and other articles containing much fatty or oily matter in their composition, are perhaps the most generally indigestible of all kinds of food, and, consequently, ought never to be eaten when the tone of the stomach is impaired. There are states, however, in which oily articles seem to agree better than lean. I have seen very fat fried bacon, for example, digested with ease at breakfast, where even a small potato would have disordered the stomach. It is very difficult to afford any explanation of the fact, which, however, is not uncommon. Perhaps it is dependant on a peculiar state of the biliary secretion, for Dr. Beaumont often remarked that the presence of bile in the stomach facilitates the digestion of fat and oily aliments, and that, even out of the stomach, gastric juice dissolves suet faster when a little bile is added to the mixture than when the juice is pure. He mentions, moreover, that he never found bile in the stomach, at least during health, except when food of an oily kind had been eaten; and, in accordance with this, I have generally noticed that fried bacon agrees best with what are called "bilious" subjects. Still, however, the quantity must be small, otherwise it will prove injurious.

Plain, well-cooked animal food, not too recently killed, and eaten in moderate quantity with bread, rice, or roasted potatoes, forms one of the most easily digested meals which can be devised for a weak stomach. Sometimes, however, potato induces acidity and flatulence, and ought not to be used. Venison and most kinds of game are very suitable in the same circumstances.

In some conditions of the system, where considerable irritability prevails, and the mode of life is not sufficiently active, red highly animalized meat proves too stimulating, al-

though easy of digestion. The same thing happens during recovery from illness; and hence fish, chicken, and other white meats which excite less and are digested more slowly, are often allowable where beef, mutton, pork, &c., cannot be taken with impunity. For the same reason, white and young meats are the best adapted for the excitable systems of the young.

It would be easy to fill many pages with disquisitions about the preference due to individual articles of food, were such the purpose which I had in view. But books devoted to this branch of the subject abound, and are already in general circulation. My object is the exposition of PRACTICAL PRINCIPLES rather than of minute details; and my great aim is to enable every intelligent person to understand, not only what digestion is, but the laws by which it is regulated, so that he may know at once WHY it is for his advantage to adhere to one course of conduct in preference to another in regard to it—WHY, in different situations, diet requires to be modified in order to adapt it more effectually to the varying wants of the system—and, lastly, the circumstances or rules by which such modifications ought to be determined. If I have succeeded in the attempt to explain any or all of these principles sufficiently to render them susceptible of a practical application by the reader, not only will I be greatly pleased, but the advantage to him will speedily convince him that I have acted judiciously in forsaking the beaten path, and drawing his attention to truths of still greater importance to his welfare than those which are most commonly treated of under the title of Dietetics.—*See Dr. Combe on Dietetics.*

TABLE SHOWING THE MEAN TIME OF DIGESTION OF THE DIFFERENT ARTICLES OF DIET.

Articles of Diet.	Mode of Preparation.	Time required for Digestion.	
		H.	M.
Rice	Boiled	1	
Pig's feet, soused	Boiled	1	
Tripe, soused	Boiled	1	
Eggs, whipped	Raw	1	30
Trout, Salmon, fresh	Boiled	1	30
Trout, Salmon, fresh	Fried	1	30
Soup, barley	Boiled	1	30
Apples, sweet and mellow	Raw	1	30
Venison steak	Broiled	1	35
Brains	Boiled	1	45
Sago	Boiled	1	45
Tapioca	Boiled	2	
Barley	Boiled	2	
Milk	Boiled	2	
Liver, beef's fresh	Broiled	2	
Eggs, fresh	Raw	2	
Codfish, cured, dry	Boiled	2	
Apples, sour and mellow	Raw	2	
Cabbage, with vinegar	Raw	2	
Milk	Raw	2	15
Eggs, fresh	Roasted	2	15
Turkey, wild	Roasted	2	18
Turkey, domestic	Boiled	2	25
Gelatine	Boiled	2	30
Turkey, domestic	Roasted	2	30
Goose	Roasted	2	30
Pig, sucking	Roasted	2	30
Lamb, fresh	Broiled	2	30
Hash, meat and vegetables	Warmed	2	30
Beans, pod	Boiled	2	30
Cake, sponge	Baked	2	30
Parsnips	Boiled	2	30
Potatoes, Irish	Roasted	2	30
Potatoes, Irish	Baked	2	30
Cabbage, head	Raw	2	30
Spinal marrow	Boiled	2	40
Chicken, full grown	Fricassee	2	45
Custard	Baked	2	45
Beef, with salt only	Boiled	2	45
Apples, sour and hard	Raw	2	50
Oysters, fresh	Raw	2	55
Eggs, fresh	Soft boiled	3	
Bass, striped, fresh	Broiled	3	
Beef, fresh, lean, rare	Roasted	3	
Beef steak	Broiled	3	
Pork, recently salted	Raw	3	
Pork, recently salted	Stewed	3	

TABLE SHOWING MEAN TIME OF DIGESTION—CONTINUED.

Articles of Diet.	Mode of Preparation.	Time required for Digestion. H.	M.
Mutton, fresh	Broiled	3	
Mutton, fresh	Boiled	3	
Soup, beans	Boiled	3	
Chicken soup	Boiled	3	
Aponeurosis	Boiled	3	
Cake, corn	Baked	3	
Dumpling, apple	Boiled	3	
Oysters, fresh	Roasted	3	15
Pork steak	Broiled	3	15
Pork, recently salted	Broiled	3	15
Mutton, fresh	Roasted	3	15
Bread, corn	Baked	3	15
Carrot, orange	Boiled	3	15
Sausage, fresh	Broiled	3	20
Flounder, fresh	Fried	3	30
Catfish, fresh	Fried	3	30
Oysters, fresh	Stewed	3	30
Beef, fresh, dry	Roasted	3	30
Beef, with mustard, &c.	Boiled	3	30
Butter	Melted	3	30
Cheese, old, strong	Raw	3	30
Soup, mutton	Boiled	3	30
Oyster soup	Boiled	3	30
Bread, wheaten, fresh	Baked	3	30
Turnips, flat	Boiled	3	30
Potatoes, Irish	Boiled	3	30
Eggs, fresh	Hard boiled	3	30
Eggs, fresh	Fried	3	30
Green corn and beans	Boiled	3	45
Beet	Boiled	3	45
Salmon, salted	Boiled	4	
Beef, fresh, lean	Fried	4	
Veal, fresh	Broiled	4	
Fowls, domestic	Boiled	4	
Fowls, domestic	Roasted	4	
Ducks, domestic	Roasted	4	
Soup, beef, vegetables and bread	Boiled	4	
Heart, animal	Fried	4	
Beef, old, hard, salted	Boiled	4	15
Pork, recently salted	Fried	4	15
Soup, marrow bones	Boiled	4	15
Cartilage	Boiled	4	15
Pork, recently salted	Boiled	4	30
Veal, fresh	Fried	4	30
Ducks, wild	Roasted	4	30
Suet, mutton	Boiled	4	30
Cabbage, with vinegar	Boiled	4	30
Suet, beef, fresh	Boiled	5	3
Pork, fat and lean	Roasted	5	15
Tendon	Boiled	5	30

SEA-SICKNESS.

There are few constitutions among the human family that can bear the rocking of a ship and the smell of bilge-water, without experiencing more or less derangement of the stomach and intestines, so as to produce what is generally called sea-sickness. In this affection the peristaltic motions of the bowels appears to be reversed, so that instead of discharging the food downwards in the usual way, the stomach and intestines become so disturbed, and constipation sets in to such a degree, that the whole intestinal tube and stomach have the opposite tendency; and in many cases discharge much of their contents from the mouth. In this condition the hepatic duct discharges the bile and gall into the stomach instead of the duodenum, and while the system remains so, there will be no chance of the unfortunate sufferer having any relief, as the stomach will reject almost every thing solid or fluid that may be taken on it.

We find nothing among the medical writers that has the smallest chance either of preventing or curing sea-sickness, nor has any thing ever been offered as a specific for cure of the disease. Some say, take a little brandy and water; others, wine mixed with salt-water; others, drink salt-water: and Lord Byron recommends a *beef-steak;* which, by-the-bye, in a pe-

culiar crisis of the disease, is not a bad restorative. But there is none of these things that can in all cases be relied on as a true remedy.

There are two indications with regard to this disagreeable affection, viz:

1. To prevent sea-sickness.
2. To cure it after it has commenced.

Persons who fear the disease should fortify their system against it three or four days before going on board, by taking one or two doses of Rhubarb and Magnesia, which cathartic has the least tendency to produce a subsequent costiveness of the bowels. Then, when on board, for the first twenty-four hours or more, no fluid of any kind, *and especially tea*, should be taken on the stomach; no, not even solids should be taken, until the system has got a little used to the heaving of the vessel, and more especially to that peculiar kick of the ship that brings on puking. This regimen must be strictly adhered to, for, if there is nothing in the stomach, there can be nothing thrown off. A peculiar qualmishness, without puking, will then exist, which must be removed by retiring to a proper place, and taking one or two good injections, or as many as will bring away a good stool; and these injections should be repeated as often as they seem to be needed, as no cathartic will be of any use at this period.

Albumen is the only real cure that we have ever found in sea-sickness, for when nothing else will remain on the stomach, eggs, boiled as hard as possible, will! There can be nothing, perhaps, more indigestible in a healthy stomach than hard boiled eggs, yet in a sea-sick stomach there is no remedy we have ever found so potent. Eat from two to four and try them.

When, without any previous preparation of the system, sea-sickness has supervened, the only true remedy will be found in

repeated powerful injections of common salt and water, or of castor oil, milk and molasses; but the common salt injections are much more convenient, and will answer full as well. Perhaps emollient injections afterwards will prove more agreeable to the intestines. By these repeated injections the bowels will be brought to their natural condition, and the hard boiled eggs will then thoroughly settle the stomach. The appetite will next become ravenous, so that the mackerel, beef, and other good things, will rapidly decrease on board ship, while the individual will enjoy the full pleasure of the voyage. These remarks are made from my own experience, and I hope and trust that other bilious and delicate constitutions, male and female, may receive the same benefit from the remedies here recommended, that I did.

NOTE TO BATHING.

One of the methods of cold bathing which we omitted to mention, and which is highly recommended by medical men, is, to strip in some proper place, and sponge the person all over with cold water, which may be repeated, after drying, as often as necessary, to the great comfort of the individual. This mode recommends itself, on account of its great convenience.

THE END