THE WATER-WAY TO BALANCED HEALTH

NONE of us bathe merely for external cleanliness and the benefits derived therefrom. If that were true, junior would not have to be reprimanded for swimming in the old pond long before the trees are green, and Atlantic City and Palm Beach would be unknown. Bathing, like eating, can be a pure sensuous delight. The contact of the skin with water, whether in a tub, under a shower, in a pool, a river or the ocean is an almost unparalleled pleasure. But the pleasure is not due only to the touch of the water on the skin, but to the far-reaching effects it has on the internal system—effects which vary with the temperature of the water, the mode of application and the length of contact with the water. It is these effects that have made water one of the principal therapeutic remedies known to man.

The use of water goes back far beyond the historic period and is lost in the folklore and legends of primitive mankind. Primitive man soon learned to dip injured limbs into cooling streams. He worshipped the waters that gave life and health, and to bathe in waters of the Ganges, the Nile and other waters, became a religious ritual. Even the Greeks combined religion with bathing, as witness the natural springs

dedicated to the god Heracles and the warm baths of the Cilician nymphs. Nor must we forget that Achilles was bathed in the waters of the Styx to give him immortality. And the ceaseless search for the fountain of youth is one of the instinctive quests which form the background of modern water therapy of hydrotherapy.

Despite the ceremonial cleansings, however, the ancients never forgot the healing qualities of water. Hippocrates, the father of physiotherapy, discarded many of the drugs that were handed down from the Egyptians and treated his patients with proper diet, fresh air, change of climate, purgation, massage and hydrotherapy. And the sumptuous baths of the Romans, which we described before, are an additional witness of this fact.

The Romans passed their knowledge of the beneficial effects of bathing to the Arabians who took it to Spain and to Northern Africa. And during the Middle Ages the science of water therapy received its chief impetus from the Arabian physicians who advocated baths for fevers. We are apt to think that the folk who lived in the Middle Ages were an unclean, unscientific lot. In truth, this is an exaggeration. Not only did the physicians prescribe baths, but there were bathkeepers who enrolled themselves in guilds and erected bath houses all over Europe. And the knowledge of the beneficial effects of water was passed on and enlarged upon in the Renaissance and modern times.

Oddly enough, truly scientific therapy of modern times was inaugurated in 1830 by a crude and powerful Silesian peasant with no medical training, one

Vincenz Priessnitz. He sprained his wrist and crushed his thumb one day and healed it by immersion in cold water. Some time later a cart passed over our hero's body and broke his ribs. When he heard the gloomy remarks of his physicians, he tore his bandages off and applied cold, wet compresses to his ribs and pressed his abdomen against his window sill, breathing deeply. So salutory was his treatment that he established a hydropathic institute at Graefenberg. Almost at once proceedings were started against him since he was not a doctor, but the Austrian government intervened and before long physicians from all countries flocked to him to learn the procedure of douche, plunge, dripping sheet, dry heat pack, wet sheet pack, foot bath, sitz bath, warm and tepid bath.

Shortly afterwards, in Germany, a series of experimental researches were undertaken with the object of ascertaining more exactly the effect of bathing at varied temperatures, its influence on the circulatory system and the nervous systems and on metabolism in general. Subsequently, a large number of clinical and experimental studies along the same lines were conducted by workers in different countries.

It is to be regretted that hydrotherapy in the United States has been too frequently controlled by faddists. For this reason prejudice sometimes exists against water treatment. However, the subject found a scientific advocate in Dr. Simon Baruch, who had a chair at Columbia University where he taught five hundred students that water has a place in the Materia Medica as a stimulant, sedative, tonic, diuretic, diaphoretic, emetic, purgative, promoter of metabo-

lism, antipyretic, hypnotic, antiseptic and even local anaesthetic.

The World War taught us the value of hydrotherapy more than any other factor of recent date. Not only was it used extensively during the War, but in both this country and in Europe hydrotherapy has been well established in veteran hospitals and in hospitals for the mentally unstable. Indeed, hydrotherapy is now considered indispensable—although, to be sure, no system of medicine can be entirely built on water. There is still much to be learned in the field of hydrotherapeutics, especially since we have so many new scientific weapons on hand. It is safe to predict, however, that its beneficial effects will be more and more recognized both in the hospital and in the home as research progresses.

Broadly speaking, hydrotherapy is used to modify the condition of the body by utilizing ordinary water on the skin as a vehicle of heat or cold or force. Its peculiar physical characteristics make it an ideal instrument for bringing about such modification. In the first place, it is a perfect vehicle of heat and cold. In the second place, its application can be localized or spread over the entire body, and with varying degrees of force. And thirdly, according to its temperature it ranges from a solid, through a liquid, to a vapor —all of which states have a marked therapeutic importance.

The effects of the application of water on the skin are both chemical and physical. As a chemical, water is a detergent or cleansing agent, as we have already learned. From a physical standpoint the effects of water are twofold—local, that is, confined to the skin;

and internal, through the media of the nervous and circulatory systems. According to its temperature and force, water may be a tonic, a stimulant or a sedative. Its thermal effect is by far more important than its mechanical effect of force. Generally speaking, water of a temperature cooler or hotter than skin temperature is stimulating, the colder to a greater degree. The neutral bath, on the other hand, that is, a bath which approximates the skin temperature, has a soothing sedative effect.

It is obvious, since any change wrought in an organism by the external application of water is effected through the skin, nervous system and blood vessels, that the mechanism of these three organs is of great importance and that the effect of the various types of baths cannot be fully appreciated without some knowledge of the structure of the skin, particularly in relation to the nervous and circulatory systems. In our review of the hygiene of the skin, we described the structure of the skin as well as its several functions, so that there is no need to repeat here, except to point out that the sensory function of the skin is of special importance. The skin is richly supplied with nerves, it will be recalled, and since it is sensitive it not only serves as a warning against harmful external forces, but controls other functions. This sensitiveness is therefore of utmost importance in the effect of varied temperature baths on the organism.

Moreover, from the previous description of the skin and its functions, one might reasonably surmise, particularly from the heat-regulating and excretory functions, that the temperature of the skin varies. This is indeed the case—while the internal temperature

remains about the same in a normal healthy individual, the temperature of the skin is modified by the weather condition, exercise, amount of perspiration, clothing and many other factors. It varies, too, in different parts of the body of the same individual. Since the skin is the organ with which water comes in direct contact in hydrotherapy, the skin temperature plays an important role in this type of treatment. Indeed, the neutral bath is maintained as near the skin temperature as possible and even in the application of hot and cold baths of all types, it is always taken into consideration, sometimes a preliminary wetting of the skin being given to avoid shock to the nervous system. It is not necessary for us to describe in detail the variations in skin temperature. Suffice to say that generally the skin temperature is a few degrees less than body temperature and that it has a tendency to rise after exercise, eating and in warmer atmospheres. The best way to judge is by the feel of the water on the skin.

As we have said, the blood supply of the skin is derived from branches of a subcutaneous, arterial network which is distributed to the sweat glands, hair follicles and fat. Other branches unite in a network which lies immediately under the sub-papillary network and which gives off arterioles or small arteries and capillaries to the papillae. From the capillaries, the blood supply passes into a sub-capillary network of veins and from thence to the connecting and main skin veins. The blood vessels of the skin are capable of contracting and dilating independently of the heart and this can be brought about by appropriate stimulation. Moreover, as we also explained,

the blood vessels are in close relation to the nerve endings and are therefore affected by their stimulation. Now much of the effect of hydrotherapeutic measures is due to the stimulus of temperature and of the pressure or force of water on these skin nerve endings.

Cold water and warm water in contact with the skin stimulate the cold and heat receptors respectively. By receptors are meant nerve cells that receive the stimuli. The receptors, in turn, reflexively affect remote tissues, producing various functional changes in the tissue. The greater the difference between the temperature of the water and the temperature of the skin, the more intense is the thermic stimulation. Furthermore, mechanical stimulation produced by the impact of the water in showers, in douches and in sea-bathing or by friction, active exercise, etc., in conjunction with baths, influences considerably the effect of the water.

The types of baths are many. Water may be applied therapeutically in the form of plain, artificially medicated or naturally mineralized water. It may be in the form of a full or partial immersion in a tub, spray or douche, with or without massage and manipulation. Water vapor may also be utilized locally or generally.

While the immersion of the whole body in a tub bath brings all the parts under the influence of the temperature of the water, a general effect is also produced by a partial submersion as the action of the water is not confined to the submerged parts. The same holds true for spray and douche, which produce an additional stimulation from the impact of the particles of water.

Baths according to temperature vary from very

cold baths through neutral, lukewarm to very hot baths. Heat and cold are, of course, relative terms and are therefore not particularly scientific. For this reason many authorities prefer to use the number of degrees rather than the terms hot and cold. For our purpose, however, it will be sufficient to designate the baths as hot, cold and neutral.

Full immersion baths of any temperature are taken in a tub which contains about forty to fifty gallons of water. If you have a feeling of oppression or a headache from the water, regardless of temperature, take the precaution of wrapping your head in a towel wrung out in cold water.

The mechanical action of water depends upon the pressure of the water on the parts immersed and the resistance offered by different parts of the circulatory system. The veins and capillaries are most affected and the great vessels the least, since their walls are under greater pressure. The smaller arteries, however, are also under influence of the external stimulation. The net result of the water pressure is to increase the circulation and the work of the heart. In regard to the abdomen, the result would be to decrease splanchnic stasis—impacted feces in the last end of the colon. The pressure on the thorax favors expiration at the expense of inspiration, which is hindered by the failure of the diaphragm to make its full expiration.

On the whole it may be said that where all factors tend in the same direction, the pressure of the water increases the work of the heart, lessens abdominal stasis and decreases inspiration.

The thermal effect naturally varies with the tem-

perature in the bath and will be treated subsequently when we describe the various types of baths.

Cold Baths

Let us first consider the effect of full immersion cold baths. If you are brave enough and hardy enough to enjoy such a bath, you'll be wise if you take the precaution of sponging your neck, head and chest with water of a temperature below that of the bath if possible. This mitigates the initial shock. If the immersion lasts more than a few seconds, rub your body vigorously the whole time. But under no circumstances remain in the tub more than three minutes.

The action of a cold bath depends upon the mode, length and intensity of the application. With short moderate immersions the blood vessels of the skin are at first contracted, the skin pales and roughens. Since the surface vessels are contracted, there is a rise in blood pressure. The pallor leaves after a short time and is replaced by a redness due to the relaxation of the vessels. The more intense the cold, the greater the reaction. This is also true in the case of a cold shower which has the added effect of mechanical stimulation.

With the initial constriction of the surface vessels and the inhibition of sweating, heat elimination is greatly diminished. However, when the reaction takes place, the heat of the body escapes through the skin and the temperature is lowered. The drop in temperature lasts for only a short time, since the voluntary and involuntary or "shivering" movements result in an increased production of heat. In fever conditions there is a more lasting fall in temperature.

The cold bath also has a combined effect of both

resting and exercising the heart, but such a bath should never be indulged in if a person has a weak heart.

Cold water at first produces deep inhalation with a momentary arrested respiration at the height of inhalation, followed by deep exhalation. This effect is usually known as gasping. If the application is prolonged, the respiratory movements continue to remain deeper and frequency is increased. The excretory function is affected in still another way—diuresis or excretion by the kidneys is increased.

Cold water tends to prevent muscular fatigue and to restore normal tone to fatigued muscles. Mechanical stimulation, such as vigorous rubbing of the body or applying the water in the form of a shower, tend to heighten this effect.

Most of the reactions which we have just described are brought about through the nervous system. Cold baths of short duration tend to increase the sensibility of the nervous system. The central nervous system, too, is decidedly influenced, as witnessed by the feeling of refreshment and heightened vigor after a brief cold bath.

Cold baths are used to reduce temperature in feverish persons but in normal individuals they are largely confined to use after a hot bath in order to tone the skin. It is an excellent form of stimulation for healthy persons and is efficacious in cases of obesity where it is used to increase metabolism or the burning up of tissues for energy. Highly irritable, nervous individuals respond irregularly to cold water. For the most part they respond poorly, although some have an excessive reaction. Cold baths should not be used

in the case of the very young and the very feeble. They are also contraindicated in febrile conditions which are due to inflammation of internal organs, arteriosclerosis and kidney disorders. And remember, even if you are in the very prime of health, if you have an unfavorable reaction, or no reaction after a cold bath, that is, if your skin isn't pink and smooth and supple, if you have no increase in perspiration and above all, no sensation of well-being, warmth and renewed vigor, by no means even think of indulging in this type of bath, despite the advice or proud boastings of friends. Hot baths are equally beneficial, and most of the effects resulting from a cold bath can be obtained through some form of the hot bath.

Hot Baths

Very hot baths cause a momentary constriction of the blood vessels of the skin, giving rise to pallor, the sensation of cold with shivering, and in some instances "goose flesh." The pallor and roughness of the skin last for only a few seconds and quickly give way to a dusky redness. A moderately hot bath is not accompanied by these phenomena—there is no initial pallor or shivering.

The general application of heat causes a rise in temperature if it lasts long enough and if the evaporation of sweat is interfered with. The less the application of heat impedes the evaporation of sweat, the less the body temperature is apt to rise. Generally speaking, however, in a full immersion bath, since the evaporation of sweat is retarded, heat accumulates in the body and there is a rise of body temperature over skin temperature after a few minutes. A plain

water bath of 104 degrees F will raise the internal temperature about five degrees, i.e., from about 98 degrees to 103 degrees F.

On the other hand, a quick hot bath will lower temperature. The reason for this lies in the fact that the heat production is diminished and its elimination encouraged by increased perspiration, relaxation of the surface vessels and increased activity of the heart. You yourself have experienced the delightful and refreshing coolness following a hot bath on a stifling summer's day or after a hard muscular exertion. It is the same principle that underlies the cooling effects of a cup of hot tea or hot soup in contrast to iced tea or ice cream.

Heat also tends to increase metabolism, provided it is intense enough to raise the body temperature. The mechanism is similar to that in the case of cold water.

The contractile elements of both the blood vessels and the skin relax under heat. With the first shock of immersion and the transitory spasm of the cutaneous blood vessels, the tonus of the heart is increased by the raising of the pressure in the systemic vessels. The pulse increases in frequency and the tone of the heart muscles is probably lowered. Within a short time, with the dilation of the peripheral vessels, the blood pressure falls. The higher the temperature and the longer the duration, the more pronounced are the changes. As in the case of cold water, mechanical stimuli enhance the effects.

Likewise, as in the case of cold water, the frequency of respiration is increased, but to a less marked degree. The breathing is usually shallow. The sweat, sebaceous glands and the kidneys react readily to heat,

so that the hot bath has a tendency to hasten the elimination of toxic substances.

As to the nervous system, warm baths of short duration have the same effect as cold baths, that is, they increase the sensibility of the nerves. Heat, however, is usually more effective in lessening pain than cold. Generally speaking, baths at a high temperature are at first exciting, but later cause exhaustion, muscular weakness and a disinclination to muscular work. If prolonged, vertigo and nausea may be provoked. On the other hand, hot baths of a short duration have a reviving effect in cases of exhaustion following severe muscular exertion. This may be due to the elimination of the waste products of muscular activity.

Hot baths of increasing temperature followed by a cold shower (if permissible) are excellent for those sensitive to cold. They also are good for diffused pain such as associated with diseases of the viscera, dysmenorrhea, bronchitis, gallstone colic, renal colic and many rheumatic conditions. They have a wonderfully relaxing effect after a hard day's work or after a severe muscular exercise and are superior to cold baths when one wishes "to cool off." However, they should not be taken in cases of organic diseases of the central nervous system, myocardial weakness, cardiac hypertrophy or arteriosclerosis.

The Sedative Bath

In addition to these baths which vary markedly from the temperature of the skin, there is another bath, a bath whose beneficial effects are well known amongst the medicos, but which is sadly neglected by the average person. However, when its delightful

effects are once experienced by an individual living under the stress and strain of modern city life, it has found a life-long strong advocate. This is the neutral or skin temperature bath, probably the simplest and easiest to obtain of all baths. Why it is so little known is difficult to say. It is probably due to the innate tendency of human beings to look far off and choose the difficult and complex while neglecting the simple remedies at hand.

Now the very sign of life, says a well-known authority, is the irritability of the cells, tissues and organs when they are exposed to physical or mechanical influences. In this connection we have just showed that a stimulating or exciting effect on the circulation and a tonic effect on the heart and blood vessels may be brought about by the use of water considerably above or below the temperature of the body surface.

But you yourself have not always wanted to produce such stimulation, and perhaps you have even foregone your daily bath because you were worn and weary from and of stimulation and were blindly seeking a sedative effect. Such an effect may be brought about by lowering the normal amount of stimulation. In this way the bodily functions can be retarded and sometimes fully stopped. This task of soothing excitement, that is, bringing about a sedative action, is more difficult than stimulation and sometimes it is necessary to resort to indirect methods to exclude irritation rather than directly induce calm.

One of the principal and the safest means of producing a sedative action is through a bath of skin temperature. This is a bath which approximates as closely as possible the temperature of the skin which

lies somewhere between 93 degrees and 96 degrees F. This is known as the point of "thermo-indifference" because there is no irritation of the skin nerve endings by hot or cold. Neither is any change produced in the circulation, in the heart action, blood pressure or respiration. Therefore its physiological effects may be said to be mainly negative.

However, while the physiologic action of the skin temperature bath is largely negative, it is far from negative with regard to its beneficial effects on an overtaxed nervous system. On the contrary, it has remarkable sedative effects. The rather long continued contact of the skin with the lukewarm water causes the blood supply of the peripheral system to increase, with a corresponding decrease in the deeper parts. As a result the intra-cranial vessels are more or less emptied and continue in this state for some time. The local effect of the water on the nerve endings in the skin plus the diminished blood supply in the head and elsewhere produces a sedative, even hypnotic effect.

The longer the duration of the bath, the more pronounced are these effects. And there is an added effect —the secretion of urine is increased if the bath is prolonged from one to two hours. In short, the effect of skin temperature is limited to soothing and relaxing the nervous system.

Therefore, as the effect of a skin temperature bath is principally a soothing one, such a bath is indicated in all conditions where a soothing, sedative effect is desired, as in cases of nervous irritability, sleeplessness, anxiety neurosis, functional neurosis as chorea, and certain diseases of the central nervous system

accompanied by spasticity. Persons suffering from any of these conditions bear thermic stimuli, whether hot or cold, very poorly and therefore the practice of prescribing hot baths in states where a sedative effect is desired, is, in the opinion of many authorities, erroneous. Such baths, instead of relieving, are apt to aggravate the symptoms. Multiple sclerosis and renal insufficiency are also greatly benefited by the lukewarm bath. Some authorities believe that such baths similarly constitute a very valuable therapeutic measure in reducing the temperature of infants and delicate children. Their use in paralysis and insanity are well known, as we observed at the beginning of this discussion.

But we are particularly concerned with the soothing effects of the skin temperature bath on the overworked nerves of individuals enjoying an average state of health. And no amount of verbal argument is half as persuasive as the actual experience of this bath. So, the next time you are overworked and nervous and irritable, or toss all night or count sheep, hoping to conquer sleep before dawn, try a skin temperature bath. While your tub is running, slip out of your clothes with all rhythmical leisureliness of motion depicted by a "slow-motion" movie. If you like, keep a mental picture before you of your favorite athlete or favorite horse as you saw him performing in "slow-motion" time. Then gently slide into the tub and let the water softly fold over your body. No other sensation should you feel from the water than one of touch—the touch of the finest chiffon. Lie back, with your eyes closed and your hands floating at your sides. By the end of ten minutes your nerves will be

all unsnarled and soon all sensation will leave your body—it is as one with the water. Even your mind becomes one with the water—a hypnotic dreaminess closes over your thoughts, far different from the active drowsiness of fatigue. Instead of fighting it, you are in complete harmony with one of nature's most potent forces, in its kindliest mood.

Now, as gently as you slipped in the bath, slip out of it and wipe your body with a linen or crash towel with long, slow, rhythmical movements with the least amount of friction possible. If you are going to bed, only half dry and slide into bed, being sure to cover up well, as cold disturbs sleep. And straight from the "sedative pool" you will be wafted to the land of dreamless sleep.

The need of keeping the skin temperature bath at a constant temperature cannot be overemphasized. Any variation in temperature will bring about the stimulating effects of the hot and cold bath. It should not be difficult to do this—the temperature may be regulated by keeping the faucet open just a little bit and letting water trickle in slowly—if the drain is working well it will not overflow. Or, if you have someone to assist you, part of the water may be let out of the tub from time to time and water of the right temperature be let in. If it is not possible to regulate the temperature by the faucet, a pail of warm water may set between the feet of the bather, making sure that it does not touch him. For persons in average health, this bath may last for fifteen minutes to one or two hours. Longer baths are usually taken by those suffering from some specific disease and are usually taken under the guidance of a physician.

And of course, this bath is never followed by a shower or douche.

Before closing the subject of baths, both cleansing and therapeutic, we should say a few more words on the psychological effect of bathing and cleanliness, aside from the social implication we mentioned previously and effects on the nervous system. If the effect of bathing was limited to the physical well-being of the individual, surely there would be no reason for the proverb, "Cleanliness is next to godliness." The only reason why cleanliness is next to godliness is because we feel godly after a bath. Whether you like to admit it or not, when you are freshly bathed, you slightly look down on the rest of the world and have a feeling of kindly condescension towards your fellow-beings. You are perfectly justified, for you are superior; you are better looking, your nerves are relaxed and your organs are functioning properly.

Sometime ago, the American Journal of Physical Therapy cited an editorial which appeared in the Louisville Herald-Post, entitled "Character and Soap." I should like to quote it here:

> "A man, as you know, feels more respectable after taking a bath, whether he takes it every morning or on Saturday night. That's why he sings as he takes it. He's giving three cheers for himself. When a man feels respectable he is prompted to act that way. He becomes ambitious—that is, he feels an urge to improve himself and the world.
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> "At a certain age a boy begins to take an interest in keeping clean. Psychologists call it 'the religious age.' It is, in fact, the age when he begins to comprehend and appreciate ethics. It is the blossoming of character.

"In the Tropics a man who plunges into a river may have no other desire than to get cool. When the early Nordic took his first bath in a snow-covered hut, his desire was to get clean.

"Of course some character was necessary to inspire the yearning for cleanliness, but the habit of taking baths under unfavorable conditions must inevitably have developed character. It was the necessity of overcoming difficulties that made the Nordic master of the world.

"Any old soldier will tell you that a smart and barbered regiment will fight better than a slovenly regiment. The first sign of weakening morale is indifference to dirt. Ask the man at the morgue. Ask the police. Ask the reporters. It seldom happens that a suicide has recently bathed.

"If it is necessary to find a new foreman quickly, go out to the shop and select ten men who shave every morning. Then pick the one who bathes every morning. He is a comer."