

Thermo-therapeia : the heat cure, or, the treatment of disease by immersion of the body in heated air / by Erasmus Wilson.

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Publication/Creation

London : Printed by T. Richards, 1860.

Persistent URL

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THERMO-THERAPEIA:

THE HEAT CURE:

OR, THE TREATMENT OF DISEASE
BY IMMERSION OF THE BODY
IN HEATED AIR.

BY

ERASMUS WILSON, F.R.S.



REPRINTED FROM THE BRITISH MEDICAL JOURNAL,
OCTOBER 13TH, 1860.

C PRINTED BY

T. RICHARDS, 37, GREAT QUEEN STREET, LONDON.

MDCCCLX.

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ERASMUS WILSON, F.R.S.

LONDON: PRINTED BY J. JOHNSON, ST. PAUL'S CHURCH-YARD, 1827.

THE NATIONAL MUSEUM, GREAT BRITAIN, LONDON.

THERMO-THERAPEIA: THE HEAT CURE.

For a knowledge of thermo-therapeia, medical science is indebted to Mr. Urquhart.

Thermo-therapeia is the application of atmospheric air at a high temperature to the surface of the body, for the relief of pain and disease. The poets use the expression, "bathed in light"; if we adopt the same language in reference to air, we may style the process a bathing in hot air or a hot air bath; but in no other sense does the term "bath" apply to its use.

Mr. Urquhart became acquainted with the construction and uses of the thermæ in the course of his travels in various parts of the world, and found it almost universal in cold and temperate climates, but absent in the tropics. By the people among whom it is found, the thermæ is employed as a luxury and a religion, the religion of physical purity, but not as a remedy against disease; it was left to Mr. Urquhart to apply highly heated air as a medicine for the relief of pain and disease, and with the most signal benefit.

The capacity of the human body for bearing dry air at a very high temperature is a matter of common observation; we see it in the daily occupations of copper-smelters, steel-pourers, the stokers of steam-engines and gas-ovens, of glass-blowers, porcelain-burners, and in a variety of manufactures and trades. And in a well ventilated thermæ, a temperature of 130° and

thence upwards to the temperature of, and above, boiling water, is not only bearable but absolutely soothing and agreeable.

If we inquire into the medical history of the men employed in the fiery occupations to which I have just referred, we shall find that they enjoy a state of health and longevity above the average of other men. Look upon them, and you perceive them to be strong, well built, muscular men, with that exact proportion of integument and muscle which denotes the nearest approach to the standard of manly beauty and health. The perspiration is streaming over the surface of their naked skin; they aliment the flowing tide, from time to time, with deep draughts of cold water or thin gruel; they frequently pursue their labours in open sheds exposed to a thorough draught of cold air; or, after enduring extreme heat for awhile, they emerge from the atmosphere of the furnace into the open air, naked as they were born, to cool their bodies in the refreshing breath of a north or an east wind. Our over-clothed and pampered skin creeps and shivers in sympathy with the seeming risk and danger of their exposure. But ask these men if they ever take cold, and they will tell you that they do not know the meaning of the word.

Our every-day observation, therefore, teaches us that the human body can bear and labour in high temperatures, not only without inconvenience or distress, not only without the danger of chill from subsequent exposure to cold air; but, on the contrary, with an increase of health, of strength and of condition; in other words, that the body derives from this process those special advantages of condition and power of endurance which are commonly sought for in the process of "training;" in truth, are acquired in no other way than by a systematic training. What a race, marvellous for power and strength and endurance, might not Britons become, exclaimed Mr. Urquhart on a recent occasion, if this kind of training were universal; if the thermæ were to become an institution of common life.

The capabilities of the thermæ for the purposes of training have already been recognised and applied. The readers of the *Field* are prepared to see the barbarous, the injurious, the exhausting process of training by the old method entirely discarded, and to behold the simpler, more natural, and more perfect operations of the thermæ take its place. Not only is the thermal process of training the most advantageous for human beings, but it is also applicable, and has been applied with the most successful results, to animals.

I will endeavour to retrace my own experience, on my first introduction to the thermæ, now sometime back. It was the winter time, the season bitterly cold; my inception as a "companion of the bath," took place in the private thermæ of my esteemed friend Mr. George Witt, of Princes Terrace, Hyde Park. As an example of simplicity of construction, Mr. Witt's thermæ may be usefully taken as an illustration. He had at the back of his house, a room twenty feet long by ten feet in breadth and twelve feet high, with a window looking out upon a lead-flat, such as is common in London houses. To convert this room into a thermæ he divided it into two compartments by means of a wall which crossed it at about one third from its further end. He had, thus, two apartments; an outer one, the cooling room or *frigidarium* of the Roman thermæ; and an inner one, entered by two small doors (inner and outer) in the partition wall, the *caldarium*, *calidarium* or *sudatorium*. To secure the detention of heat in the calidarium, a lath and plaster lining was placed inside and at the distance of a few inches from the wall and the space filled in with sawdust, and the floor was paved with earthen tiles bedded on concrete. Outside the room, on the lead-flat, an opening was cut through the wall for the construction of a common furnace; the furnace encased with brickwork entered the calidarium and its flue was carried around the apartment close to the floor. Having completed the circuit of the room it was made to ascend a few feet, then carried transversely across the end of the room above the

furnace, and subsequently permitted to escape at the corner of the ceiling into an outside chimney. The entire length of the flue was thirty-five feet, and as it was propped from the floor by means of a brick placed at short distances and a space left between it and the wall, the whole of its external surface was free to radiate its heat in all directions and communicate its temperature to the air of the apartment. A thick plate of glass let into the outside wall gave light to the room, and four holes, two below and two above, piercing the wall and furnished with moveable plugs, afforded sufficient ventilation. Add to this description a wooden seat supported on the flue; a platform, which afforded additional sitting room over the masonry of the furnace; and a wooden couch, the *duretum* of the Romans, and the calidarium is complete.

Having left my garments in a portion of the outer apartment which served as a *vestiarium*, and girt around the loins with a *cummerbund*, the kilt of oriental nations, I entered the calidarium: the temperature was delicious, such a contrast with the exterior world. The wind and snow were raging without, while here was a paradise of 135 degrees of Fahrenheit. Within this hallowed nook anxiety and care and fatigue, like the burden of Bunyan's Christian, seemed to fall from my shoulders; I stretched forth my limbs in peace and enjoyment; the brain seemed to think more lightly and pleasantly and my ideas flowed brightly and calmly. I longed to compare my sensations with those around me, for I was not alone; that day I was the seventh or ninth "companion of the bath," I scarcely remember which; but I called to mind that the greatest wisdom often lies in silence, and I yielded the pleasure of speaking for the greater pleasure of listening.

My friend, Mr. Witt, in the course of a few minutes was streaming with perspiration, which ran down his face in rills and dripped from his elbows and finger-ends in continuous drops, while my skin was as yet dry. He explained to me that this facility of perspiration distinguished the practised bather

from the unpractised, the educated from the uneducated skin ; and he reminded me by that remark, how little opportunity the skin has, in this climate, of performing its normal function thoroughly and therefore healthily, and that the function of the skin in the majority of the inhabitants of this island is a dormant function and its purpose as an emunctory to the system almost entirely undeveloped.

I was struck also with the rich and healthy complexion of his skin ; it took its hues from the free circulation of the pure arterial stream through the capillary plexus of the derma ; as he drew his fingers forcibly across his chest, the white traces left by their pressure were instantly replaced by the glowing vermilion of the arterial flood. There were no gorged capillaries in that skin ; no venous transformation in that cutaneous plexus ; no deposits of unhealthy colouring matter either in the cuticle or in the tissues beneath ; no pallor ; no excess and no deficiency of fat ; no choked pores ; no wrinkles from loss of elasticity and contractility of the fibrous and muscular structures of the corium ; no abnormal or deficient sensibility of the nerves ; all was, as nature made it, perfect and beautiful. I looked for the first time in my life on a really healthy skin.

How very curious and striking was the difference between my friend's skin and that of everyone present ; one gentleman, a finely-built handsome man, with a remarkably-capacious chest, had too great a preponderance of adipose tissue, while the hue of the skin in an oblique light was a bright golden yellow. In another, the muddy tinge of the skin discovered the impure and muddy condition of the blood. The habitual use of the thermæ removes these discolorations, these indications of imperfect elimination, by drainage through the perspiratory system, and while it gives beauty to the skin, bestows health on the entire economy.

Seeing the perspiration flowing in such wonderful abundance from my friend's skin, and observing that he encouraged its quantity by taking frequent draughts of cold water ; and led

into the same channel of thought by the state of my own skin which was now perspiring actively, I ventured to remark that we were literally supplying the means of washing the body from our inward selves. "It has always been a theme of wonder, in the exploration of the thermæ of the Romans, as also in the examination of the writings of different translators and commentators," replied my friend, "how the Romans could have obtained a quantity of water sufficient to supply all their baths and the vast numbers of bathers who availed themselves of their use; but, it is evident, as you see, that a very small quantity of water for each person to rinse the body, after ablution in its own perspiration, would be all that is needful."

Another inference from these remarks is self-evident, but not the less important. Among our various medical remedies for procuring diaphoresis, a list which embraces antimony, guaicum and ipecacuanha, hot air must take a prominent place. But how different its mode of action! If we ourselves were the subjects of treatment, how infinitely more agreeable should we find it, to convey ourselves bodily into the pleasant and agreeable temperature of the calidarium, than to consign the above nauseating medicines to our stomach. Moreover, the latter may fail; the former cannot fail. The former we can regulate to a nicety; we can procure as much perspiration as we will, we can suspend it when we will; but the antimonial may not do its duty sufficiently, while we dare not give more. The antimonial may be hours before it responds, may need encouragement, assistance; the calidarium breaks down all restraints in a few minutes and needs no second help.

After a free perspiration of half-an-hour's duration I was anointed with soap and had a rub down with a wisp of white fibre called *lyf*, the fibre of one of the palm trees commonly used in the east for the purpose to which it was now being applied. To the friction with soap succeeded a shower of warm water, then a douche of cold water, after which I was

made to sit still for some minutes until the warmth of the skin was restored. In Mr. Witt's thermæ the ablutory process is performed in the calidarium, but where space permits, a closet or small apartment is devoted to the purpose and constitutes the *lavatorium*. Not unfrequently, the lavatorium is warmed by a part of the flue of the calidarium and then performs the double office of lavatorium and *tepidarium*. Where a proper tepidarium, having a temperature of 98° exists, it supplies an atmosphere which is intermediate in warmth between the frigidarium and calidarium, and serves as a transition between the two; preparing the skin, by a gentle warmth, before its exposure to the higher temperature on the one hand, and mitigating the extreme of depression of temperature, on quitting the calidarium, on the other.

To invalids, the transitional temperature of the tepidarium is of importance, and suggests one of the precautions necessary to be taken in employing the thermæ as a medicine for the treatment of disease; but where the thermæ is used for the purposes of cleanliness, maintenance of existing health, training, or luxury, then the absence of the tepidarium is of little consequence.

From the calidarium I passed therefore to the frigidarium, on this occasion, mid-winter, and a piercingly cold snowy day, truly deserving its name. I was then *cloaked* in a sheet taken from one of the pigeon-holes of the *columbarium* standing in the corner of the room, my *cummerbund* was allowed to drop on the floor, and I was made to recline upon a cane couch immediately under the open window. How cool and pleasant were the puffs of wind that played over my face and limbs; how different their impression on my skin to what they had been an hour before. I needed not the assurance of my friend that there was no fear of catarrh or bronchitis; my own feelings told me that I could resist any amount of cold, and I was obliged to suppress a longing to walk out upon the leads with no other covering than my sheet, into the midst of the sleet

and wind; had the lead-flat been a terrace or a lawn I could not have resisted the temptation.

To a person prone to take cold on exposure to slight draughts of air, this instinct of defiance of cold seemed very strange—one of the phenomena of the *thermæ*. I was reminded how the inhabitants of countries colder than Great Britain, for example, Tierra del Fuego, go about naked; and I also called to remembrance that our forefathers of England and Ireland, as well as the “naked savages” of Scotland, were equally without covering. The climate is still the same; the difference between the people of those times and these is therefore clearly nothing more than one of habit. The face, which is always uncovered and exposed to every alternation of temperature, still represents our original state of nakedness and endurance, but the rest of the body is swathed in the close folds of a heating clothing, and remains for ever etiolated and unnaturally sensitive to painful impressions, while its appreciation of agreeable impressions is proportionately destroyed. I lately saw a child, four years and a-half old, who had been brought up in the constant use of the *thermæ* and who had never worn clothes. He is a sturdy, healthy little fellow, graceful in his figure and movements, and has the independence of deportment of an Indian chieftain. Blows and outward injuries do not affect him painfully as they would other children; and being met one day playing naked in the snow he was asked whether he was cold: “cold?” said the boy, touching with his finger his chest and cheek, “*yes, I think I am cold.*” It required that he should pass his finger over his body as he would have done over a marble statue to become aware that the surface of his skin was, in external sensation, cold.

“How is it,” inquired the Rev. David Laing, “that in my visits among the very poor, I so rarely meet with consumption or serious consequences resulting from exposure to cold.” I could not answer that question then, but *now*, I should have no hesitation in replying that the exposure of the poor to cold

air gave endurance to their skin and enabled them to resist the influence and the effects of cold. "In my early life," said Miss Jane Porter, one day when we were conversing on a kindred subject, "in my early life I was extremely sensitive to the impression of cold; if any part of my skin, however small, beyond the limits of my face, were exposed only for a few minutes to a draught of cold air, I was immediately seized with catarrh. I longed that my skin should become *all face*, for then it would have had the power to resist the cold." How suggestive these observations are when they are ranged side by side with the remarkable phenomena which are presented to us in following out the operations of the thermæ.

After awhile I exchanged the horizontal position on the couch by the open window, to a sitting posture; the sheet was thrown off from my back and limbs; the moisture of the surface was dried up, no wiping, excepting of the head and face was practised or required, the skin felt smooth and warm, and I was permitted to dress, but with the injunction that I was to dress leisurely, lest the perspiration, which had ceased, should again be excited. It is worthy of notice, that great attention is paid to the temperature of the skin during the curriculum of the thermæ; after the cold douche, we return to the calidarium to recover any waste of heat; and in the after cooling of the body in the frigidarium, the whole of the moisture must be dried off the skin, and perspiration must be wholly suppressed, as indicated by a peculiar smoothness and polish of the surface, before we are qualified to resume our dress. All clamminess of the skin must have ceased entirely before we resort again to our usual coverings.

Sometimes the flue of the furnace, instead of being admitted into the calidarium, as in Mr. Witt's thermæ, is made to travel under the pavement of the room, making a series of traverses from side to side and representing the *hypocaustum* of the Romans. In this arrangement, the floor is frequently excessively hot, too hot to be trodden by naked feet, and the use of

wooden shoes becomes necessary. The thermæ of Mr. Stewart Erskine Rolland, one of our highest authorities on the Bath after Mr. Urquhart, is constructed in this manner. I had recently the gratification of testing the merits of Mr. Rolland's thermæ; the temperature was 160° ; the air, being perfectly dry, did not feel otherwise than pleasantly warm; the wooden couches, arranged around the room and covered with soft Turkish sheets, afforded most agreeable reclining and lounging places, and upon these we stretched ourselves at ease while the perspiration burst forth from its seven millions of pores. I then went into a small closet, wherein the temperature was ten degrees higher, the sensible heat being very much increased above that point by the introduction of vapour; and from the hot closet I stepped into the lavatorium, and, after inunction with soap, was greeted with a douche of alternate hot and cold water for the space of some minutes. The sensation of this alternate douche is beyond everything delicious.

Mr. Rolland, like Mr. Urquhart, is an Eastern traveller; his frigidarium is a divan furnished with reclining couches of the most approved oriental character; door and windows were open, to gain as strong a current of air as possible; and here, in the most graceful, because the most natural attitudes of quiescent repose, we sip our sherbet and cool our glowing limbs. Struggler in the sun and dust of hot July, how you envy our enjoyment! Toiler in the mud, the slush, the biting winds and blinding sleet of the wintry world without, what would you not give to change places with us!

But quitting the construction and appliances of the thermæ, the mechanical means, let us inquire, firstly: What are its physiological properties? secondly, what are its medical properties? With its psychological and moral properties we have at present nothing to do; albeit it would not call for much argument to prove that both are elevated and exalted. All agree that the brain never works more pleasantly than in the thermæ;

the mind seems cleared of its physical impurities; the godhood of our nature is elicited by the body's purity.

Physiologically we find that a grateful feeling of warmth pervades the entire skin, whatever its previous condition of temperature, of dryness, or moisture; secondly, the skin appears to soften, to become ductile and pliant; thirdly, minute drops of water, gradually becoming larger, stand upon the skin like crystal beads. "I shall tell my friends," said a gentleman to a 'companion of the bath,' a doctor of divinity who was noting this phenomenon, "that I beheld a clergyman of the Church of England, while sitting in the thermæ, piously counting his beads." And soon, these limpid beads, swollen beyond their bound, trickle downwards to the earth. The skin, likewise, loses its accustomed paleness, and becomes more or less reddened; it is clear that the blood is sent more actively to the surface and in larger quantities. The skin of the face and hands is more suffused than the rest of the body and the conjunctivæ are also reddened.

It is evident that the high temperature of the atmosphere of the thermæ is a stimulant of the circulation, of the heart's action in fact; the pulse becomes frequent, and after a time the heart also is felt to be quickened; sometimes a sense of oppression, of giddiness, of faintness, and sometimes, though rarely, of sickness occurs, and the novice is constrained to seek the fresh air of the frigidarium. These effects of the thermæ are perfectly natural, perfectly physiological, are exactly what would be predicted by any physiologist to whom the problem were submitted: What would be the effect upon the animal system of an excessively heated temperature? His ready answer would be; the pulse will be accelerated, the heart's action rapid, and according to the degree of temperature or the constitutional susceptibility of the individual, there will be more or less distress of the nervous system. But the same answer applies to a heated state of the body, however induced, whether by extreme heat, as in the Indian camp, during the

late campaign, where the thermometer in the tents often reached 140° degrees of Fahrenheit; whether in a sultry day in our own climate; whether in hot rooms; under hot bed-clothes; from active exercise; or from the use of diaphoretic medicines.

These remarks are intended to show that the thermæ is not to be trifled with; it is a medicine, a great and a powerful medicine; and can only be applied with safety and advantage by those whose vocation it is to study the physiology of man and to treat his diseases. In the judicious hands of the essentially practical medical man of Britain I look to see thermo-therapeia occupy an useful and a dignified place; and I trust that in a short time, in every small village and hamlet in England, wherever a medical man is found, there also will be found a British thermæ. The medical man will be too happy to make himself the subject of his first experiments, to apprentice himself to an art wherein all is enjoyment; to learn by his own impressions how far he may push the remedy in the treatment of his patient, and how often he may apply it. In his own person he will reap a rich reward; after the cares and anxieties of the day, his thermæ will give him rest and renewed life; his moral atmosphere will be brightened, his spirits revived, his power and usefulness enhanced.

It is one of the first, as it is an hourly matter of duty to the medical man, to reduce to practice the simple problem:—*Given a powerful remedy which may be employed in excess, how shall it be regulated?* It matters not whether the remedy be an aperient or a saline medicine, brandy, tobacco, laudanum, diet, or hot air. It is the business of the medical man to effect this regulation, and he is equal to the task. If the calidarium be too hot, cool it; if the patient be too susceptible, let him retire to the tepidarium; if he cannot support so high a temperature for one hour, let him abide in it for only half or a quarter of the time. I cannot conceive any difficulty on this head, and I cannot realise to my mind any constitution or age repugnant

to the remedy if properly and judiciously applied. I am not to be told that because the remedy stimulates the heart, it is not to be used. Every remedy that produces perspiration stimulates the heart, and it is one of the virtues of the hot air that it does stimulate the heart. Nor am I prepared to admit that in cases of disease of the heart the thermæ would be inapplicable. I believe just the contrary, that many diseases of the heart may be cured by a judicious use of the thermæ; and in the very worst cases it would prove to be the best remedy that could be employed.

The natural remedy for accelerated action of the heart, particularly when excessive, is the open air; a few chestfuls of air calms the heart's action and all uneasiness passes away; but to prevent the possibility of this inconvenience, the thermal chamber should be sufficiently ventilated. There should be an abundance of oxygen present in the atmosphere and a constant current of fresh unrespired air should be secured. In this respect a large and lofty calidarium has an advantage over a smaller one; but the small calidarium may be rendered equally fresh, by making several perforations through the wall and adapting the means of opening or closing them according to circumstances.

The essence of the quality of a high temperature of air is its dryness. While the human body can support a temperature of 300° and 400° of Fahrenheit in dry air, hot vapour is scalding at 120° and water boils at 212°. A gentleman whom I had frequently the pleasure of meeting at Mr. Witt's, wrote to his friend, in corroboration of the account which had been given him of the heat of the thermæ:—"I have been at Mr. Witt's bath; all that he told us is true. I cooked a mutton chop on my knee! and in eating it afterwards, the only inconvenience that I experienced, was in the matter of the bread; it became toast before I could get it to my mouth!" A dash of water thrown into the thermal chamber is instantly dissipated in

vapour, but the temperature although actually reduced becomes sensibly hotter.

The expression "dry air" must necessarily be held to be relative; the air cannot be perfectly dry in an atmosphere traversed with a continuous current of air from without. Each time that the door of the thermal chamber is opened, a rush inwards of cold and moist air takes place; and the body of the entering man gives off its moisture so rapidly, that in a short time, if there be several inmates, the moisture of the air must be considerable. It has been suggested that the highly heated air inhaled into the lungs must prove an irritant to those organs. I have seen no such effect, and can hardly believe it possible; the lungs and fauces are so abundantly supplied with moisture that the air must lose all its dryness before it can reach the bronchial tubes, and I should imagine, even the glottis. But I must confess to have had no experience in the application of the thermæ to susceptible or diseased lungs. If I might predicate its influence, I should declare in favour of its special adaptation to diseased states of those organs, on account of its powerful derivative action on the skin. If consumption is to be cured, the thermæ is the remedy from which I should anticipate the best chance of success.

But supposing that an instance does occur in which dry air properly ventilated, having a temperature of 130° and upwards does produce irritation of the lungs; how easy to introduce a watering pot and dash a shower through the air. Surely no man could be so unreasonable as to suggest the abandonment of an useful and powerful remedy because in one case, or in one class of diseases, it was inapplicable. My own experience however points to the heart and increased activity of circulation as the real origin of any inconveniences that may be felt in the thermæ; that this increase of circulation may act secondarily upon the lungs as well as upon the brain and nervous system, if allowed to continue, is of course perfectly possible.

But these are matters of detail; not of principle; if the prin-

ciple be good, be worthy of adoption, experience will soon teach us to adjust it to circumstances, to regulate its application. It is for this we are philosophers of medicine; and in the present instance we have to determine the plus or the minus of temperature; the plus or the minus of ventilation; the minus or the plus of watery vapour. If we require high temperatures to act upon the blood of the cutaneous circulation, to seek out and eliminate hidden and deep-seated morbid changes, it is clear that we must have a minimum of moisture in the atmosphere.

I must again advert to the modifying influences which regulate the temperature. On entering the thermal chamber, the skin feels cold to the touch, it gradually becomes warm, but its warmth never reaches a high altitude; it is moderated by the evaporation from the surface and kept at a genial heat. On the first few occasions the perspiration does not so readily obey the call as it does subsequently; the skin requires practice to bring it into a perfectly respondent state, to cast off the torpor of a life-time and to perform its function healthily. Hence the feelings of uneasiness which occasionally oppress the novice on his first visits to the thermæ gradually diminish and at last finally cease. But when they do cease he has the satisfaction of knowing that his whole organisation has become strengthened, that the weak heart has become a strong heart, and that his active vitality is augmented.

The *first* physiological effect of the thermæ is, therefore, *to perfect the perspiratory or eliminant function of the skin*; to give us in fact an organic skin instead of the mere, threadbare, dirty, unwholesome, and almost useless garment of the body that goes by that name. The *second* physiological effect is to make the skin more apt for the performance of a highly important function, *the imbibition of oxygen, a function that renders the skin a breathing organ*. The *third* physiological effect of the thermæ is *to regulate the nervous capabilities of the skin*; to enable it to feel truly and not mendaciously; to distinguish

between real and unreal sensation. A *fourth* physiological effect of the thermæ is to promote those changes in the structure of the skin which result in *its perfection as a healthy organ*.

It is common to associate the idea of profuse perspiration with weakness, and to imagine that the effect of abundant perspiration must be the lowering of the system. This idea probably takes its origin in the observation of the exhausting sweatings of fever, of consumption, or debility from whatever cause induced; but it has no abiding place among the true phenomena of the thermæ. The perspiration of the thermæ is a tonic emunctory process of the skin, acting under and supported and kept up by the stimulus of heat. The body feels lighter after these sweatings, as though it had lost something which oppressed it; which is the fact. It represents those other processes of the animal economy, under the influence of which, effete and often irritant matter is conveyed out of the system. Mr. Urquhart, Mr. Rolland, and Mr. Witt, pass frequently many consecutive hours in the thermæ perspiring the greater part of the time and renewing the lost moisture of their bodies by the imbibition of copious draughts of water.

In reference to the second physiological effect, I apprehend that there can be no doubt that, in its healthy condition and exposed to the atmosphere, the law of endosmosis which rules over the destinies of the whole of nature, acts upon the human skin as well as upon all other created things, both organic and inorganic. But while I am convinced of the imbibition of oxygen by the skin in a state of health, I am also aware that that action must be immeasurably weakened in the state in which we commonly find it, partially atrophied, excluded from the light and air; and prostrated in tone and power by hot and relaxing coverings. In cutaneous disease the oxygen of the atmosphere plays a mischievous and vexatious part, and if it be susceptible of absorption in disease it must also be capable of traversing the cutaneous tissues in the state

of health. Endosmosis operates its results on the human body by a combined electrical and vital agency, and a healthy electrical condition of the skin is amongst its most important properties.

In its function of a breathing organ and a transmitter of oxygen, the blood is the principal agent engaged, and the degree of absorption of oxygen will be determined by the freedom and abundance of circulation through the capillaries of the skin. Now, one of the first effects of a high thermal temperature is to augment the circulation of arterial blood through the skin, to carry the arterial stream into capillaries that have long been inactive, and to bring the circulating blood nearer to the periphery and nearer to the oxygenising element. Therefore the use of the thermæ must tend directly to the oxygenisation of the blood and to the perfection of those nutritive and vital processes that are due to the appropriation of oxygen. The lungs, which are the great oxydisers of the blood are in structure very little different from the skin, the differences between them being more those of position than organisation; the mucous membrane of the lungs is an inverted skin, while the skin may be regarded as an everted lung.

The third physiological effect of a thermal temperature, namely, the restoration of the skin to its normal sensibility, is illustrated remarkably in the example of the little boy brought up in the state of nudity and in the constant use of the thermæ; *his skin was all face*. In ourselves, from the habitual use of clothing from our earliest infancy to one part of the body and its absence from another, we are enabled to contrast the power of resistance and endurance of the face with the opposite qualities of the skin of the rest of the body. We are accustomed to regard the skin of the covered parts of the body as more sensitive than the skin of the face; but if we look closely at the matter we shall find that the sensitiveness only applies to its weakness. It is more sensitive to pain and suffering; but less sensitive to ordinary healthy and appreciative sensations; while the skin

of the face feels more truly and is less easily excited by painful impressions. When I was invited by Mr. Rolland to enter his hot closet, to pass from an atmosphere of dry air of a temperature of 160° , into one of moist air at 170° , I stepped back for an instant with a feeling of scalding; but it was not the weak and sensitive skin of my body that detected the extreme heat, but the more seasoned and appreciative skin of the face and hands. The experiment, simple as it was, convinced me at once, that from constant covering with clothing, the skin becomes weakened as to its nervous influence and nervous sensibility, possesses a low nervous tone and exhibits a first step towards paralysis of power.

The fourth physiological effect of the thermæ is to strengthen the skin as an organ, independently of improving its function. That the function of an organ must be improved by the perfection of the structure of the organ is obvious, but I now wish to draw attention to an improvement in tone of the organ itself. It is well known that some persons bruise more easily than others; and that the skin is sometimes apt to be bruised by a very trivial cause, the extent and depth of colour of a bruise being no test of the severity of the injury, but simply indicating the softness and weakness of the skin of the individual. We occasionally meet with a deep black bruise as the result of mere pressure without any blow, and an ecchymosed stain from a pinch or grasp is among the commonest phenomena of civilised, or perhaps I may be permitted to say, of *well-dressed* life. Now, ecchymosed stains and the discolorations of bruises disappear very quickly by the use of the thermæ, and the skin acquires so much and so healthy a firmness that they soon cease to be produced by trivial causes. In the thermæ the skin acquires colour, freshness, firmness, and elasticity; it loses the muddy and faded hues of ill health; and it loses equally the parched and arid dryness and wrinkled aspect of infirmity and age.

We have thus presented to us as the effects of a thermal temperature applied to the skin:—

1. An improvement of organic structure.
2. An improvement of secreting function.
3. An improvement in circulation and respiratory power.
4. An improvement of innervation and sensation.

Now these are extraordinary and unexpected physiological results; but results that admit of no doubt or question, and they serve to clear the way to the consideration of a still more important series of phenomena, namely, such as belong to the treatment and removal of disease.

Looking at the skin in relation to the other organs of the animal economy, we recognise it as one of the great emunctories or scavengers of the body; and we may fairly place it by the side of those other great emunctory organs, the liver, and the kidneys, and probably, the lungs. But taking it in conjunction with the liver and kidneys, and regarding it as one of the three great scavengers of the animal system, we have the following considerations brought before us for reflection. In the climate of Britain, the skin, in many persons, is not brought into exercise for six months of the year; in many, not for nine months; in many, as in women and persons of sedentary habits, scarcely once in twelve months.

Now, this being the case, an increased amount of duty is thrown on the liver and kidneys. These latter organs are called upon to perform their own office as well as that of the skin; and for a number of years they succeed more or less well. But after a time, say about the mid period of life, the over-worked organs begin to show signs of failure; we hear complaints of the liver or of the kidneys; the liver becomes enlarged; fat accumulates in the abdominal region; hæmorrhoids are developed with congestion of the pelvic organs, and symptoms of plethora abdominalis are established. After the abdominal emunctory organs, come the heart, the lungs, the brain, and the organs of sense, sight and hearing. So that, originating from a mere

deficiency of function of one organ in the first instance, a whole series of disorders are engendered, which involve in succession the most important organs of the body.

It is an axiom in medicine that the first step towards the cure of a disease, is the removal of its *cause*; and if this doctrine be applied in the case that I have just stated, we have only to restore the skin to its healthy tone and function, to bring back to their allegiance the organs whose function has become disordered by its impairment. The thermal treatment, by unlocking the pores of the skin, gives to the liver and kidneys the opportunity of recovering their tone and resuming their healthy function; and the whole of the emunctories, acting in harmony, gradually lead the way to the restoration of the entire system to health.

But suppose the mischief to have gone further; and that the disorder of function of the emunctory organs has left behind in the blood a considerable quantity of irritant matter, the product of indigestion and malassimilation. These morbid materials are moved hither and thither with the tide of the circulation, they communicate a sadness to the blood and with the blood to the entire organism; they discolour the skin; they give pains and aches to the nerves; heaviness and distemper to the brain; and they rack the joints with gout and rheumatism. Here is a catalogue of diseases all taking their rise in malassimilation, all dependent on the presence of impurity in the blood. How, then, are they to be removed? We resort to the emunctories,—the liver, the kidneys, the skin. For the liver and kidneys we prescribe the accustomed remedies; but for the skin directly and the liver and kidneys indirectly, what remedy is there so simple and yet so powerful as the *thermæ*?

It must not be supposed that I advocate the *thermæ* as capable of superseding other remedies. My present aim is directed to the illustration of the uses of the *thermæ*, and therefore I recur to it frequently. I would employ the *thermæ*, not always as a primary means, but often as an adjuvant, more than re-

spectable both in character and power. An increased action of the skin empties from the system a large quantity of water, with the water there pass away saline and effete substances in a state of solution, a fresh addition of water drunk during the perspiratory process also comes away rapidly, until the blood may be said to be washed clean of every impurity; poisons that have crept unbidden into the blood are drained out, as also are the broken and dissolved particles of organic transformations of a morbid type. This operation renders the absorbing powers of the system more than usually active; accumulations of fat are removed; nutritive matters are taken up, and medicines find their way more quickly and more abundantly into the blood, and therefore act with greater energy. Herein we have the explanation of an apparent paradox. We reduce fat by the thermæ, because fat is an excess, a redundancy, and a result of defective emunctory power. We fatten and bring into condition those that are lean by the same means, because we render nutrition more active and facilitate the absorption of nutrient material from the digestive system.

During my short experience of the thermæ, I have seen the infant and the aged subjected to its influence, the strong and the infirm, the healthy and the diseased. I have been struck by observing the ease with which the young, and the old especially, glide into its use. If any difficulty arise, it occurs more constantly among the middle-aged than at either extreme of life; and more frequently among women than among men. There are reasons for these peculiarities which those accustomed to the thermæ will immediately recognise.

Among my fellow subjects of the thermæ, I have seen numerous examples of relief from painful affections dependent on morbid composition of the blood. Several were cured of gout, of rheumatism, of neuralgia. A clergyman and Doctor of Divinity who resorted to the thermæ to reduce redundancy of adipose accumulation suffered habitually during the winter season from catarrh, bronchitis, and neuralgia, and was often

laid up for weeks together with these affections. Since he has adopted the use of the thermæ, which he enjoys excessively, he has diminished in bulk; he has lost all proneness to catarrh and bronchitis, and no longer experiences the pangs of neuralgia. Recently I was much interested in seeing a case of eczema of the face treated throughout by the thermal process alone; the patient lived in the thermæ for several days, he used very high temperatures and he succeeded completely in curing his disease. It was curious, he remarked, to observe the patches of eruption; they yielded no perspiration and looked like so many parched up islets in the midst of the surrounding copiously-perspiring skin. At about the same time, a medical friend consulted me for prurigo senilis. "You know Mr. Witt; go and ask him to admit you to his thermæ," was my counsel. The next time I paid a visit to my friend's thermæ, there was my elderly patient, luxuriating in the fulness of enjoyment. That day he left his prurigo senilis behind him in the calidarium, and I believe has had no reminder of it since. He went back to his home on the coast, and now offers a seat in his own thermæ to his curious or suffering friends.

How often since my first acquaintance with the thermæ have I longed to prescribe it to those who have been suffering from some forms of cutaneous disease. How important it will prove in a large group of diseases which have their origin in defective vitality and defective nutrition of the skin; prurigo among these; acne and its allies of torpid function; chloasma and its associated discolorations. I have now under treatment two cases of the ancient leprosy, elephantiasis græcorum, that have been much benefited by the thermæ. Mr. Urquhart has met with a case of chronic psoriasis which was cured by the thermal treatment alone.

I have hinted at the curative effects of very high temperatures; and both Mr. Urquhart and Mr. Rolland have mentioned to me important results from this process. It occurred to Mr. Urquhart's mind that as *fever-heat* was represented by 112° , he

should be able, could he create a temperature higher than fever-heat, to supersede the stage of fever at once. Thus, taking the beginning of the cold stage, which nature seemed to struggle painfully to overcome; he was enabled by a high thermal temperature to cut it short at once and to pass over it and the hot stage to that which nature seemed desirous of reaching, namely, the sweating stage. He believes that at a certain temperature he can put a stop to the fermentative process of zymotic diseases; and, at a higher temperature still, destroy animal poisons. He suggests, moreover, a curious and important inquiry, namely, the influence on the chemical composition of the blood circulating through the capillary plexuses of the skin, of hot air having a temperature of 160° of Fahrenheit. Not so much its influence on the healthy blood as on the blood of persons in a state of disease.

A member of Mr. Urquhart's family, a child, was accidentally burnt; the burn was distressingly painful; various applications had been made without relief; the child was accustomed to the thermæ and desired to go into it; it was carried into the thermal chamber and the pain of the burn was immediately assuaged. Mr. Urquhart, himself, received a severe scald, he betook himself to the thermæ; there, in a heated atmosphere, he directed upon the injured part a blast of air hotter than the temperature of the apartment; the pain became lessened, the process of effusion which results in the production of a blister was arrested; to use a popular expression "the heat had drawn out the heat."

In an earlier page I have said that the active function of the skin, by removing all excess of fluids from the blood, by inciting in the blood a desire for fresh fluids, becomes an important agent of nutrition. Let us suppose that the fluids which are removed by the process of perspiration, contain in solution the old and worn out material of the body; while the fluids with which we supply their place are highly nutritious; it is clear that we shall nourish the blood, and through the blood we shall nourish

the body. I am here supposing a simple physiological process, which although unseen, is in constant operation in the animal organism. The necessity for nutrition is proportioned to the loss of material; the waste creates the necessity for supply.

In the retort house of our gas factories, where perspiration is excessive and is continued through the entire day, the men are allowed a certain quantity of oatmeal which is made into thin gruel, and drank largely as often as the waste of fluids occasions thirst. The men are the gainers by the exchange, they give out waste water and used up solids, and they receive in exchange fresh water and nutritious solids. It is needless to say that by this process they get into high condition both of structure and health.

If we have a weakly and ill-nourished child, or a thin and emaciated adult, in whom there is no organic disease, but simply a powerless condition of the nutritive functions, may we not hope by means of the thermæ to bring about a more active and healthy nutrition and thereby change that which is weak into strength; that which was skin and bone, into flesh and blood and their usual concomitants.

The same argument applies to disease in all its protean forms; we must apply ourselves to the hope of improving nutrition, of draining away that which is bad, and supplying its place with that which is good. It is here that our pharmacopeia will afford us important auxiliaries, and those auxiliaries will be placed on the best footing for developing their most useful properties. Viewing the operation of the thermæ in this way, we are imperceptibly led to the conclusion that every morbid process, of whatever kind, must be relieved by its use, and we ask ourselves, not, what disease will be benefited by the thermæ? but, what disease can resist its power?

Looking at the thermæ in a social and political point of view, we find that it is wonderfully adapted for the preservation in health of large bodies of men, combining in itself the respective advantages of air, exercise, and ablution. The Romans were

so impressed with its importance, that they carried with them the genius of their thermæ wherever they migrated, and they put it in operation wherever they were located even for a short period of time. Thus we discover vestiges of the thermæ in all their temporary encampments as well as in their cities ; and by its means they kept themselves in health even when hemmed in and surrounded by warlike enemies.

Adopted by our own army, there cannot be a doubt that it would very considerably reduce the rate of sickness and death and add to the efficiency of the men. It is applicable also in all cases where numbers of persons are collected together, as in barracks, prisons, poorhouses, factories, and schools ; in large business establishments where a considerable number of young men or young women are assembled ; or in places of temporary meeting as the House of Commons and clubs. It must always be borne in mind that the thermæ not only offers advantages as respects physical health, but it also conduces to moral vigour. Those who have recourse to it would be more likely than others to shun vicious excesses of all kinds, particularly of stimulants, and be disposed to respond in their hearts and lives to the beautiful sentiment of the poet Thomson :—

“ Even from the body's purity, the mind
Receives a secret sympathetic aid.”

But the usefulness of the thermæ has even a wider sphere ; the Londoner, or the inhabitant of a large city, would live as healthily immured within his city walls as the rustic amidst the fields and meadows of the country. His thermæ would be to him in the place of a country house, of a horse, it would give him air, exercise, freshness, health, and life.

I might add very materially to the long list of conditions to which the thermæ might be applied with advantage, but I limit myself to a single one more ; it is that of extensive works, employing a large number of men, either in operations in themselves unsalutary, or in unhealthy localities. The importance of preserving a body of working men in a state of health,

and in the best condition for the performance of their duties, must strike every one, and is an object worthy a moderate sacrifice on the part of proprietors or owners. There are many localities in which miasmatic fevers abound, and constantly incapacitate the working force of large operative establishments. I believe that a few pounds expended in thermæ would correct this evil; would put the men into condition to resist the miasmatic influence, and to eject the poisonous elements from the blood when they had already found admission into the organism.

In conclusion, I feel that I cannot do better than leave the important questions raised by this communication in the hands of the members of the British Medical Association, from whom, I feel assured, they will receive all the attention and practical consideration which they deserve.

without wincing. This happened on one occasion to myself. My friend received me with all the honours—he received me as he would a phoenix or a salamander: “Heap high the coals, fellow,” cried he to his stoker; “for a passed Grand Master of the Bath cometh to stew with me to day.” I was expected to say, when I entered the bath:—“Behold, my brother, this is good!” and I did say so. But what was my brother’s reply? “Dost thou find it warm enough, for it is barely 198° .” To which I could do no other than answer:—“Passably warm, brother, it may be better another day.” But alack! in good sooth, I was not sorry to escape with an unblistered hide; but I would not have shown my suffering, and would not have lost my reputation as an experienced bather for the world. “I kiss your feet, brother; I perspire well; may you never perspire less.”

Of the practice of the Romans, as regards temperature, there is, I believe, no record; but viewing the thermæ as it at present exists in the east, after its migration from the Tiber to the Bosphorus, we should be led to infer that a low temperature—that is, one not exceeding 120° or 130° —is that which was preferred; and I am quite of opinion, that for most purposes, at the present time, that temperature would be the most desirable. In the case of invalids, it might be still further reduced—say to 115° , 110° , or even 105° . And for persons in health, while they are novitiates or inceptor candidates for the honours of the bath, 120° would be a proper heat. After being accustomed to that heat for awhile, they might take a higher and even a higher degree, until they acquired, if they chose, the dignity of real salamanders.

The great purpose to be arrived at, as far as temperature is concerned, is to obtain one which shall be agreeable to the sensations; which shall slowly expand the pores of the skin; which *shall produce perspiration gently and slowly and without effort; so that it may be continued for an indefinite length of time.* The temperature of 135° or 140° is very agreeable to the sensations; but in me it excites a perspiration which is too profuse; the energy of perspiration occasions a feeling of exhaustion; and the exhaustion is succeeded by quickened action of the heart, throbbing pulse, a sensation of faintness, of oppression, which makes it necessary that I should quit the calidarium for a few minutes. It is true, that these unpleasant

sensations quickly pass off; but they are again renewed after a time, as often as I return to the calidarium. It is easy to see why these disagreeable sensations occur; it is easy to understand that the blood, suddenly robbed of a considerable proportion of its watery fluid, must for the moment occasion a physiological change in the whole economy. But we must do more than explain them to our own mental satisfaction, we must stop them; and the way to stop them is, I believe, to use lower temperatures.

Again, high temperatures clearly frustrate the purpose of the bath; by producing excessive perspiration, they shorten the period passed in the bath; they bring it to a too sudden and too rapid conclusion. Profuse perspiration is an excess of function, and excess of function cannot exist without fatigue and consequent injury to the organ so excited; together with more or less disturbance of the whole economy. I have had many complaints of the bath made to me, which have been clearly referrible to the use of high temperatures at the beginning of treatment; and the abuse is so plain, that I wonder, having once occurred, it could again be repeated. These were examples of direct inconvenience resulting from too high a temperature. But in another case, the function of the liver was considerably disturbed; and many days elapsed before the digestive organs were restored to their normal condition.

These remarks all point to the importance of a tepidarium when a tepidarium can be obtained; the time passed in the tepidarium may be considerable, the body undergoing a gradual process of warming, of softening, of perspiration; and at the end of this process, being transferred for a few minutes only to the calidarium.

C.—TIME OF TAKING THE BATH.

The best time for taking the Roman bath, and, indeed, every form of bath, is that which is least likely to interfere with the process of digestion; for example, *before a meal*. But at this point it is necessary to draw a line of distinction between the Roman bath and all other kinds of bath: the Roman bath abstracts from the system a proportion of its solid constituents, more or less considerable, while it makes only a gasiform

return in the form of oxygen. All other baths abstract little or nothing; and therefore, in this particular, there is a wide and important difference between them. It is as needful to take the sea bath before a meal as it is the Roman bath; but the sea bath may be taken before breakfast, which I should in nowise advocate in the case of the Roman bath. I do not, mean, that to those who can bear it and who approve of it, the Roman bath might not be suitable on first rising in the morning; but the generality of mankind will find the most advantageous time for taking it from three or four, to five or six hours after a meal. At that time there will be that in the economy which nature can spare, and often with benefit to the health, the waste of the digestive process, the detrita of nutrition; whereas, before breakfast, there is or ought to be scant matter for giving off from the blood by way of perspiration. Invalids may take the Roman bath three hours after breakfast; or three hours after the midday meal or lunch; while the man of occupation may advantageously devote to its rites the hour-and-a-half or two hours which immediately precede dinner; and the more engaged may probably, with equal advantage, take it in the evening, after the dust and toil of the day are at an end, and shortly before bedtime.

D.—FREQUENCY OF TAKING THE BATH.

We are continually asked; How frequently may we take the bath? We answer the question by reminding the interrogator, that the bath is employed for various purposes; and according to the purpose to be attained, must the bath be taken more or less frequently. Where maintenance of existing health is the object, once or twice a week may be sufficient. I can conceive the bath to be made a part of the process, known as "dressing for dinner", and then it may be taken as often as we dine. Medically, its frequency of repetition must be left to the medical man; and in every case the amount of effect produced must regulate its repetition. "Little and often," I would suggest as a maxim applicable to the bath as to some others of the enjoyments of life; and much to be preferred to the opposite position, "seldom and much."

E.—SHAMPOOING.

Shampooing is friction and pressure and stretching. We shampoo our hands and face in the act of washing them; and we shampoo our body and limbs while basking in the warmth and moisture of the tepidarium and calidarium. The friction of the surface with soap and with the lyf or the kheesah, is also shampooing. If a companion of the bath, or a bath attendant, give us a rub down, with a pull upon our limbs, and a squeeze, and a pinch of our flesh, this also is shampooing. Carry this simple process a little further, and we may magnify it to an *art*; but it is still no more than an artistic application of pressing and squeezing, of stretching and friction. Suppose we have a rheumatic joint or a rheumatic limb; we shampoo with more care; we rub more diligently; we endeavour to straighten the bent limb; we knead the thickened muscle; we press the œdematous skin. This is shampooing: and shampooing may be dexterous or it may be clumsy; it may be pleasant or it may be painful; and this constitutes the difference between the real shampooer and the pretender. And this view of the nature of shampooing may determine whether the operation is to be considered necessary or otherwise. To the healthy man it may be very pleasant to have the skin gently rubbed, with a circular movement, to have the muscles squeezed from end to end, to have the soft pressure of the fingers carried lightly along the course of the vessels and the nerves, but it is not necessary to his well-being; while to the invalid or to the sufferer it may be an important means of restoration to health. All I wish to inculcate under this head is, that there is no secret process concealed under the extraordinary term *shampoo*; and that if it be practised naturally and earnestly, and with moderate adroitness, it may be as well accomplished by an ordinary attendant, as when performed by the most distinguished charlatan and posture master.

F.—ROLLS OF CUTICLE.

It is not customary, neither is it pleasant, to hear men boasting of their own dirt; and yet to see how travellers will sometimes dilate upon the dirty mess of rolled-up filth which the shampooer displays to their astonished eyes in the bath, one would think that their chief virtue was that of a dung-hill. But these travellers, as they say is not uncommon with travellers, commit a grave physiological error. There are no rolls of exfoliated cuticle to be rubbed up on the skin of the bather; it is only on the hide of the non-bather that the accumulation takes place; and it is certainly remarkable in how short a time—and in some skins more than others—a stratum crops forth beyond the range of organic vitality, and admits of being softened and rubbed up into the fat bloated maggots which have been so often described. The accumulation is naturally greatest where the cuticle is thick, and especially on the feet. Travellers, it is true, may not have the opportunity of a good soak for many weeks, and then a very microscopic film of hourly formation has to be magnified by many days; indeed, our travellers in general do not speak of the bath—the Turkish bath this time—as an usual practice, but as an occasional freak; and then, heaven knows, the cuticle may be thick indeed.

It has been thought that the Roman *strigil* was intended for the removal of the softened cuticle in the bath; and so it was, but not as is usually supposed. If the Romans took the bath frequently, as they doubtless did, there could be no such accumulation of cuticle on their skin, as the strigil was adapted to remove. But the strigil would be very useful in scraping the thickened cuticle of the feet; and it would be particularly suitable for removing the stratum of grease and dust with which the competitors in the public games were wont to cover themselves; and also for the removal of the dust and dirt which, from the very nature of their games, would settle and accumulate on a skin anointed with oil, in order to secure its more perfect flexibility.

G.—VENTILATION OF THE SKIN.

I have assumed for the skin the rank of a respiratory, of a breathing organ; and have endeavoured to show that the cooling and drying operations of the frigidarium are an important part of the bath, as their performance is associated with the exposure of the skin to the atmosphere. Mr. Witt urges the prolongation of this period of the bath to as lengthened a degree as possible; and he delights to tell his auditors, dispersed around him like Roman senators in the forum, and with no other garment than a cotton scarf, variously and negligently twined around their bodies—that this was the period when Pliny betook himself to his garden, and in the full light of the sun, and refreshed by the sweet breath of the unfettered winds of heaven, walked in pleasant contemplation on a terrace carpeted with a beautiful little moss of velvet softness. We read that Sir Walter Scott indulged in this kind of atmospheric bath; we recognise in it the special charm and much of the value of the river bath and the sea-shore bath; and we are not startled when we hear from the mouth of an advocate of the Roman bath, Dr. John Le Gay Brereton, in a lecture delivered in Sheffield in 1858, that—"After leaving the hot room in our Bradford bath, bathers were in the habit, last winter, of jumping into a bed of snow which had been collected for the purpose. I have myself spent the whole night in the woods at Blarney, without any clothing save the bath sheet, after coming out of Dr. Barter's bath at that place. This was after a ball, when, with several other gentlemen, we had retreated to the bath for the sake of refreshment from fatigue. So delightful was the cool air, that when far away from any dwelling, we threw aside even our sheets, to enjoy the morning breeze at day-break. You need not then fear exposure to the air, after the bath; it is not so much for the sake of *cooling* that this process is necessary, as to keep up the action of the bath by exposing the skin to air; it is to compel the skin to *breathe*."

H.—MUSCULAR RELAXATION IN THE BATH.

How many are the instances of spasm which come under the observation of medical men. Spasm of the stomach, of the bowels, of the ducts of the liver and kidneys, of the muscles. How needless to remind my brethren of their infinite variety; of their fearful agony; of our poverty of means for their relief. But here, again, the Roman bath cries out emphatically: "Behold, we bring succour!" Without going more gravely into the matter, let us smile over the paragraph which I have just cut out of the *Cork Examiner*. As physiologists, we recognise the point and the value of the illustration; as philosophers, we appreciate the lesson, and become the wiser for its gift. "One day last week, a boy, employed in Messrs. Simpson and Baker's biscuit factory, was ascending to a loft, when one of the workmen below called him; and, in turning his head quickly to answer the call, he got a crick in the neck of such severity, that the head lay almost flat on the shoulder. The poor boy was going home in great agony, when he was met by Mr. Hegarty, the proprietor of the City View Turkish Bath, in the neighbourhood of Blarney, who, on learning what was the matter with him, sent him to take a bath. When the boy was inside about a quarter of an hour, and perspiration had set in, he was placed under a tepid shower-bath, and as soon as the water commenced to fall on him, the neck began to straighten, and in a short time the head had recovered its natural position, to the great delight of the poor lad, and rather to the astonishment of the other parties in the bath, who did not expect so speedy a cure. The boy was still suffering from a pain in the neck; but a second bath the next morning removed that, and he returned to his work immediately."

What remedy so potent for that dislocation and spasm of the fibres of the sterno-mastoid as the relaxing warmth of the calidarium. How many who read this will call to mind hundreds of cases in which its effects to the untaught mind would be equally amazing. We may dare to balance its merits against those of chloroform. We may discover in it a valuable aid in the reduction of dislocations; in the relief of strangulated hernia; or in soothing the wasted pangs of parturition.

I.—TRAINING CAPABILITIES OF THE BATH.

In employing the bath as a means of training, we must have clearly before us the powers of the bath, on the one hand, and the precise objects which we wish to attain, on the other. The bath will abstract the old material from the system, and will thereby render the system more ready to take up and more capable of appropriating new and strengthening nutritious matter which may be given to supply its place. In other words, it will do the sweating part of the process excellently, without fatigue, without wear and tear to the economy. But this, although a necessary part of the process of training, is only a part of the process. Other means are required to direct the new nutritive matter to the organs which especially require it, the organs of locomotion, and the principal of these means is exercise. The racehorse must still have his muscles trained by exercise; the prize-fighter, prize-runner, or prize-rower, must still pursue a systematic course of exercise; but the exercise in both instances is only that which is required to educate the muscles, to give them power, precision, facility of action, and to strengthen the breathing function; the exercise for the abstraction of unnecessary matter, for the removal of fat, is no longer requisite; for that the bath will amply and sufficiently provide.

K.—ADAPTATION OF THE BATH TO THE PRESERVATION OF THE HEALTH OF THE HORSE.

My friend G., who has had much and the best kind of experience in the management of horses, tells me that for more than twenty-five years he has been in the habit of having his horses washed whenever they returned to the stable in a state of perspiration, and with the result that his stable was remarkable for the health and condition of the animals. His process was as follows:—the horses were thoroughly sponged over with warm water; then with tepid water; and, lastly, with cold; the water was then scraped out of their coats with a scraper (*strigillum*), and they were well wiped down with a leather. After this they were covered with a cotton sheet, and their legs

were bandaged with cotton rollers. In fifteen or twenty minutes the sheet was raised gradually, first at one corner, then at another, until it was completely removed; the uncovered portion being thoroughly wiped before the next was proceeded with, and the process being continued until the animal was completely dry. After this treatment, there was no fear of any subsequent *breaking out*, and however sharply the horses had been worked, frequently after a run of ten miles in half an hour, they were ready and willing for a double feed of oats.

How different this picture from that of the common condition of horses under similar circumstances; breaking out into a profuse and often a succession of profuse perspirations after being put into the stable, and unable to eat their corn from faintness and exhaustion. But how curious the parallel with the stages of the Roman bath: the exercise is the *sudatorium*; then the operations of the *lavatorium*; firstly, the warm affusion, then the cold douche and the *strigil*; and, lastly, the *frigidarium* and the sheet. Nay, the parallel permits of being pushed even one stage further. My friend W. says:—"I have no objection to see a friend in the bath, or invite him to dinner; but not both on the same day, for the bath makes him so hungry, that my cook threatens to give me warning."

L.—VENTILATION OF THE SKIN OF THE HORSE.

The importance of *ventilating the skin* is illustrated in the process of clipping and singeing, as applied to the horse. The thickening and lengthening of the coat of the horse in the autumn season is a change obviously adapted to prepare them for the coming severity of the winter; and however natural to the animal in his wild state, is ill suited to his condition as the useful and obedient servant of man. As autumn advances, and after a few cold days, the coat of the horse appears as if "broken up" into plots, and the individual hairs stand out roughly, or in technical language, the coat "stares". Accompanying this change in the appearance of the skin, the animal becomes weak and languid, loses his spirit, breaks out into sudden and abundant perspirations upon slight exercise, and shows himself unequal to his work. Now, the ready remedy

for this state of things is the removal of the excess of hair, and the exposure of the skin to the action of the atmosphere. If the coat be clipped close to the skin or singed, or better still, be shaven, the animal preserves his strength and vigour, and is equal to all the labour that may reasonably be imposed upon him. Of the three processes, shaving is the best, then clipping, and lastly singeing. As to the latter, it is not quite clear whether its inferior position in rank to the others is due to the less complete exposure of the skin to the action of the air, or to the sealing of the ends of the hair by the act of burning. It is not improbable that the cut ends of the hair in shaving and clipping may serve as breathing pores for the inhalation of air; an advantage to the oxygenisation of the circulation in the skin that is lost in the contraction and obliteration of the cells of the hair which ensues after singeing.

Another curious concomitant of clipping is the change in the colour of the coat, a change which seems to indicate that the colour of the hair produced in the winter time is different from that of the summer.

In the Press.

THE ROMAN BATH: its Nature and Uses; with especial reference to its powers of Preserving Health, and Preventing and Curing Disease. By ERASMUS WILSON, F.R.S.