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PRACTICAL OBSERVATIONS

Inf. for Royal 1831
CONCERNING

SEA BATHING.

To which are added,

R E M A R K S

On the Use of the

W A R M B A T H.

By A. P. BUCHAN, M.D.

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L O N D O N :

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PREFACE.

IN that state of society, when the general diffusion of wealth has removed from a considerable part of the community all apprehensions respecting the immediate means of subsistence; the mind, not being engaged in providing against real wants, is obliged to find employment in the creation of such as are imaginary. Among the most generally predominant of these, is the fancied want of health. A too solicitous attention to personal welfare, may be classed among the refinements of a luxurious age; and the pursuit of health, of which the importance is universally acknowledged, forms

to the rich an apology for that frequent change of place, which in reality originates in a hope of finding, in some new situation, objects to excite the attention, and occupy that intellectual vacuity, the perception of which constitutes the chief misery of the idle. For such is the present condition of man, that those who are not obliged to live by labour, must labour that they may live.

That propensity to imitate the manners of their superiors, which influences the conduct of so great a portion of mankind, has diffused the inclination for an annual temporary change of situation very generally among the people of this country : and though that tendency to dissipation, the unavoidable consequence of a congress of the unemployed, makes the improvement of health, which is the general plea for frequenting what are termed watering-places, appear to the sober eye of industry, in most instances, to be merely a pretence for the pursuit of pleasure ; yet the periodical migrations of the inhabitants of great towns, and especially of the metropolis, to the country,

try, admit of many arguments in vindication of their propriety.

The emanations which are perpetually proceeding from the bodies of living animals are found to be noxious to others of the same species. Men, crowded together to a certain degree, generate diseases not only fatal to themselves, but which are contagious, and therefore destructive to others. Persons conversant with the practice of medicine know well, that long confinement within the walls of an hospital induces a peculiar habit of body, prone to a certain class of diseases. A permanent residence in a crowded city is productive of similar effects, though in a more limited degree. The constitution of the generality of citizens may be denominated weak, irritable, and easily susceptible of diseased action. The same complaints occurring in towns require a very different plan of treatment, from what is found to succeed in the country. Erysipelas, for example, which in one situation would yield to general depletion and the use of the lancet, in the other frequently requires the

administration of Peruvian bark, and perhaps the use of wine. Breathing the pure air of the country is the only effectual means of counteracting this pre-disposition to disease.

A temporary change of scene is also useful, by interrupting the customary trains of thought, into which the mind, constantly intent on the same pursuits, and accustomed to the monotonous routine of similar objects, is apt to fall; the pregnant sources whence complaints of the stomach, and dejection of spirits, are generally derived. Even the trifling entertainments which are contrived at such places of public resort, in perpetual succession, to interest the attention, and in which visitors of every description are imperceptibly led to take some part, essentially contribute to the same salutary purpose. An invalid will derive more benefit from residing in a place, where he can have an opportunity of occasionally sharing in some innocent amusement, than from moping in melancholy seclusion, in a situation where the purity of the air, and every other natural advantage, may be equal.

An absence from home may sometimes too be rendered subservient to the profitable purpose of what SENECA calls *observandi se protinus*, taking a review of one's own conduct, and of eradicating those improper habits, which, being interwoven as it were with the usual tenor of life, are not perceived, and therefore not corrected. The custom of early rising, and timely retirement to rest, which a certain admixture of the manners of the inhabitants of the country renders prevalent, are also productive of considerable benefit.

At present, the tide of fashion carries those who want, or think they want health, towards the shores of the sea. Nor does any situation seem better calculated to promote the well-being of either the real, or the imaginary valedudinarian. The view of the wide expanded ocean, in its ever-varying forms, elevates and exhilarates the mind, while the cool and vivifying breezes, which play round its shores, ventilate the withered lungs, and dispel that languor of mind, and lassitude of limbs,

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which are but too familiar to those who are obliged to pass the sultry months of summer in a great city, where the heat of the sun's rays is augmented by the infinitely multiplied reflections from brick walls and burning pavements. The advantages accruing to the citizen from such a change, may be considered as analogous to the benefits which a person, who has long resided in the torrid zone, derives from revisiting his native country.

Many valuable facts relating to the beneficial effects of sea bathing, and of sea air, are dispersed in the larger works of medical writers; and their utility in particular diseases have been pointed out in a variety of separate tracts. But, though the increasing popularity of the subject might well be supposed to excite attention; and while every spring possessed of any real or reputed sanative powers has been the theme of some treatise, containing an analysis of its contents, and an exposition of its virtues, I am not acquainted with any publication which professes to give an intelligible account of the effects of sea bathing; or which contains
specific

specific directions for the general conduct of those who resort to the sea-coast in search of health.

To imagine that people may indiscriminately plunge into the sea under every slight derangement of health, with advantage, or even with impunity, is an opinion that places sea bathing precisely on a footing with those medicines which are said to possess the power of curing all diseases. For though an empiric may attempt to persuade a credulous public, that the use of his nostrum will infallibly restore health, by whatever cause it may have been impaired, while its own operation is perfectly innoxious; no medical axiom is more true, than that every remedy which is capable of doing much good, is also capable of doing much harm. It therefore can hardly admit of a doubt, that a means of ameliorating general health, so universally resorted to as sea bathing is at present, must be frequently misapplied; some plain and practical directions for regulating the conduct of sea bathers, will not, I trust, be deemed a superfluous addition to the pre-

sent mass of literature, which has for its object the preservation of human health.

Sea bathing is employed for two distinct purposes; the general improvement of health, and the cure of certain diseases. In treating of the subject of bathing, I have tried to keep these different points of view, in which it may be considered, separate from each other. To those who bathe chiefly for pleasure, I have endeavoured to suggest such hints and cautions as may tend to prevent the mischiefs that cannot fail to result from plunging into the water at random. In the catalogue of diseases, I believe, I have not omitted any, for which either the external or internal use of sea water has been proved by experience to be a remedy. I have also attempted to discriminate those complaints in which bathing in the sea has been found to be injurious. The general purport of the following observations will, however, be confined within limits, which no medical work, intended for popular perusal, ought, in my opinion, to exceed: they will be found rather of the negative than the positive kind; and

and to contain more precautions against the imprudent use of cold bathing, than incentives to the adoption of that practice in doubtful and anomalous cases. Among those who resort to the sea-side, a propensity to rush indiscriminately into the water is already sufficiently prevalent, and appears to stand more in need of the bridle than the spur.

It might be naturally presumed, that the best information respecting the propriety of bathing, could, when necessary, be obtained by applying to some of the medical practitioners residing on the spot. But a person repairing to the sea coast with some slight ailment, which he has reason to expect will be removed by bathing, or by change of air, does not always consider it as being incumbent on him to make a formal appeal to medical opinion: and, when information is required concerning the propriety, frequency, or fittest time of bathing, I have in general observed, that the Bathers are the oracles to whom people apply for advice. Of their opinion I would say, with HORACE,
“*Male verum examinat omnis corruptus iudex.*”

It is scarcely indeed to be expected that a person, whose profits depend on the number of his employers, should have the candour to tell any of them, that they have no occasion for his services. In cases where any serious doubts are entertained respecting the eventual utility of bathing, the medical resident is unquestionably the proper person to resolve them. Against mistakes of minor importance, the present publication may prove, it is hoped, an adequate safeguard.

Though I have never resided for any great length of time together on the sea-coast, the subsequent pages are not to be considered as the result of theory, or of cursory observation. Their contents have been gradually accumulating in the course of more than sixteen annual visits to various situations frequented for the purpose of sea bathing. On these occasions, I have neglected no opportunity of obtaining knowledge from persons whose opportunities of observation must have furnished them with experience; to which I have endeavoured to add whatever information was

to be obtained from a perusal of the works of, I believe, every author who has treated on this subject.

These visits have not been made in a professional character, but as an invalid endeavouring to shake off various states of languor and debility which result from an almost constant residence in a great town, occupied in the laborious exercise of an anxious profession. Valetudinarians being ever prone to talk of their feelings and complaints, I am inclined to think that, if I do not deceive myself, I have, by mixing with the company in general, gleaned many interesting observations concerning the good and bad effects of sea bathing, which would never have come to my knowledge as a local practitioner of medicine. That the re-iterated convalescence I have myself experienced, may have biased me in favour of an occasional retirement to the shores of the sea, in a variety of those anomalous indispositions to which the inhabitants of a crowded city are singularly liable, I will not attempt to deny; but if my opinion be tinged with some degree of prejudice, it is of a nature which has some claims

claims to indulgence, as it seldom falls to the lot of a professional man to inculcate the virtues of a remedy with so feeling a conviction of their truth.

Of the various situations on the coast of this country, frequented for the purpose of bathing in the sea, which I have visited, I have not anywhere observed the two great requisites of salubrity and convenience of accommodation more perfectly united, than in the Isle of Thanet. The rising plat of ground, known by that name, consists of a solid mass of chalk stretching into the German Ocean, above the level of which it is considerably elevated, constituting the most eastern point of land in England. More than two-thirds of its shores are washed by the waves of the sea, so that the wind blowing from almost any quarter, is justly entitled to the epithet of a sea breeze. From those vapours which everywhere occasionally mix with, and contaminate the atmosphere, the air is here in a great measure purified by the absorbing powers of the immense beds of calcareous matter, of which this peninsula is composed; while it is in general impreg-

impregnated with the agreeable perfume of the various aromatic plants, which the light loamy soil produces everywhere in uncommon abundance. There is scarcely any stagnant water to be met with, and what falls from the clouds is so quickly absorbed, that the most delicate invalid is seldom prevented from taking his accustomed exercise in the open air, even after the heaviest rains.

From the total deficiency of trees, which seldom thrive within the influence of the sea spray, some situations on the coast are found, during the summer months, to be almost intolerably hot. The north-east aspect of a great part of the coast of the Isle of Thanet, occasions an extensive shadow to be thrown over the sands by the lofty cliffs, during that portion of the day when the rays of the sun have the greatest influence in producing heat. This, the invalid, to whom inhaling an air impregnated with the spray of the sea is deemed beneficial, will find a salutary walk; where, as evinced by the brackish taste perceptible on the lips and palate, that purpose may be completely obtained. Persons even of
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the most delicate health need not be deterred from walking near the margin of the sea, by any apprehensions of the bad consequences of damp feet, as it is a well-ascertained fact, that to have the feet wetted with salt water has by no means the same tendency to produce catarrhal affections, as exposing them in a similar manner to the effects of water unimpregnated with salt. To the same local exposure of this part of the coast, it is to be attributed, that the south west wind, so generally prevalent in autumn, and which brings with it such a sea on many parts of this kingdom exposed to its influence, as materially to obstruct the business of bathing, being here an off-land breeze, produces no such effect. The facility of bathing at any time of the day, and in almost every state of the tide, must necessarily have considerable influence in determining the choice of situation, among those who repair to the sea-shore expressly for that purpose.

The use of the warm bath, as the means of preserving health, is rapidly, and with great propriety,

propriety, gaining ground in this country. I have taken some pains to investigate the causes which occasioned this equally salutary and agreeable practice, formerly considered as the solace of toil, and the best restorative of lost strength, to fall into neglect. The prejudices against warm bathing, appear in a great measure to have originated in the misapplication of some phrases expressive only of the condition of dead matter, to explain certain states of the living body. The familiar terms of tonic and relaxant, as applied to the effects of either warm or cold bathing on an animated being, are in reality without meaning. For this observation, I own myself indebted to Dr. DARWIN; from whose ingenious works, as well as from the excellent Treatise on the external use of water by Dr. CURRIE, I have freely borrowed sometimes with, and often without acknowledgment. — Should this little volume, which has been delayed from time to time, in hopes of being able to give it a degree of correctness, more respectful to the eye of public attention, but which the author finds more immediate occupations prevent him from being

being able to accomplish, tend to diffuse the philosophical opinions of these truly enlightened physicians, respecting the important objects of health and life, among persons who might be deterred from the perusal of a work professedly medical, the publication of it will not be altogether in vain.

PERCY-STREET,
AUG. 1804.

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OBSERVATIONS
ON
SEA BATHING.

ON COLD BATHING.

AUTUMN is the season of the year generally made choice of in this country as most proper for the purpose of bathing in the sea. Land is known to be capable of receiving more heat, as well as of retaining it longer, than water; and the earth continues to impart to the waters of the ocean contiguous to the shore a portion of the heat, accumulated under the influence of the summer sun, for a considerable length of time after the solstice is passed. The sea is therefore found to be

much warmer some weeks after Midsummer, than at an equal distance of time previous to that period of the year. The heat of the atmosphere is at the same time mitigated by the western gales, then generally prevalent, which are cooled by passing over a long tract of ocean. The temperature of the sea, during the month of August, will seldom be found much below 60° of Fahrenheit's thermometer, while that of the atmosphere is calculated by Mr. Kirwan to be, on an average, somewhat above 65° . The heat of the fluid in which we bathe being but a few degrees inferior to that of the medium in which we are accustomed to live, the sea at that time of the year may seem better entitled to the appellation of a temperate, than a cold bath.

Although man, and the higher classes of animated beings in general, possess the faculty of maintaining in themselves an uniform degree of heat superior to that of the medium in which they exist; still they are liable to be affected by the temperature of the circumbient air, and of the various substances with which they occasionally

occasionally come in contact. The effect of these external impressions constitute the sensations termed heat and cold; which, though not easy to define, are in general very well understood.

Taking the heat of the human body as indicated by 98° , were we to suppose it surrounded by a medium of the same temperature with itself, the contact of any substance whose temperature was superior to 98° would produce the perception of heat, while every thing of an inferior temperature would occasion the sensation of cold. Our present sensations are, however, in almost every instance, much influenced by preceding impressions. For example; after keeping one hand for some time in hot water, if both hands be immersed in that fluid at its common temperature, the water will appear much colder to the hand previously heated, than to the other. In the evening of a very hot day we feel chilly, though the air continues to be in fact much warmer than usual. And in this climate our bodies are constantly surrounded by an atmosphere

of a temperature much inferior to their own, which is perpetually abstracting a portion of the heat furnished by the powers of animation. This abstraction of heat we endeavour to limit by the use of clothing, generally consisting of substances of a porous texture, which, by preventing the access of fresh portions of the cooler air, keeps us constantly surrounded with an atmosphere of a temperature nearly equal to that of our own bodies.

Our sensations are also very differently affected by various substances, according to the facility with which they transmit or conduct heat, which is generally found to be in proportion to their respective densities. At equal temperatures, a piece of metal feels colder to the touch, than a piece of wood; and to our sensations water and air will have the same relation.

The alteration taking place on immersion in the sea is to be estimated, not only as a transition equivalent to 30° of temperature, as indicated by the thermometer, being the average

average difference between the heat of the living body and that of the sea ; but the immediate sensation of cold is moreover augmented by the rapidity with which the heat is carried away from the living body while immersed in the dense medium of water, compared with what takes place during exposure to the common air. In conformity, therefore, with the more generally received mode of expression, I shall continue to denominate the sea a cold bath.

Plunging into the sea, or into water of an equal temperature, occasions a tumult of confused sensations, not easily detailed, but certainly rather of the unpleasant than the agreeable kind. The aggregate of these constitutes what is usually termed the Shock. When the first impression has so far subsided, as to permit us to attend to our feelings, besides the general sense of cold, a degree of pressure and stricture across the breast, accompanied with sobbing, convulsive respiration, and considerable palpitation of the heart, are perceived. After remaining some time immersed to the neck, these symptoms gradually subside ; but

if the upper part of the body, as far as the region of the heart, be uncovered by the water, the convulsive respiration will continue much longer. The duration of these symptoms depends much on the general susceptibility of the habit, and on the degree in which the person has been accustomed to the use of the cold bath. In delicate and irritable constitutions these disagreeable feelings continue much longer than in the hardy and robust. In all cases they are gradually diminished by habit, till at length, as is observed to be the case with the guides at bathing-places, immersion in the water, or even continuing in it for hours together, ceases to produce any derangement of the vital functions.

If a person remain in the water in a state of absolute rest, the temperature of the sea being from 58° to 60° , at which it is generally used as a bath; the sense of cold gradually abates, and the body seems to recover its usual warmth. This return of the natural sensations depends on the re-action of the system, and is an effort of the vital principle to resist the
farther

farther abstraction of heat; for it is hardly necessary to observe, that a mass of inanimate matter of equal bulk would gradually cool, till it became of the same temperature as of the medium by which it was surrounded.

If the immersion be still longer persisted in, a sense of cold again recurs, particularly in the extremities, which become shrunk and colourless. If rings are worn, they now drop off. The skin over the whole surface of the body contracts, and being partially resisted by the little bulbs from whence the hairs originate, produces that peculiar roughness commonly known by the name of goose-skin. If the temperature of the body be examined by the thermometer introduced under the tongue, it will be found gradually to decrease, although not regularly, being interrupted by transient glows of heat. Were the immersion to be still longer persisted in, the vital energy would at length be exhausted by these efforts to support the natural temperature of the body, and death would ultimately ensue, at a period not yet determined by experiment, but most probably

with a degree of acceleration proportioned to the coldness of the fluid with which the body was surrounded.

The convulsive anhelation that takes place on immersion in a cold bath, has been usually attributed to the augmented pressure on the external surface of the body, by which the free dilatation of the chest was supposed to be prevented. That this effect is not connected with the weight of the water, as being a denser fluid than air, is proved, by observing that no such consequence occurs on entering a bath of the same temperature of the human body, or of a higher, as in that at Bath, for instance; while, on the contrary, it is caused in equal degree by pouring cold water over the head, or by standing under a shower bath, as by plunging into the sea.

We are commonly in the habit of breathing the air of the atmosphere of the same temperature to which the body is exposed. The vessels of the skin, and those diffused over the internal surface of the lungs, are therefore constantly
liable

liable to be affected by diminished temperature at the same time. Hence a sympathetic action is established between them, so that, when the heat of the surface of the body is considerably lowered, the vessels of the lungs participate in the temporary torpor occurring in those of the skin; the circulation of the blood through them is performed with difficulty, which the efforts of voluntary breathing are exerted to overcome.

Involuntary respiration is chiefly carried on by the action of the diaphragm, a large membranous muscle extended across the lower part of the thorax, and dividing the cavity of the chest from that of the abdomen. By exerting an effort of the will, we endeavour, by means of this muscle, to enlarge the capacity of the chest; after which it again contracts with violence. Hence the irregular and catching respiration, on first entering a cold bath. The natural alternate contraction and relaxation of this muscle appear to be disturbed, and its actions to become convulsive, in consequence of the cold medium coming nearly

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into contact with its insertion into the margin of the thorax; the convulsive sobbing being most violent, when the surface of the water is nearly on a level with the pit of the stomach. If the body be kept under water as high as the chin, this affection will be found greatly to diminish, and after the agitation caused by the first immersion has completely subsided, the action of respiration under water is carried on even more slowly than usual.

In estimating the effects of sea bathing on the constitution, this phenomenon is to be disregarded; excepting that, in as far as it has been proved to be connected with a state of inactivity of the circulating vessels of the lungs, it refutes the common-place notion, that cold bathing is dangerous in every case of spitting of blood. This prejudice has arisen from some vague idea of cold applied to the surface tending to drive the blood inwards. Perhaps medicine does not possess any more efficacious remedy for internal hæmorrhage, than to immerse the extremities, or occasionally the whole of the body, in cold water.

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After persevering some time in the use of the cold bath, the strict association between the temperature of the surface of the body, and the action of the organs of respiration, will be found gradually to diminish, and new habits to be established, until at length the act of bathing hardly interrupts the usual tenor of respiration.

During immersion in the cold bath, the pulse is variously affected in different individuals. In all on whom I have had any opportunities of making observations, it was at first accelerated. In the experiments instituted by Dr. Currie, he found the number of pulsations of the person who was the subject of them decrease regularly from ten to fifteen beats *per* minute, becoming at the same time firm, regular, and small*. Other † experimenters have found the pulse to be considerably accelerated in the cold bath.

* Medical Reports on the Effects of Water, by James Currie, M.D. F. R. S. Appendix, N° II.

† Sam. Byam Athill, *De usu aquæ frigidae externo*. Edin. 1778.

In the summer of 1800, I tried a variety of experiments on my own person, which coincide with the latter observation. In the morning, previous to bathing, my pulse was on an average seventy-two; while, in the water, I could never perceive the artery beat at the wrist; but the number of pulsations of the heart, as measured by a stop-watch, always exceeded a hundred *per* minute, and often amounted to a hundred and twenty. Even after remaining in the water at the temperature of 60° for more than an hour, the quickness of the pulse did not diminish, although, towards the latter part of the time, when I began to feel chilly, the pulsation of the heart became evidently more feeble.

In another person on whom I had an opportunity of making some similar observations, the pulse became evidently slower after remaining an equal length of time in the water. These variations probably depend on the relative vigour of different constitutions. In the irritable, the heart will endeavour, by the frequency

frequency of its contractions, to propel the blood into the vessels of the surface which are contracted by the cold; while this resistance in the more robust will give rise to a more firm and regular action of the circulating organs. In the course of an hour after bathing, the pulse will be found to have resumed its usual rate. I have occasionally observed it a few beats slower than in health, till something warm had been taken into the stomach. If the circulation has been hurried by any slight irregularity, bathing generally reduces it to its usual standard.

On emerging from the bath, and while exposed to the air, the sensation of cold appears for a time to increase, and is commonly attended with shivering. In this situation, I have repeatedly introduced the thermometer under the tongue, and have thought that it rather sunk lower than while in the water. Being, however, generally, the subject of my own experiments, I found it difficult, during this state of agitation, to observe with any degree of accuracy, and after a few trials the instrument

ment was broken by the involuntary chattering of my teeth. This farther decrease of heat is most probably owing to the evaporation of the water which adheres to the surface of the body. It is well known that, whenever a solid is converted into a fluid, or a fluid becomes vapour, a certain quantity of heat is absorbed or disappears. Water cannot by any means be heated in an open vessel beyond the boiling point, 212° ; because the superabundant heat is employed in converting the water into steam. In the present instance, the heat requisite to vaporize the water, is withdrawn from the living body. If the surface of the body be exposed naked to a current of air, by which evaporation is rendered more rapid, the sense of cold is still farther augmented. Hence those who dress on the open beach after bathing, frequently think the air colder than the water, though it is not so in fact.

The shivering, a species of slight convulsion, is to be attributed to the temporary torpor and debility produced by cold. Weak people are most prone to convulsive disorders; and

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we find the temporary debility, antecedent to an attack of fever, accompanied with shivering. The duration of it is in proportion to the vigour of the constitution : for, as it has been already observed that animated beings possess the faculty of maintaining an equality of temperature in proportion to their more complicated structure, and perfection of organization ; so there is perhaps not a better proof of a vigorous constitution, than the power of resisting, to a certain degree, the external impressions of heat and cold.

After emerging from the bath, and the resumption of the usual habiliments, a sensation of glowing warmth is generally perceived to diffuse itself over the whole surface of the body. The presence of this glow has with justice been considered as a criterion of the eventual utility of cold bathing relative to the constitutions of various individuals.

This perception of increased warmth, for the heat of the body is not in reality augmented, may be referred to the following general law of
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animated existence :——The influence of any external impression on the living body being for a time suspended, it will operate with increased energy when its action is renewed.—After handling snow, or having been exposed to a very cold air, our hands and face glow on coming into the house, and appear to be warmed by washing them in water just above the freezing point. When walking or riding against a keen north-east wind, if we turn our face the contrary way, it feels immediately warmer, which is owing to the sudden cessation of the previous impression. After remaining for some time in a dark room, the ordinary light of day appears brighter than usual. To a person who has been long deprived of food, a cup of warm soup hastily swallowed, will produce effects similar to intoxication. This principle might be illustrated by a variety of examples ; but I shall adduce only one more, as being strongly in point. When abroad in the open air in winter, the hands feeling cold and benumbed, notwithstanding the common defence of gloves, if one glove be taken off, and the hand exposed during some minutes to the

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the cold air, on replacing the glove, that hand will soon glow, and feel much warmer than the other. On the attention being first directed to this circumstance, it frequently surprises those who are not aware of the cause on which it depends.

The human body is perpetually influenced by the atmospheric air, the medium in which all things exist. Its temperature varies at different seasons of the year; and, when it exceeds 60° , to which we are not accustomed, except during the hot days of summer, it operates as a general stimulant on the living fibre, augmenting perspiration, and accelerating the actions of the various organs by which the functions of vitality are carried on. This increased action is followed by weakness; or, what is the same, by weariness. The common expression of being exhausted by heat is, therefore, philosophically just. By going into a cold bath, we obtain a temporary suspension of this stimulus; the too rapid action of the vital powers is checked; and, on reverting to the usual medium of the air, an augmented energy of all the vital

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actions takes place, productive of a glowing warmth over the whole surface of the body; the sense of lassitude is removed; and the whole system, to use the popular phrase, feels braced.

If immersion in the bath be not succeeded by this glow on the surface of the skin, bathing should by no means be persisted in. The absence of it is a proof, either that the water has been too cold, or immersion in it too long continued relatively to the vigour of the constitution; and that the powers propelling the blood have not sufficient energy to overcome the temporary torpor of the superficial vessels. Head-ach, indigestion, cold, and appearance of deadness of the extremities, will be the certain consequences of persisting in the use of the bath by individuals in whom this salutary symptom does not occur; their systems being too feeble, either naturally, or from the effects of disease, to derive benefit from this remedy. From these observations may be deduced the reason why bathing in the sea is salutary to many persons who are injured by the lower temperature of a bath supplied by a cold spring; and also why
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the thermal baths at Buxton in Derbyshire are beneficial to many delicate or debilitated invalids, who are unable to bear the greater cold of the open sea.

It is also worthy of attention, that the increased energy of the powers of life resulting from the temporary abstraction of an habitual stimulus, as of heat, by the use of the cold bath, is followed by permanent vigour; unlike the occasional excitement produced by increase of stimulus, as by taking spirituous or fermented liquors into the stomach, which, though they may seem to impart a momentary strength, never fail to be followed by an equivalent torpor, and, if their use be frequently repeated, finally accelerate the torpor of death.

Having thus attempted to offer some explanation of the immediate consequences of immersion in water of a temperature considerably lower than that of the human body, I shall now proceed to notice some of the more remote effects that may be expected to result from the practice of cold bathing.

What is commonly termed, catching cold, has been said to be a disease peculiar to England. The variableness of our climate seems indeed to afford some grounds for this observation; especially as catarrhal affections are known to be most frequent at those seasons of the year when the variations of temperature are most extensive. Colds are more common in autumn and spring, than in summer and winter; in short, their prevalence appears in a great measure to keep pace with the variations of the thermometer; as the following Table, taken from Mr. Kirwan's truly philosophical work on Temperature, satisfactorily ascertains.

“The most usual variations of temperature within the space of 24 hours in every month are:

January, 6°.	May, 14°.	Sept. 18°.
February, 8°.	June, 11°.	Oct. 14°.
March, 20°.	July, 10°.	Nov. 9°.
April, 18°.	August, 15°.	Dec. 6°.

“Thence,” he observes, “the origin of vernal and autumnal colds.”

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With a view to avoid these inconveniences, it becomes of importance to extend, as far as possible, the scale in which the human body can accommodate itself, without injury, to the variations of heat and cold. The lower the temperature we can accustom ourselves to bear with impunity, the more secure is our health. In this respect the faculties of the living body are much influenced by custom. "A habit of uniformity," as Mr. Hunter well observes, "in the application of heat and cold to an animal body, renders it more sensible of the smallest variation in either; while, by the habit of variety, it will become, in a proportionable degree, less susceptible of all such sensations. This is proved every day, in cold weather, by people who are accustomed to clothe themselves warm. In them the least exposure to cold, although the effect produced in the skin is not perhaps the hundredth part of a degree, immediately gives the sensation of cold, even through the thickest covering: those, on the contrary, who have been used to go thinly clothed, can bear the variation of some degrees without being sensible

of it. Of this the hands and feet afford an instance in point ; exciting the sensation of cold when applied to another part of the body, without having before given to the mind an impression of cold existing in them *.” It is observed that, during a voyage to Greenland, disease is hardly known among a ship’s crew. Even wounds and sores are said to heal almost spontaneously. The very different consequences that occur during a transition from a cold to a warm climate, are too generally known to require any detail.

The modern refinement of constructing houses so as, by means of double doors and windows, almost wholly to exclude the external air ; the thick covering which we spread upon the floors of our chambers ; and the heating of them by close stoves, with narrow chimneys ; are in direct opposition to the doctrine I am now endeavouring to inculcate. But is disease less frequent ? Is catarrh more rare, or consumption less fatal ? In vain do the delicate

* Observations on Animals, with respect to the power of producing Heat, by John Hunter.

accumulate defences against the vicissitudes of external temperature. Those who never tread but on carpets, and take every precaution to prevent the breath of Heaven from blowing on them, are more liable to be disordered by the impresson of cold, than the laborious peasant, or the seaman daily exposed to the rage of storms and tempests. The occasional use of the cold bath, by inuring the body to a wider range of temperature, tends to diminish the danger of those sudden transitions from heat to cold, and the contrary; which, in the common tenor of life, it is impossible wholly to avoid. After having bathed in the sea during a few weeks in autumn, I have observed, with respect to myself, as well as in many other instances, that persons prone to catarrhal affections are much less susceptible of them during the ensuing winter. One general effect of the cold bath being unquestionably to induce a degree of what in common language is denominated hardiness, and which may be defined, that state of the living system which is least liable to be affected by disagreeable impressions.

———“ a frame so Steele'd

Dreads not the cough, nor those ungenial blasts
That breathe the Tertian, or fell Rheumatism ;
The nerves so tempered never quit their tone,
No chronic languors haunt such hardy breasts.”

ARMSTRONG.

As we have reason to believe that the source of animal heat is in the lungs, so the external surface of the body appears to be the organ by which the temperature of the system is regulated. By exercise the circulation is accelerated, a greater quantity of blood passes through the lungs in a given time, the respiration is quickened, and more heat is evolved. But exercise at the same time augments the discharge from the surface of the body ; which, being converted into vapour as fast as it is produced, tends, on the principle already explained, to carry off, or render insensible, a considerable portion of the increased heat. To modify the temperature of the human body in warm climates the secretions of perspirable matter is prodigiously augmented, and copious supplies of diluting fluids are required to supply the rapid waste. By these means the heat of the living body,
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while in health, is prevented, in all situations, from exceeding 98° . Any excess above this standard is indicative of disease: for example, in fever, the heat of the body, as determined by the thermometer, sometimes is found to exceed this proportion, but at the same time the skin is dry and parched; as soon as a free perspiration is procured by art, or takes place spontaneously, which is frequently the natural crisis of the disease, the increased heat is found to subside.

It is necessary to understand, that the perspirable matter does not exude through the pores of the skin in proportion as they are relaxed by heat, as water might be supposed to transude the pores of leather. Perspiration is to be considered as an active function, in like manner as any other secretion of the living body. It is carried on by vessels called exhaling arteries, communicating with the pores of the skin. These vessels are liable to be stimulated to increased action by heat, or rendered torpid by cold, in the same manner as every other

other part of the animated body. When the exhaled fluid is dissolved by the air as fast as it perspires through the skin, the perspiration is said to be insensible; this is particularly the case when the atmosphere is warm and dry. When the air is impregnated with moisture, so as to dissolve more with difficulty; or when the quantity of perspiration is augmented by exercise faster than the air can take it up; it becomes visible on the skin in form of drops, and is then termed sensible perspiration, or sweat. The same effect takes place when the body is covered with bed-clothes, or with silk rendered impervious by varnish, which precludes the access of fresh portions of air. Perspiration may then be stated to take place in the compound ratio of the activity of the exhalent vessels, and the solvent power of the atmospheric air: and the appearance of sweat is not to be considered as any real proof of an augmentation of the quantity of matter perspired; but only as demonstrating the excess of the discharge above the then relative solvent power of the air.

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The quantity of perspirable matter discharged from the surface of the skin in this country, in the course of twenty-four hours, is calculated, on an average, to amount to fifty ounces. When we reflect that the matter daily discharged by perspiration exceeds, in more than a double proportion, the quantity of all the other secretions from the human body taken together, the importance of endeavouring to maintain in a healthy state, the organ by which a function of such importance in the animal economy is performed, becomes obvious.

But a healthy state of the skin, as of every other organ of the living body, consists in the power of carrying on its own functions with regularity, independent of the influence of any extraordinary stimulus. If the body be constantly surrounded by a medium of a high temperature, either from living in a warm climate, or by wearing clothes which are very imperfect conductors of heat, the insensible perspiration will be checked by the smallest diminution of that temperature. By accustoming

toming the cutaneous vessels to sudden transitions from heat to cold, their susceptibility of the effects of slighter alterations is diminished, and perspiration becomes firm and regular. As a proof that the organs of perspiration are rendered more vigorous by occasional exposure to cold, I have known many examples of people who never failed to catch cold, as it is called, on having their feet in the slightest degree wet; who, in consequence of adopting the habit of washing their feet regularly every morning with a cloth dipped in cold water, or, what is preferable, in a solution of common salt in water, have entirely overcome this delicacy of constitution. By pursuing the same practice, I have known that dryness of the feet, which is generally a symptom of feeble health, wholly removed.

A free and regular perspiration is in general accompanied with good health, and a good digestion. This is well exemplified in the poor country-labourer; who, by working all day thinly clad, in the open air, acquires a keen appetite, that makes him relish the most solid

solid and substantial food. That cold bathing, and the more free exposure to the open air, which people generally accustom themselves to, during a residence at the sea-side, are conducive to the same purpose, is a well-known fact.

The lower the temperature at which the organ of perspiration is accustomed to perform its functions, the less is the risk of its due action being interrupted by the inconstancy of our climate; and in the same proportion is the danger of diseases originating from checked perspiration diminished. And I have sometimes been inclined to imagine that the predilection of the inhabitants of Great Britain for bathing in the sea, and in cold baths, a practice more generally followed here than in any other part of Europe, arises from an instinctive sense, independent of reasoning, of the utility of accustoming themselves to the vicissitude of an uncertain climate.

A free perspiration is too often confounded with sweating. The former, however, is always

always to be considered as a proof of vigorous health, whereas the latter is generally a symptom of debility. It is commonly observed that weak people are most prone to sweat. The inordinate increase of this secretion, as of any other, tends to debilitate. If exercise be carried so far as to excite sweat, it will be followed by an adequate degree of fatigue. Perhaps no animal would voluntarily carry exertion so far as to produce sweat. The debilitating effects of excessive sweating, produced by warm clothing, is sufficiently testified by the sickly and emaciated appearance of horse-jockies, who submit to this process in order to reduce their weight to a certain standard. A great part of the injurious effects of a warm climate may be attributed to the same cause. To those who are under the necessity of using violent exercise, or who, from living in a warm climate, are liable to profuse sweats, a woollen tegument worn next the skin, as tending to absorb the superfluous moisture, is found to be a very salutary part of dress. But whether the present prevailing fashion of keeping the body constantly bathed in perspiration

ation, by wearing flannel, in all seasons of the year, next the skin, can be supposed to improve the general health of the inhabitants of this country, is a question perhaps not yet fully determined.

Besides the debility that flannel worn next the skin occasions, by increasing the secretion of sweat, it probably tends also to weaken by other means. The incessant irritation of the numerous points of which its rough surface is composed, and which always occasion uneasiness on the first adoption of flannel, only ceases to be perceived in consequence of the skin losing part of its sensibility; and this, like every other incessant irritation, must tend to accelerate the approach of old age. Of this effect the pale and sickly appearance of a person accustomed to be too warmly clothed, which differs as far from the hue of health, as the sickly delicacy of the hot-house plant is distant from the vigour of the forest oak, affords proof almost sufficient. Lord Bacon says, "*vestes nimiae sive in lectis, sive portatæ, corpus solvunt*.*"

* *Historia Vitæ et Mortis.*

The sensation of increased warmth and comfort, experienced on first wearing flannel in immediate contact with the skin, constitutes one source of deception with regard to its ultimate effects. To the living body every new stimulus is for a time agreeable. A person not habituated to the use of fermented liquor thinks himself warmed and invigorated by swallowing a glass of distilled spirits: but how frequently do such fallacious sensations allure unhappy victims to the repetition of these Circean cups, till irremediable debility ensues, and men are indeed transformed into very beasts! People in the habit of taking purgative medicines soon find that the bowels will not perform their functions without them; but that would not be a good reason for saying that such people were more healthy than others, or for recommending the daily use of an aloetic pill to preserve health. The habitual use of flannel garments, by accustoming the exhaling vessels to perform their functions in a certain high temperature, in like manner diminishes their natural energy, and renders them liable to become torpid by the slightest abstraction

abstraction of their usual warmth; and thus gives rise to colds, rheumatism, and other complaints arising from checked perspiration, which much clothing is commonly, but erroneously, supposed to prevent. Dr. Cheyne, who was certainly well acquainted with the maladies of the feeble and the delicate, asserts “that much clothing debilitates the habit, and weakens the strength; and that the custom of wearing flannel is almost as bad as a diabetes.”

On a subject concerning which there certainly exists a very considerable diversity of opinion, I am happy to be able to quote the sentiments of Dr. Trotter, in confirmation of those which my own observation has led me to adopt. From having been for some years Physician to the Fleet, the Doctor must necessarily have had considerable experience of the effects of sudden and extreme variations of temperature on the living body.

“The use of flannel next the skin has become a very general practice in phthisis;

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and the moment any person is phthically disposed, he is immediately recommended to wrap himself in this kind of clothing. But this custom is certainly to be followed with some qualification. To preserve the body in a grateful and equal temperature, must be very desirable in this disease; but it never could be intended to keep flannel as long in contact with the human body, without shifting, as we daily see done. Those who wear it sleep with it on, and it must be very soon offensive. It therefore ought never to be continued beyond a single night without a change; otherwise the body will be confined, as it were, in a bath of impure air, that ought to be exhaled, instead of being accumulated. Very frequent ablution of the whole surface should be regularly attended to during the use of flannel.

“ But if the weakly and valetudinary have safely indulged in this practice, it never was meant that the young and healthy should have recourse to such effeminate modes of clothing. The custom, however, has become so general, that we are in danger of losing the hardihood

and vigour of our national character from its use. Flannel and fleecy hosiery are to be found under the shirt, among half of the young men of the age, whose habits of changing them are not more delicate than others I have mentioned.

“ After being much weakened by West-India sickness, I had recourse to flannel next the skin; but in cold weather I now find more advantage from wearing it over the shirt, and think that I have fewer attacks of catarrh in variable weather from this, and the custom of general ablution.

“ Although I was at one time a great advocate for flannel next the skin, I am now rather disposed to wear it over the linen, and to recommend daily ablution of the whole body, to inure it to the weather.”

In another place the Doctor observes, “ Flannel worn next the skin has been cried up by many, in the treatment of stomach complaints, from the sympathy that is said

to exist between that organ and the skin. I think better effects are to be derived from the daily ablution of the surface of the body. The one practice is to soften the skin, and render it too delicate; whereas the other tends to fortify it against the rigours and changes of season, and, by preserving it pure and pervious, promotes the extraneous discharge. Those who wish to try this practice, of washing the whole body every morning with resolution and perseverance, will soon find reason to make them continue it for life."

The practice of the ancients, whose raiment was entirely composed of wool, is frequently quoted in support of the health and hardiness that is to be derived from wearing flannel next the skin. But there is no analogy between the present close fashion of dress, by which whatever is worn is kept in immediate contact with the body, and the loose and open garments of the Greeks and Romans, which permitted the free access of air to every part of the body. Besides, their habitual and alternate use of the warm as well as the cold

cold bath inured their frames to sudden and considerable vicissitudes of external temperature.

These remarks on the use, or rather the abuse, of flannel teguments, worn in immediate contact with the surface of the body, are introduced here, because I have known many persons who have been evidently debilitated, and who have experienced various inconveniencies from their use, without suspecting the real cause from which they suffered. And I know also, from personal experience, that the custom of wearing woollen may, in most instances, be laid aside during a course of sea bathing with impunity, though certainly not without caution. The flannel waistcoat may at first be put over the shirt, and during warm weather may be exchanged for one of cotton. By this means the stimulation of the skin by the roughness of the flannel will be prevented, while the body still continues to be preserved in its usual temperature. Let it not be supposed that I mean indiscriminately to condemn the use of flannel as a remedy in

disease,

disease, or as a fit protection for the enfeebled constitution. Every person ought certainly to wear a proportion of clothing sufficient to exclude the actual sensation of cold. But let the young and the healthy beware of indulging effeminate habits; let them rather endeavour to accustom themselves to bear with impunity those vicissitudes of the seasons, which, the more they attempt to guard against by artificial means, the less will they be able to resist. Let the use of flannel coverings worn next the skin be reserved as the refuge of sickness, and the solace of old age, when the increasing torpor of the cutaneous vessels renders augmented warmth salutary; keeping in mind the judicious precept of Celsus, "*Cavendum, ne in secunda valetudine adversæ præsidia consumantur.*"

Nothing tends more to maintain the skin in a healthy state, and to promote a free perspiration, than the regular use of the flesh-brush. It is surprising that cutaneous friction, the good effects of which are so evident in preserving other animals in a state of health,

health, and whose varied application formed so great a part of the hygeiaſtic regimen of the ancients, ſhould in modern times have fallen ſo completely into neglect. The occaſional excitement of the cutaneous ſurface, by means of that inſtrument, differs widely from the perpetual irritation of flannel. Beſides, the uſe of it requires a temporary expoſure of the body to the open air, which, while all danger of taking cold is prevented by the increaſed exertion, accuſtoms the ſyſtem to occaſional changes of external temperature, the uſefulneſs of which has been repeatedly adverted to. By removing the groſſer part of the perſpirable matter, which, when permitted to accumulate on the ſurface of the ſkin, forms that ſcurf which may be rubbed off like ſmall ſcales, daily friction with a fleſh-bruſh tends to facilitate the cutaneous diſcharge, and to keep the exhaling veſſels diffuſed over the ſurface of the body in a ſtate of health and activity. By the aſſiduous uſe of this ſimple means, which after a little time will be found very pleaſant, I have known repeated inſtances where the ſkin has

been totally changed from an habitual rough, scabrous, and pimpled appearance, and has become smooth and mellow, accompanied with a general amelioration of the health. The glow which ought to succeed the cold immersion, will be found also to be considerably promoted, by the active state of the cutaneous vessels produced by daily and regular friction. The use of the flesh-brush should, therefore, never be omitted during a course of sea bathing, especially if undertaken for the purpose of restoring lost health.

Among the ancients, the practice of anointing the surface of the body with odoriferous oil, was generally associated with the use of the bath. Lord Bacon, in his "History of Life and Death," regrets the disuse of this custom, and thinks the revival of it would be conducive to the preservation of health, and the prolongation of life, by preventing, what he terms, the predatory effects of the external air upon the spirits. By this expression he probably means, regulating perspiration within due bounds. In what particular cases this
practice

practice would be found most salutary, the experience of modern times is perhaps not sufficient to decide. The external use of oil has lately been affirmed to have cured the Plague. From the copious sweats that follow its use in that disease, we may conclude that it does not impede the cutaneous discharge. To swimmers, who are desirous of remaining long in the water, it might be of use, by lubricating the surface of the body, to enable them to glide more swiftly through the liquid element. From experiments tried on my own person, I have ascertained that oil may be applied over the whole surface of the body at all seasons of the year without danger. It appears to increase the general warmth of the system, and might probably be found useful in obviating the disagreeable effects of easterly winds on a delicate constitution, by preventing the too quick evaporation of moisture from the surface of the body.

The effects of sea bathing have hitherto been considered only as depending on the difference between the temperature of the
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living body and that of the water in which it is immersed. But I am inclined to think, that bathing in salt water affects the skin in a manner that has not as yet been sufficiently attended to. Dr. Currie, it is true, has observed, "That by the stimulating effects of sea salt on the vessels of the skin, the debilitating action of cold is prevented. Persons immersed in salt water preserve the lustre of the eye, and the ruddiness of the cheek, longer than those in fresh water of the same temperature, and exhibit the vital re-action stronger, when removed from it." Fishermen, whose occupation exposes them much to the various inclemencies of the elements, commonly say they are less liable to be injured by being wet with salt water than with rain. And even people of more delicate habits observe, that in this country, as well as in warmer climes, they are less susceptible of cold from being wet with salt, than with fresh water. This fact admits of being in part explained by the comparatively slow evaporation of water impregnated with salt, in consequence of which the heat of the body is more gradually

ally abstracted. But it is probably still more closely connected with the stimulating effects of the saline particles deposited on the skin by the evaporation of the water.

That a saline incrustation is formed on the skin, in consequence of bathing in the sea, a person may be easily convinced, by applying the tongue to any part of the body even after several days have elapsed since the last time of bathing. By the mere mechanical action of the particles which compose this deposit, the common friction of the apparel must be so far increased, as to excite in some measure the action of the cutaneous vessels. The effects of a long continued exposure of the surface of the body to the action of sea-water, is well exemplified in the following quotations from Capt. Bligh's narrative of his miraculous run of 4000 miles, in an open boat, across the Pacific Ocean.

“ As I saw no prospect of getting our clothes dried, I recommended it to every one to strip, and wring them through salt water, by which means

means they received a warmth that, while wet with rain water, they could not have; and we were less liable to suffer from colds or rheumatic complaints."

Again he observes, "I would recommend to every one the method we practised, which is, to dip their clothes in salt water, and wring them out, as often as they become filled with rain: it was the only resource, and was, I believe, of the greatest service to us, for it felt more like a change of dry clothes, than could well be imagined."

And at page 63: "In the morning the rain abated, when we stripped, and wrung our clothes through the sea water as usual, which refreshed us wonderfully."

In the account of the loss of the Centaur, by Capt. Inglefield, it is stated, that "by their clothes being continually wet with salt water, their bodies were in many places chafed into sores." If so considerable an effect as actual ulceration be found to result from the permanent

nent application of water impregnated with salt to the surface of the body, it is surely fair to infer, that some degree of, perhaps, salutary excitement of that surface, may be produced by frequently repeated immersion in the sea during a more limited period of time.

A pale, languid, flaccid state of the skin is generally the concomitant of feeble health. The irritation of the salt deposited on it appears to have a tendency to alter its condition in this respect. It is a common observation, that bathing in the sea tends to give a certain roughness and asperity to the surface of the body; and I believe that in all cases where some degree of cutaneous efflorescence is the result of bathing; the practice will be found ultimately to prove beneficial.

The opposite state of the constitution to that which has been just mentioned, is what may be termed the irritable, or inflammatory habit. This most commonly prevails among the inhabitants of the northern parts of Europe. Persons of this temperament enjoy the most vigorous

rous health; but their great susceptibility of external impressions renders them at the same time peculiarly liable to the action of the exciting causes of disease. Healthy children, in the facility with which they are affected by all external stimuli, exemplify this highly irritable state of the constitution. If their extremities, after having been exposed to cold, are suddenly brought near a fire, the inflammatory affection termed Chilblains is often the consequence. As life advances, the irritability of the constitution is diminished, and people become less liable to these, as well as all other directly inflammatory complaints. On removing to warm climates, the most healthy and vigorous individuals are most liable to be attacked and destroyed by the yellow fever, and other indigenous diseases of those countries. After a few years' residence, they become less susceptible of the impression of heat, or of contagion, the constitution gradually accommodating itself, or being seasoned, as it is termed, to the climate. But, in proportion as they become less liable to disease, the same persons lose their pristine vigour, and
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partake of the languor and debility of the older inhabitants. And it is a curious fact, that not only Europeans, on their return to the West Indies, after having revisited Europe, become again liable to be affected by the diseases peculiar to those climates, but the native Creoles, and even Negroes, after having resided some time in this country, are found to be susceptible of these diseases, to which they were not previously liable, or at least much less so than Europeans.

Bathing in the sea, by exposing the body for a time to a medium of a lower temperature than it is accustomed to, combined with the opportunity of breathing a pure air, appears, in like manner, to restore to the constitution a portion of that irritability which had been previously exhausted, by the heat, the impure atmosphere, and, above all, by the enervating modes of life peculiar to great towns*. The transition

* Towns being formed of stone or brick, are warmer in summer than the open country, unless the streets be so close as to intercept the free action of the sun's rays.

Kirwan's Estimate of Temperature.

transition from languor and lassitude to vigorous and florid health, which is sometimes so rapid during even a short course of judiciously regulated sea-bathing, as to render it difficult to recognize the meagre invalid who, a few weeks before, had repaired to the sea-coast in search of health, seems to afford a strong confirmation of this opinion.

ON THE TIME OF BATHING.

AMONG those who repair to the sea-coast, whether in pursuit of health or of pleasure, a notion very generally prevails; that it is impossible to bathe too early in the morning. This opinion was no doubt originally founded on observation. The process of digestion requires an uniform degree of heat; and a sense of weight and fulness in the region of the stomach, accompanied with eructations of air, and other symptoms of indigestion, are the usual consequences of going into a bath of a lower temperature than the living body, soon after a full meal. While the vital energy is occupied in producing that re-action, or glow, on which all the good effects of bathing depend, the digestive process suffers a temporary interruption; but, as this can never be the case early in the morning, it has been inferred, that the morning, before breakfast,

breakfast, is the only proper time for persons of every description to bathe.

Although there can be no doubt of the impropriety of plunging into cold water while the stomach is loaded with aliment, it by no means follows that, in every instance, it is right to bathe immediately on leaving bed in the morning.

I have frequently been shocked at seeing delicate invalids of both sexes, apparently just risen, and before the vital functions had resumed their proper energy, standing pale and shivering on the bleak beach, or waiting in a bathing-room, chilled by streams of cold air rushing through opposite doors and windows, and expecting, apparently with a degree of horror, their turn to go into the water. From bathing in this state of the body, no possible advantage can be derived.

Persons possessed of feeble health should content themselves with a gentle walk in the open air before breakfast; nor should that be
continued

continued beyond the first sensation of fatigue. The time of bathing ought to be postponed till past noon, or at least till some hours after breakfast, when the digestion of that meal may be supposed to be terminated; and such a degree of exercise should always be taken previously to entering the water, as may be sufficient to produce a general sensation of warmth over the whole body. These observations are by no means intended to dissuade from the practice of early rising. No maxim respecting the preservation of health being more universally true, than that every moment passed in bed after the termination of natural sleep tends to debilitate.

The time of bathing must always indeed be, in some measure, regulated by the state of the tide. At most bathing places, a person may contrive, at all times of the day, with the assistance of a machine, to get into the sea. But in different situations of the tide, the temperature of the water will be found to vary considerably. This fact, first suggested to me by accident, I have since frequently verified

by the thermometer, and have found the temperature of the sea, when high water occurs about two or three o'clock in the afternoon, to be from ten to twelve degrees above what it was at low water, at eight o'clock in the morning of the same day.

This phenomenon appears to admit of the following explanation. The early retiring tide leaves the sand uncovered, which continues for many hours exposed to the rays of the sun. During this period it acquires a considerable degree of heat. As the tide rises, the particles constituting the lower stratum of the advancing thin sheet of water, as they successively come in contact with this heated sand, are warmed, expanded, and rise to the surface. Being specifically lighter, they will continue to advance foremost, till they reach the limits of high tide, when the margin of the sea must necessarily be warmer by all the heat it has acquired during the flowing of the tide over this long tract of heated sand, than the great body of the ocean. For analogous reasons, the heat of rivers is

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is observed in summer to increase from early in the morning till towards evening.

This variation of temperature in the sea can only take place during fine weather. The agitation occasioned by a storm mingles the deeper water, to which the influence of the sun has not penetrated, with that of the surface, after which the general temperature of the sea is found to be lowered. During warm weather and on a sandy beach, this difference of temperature will be most obvious; sand acquiring, as well as parting with heat, more readily than shingles or rock. It must be of importance to invalids to know, that by selecting a proper situation, and bathing in a rising tide, about noon, or within an hour or two afterwards, they have it in their power to use a bath ten or twelve degrees warmer, than at a more early hour in the morning.

To the vigorous and robust such precautions are superfluous. A healthy man can sustain no injury from bathing early in the morning, provided he has not been intemperate the pre-

ceding night. If he has been accidentally betrayed into any slight irregularity, the time of bathing should be postponed till noon, when the system may be supposed to have recovered from the effects of intemperance. To take half an hour's previous exercise, will be found salutary to every person, so as to avoid going into the water with any sensation of chilliness.

The temperature of the sea varies considerably also at different seasons of the year. During the months of July and August, it is warmest. The average temperature of the sea on the coast of this country during these months has been stated by Dr. J. Hunter to be a little above 63° , though he has observed it to rise as high as 71° *. Heat, like all other fluids, constantly tends towards an equilibrium. Whatever causes the air to expand augments its capacity for the reception of heat, which flowing where it finds the least resistance, the substances

* In his very ingenious Paper on the Heat of Wells and Springs in the island of Jamaica. Philosophical Transactions for 1788.

substances from which it departs are proportionally cooled. Hence, in low states of the barometer, which commonly precede rain, or thunder, the temperature of the sea has been observed to be considerably diminished.

Formerly it was the custom to bathe in the evening; and we may observe, that youth in general, and those who resort to the water merely for pleasure, spontaneously make choice of the close of the day. To obey the dictates of Nature can seldom be wrong. The removal of lassitude, and the sense of refreshment, which are the immediate consequences of immersion in cool water after moderate fatigue, and the profound repose of the ensuing night, are incontestible proofs of the salubrity of the practice to the young and the healthy. But for those who are in the habits of full living, of dining late, and afterwards taking their wine, or who have during the day been exhausted by severe fatigue, to bathe in the evening would be a very imprudent experiment.

The advice to bathe in cold water, in order to procure sound sleep, is as old as the time of Horace :

—————"Ter uncti
Transfanto Tyberim, fomno quibus opus est alto."

From this passage we also learn, that the ancients were accustomed to anoint the surface of the body previously to bathing. The tendency to sleep appears to be the effect of the exhaustion of the system in consequence of the effort made to maintain the natural temperature of the body while immersed in a medium colder than usual. In cases of nervous irritability, accompanied with watchfulness, immersion in water of a low temperature, continued even for many hours together, has been advised and practised with success by Pommè *.

Long continued immersion in a cold bath is also said to have removed mania, and even to have been successful in some cases of hydrophobia. In all instances where it has been used with advantage, profound and long continued

* Recueil sur les Vapeurs.

tinued sleep has been the first symptom of returning health. In diseases of so serious a nature, experiments should not be tried, except under the superintendence of a professional man.

I have frequently observed, that evening bathing has been followed by a copious perspiration during the ensuing night. The same effect is a frequent consequence of the custom pursued by some parents of permitting their children to return to bed after bathing in the morning. The debility consequent to the perspiration produced by the warmth of the bed clothes, must do more than counteract all the invigorating effects expected from the use of the cold bath.

ON THE MANNER OF BATHING.

CONCERNING the peculiar state of the living body, which renders it most safe and prudent to venture on an immediate immersion in the cold bath, erroneous notions, perhaps, more generally prevail, than with regard to any other circumstance connected with the practice of bathing. Like many other opinions relative to the conduct of the healthy, as well as to the treatment of the sick, which are now considered as popular prejudices, these errors appear to have emanated from medical doctrines, which were at some former period generally received, but which have since been discovered to originate from false theory, or to be founded on mistaken views of the laws by which the animal economy is regulated.

Frequent examples of dangerous, and even fatal, effects having been observed to take place

place in consequence of drinking cold fluids, or of plunging into cold water after having been heated and fatigued by violent exercise, it appeared to be a fair conclusion, that the previous heat of the body was the real cause of the mischief; and it came to be a sort of aphorism, apparently sanctioned by experience, that no person ought either to drink, or to bathe in cold water, while the warmth of the system was by any means raised above its usual standard. This error might be harmless; but a false and most pernicious doctrine has been deduced from it,—That, by waiting till they were cool, persons who had been previously heated by exercise might then bathe with impunity.

The situation of the living body, while cooling, after having been heated by exercise, is as far removed from that state in which it is most safe to venture into the cold bath, as can well be imagined. Feebleness and debility are then fast approaching, and the vital energy is incapable of resisting the further temporary weakening

weakening effects of the cold immersion, which, instead of being followed by the genial glow of health, is then more likely to induce a dangerous, perhaps a fatal, torpor. To bathe in this state of the system, may be compared to immersing the body during the cold fit of an intermitting fever in a cold bath. The progress of this disease, it is well known, may often be arrested by the affusion of cold water timely applied during the hot paroxysm; but were the same practice to be attempted in the cold fit, the consequence would probably be immediate death.

But, although it is attended with much danger to enter water of a temperature so low as that of the sea, when the body has been exhausted by fatigue; it by no means follows that it is improper to bathe during the permanence of that warmth which has been produced by moderate exercise. The consequences of bathing in these very different states of the body, have been so well discriminated by Dr. Currie, that I am induced to give his opinion
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in his own words. The truth and appositeness of the Doctor's observations must be my apology for the frequent quotation of them.

“ In the earlier stages of exercise, before perspiration has dissipated the heat, and fatigue debilitated the living power, nothing is more safe, according to my experience, than the cold bath. This is so true, that I have for some years constantly directed infirm persons to use such a degree of exercise before immersion, as may produce some increased action of the vascular system, with some increase of heat, and thus secure a force of re-action under the shock, which otherwise might not always take place. The popular opinion, that it is safest to go perfectly cool into the water, is founded on erroneous notions, and is sometimes productive of injurious consequences. Thus, persons heated and beginning to sweat, often think it necessary to wait on the edge of the bath until they are perfectly cooled; and then plunging into the water, feel a sudden chilliness that is alarming and dangerous. In
such

such cases the injury is generally imputed to going into the water too warm, whereas in truth it arises from going in too cold.

“ But though it be perfectly safe to go into the cold bath in the earlier stage of exercise, nothing is more dangerous than this practice, after exercise has produced profuse sweating and terminated in languor and fatigue; because, as has already been repeated more than once, in such circumstances the heat is not only sinking rapidly, but the system parts more easily with the portion that remains.”

Many of the circumstances which, perhaps, unavoidably precede the present mode of bathing, seem calculated to induce a state of the system the very reverse of what has just been insisted on as the most proper with which it is eligible to enter the water. The machines, as they are called, which are provided for conveying bathers into the sea, are frequently composed of canvas; at least the extensive awning with which they are in some places

places furnished, and which, as subservient to the purposes of shelter and decency, they certainly ought never to be without, is always constructed of this material. Being necessarily exposed to all kinds of weather, they are occasionally so completely pervaded by rain, that several days of sunshine are required to render them perfectly dry. They will moreover be found in general replete with moist exhalations arising from wet clothes and damp boards, the perpetual evaporation from which is so productive of cold, that I have frequently observed the thermometer indicate their temperature as being from three to five degrees under that of the open air *.

Of

* I have not seen the process of bathing conducted anywhere with more propriety than in the isle of Thanet. The bathing machines with awnings, which are or ought to be everywhere adopted, were first constructed by an inhabitant of Margate, as I have been informed by his respectable widow, Mrs. Beale, now ninety years of age, residing at Draper's, a living testimony of the salubrity of that part of Kent. This Lady, who still retains her memory, and all her senses nearly in their pristine perfection, told me that she remembered the first family, who ever resorted to Margate for the purpose of bathing, being conveyed into the sea in a covered cart.

Of these vehicles, such as they are, a sufficient number is never to be found in readiness to accommodate the bathers in uninterrupted succession. As persons are only entitled to a machine in the order in which their names are set down, numbers must necessarily be always waiting in expectation of their turn. This interval is generally passed in loitering in an apartment rendered cold by the exclusion of the rays of the sun, the exhalation of moisture from various sources, and a perpetual thorough draught of air. The apprehension which many timid people have of going into the sea is further increased by the abatement of spirits consequent to that kind of slight disappointment which arises from not having an opportunity of bathing at the moment when the mind was made up to it. All these circumstances tend to impair the energies of life, and consequently to diminish the advantages to be expected from the cold immersion. Such inconveniences do not perhaps admit of being completely corrected; it is, however, proper to point them out, in order to put the more delicate, and especially invalids, on their guard;

guard ; to prevent them from imputing evils to sea bathing which in fact originate from their own improper conduct ; and at the same time to enable them to use such precautions as are within their power, in order to obviate those evils.

By continuing a due degree of exercise, the heat of the body should be kept up to its highest point till the moment of entering the bathing machine. If the clothes be taken off too soon, an interval elapses between the time of undressing and of immersion in the water, during which the body is liable to be chilled by exposure to the air. But the preferable plan is, after undressing as quickly as possible, immediately to wrap the body in a large dry flannel gown, which should not be laid aside till the very moment previous to plunging into the water. By this means the shock of immersion will be diminished, and the occurrence of the salutary glow, which ought always to succeed bathing, may in general be insured.

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That a transition from a warm to a colder medium, when the body is actually heated, but not exhausted by perspiration or fatigue, is not attended with danger, may be proved by abundance of instances. In this country, during the winter season, we are in the daily habit of going from rooms heated by means of fires to 60° and upwards, into the open air at or beneath the freezing point, an alteration of more than thirty degrees, as measured by the thermometer, with impunity: for, were this a fit place to introduce such disquisitions, it might easily be shewn that the coughs and colds, commonly supposed to be caught by passing too suddenly from heated theatres, and crowded ball-rooms, into the open air, are either to be attributed to the direct effects of increased temperature, or to the consequence of exposing the body, enfeebled by sweating, fatigue, and breathing impure air, to the action of cold.

“ On the *Campus Martius*, the exercises of the Roman youth were carried on with all the vehemence

vehemence of emulation. Swimming formed a part of those exercises, and generally terminated the foot-race. The youthful candidates in this exercise directed their course towards the banks of the river, and plunged headlong into the stream. Sometimes the contention did not terminate till they had swum across the river twice. Hence it will easily be seen, that they were accustomed to immerse themselves in water in the very fervor of their exertions, when the heat was preternaturally great; and not after the body was cooled by profuse perspirations, or exhausted by long-continued fatigue *."

But the most surprising and almost incredible examples of the transitions from great heat to extreme cold, which the human frame can sustain without injury, are furnished by the practice of the more northern nations of Europe. The Russian vapour baths are heated to 120° , and from these the natives plunge into the neighbouring river, through holes cut in

* Dr. Currie's Reports.

the ice, or roll themselves amid the snow. The colder the climate, the more do the inhabitants appear to delight in these transitions from one extreme of temperature to another.

The following account of the mode of bathing in Finland, is to be found in Acerbi's Travels :

“ Almost all the Finnish peasants have a small house built on purpose for a bath : it consists of only one small chamber, in the innermost part of which are placed a number of stones, which are heated by fire till they become red. On these stones thus heated water is thrown, until the company within be involved in a thick cloud of vapour. In this innermost part, the chamber is formed into two stories for the accommodation of a greater number of persons within that small compass ; and it being the nature of heat and vapour to ascend, the second story is, of course, the hottest. Men and women use the bath promiscuously, without any concealment of dress, or being in the least influenced by any emotions of attachment. If, however, a stranger open
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the door, and come on the bathers by surprise, the women are not a little startled at his appearance; for, besides his person, he introduces along with him, by opening the door, a great quantity of light, which discovers at once to the view their situation, as well as forms. Without such an accident they remain, if not in total darkness, yet in great obscurity, as there is no other window besides a small hole, nor any light but what enters in from some chink in the roof of the house, or the crevices between the pieces of wood of which it is constructed. I often amused myself with surprising the bathers in this manner; and I once or twice tried to go in and join the assembly; but the heat was so excessive that I could not breathe, and in the space of a minute at most, I verily believe, must have been suffocated. I sometimes stepped in for a moment, just to leave my thermometer in some proper place, and immediately went out again, where I would remain for a quarter of an hour, or ten minutes, and then enter again, and fetch the instrument to ascertain the degree of heat. My astonishment was so great that I could scarcely believe my senses, when I

I found that those people remain together, and amuse themselves for the space of half an hour, and sometimes a whole hour, in the same chamber, heated to the 70th or 75th degree of Celsius (equal to 167° of Fahrenheit, or within 8° of boiling spirits). The thermometer in contact with those vapours, became sometimes so hot, that I could scarcely hold it in my hands.

“ The Finlanders, all the while they are in this hot bath, continue to rub themselves, and lash every part of their bodies with switches formed of twigs of the birch-tree. In ten minutes they become as red as raw flesh, and have altogether a very frightful appearance. In the winter season they frequently go out of the bath, naked as they are, to roll themselves in the snow, when the cold is at 20 and even 30 degrees below zero. They will sometimes come out, still naked, and converse together, or with any one near them, in the open air. If travellers happen to pass by, while the peasants of any hamlet or little village are in the bath, and their assistance is needed.

ded, they will leave the bath, and assist in yoking or unyoking, and fetching provender for the horses, or in any thing else, without any sort of covering whatever, while the passenger sits shivering with cold, though wrapped up in a good sound wolf's skin. There is nothing more wonderful than the extremities which man is capable of enduring through the power of habit.

“ The Finnish peasants pass thus instantaneously from an atmosphere of 70 degrees of heat to one of 30 degrees of cold, a transition of 100 degrees, which is *the same thing as going out of boiling into freezing water!* and, what is more astonishing, without the least inconvenience, while other people are very sensibly affected by a variation of but five degrees, and in danger of being afflicted with rheumatism by the most trifling wind that blows.”

To determine how long it is proper to continue in the water, as well as whether it be preferable to remain satisfied with only one plunge,

plunge, or to repeat the immersion several times successively, has more influence on the ultimate utility of bathing, than, on a slight view of the subject, might be supposed. While augmented warmth, vigour, and refreshment, were the constant result of a single plunge, I have repeatedly had occasion to remark, that the same person, by returning into the water several times, has at length become so enfeebled, as with difficulty to be able to regain the machine; and has continued to be affected with head-ach, chilliness, and general lassitude, during the remainder of the day.

After leaving the bath, I have often noticed, as well as caused others to remark, that if a limb, as a leg or an arm, or the whole body, be again immersed, the water seems perceptibly colder to the sensation than it did at first going into the sea. There are many reasons to believe that, on a sudden transition to a cold and dense medium, an effort takes place in the living body to produce heat, or to resist the action of cold. The continuation of this action, for some time after leaving the bath,

On every occasion a second immersion to feel colder to our sensations than the first. Without professing to be acquainted with the real nature of this effort, it is consistent with the laws of the animal economy, as well as with fact, to suppose that a frequent repetition of this, as of any other energetic action of the system, will be followed by weakness.

To remain during a moderate space of time completely immersed in water, has by no means similar debilitating effects. The very different consequences resulting from long-continued immersion in the sea, and from being alternately covered with water, and exposed to the air, is strongly exemplified in Dr. Currie's interesting narrative of the effects of a shipwreck on some mariners, who were cast away on a sand-bank that lies at the mouth of the river Mersey. They remained twenty-three hours clinging to the wreck, in the month of December. The part of the wreck to which they adhered, lying in a sloping direction, those of the crew who were placed on the higher part of it were generally out of the

sea, but occasionally overwhelmed by surge, and exposed to a piercing wind, while the others were almost constantly immersed in the water. In the former situation were placed the two masters, stout men, in the prime of life, and accustomed to hardships. They both died during the night, while the remainder of the crew, among whom was a Negro, were all preserved, except one, and ultimately recovered.

The example of the guides, who at most bathing places continue often for hours together in the water, without sustaining any material injury, proves that healthy people may remain immersed in water of the temperature of the sea, during a considerable time, with impunity.

Those who bathe for health ought therefore to keep in mind, that it is safer to remain during a short time completely immersed in the water, than to take repeated plunges. Indeed, I have frequently remarked the reaction to be more powerful, and the glow on the surface

the of the body more vivid, after remaining under water about a minute, than when the immersion was only instantaneous. The repetition of immersions, as well as their continuance, must be regulated by the peculiar constitution, and state of health, of particular individuals. Their duration, as well as their frequency, may be increased in proportion as the system is invigorated by the practice of bathing, and as the effects of a transition from one medium to another become diminished by habit.

Where circumstances permit the practice, to plunge head foremost into the water is generally advised as the best mode of bathing. It appears difficult to discover either the principle on which this method is founded, or the purpose which it is supposed to answer. Assuredly, it is not the mode indicated by Nature. A person desirous of bathing for the sake of cleanliness, or of pleasure, whose mind was free from the influence of any previous tuition, on reaching the margin of the main, or a river, would strip, and walk leisurely into

into the water, till a depth suited to his purpose was attained. What should induce those who bathe for the purpose of invigorating the constitution, or the recovery of health, to make this violent and unnatural exertion, is truly difficult to surmise. But I am inclined to think, that some of the kinds of head-ach, attributed to bathing, in reality originate from this precipitant plan of immersion.

To hear a person not accustomed to such an attitude, complain of head-ach after standing half a minute with his heels in the air, would not excite much surprize. To such an action the headlong leap into the sea is very analogous. The act of temporarily containing the breath too, which this mode of immersion necessarily implies, tends likewise to accumulate more than the due quantity of blood in the head.

More than once, I have heard, especially from the fair sex, expressions of repugnance and horror at the idea of being dragged head foremost into the water by the guides. Whether any individuals or that very useful and necessary

every class of people, actuated perhaps by the false notions of increasing their own consequence, by occasionally operating a little on the fears of their employers, have ever acted in such manner, I pretend not to determine. But the proper office, and duty of a guide is surely very obvious, and consists solely in taking care that no accident befalls the timorous, or the imprudent, while descending from, or returning into the machine, or during the time they remain in the water.

In bathing, it is unquestionably proper to sink the head, and the whole of the body, under water, with all possible expedition. But to effect this purpose, a headlong plunge is by no means requisite. Let the bather, holding by the rope if timid, or with the assistance of the guide, quickly descend the steps of the machine, then immediately stooping, or crouching down, permit the water to flow over the whole body, including the head. The more speedily the whole of this process is performed, the less will the person be affected by convulsive respiration. The rubbing is always most harassing,

harassing, when one half of the body is in water, while the other remains exposed to the air. For reasons which have already been detailed, the more delicate will find it much better to leave the water immediately after having remained in this situation as long as convenient, than to persist in repeated submersions of the upper part of the body.

Although during the general season of bathing, the air is always a warmer medium than the sea, a person after bathing cannot properly be considered as restored to the temperature in which he is accustomed to live, till the usual dress has been resumed. The more speedily therefore the customary cloathing is restored, especially to the chest and upper part of the body, the more rapid and intense will be the return of the salubrious glow. During the process of dressing, which is considerably impeded by the motion of the machine, even the healthy in general experience a severe fit of shivering, which in the more delicate sometimes amounts nearly to convulsion.

A great part of these unpleasant sensations may be avoided by the easy expedient of enfolding the whole body, immediately on emerging from the water, in a dry and ample flannel wrapper. Enveloped in this covering, the bather may sit quiet, till the machine be drawn completely out of the water, when the usual dress may be resumed at leisure, and without impediment. The flannel readily absorbs whatever superfluous moisture may remain adhering to the surface, and thus supercedes the tedious process of wiping the skin; while at the same time it completely prevents all loss of heat by evaporation, or by the successive contact of fresh portions of cool air. A sensation of warmth, accompanied with a tingling of the skin, is thus produced, which I have heard healthy people complain of as being hardly bearable; but the more infirm, by the adoption of these simple means, may insure to themselves feelings of a much more comfortable kind than they usually experience after bathing.

Scrupulous attention, to wiping the surface of the body quite dry, after leaving the bath, is less

less requisite than is commonly imagined. Speedily to resume the usual vestments, which is incompatible with sedulous wiping, is comparatively of much more importance. The utility to be expected from the crystallization of the saline particles on the cutaneous surface, and the total impunity with which the body may be exposed to be wet with sea water, which have been already pointed out, tend to prove that the operation of rubbing the body after bathing may in general be dispensed with.

After bathing it is proper to take a moderate degree of exercise. But the invalid should beware of prolonging the walk, or the ride, especially if exposed to the rays of the sun, so far as to induce any degree of sensible perspiration, or of lassitude.

If, in consequence of going into the bath in an improper state of health, or of remaining too long in the water, the perception of cold, and the convulsive shivering, should continue so long as to become painful or alarming, the person

ought without delay to be removed into a warm bed; and a bladder filled with hot water should be applied to the pit of the stomach. The last mentioned expedient, it ought to be remembered, is the most effectual method of restoring warmth to the living body, in all cases where, from chance or necessity, it has been long exposed to intense cold. Independently of these circumstances, the practice of returning to bed after bathing is always to be reprobated.

Some people never recover their usual temperature after morning bathing, nor does their pulse return to its healthy standard, till they have had their breakfast. The effect produced by taking a warm fluid into the stomach is perfectly analogous to what has been just mentioned respecting its external application. Those who bathe towards noon, should they feel chilly afterwards, will experience similar benefit from taking a basin of soup, a cup of chocolate, or of a warm infusion of lemon peel, ginger, or mace, either of which will be found at least as efficacious

as a cordial disguised in the form of a drug.

To insert a caution against the practice of crowding in too great numbers into the same machine, might appear almost superfluous, had I not occasionally heard ladies complain (for it is among the fair sex that this custom, originating probably in some idea of social support, is most generally prevalent), that in such a situation they have felt themselves oppressed almost to fainting. Every person must at some time have experienced the distressing sensations that take place after several people have remained during some hours together in a small room, especially in summer, when the air is not renovated by means of an open fire. But the air must be proportionably much more contaminated by five or six persons boxed up, for perhaps an hour, within the small compass of a bathing machine, the construction of which totally precludes all possibility of the renovation of an element so constantly necessary to the maintenance of life.

The frequency of bathing must be, in a great measure, regulated by the strength of the constitution. For the healthy, to bathe on alternate days is generally considered as sufficient. Daily bathing is frequently found to be productive of lassitude, accompanied with a manifest wasting of the body: but, if no other bad consequences are perceived, these symptoms, soon after discontinuing the bath, will disappear, and be succeeded by increased alacrity and vigour.

It is not uncommon, after bathing, to be affected with some degree of head-ach. The head-ach which succeeds bathing appears to be of two kinds, which may, with apparent propriety, be referred to different causes. In one species, a general sense of fullness in the head is perceived, sometimes accompanied with throbbing, and a turgid glistening appearance of the eyes. The human brain, it is to be observed, is much larger in proportion to the rest of the body, than that of any other animal; so that not less than a sixth part of the whole mass of blood is constantly circulating

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through.

through that organ. The coats of the blood-vessels ramifying throughout the brain are not only thinner; but, as lying in the midst of a soft pulpy mass, are destitute of that support which is afforded by the surrounding parts to the veins and arteries of the body in general. The thick substance of the brain tends also to prevent the vessels situated in its more interior parts from being influenced by the variations of external temperature so readily as those which are spread over the superficies of the body. Hence, while the blood-vessels of the surface of the body in general are contracted by the diminished temperature of the bath, a larger than usual portion of the vital fluid is determined towards the brain, giving rise to what, in the technical language of Medicine, is termed a congestion. After a time, the circulation generally recovers its equilibrium, and the sense of fullness of the head subsides.

Sometimes, however, the coats of the blood-vessels yield to the increased impetus of the circulation; and instances have occurred of palsy,

palsy, and even of fatal apoplexy, taking place instantaneously on entering the cold bath. Individuals sensible of any habitual fullness of the head ought, therefore, to be very cautious how they venture on the practice of cold bathing. Or, should other circumstances relative to their state of health induce them to make trial of it, they ought on no account to neglect previously to lose blood by the operation of cupping, which is by far the most effectual means that can be employed to prevent such accidents. If the sense of fullness still continue to recur after bathing, it should not be further persisted in.

The second species of head-ach occurs chiefly to the more feeble and delicate, especially of the female sex; and occasionally to the more robust, when they have erred by remaining too long in the water. The pain is generally seated in the external, or the back part of the head, which feels cold. This complaint seems to be analogous to the head-ach, which is a common symptom of hysteric complaints, or which accompanies the cold fit

of an ague, as well as to that which occurs the day after inebriation, and appears to be the result of a general torpor of the system, produced by the too great cold of the bath, relative to the vigour of the constitution. It may generally be removed by whatever tends gently to excite the action of the stomach, as by a few drops of compound tincture of lavender, or of steel, taken daily in a cup of warm water. In general, it may be obviated by covering the head with a warm woollen cap immediately after bathing. This species of head-ach ought not, like the other just described, to deter from the use of the bath; for, in proportion as the system is invigorated, the recurrence of this complaint will be found gradually to diminish.

With a view to prevent both these kinds of head-ach, it is equally proper to wet the head as soon and as completely as possible after immersion in the water. No person, desirous of giving a fair trial to the effects of sea bathing, should ever go into the water with any covering on the head. Dr. CULLEN, in
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his Lectures, used to relate the case of a lady who, after bathing, was always affected with violent head-ach, drowsiness, and other symptoms approaching to apoplexy, although in other respects the use of the cold bath was of material service to her general health. On inquiry, he found she studiously abstained from wetting her head. Next time she tried the bath, the Doctor advised her carefully to submerge her head as well as the rest of the body. These directions were followed, and from that time she continued to bathe, not only with impunity but advantage. Many similar instances have come to my knowledge, of persons who have been completely liberated from a head-ach which generally supervened after bathing, by laying aside the use of the cap of varnished silk. In one gentleman, the intimate connection between this complaint and the exposure of the external surface of the head to the influence of the water was strongly exemplified: If he enclosed his ears within the cap, he was generally affected with head-ach, which he never experienced when he took the precaution to leave them uncovered.

Fashion, for the present, has happily banished the mode of bedaubing the hair with grease and powder; a custom, to which the use of the cap was chiefly subservient, so that no apology now remains for wearing one. There are no just grounds for the common apprehension of taking cold in consequence of the hair being wet. On the contrary, the local coldness occasioned by the water, which may for a short time adhere to it, ought rather to be considered as a provision of Nature against the inconveniences that might arise from the head not being equally cooled with the other parts of the body, by a temporary immersion in the cold bath.

The hilarity of spirits, and increase of appetite, which people in general experience during a visit to the sea-coast, together with the temporary exemption from all serious occupations, are powerful inducements to indulge in the pleasures of the convivial board. To inculcate any strict plan of regimen, would, I am sure, prove an invidious, and, I suspect, be an useless attempt. To live, as the expression
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is commonly understood, lower than usual during a course of sea bathing, can answer no good purpose. But the intention of these observations would be ill fulfilled, were I to omit pointing out the dangerous consequences of excess.

The impropriety of bathing in the morning, after having been in any degree intoxicated the preceding evening, is nearly equivalent to the risk of going into the water while the body is in the act of cooling after severe exercise, which has already been adverted to. The general debility and torpor of the system, the effects of the immoderate use of intoxicating liquors, cannot fail to be augmented by immersing the body in cold water. To plunge into the sea in the height of the drunken paroxysm, would be attended with less danger, than to bathe during that state of comparative weakness through which the inebriate must necessarily pass before reverting to the usual standard of health. Never to exceed the limits of moderation, is a degree of self-denial

self-denial perhaps difficult to practise; but after any aberration from the rules of temperance, prudence ought to enforce the propriety of desisting from the use of the bath for some days. Personal observation leads me to conclude, that no year passes without some victims to the neglect of this necessary precaution.

Dancing, of course, forms a considerable share of the amusement of the company at every place of general resort for the purpose of sea bathing. Without insisting on the danger to which the more delicate of the female sex expose themselves by encountering the cold and bleak midnight blasts from the sea, in that exhausted state which must be the consequence of long continued exertion in rooms where the air is heated, contaminated, and exhausted by the aggregated number of people, and of lights; it is impossible that the energies of life can be sufficiently recruited by a short and probably perturbed sleep, to render the use of the cold bath, the succeeding morning,

morning, salutary, or even safe. Those, who choose to indulge in the evening bath, ought to abstain from the morning bath.

The same arguments tend to prove the impropriety of rushing into the sea immediately after a long and perhaps a fatiguing journey. But let the following example, evincing the dangerous consequences of bathing soon after the system had been exposed to the combined influence of fatigue and of intoxication, which came under my own immediate notice, suffice to illustrate the doctrine I am endeavouring to establish.—A gentleman, being engaged on a shooting party, had prolonged his amusement till a late hour in the evening, without taking any refreshment. Exhausted with hunger and fatigue, he made a hearty supper; and, without much exceeding his usual quantity of wine, a degree of intoxication, owing in a great measure to the previous abstinence, rapidly took place. Next morning, with a view of removing the faintness and languor which are the usual consequences of such excesses, he determined to bathe.

bathe. The moment he emerged from the water, it seemed, to use his own expression, as if his head was ready to explode. With considerable difficulty he regained the bathing-machine: an intense head-ach, accompanied with a painful and torpid state of the limbs, with total aversion to food, continued during the whole of the day; and several weeks elapsed before he became perfectly free from a kind of stupor, and recovered his usual state of health. Had this person been somewhat further advanced in life, instant death, in consequence of the rupture of a blood-vessel in the brain, would most probably have been the result of his imprudence.

Some farther modification of the bath, with respect to warmth, appears still required, in order to accommodate the peculiarities of the various states of health in different invalids. I have not observed any example of sea water being employed as a bath, of any intermediate temperature between 98° , the heat of the human body, which may be considered as a warm bath, and the open sea. But no valid reason,

reason, in my opinion, can be assigned, why the warmth of the water should not be tempered in such manner, as gradually to accustom the feelings of the more delicate to endure greater degrees of cold. The temperature of the bath might, for example, be lowered five degrees of the thermometer every second time of using it, commencing at 90° , and terminating at 65° , abbreviating the time of immersion in proportion to the diminution of the heat. A transition to the open sea from the last-mentioned degree of heat would hardly be perceptible; from bathing in which, many invalids, after passing through this gradation, might derive advantage, who would have been injured by abruptly dashing into the waters of the ocean at their common temperature.

A bath somewhat warmer than the open sea would, in all probability, be found salutary to children. By this means they might, moreover, be gradually induced to delight in the water; whereas, according to the present mode of bathing them, they appear frequently almost convulsed with terror at the prospect of being forcibly

forcibly plunged into the sea. Their tender and delicate organization can hardly be supposed to bear a frequent repetition of such violent agitation of body and mind with impunity.

The sensation occasioned by the shower-bath proves, at least to my feelings, much more severe and unpleasant, than the shock of immersion in the sea. Those to whom the open sea is an object of terror, or when prevented from bathing by tempestuous weather, may unquestionably derive equal benefit from going into a light and well ventilated bath within doors, such as the commodious and excellent one at Brighton.

Some delicate people I have known to derive advantage from daily washing the surface of the body with a sponge previously immersed in sea water. To rub the skin till it glows, with a coarse towel wrung out of salt water, and rendered nearly but not quite dry by exposure to the rays of the sun, may perhaps be admitted to constitute a still
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more gentle modification of the bath. From either of these last-mentioned methods, the advantages formerly stated to arise from the adherence of the saline particles to the surface of the body may be expected to accrue.

ON THE COMPLAINTS IN WHICH SEA BATHING IS BENEFICIAL.

OF the two great classes into which the diseases incident to mankind are commonly divided, sea bathing is to be considered as a remedy much more generally applicable to those denominated chronic, than to the acute. Of late, Dr. Currie of Liverpool has indeed conferred an important benefit on the human race, by investigating the medicinal effects of the affusion of cold water in arresting the progress of malignant fever, and ascertaining the laws according to which the administration of that remedy, equally simple and efficacious, ought to be regulated. My present purpose, however, being not by any means intended to interfere with the active practice of the medical art, which can be conducted with propriety by those only who are familiar with the appearances of disease, I shall confine my endeavours

endeavours to point out those states of impaired health, and to discriminate the peculiarities of constitution, in which the salutary effects of sea bathing have been ascertained by experience.

Bathing in the sea has been found to be most generally useful in complaints arising from diminished energy of the vital functions, and distinguished by symptoms of languor and debility. This state of the system may be either the result of originally feeble and delicate stamina, fostered by effeminate modes of living; or it may be the consequence of having impaired a more firm and healthy constitution, by habitual indulgence in too stimulating a diet, or by the effects of excess in bodily or in mental exertion. For the sake of perspicuity, I shall attempt to arrange, under one or other of these classes, the diseases in which advantage is to be expected from the practice of bathing in the sea.

Of the diseases originating in congenite delicacy of constitution, the most exten-

five prevalence must in this country be assigned to SCROPHULA. Children who are liable to this disease are characterized by a fair skin, light hair, a delicate complexion, a protuberance of the upper lip, and a thickening of the division of the nostrils. In early youth it shews itself by an enlargement of the glands of the neck, which occasionally suppurate; and when this takes place, are healed with difficulty. When the glands through which the absorbent vessels of the intestines pass, become the seat of this disease, it produces a gradual wasting, which, though the patient often eats voraciously to the very last, generally terminates fatally. Towards the age of puberty, persons of this habit of body are liable to tender eyes, white swellings, diseases of the bones, and pulmonary consumption. Nor can there be any doubt that the children of parents who have been themselves of this constitution, are more subject to all the symptoms of the disease than others. But, that it does also frequently originate from meagre diet, combined with want of pure air and due exercise, numerous instances, to be met

met with among the offspring of sedentary tradesmen and mechanics, especially those who inhabit the damp and unventilated cellars of great towns, afford sufficient proofs.

The seat of this disease appears to be in the absorbent vessels and their glands; which, in persons of the scrophulous habit, seem to be of such delicate organization, as to be rendered torpid, and incapable of performing their functions by the degree of cold to which they are occasionally exposed in this country. If a scrophulous person remove to a warmer region, the symptoms of the disease generally disappear, and they will again recur on returning to a colder. The natives of the East Indies, or of Africa, resident in this country, are very liable to scrophulous affections; and even the animals of warmer regions, when brought here, are frequently affected in a similar manner. It is by no means uncommon to observe scrophulous tumours seated under the bills of parrots; and I have had an opportunity of seeing the dead bodies of several monkeys

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examined,

examined, all of which exhibited manifest symptoms of this disease, in the glands of the lungs and of the bowels, which indeed most probably occasioned their death.

These facts are stated, in order to shew, that scrophulous affections are connected with a peculiar delicacy of constitution; which, though it might be compatible with the enjoyment of perfect health in a warmer clime, is unable to sustain the vicissitudes of this, without some derangement of its functions. It has been also shewn, that a disposition to this disease may be engendered by subsisting on food not containing a due proportion of nutritious matter, together with other enervating habits of living. From pursuing a contrary plan, there are many reasons to believe, that the tendency to this disease might be counteracted. By eating nutritious, but not stimulating food, taking sufficient exercise in the open air, and residing in a dry and elevated situation; but especially by early accustoming the frame to endure the vicissitudes

profusion of fine hair: though this may be reckoned an ornament, parents who consult the welfare of their offspring, should not permit it to remain; for it is commonly observed, that children who have very long hair are in general pale and unhealthy.

This complaint occasionally manifests itself by redness and thickening of the margin of the eyelids, sometimes accompanied with slight ulceration. In this case, the efficacy of bathing will be augmented by keeping the eyes open while under water. At first, this attempt is somewhat difficult; but a little perseverance will be found to render the practice very easy.

In WHITE SWELLINGS of the joints, as they are commonly termed, or in the enlargement of the bones, accompanied with ulceration, which, when it occurs in the fingers or toes, has been named SPINA VENTOSA, the parts affected should be kept constantly swathed with bandages previously imbued with sea water, which, when they become dry, may be conveniently moistened by means of a sponge,

sponge, without removing them. In white swelling, the partial application of sea water by means of a pump has been found beneficial. The utility of this mode of applying it has been supposed to depend on the excitement of a kind of internal vibration in the tumour by the concussion of the stream of water.

Even when the BONES are so much afflicted by CARIES, that the sores cannot be healed without exfoliation taking place, the termination of that tedious process may be accelerated by partial as well as general bathing with sea water.

Dr. Ruffel has observed, that the discharge from scrophulous sores is augmented on the days on which the patient bathes, and diminished on those when the sea water is used internally as a purgative.

When the glands through which the absorbent vessels of the intestines pass, called the mesenteric glands, become the seat of scrophulous affection, it is distinguished by tume-

faction of the abdomen, which feels hard and solid to the touch; there is generally a voracious appetite, accompanied with great wasting of the body, which has been called ATROPHY, and MARASMUS. In this disease, bathing is rarely advisable. More advantage may be expected from the internal use of sea water; but when completely formed, this complaint rarely admits of a cure.

It may not be improper here to mention, that I have lately seen one case, and heard of some others, where scrophulous sores of considerable extent healed while the patient was daily taking two table-spoonfuls of the recently-expressed juice of the water-parsnip (*fium nodiflorum*), mixed with an equal quantity of milk. It produced no effect on the constitution, except that of keeping the body gently open.

The disease named the RICKETTS is generally supposed to have made its first appearance in this country towards the end of the sixteenth century. At present, it is certainly on the decline. There are not nearly so many ricketty

ricketty children now to be seen, as there were twenty years ago. To attempt any investigation of the causes of the rise and decline of this disease, would here be misplaced; but, when it does occur, sea bathing has been considered as perhaps the best means of removing the tendency to this complaint.

Children liable to CONVULSIONS generally derive much benefit from being bathed in the sea, or in a cold bath. Previous to the use of the bath, their bowels ought to be cleared by a mercurial purgative, or by sea water; as, in the more early periods of life, convulsions frequently arise from that accumulation of slimy matter in the intestines, which is connected with the existence of worms. Dr. Currie's experience of the utility of the cold bath in convulsive diseases, has led him to conclude that this remedy is most to be depended on, when the patient is plunged into the cold water in the height of the paroxysm.

When

When the HOOPING COUGH has degenerated into a chronic disease, accompanied with wasting of the body, and evening exacerbations of fever, it is frequently removed by a residence at the sea-side; and when the cough has ceased, bathing may be had recourse to with advantage.

EPILEPSY, when it occurs before the time of puberty, has been cured by sea bathing.

The convulsive complaint called St. VITUS'S DANCE, has been removed by bathing in the sea, combined with the internal use of the water. Cases of the successful treatment of this complaint by these means, are related in Dr. Ruffel's *ÆCONOMIA NATURÆ*, and in Dr. White's *TREATISE ON NERVOUS DISEASES*, who recommends sea bathing as an excellent remedy in nervous complaints in general.

HYSTERICAL AFFECTIONS are in general benefited by bathing in the sea; and persons

liable to them bear the shock of the cold immersion better than, from the apparent susceptibility of the system, might previously be supposed. To dash suddenly some cold water on the face and neck, is the most effectual means of putting an end to a hysteric paroxysm, as well as the best remedy for that kind of insensibility produced by inhaling the vapours of charcoal.

As a cure for that species of convulsive disease termed HYDROPHOBIA, bathing in the sea has been celebrated. But experience has by no means so decidedly determined its efficacy either in preventing or curing this deplorable malady, as to justify the omission of the only preventive that can be relied on,—the immediate excision of the part bitten, in every case where that operation is practicable.

A great many of that extensive class of complaints at present comprehended under the name of NERVOUS DISEASES, are cured or relieved by sea bathing.

PALPITATION OF THE HEART, INDIGESTION, HYPOCHONDRIASIS, or dejection of spirits, may all be considered as symptomatic of that general debility of the system to which the common appellation of NERVOUS is given. A frequent and very distressing symptom attending these complaints is WANT OF SLEEP, which bathing in the sea generally removes.

The NERVOUS HEAD-ACH, which is in general to be considered as a symptom of indigestion, is frequently cured by bathing.

Many cases are on record, of obstinate constipation of the bowels, after having resisted the action of the most powerful internal remedies, having been removed by dashing cold water on the lower parts of the body. The torpor of the intestines seems, in these instances, to have been removed, and their natural action excited, in consequence of some peculiar sympathy existing between the external and internal surfaces of the body. I have heard many people remark, that the
action

action of their bowels was much more regular during a course of sea bathing, than at other times, independently of drinking the water, probably for reasons of a similar kind.

Persons of a delicate habit of body, resident in great towns, are liable to a peculiar species of sore throat, which has been termed aphthous. This disease is characterized by a relaxation of the uvula, and a honeycomb-like appearance of the glands situated in the inside of the throat. A sallowness of complexion and great listlessness and aversion to bodily exertion, commonly attend this disease. I have repeatedly known it brought on by anxiety of mind. When this disease occurs in the female, it is occasionally attended with a total loss of voice, *APHONIA*, which sometimes takes place suddenly. Several instances of this complaint have come within my notice, which have always been removed by a short residence at the sea-side, accompanied with bathing. On returning to town, and resuming their usual habits of life, patients are very liable to a recurrence of the affection. Two cases

cases of this complaint, which were cured by sea bathing, are recorded by SPEED, in his COMMENTARIUM DE AQUA MARINA; and several cases successfully treated by the use of the cold bath are mentioned by FLOYER, in his HISTORY OF COLD BATHING. Sometimes this disease is mistaken for a venereal affection of the throat; and if the practitioner, impressed with this idea, urges the continued use of the specific, the most serious and even fatal consequences may ensue, as that peculiar constitution which disposes to this kind of sore throat, is particularly unable to bear the action of mercury. Some instances of such erroneous treatment, terminating in the most distressing manner, I am sorry to say I have witnessed, when too much mischief had been already done to admit of relief.

A peculiar diseased state of the system, in which decided benefit is commonly derived from sea bathing, is so well described by Dr. SAUNDERS, that I shall take the liberty of using his own words* :

* Treatise on Mineral Waters, and on Cold and Warm Bathing, &c. by William Saunders, p. 417.

“ There

“ There is a kind of flow, irregular fever, or rather *febricula*, in which I have often found the cold bath of singular service. This disorder principally affects persons naturally of a sound constitution, but who lead a sedentary life, and at the same time are employed in some occupation which strongly engages their attention, requires much exertion of thought, and excites a degree of anxiety. Such persons have constantly a pulse rather quicker than natural, hot hands, restless nights, and an impaired appetite, but without any considerable derangement in the digestive organs. This disorder will continue for a long time, in an irregular way, never entirely preventing their ordinary occupation, but rendering it more than usually anxious and fatiguing, and often preparing the way for confirmed hypochondriasis.

“ Persons in this situation are remarkably relieved by the cold bath, and for the most part bear it well; and its use should also, if possible, be aided by that relaxation from business,

business, and that diversion of the mind from its ordinary train of thinking, which are obtained by attending a watering-place."

Although, in recent PARALYTIC AFFECTIONS, to venture into the cold bath might be imprudent, yet after complaints of this kind have continued for some time, when all partial affection of the head is removed, and the disease has subsided into a chronic debility of the parts affected, patients always appear to find themselves refreshed by bathing in the sea, which seems to impart at least temporary vigour to the languid limbs. I have indeed been informed, by an intelligent practitioner resident at the sea-side, that he has known examples of paralytic complaints recurring after sea bathing, and even of hemiplegia being converted into palsy. Those who have suffered from paralytic attacks ought, therefore, to be cautious how they have recourse to this remedy; though I must add, that no instance of this kind has ever come within my own immediate knowledge.

EXCESSIVE

EXCESSIVE PERSPIRATION, accompanied with a relaxed state of the skin, are generally removed by sea bathing. This flaccid condition of the cutaneous surface is generally accompanied with lankness of the hair of the head, which I have observed to undergo a great alteration during a course of sea bathing. The hair of seafaring men, which necessarily is often wet with the spray of the sea, is in general crisp, and disposed to curl. From hence, would it be fair to infer, that sea water possesses any mechanical power of corrugating the animal fibre?

INORDINATE MENSTRUUAL, and other SIMILAR DISCHARGES, are in general observed to be restrained within due bounds by sea bathing. By strengthening the system in general, it tends to obviate the risk of ABORTION, in those who, from delicacy of constitution, are liable to this accident. And though I have known many instances of ladies bathing in the sea during almost all stages of pregnancy, I never heard of any bad consequences

quences arising from the practice. It would hardly be prudent in a female, while in this situation, to commence the use of the cold bath, who had never been previously accustomed to it.

CHLOROSIS. Perhaps there is no state of the system in which, where recourse is had to sea bathing as a remedy, it occasionally does more good, as well as more harm, than during that critical time of life, when the female constitution is developing into maturity. How often is the happiness and welfare of every remaining hour of life influenced by improper management at this important period.

To those young people with whom sea bathing agrees, that is to say, who feel themselves warmed, refreshed, and invigorated, after having been in the water, bathing, employed at this particular time of life, generally confers a force and regularity of constitution, not afterwards easily deranged.

But

But to females of a more languid and phlegmatic habit, who have a feeble pulse and a pale complexion, perhaps attended with occasional slight œdematous swellings of the legs, bathing in the sea often does infinite mischief, and aggravates all their complaints. To these, however, it may be a consolation to know, that such cases are almost always benefited by the use of the warm salt water bath; and that after this, bathing in the open sea, under due regulations, accompanied with exercise, and assisted, if necessary, by some appropriate remedies, may be employed with great advantage, in order to confirm the constitution.

INTERMITTENT FEVERS, after having been protracted for a great length of time, and resisted all the common remedies, have been almost immediately arrested by immersion in the cold bath. Previous to having recourse to this remedy, it is proper, as far as possible, to ascertain that there is no induration of the liver, or disease of any other of the important internal viscera.

CHRONIC INFLAMMATION OF THE EYES, where redness of the eyelids, or suffusion of the cornea remains, without any concomitant acute pain, is frequently removed by bathing in the sea.

One instance has occurred to me of FISTULA LACHRYMALIS getting well during a course of sea bathing.

The efficacy of a course of sea bathing in diminishing the susceptibility of catarrhal affections, in persons who are constitutionally prone to such complaints, has already been noticed. It was probably as a remuneration for having cured the Emperor AUGUSTUS of some species of catarrhal affection, as we are informed by SÜETONIUS he was "*distillationibus ad desperationem redactus*," that the physician ANTONIUS MUSA was honoured with the gold ring of the equestrian order, and had a statue erected to him in the Temple of Æsculapius. From the same authority we learn, that he was accustomed to bathe in the sea also, in order to strengthen his nerves: "At nervorum causa marinis utebatur."

The

The physicians of Rome appear to have entertained a very favourable opinion of the utility of the application of cold water in various affections of the head. They recommended those who were liable to VERTIGO, or indeed to any infirmity of that part, to expose the head daily to the action of a stream of the coldest water. “Capiti nihil æque prodest atque aqua frigida,” says CELSUS.

The following case not only affords an example of an inveterate catarrhal complaint being removed by the application of cold water to the head, but is curious, as being extracted from the earliest modern writer on the subject of cold bathing, whose Treatise is now rarely to be found.

“Bathing of the head in cold water cures also inveterate pains of that part, and the continual catarrhs and defluxions from thence. For it is certain, that if the head be put into cold water, as far as the middle of the bone of the hinder part of the head, and to the end of the nose before, so that there be left just so

much of the nose out of the water, as that the party may have freedom of breathing only, and that this be done so long as while a man may be saying the Lord's Prayer, the pain of the head, though it hath been of long continuance, will hereby be removed, and the defluxions stopped, as hath often been proved by experience.—And I have been much confirmed in this opinion of mine, by an experiment of it, made upon a certain ENGLISH Knight, named Sir TOBY MATHEWS, a man no less eminent for wisdom, than fit for public trust. This gentleman, having been troubled twenty years together with an intolerable pain on one side of his head, and also with a continual and violent defluxion from the head, distilling through his palate and nose, in so great quantity, as that he could never go without a wet handkerchief in his pocket, he was so happily cured of both these maladies in the sixtieth year of his age, by thus bathing his head in cold water, as that till the seventieth year of the same, which he hath now passed, he hath never had the least touch of either during the said space of time; and being now better in health than

ever he was in his life before, to prevent his falling into the like infirmities again, he useth the said immersion of his head in COLD WATER all the year long, and even in the depth of winter also: and he saith that he received this profitable advice from a certain English Nobleman, who, having himself been a long time much tormented with the same disease, had by this means cured both himself, and very many others who were alike affected, and restored them to their perfect health, to the great admiration of all men *."

No person would think of sending a patient labouring under PHTHISIS PULMONALIS, to bathe in the sea. But, when the intimate connection between one species at least of pulmonary consumption and the scrophulous habit is considered; and, moreover, that the transparent delicacy and pallid smoothness of the skin, so peculiarly indicative of a propen-

* Certain *Physicall Discourses* touching the Vertue of Cold Water, &c. written in Latine by HERMANNUS VANDER HEYDEN, a *Physician* of Gaunt; and published in English, in 1653.

sity to phthisis, is capable of being much changed by a course of bathing in salt water; this practice, under prudent management, may perhaps be allowed to possess some reasonable claims to be considered as a *preventive* of this too fatal malady.

In the NERVOUS ASTHMA I have known sea bathing tried without advantage, but certainly without injury.

In the more early stages of GOUT, while the fits continue to occur with regularity, and during the intervals between them the person enjoys his usual health, sea bathing may be used at these times with impunity, and even with advantage, as a general restorative of health: although, to affirm that bathing in the sea has the smallest tendency to counteract a predisposition to gout, or to prevent, or even to postpone, the recurrence of a paroxysm of that disease, would be absurd. But after the constitution has been impaired by repeated and irregular attacks of this disease, if a person ventures into the sea, or into a cold bath,
he

he certainly does so at the peril of his life.

PAINFUL AFFECTIONS of the joints, accompanied with puffy swellings, frequently consequent to attacks of rheumatism, and which have sometimes been termed CHRONIC RHEUMATISM, are very generally removed by bathing in the sea: and the system, being at the same time invigorated, is rendered less liable to future attacks of the disease.

That IRRITABILITY and WEAKNESS of the constitution, which is frequently the result of the use of mercurial medicines, is sooner removed by sea air, and sea bathing, than by any other means with which I am acquainted. Bathing should not, however, be ventured on too soon after the termination of a mercurial course.

The local application of salt and water, or of sea water, has in some instances completely succeeded in removing that species of encysted tumour termed a WEN. A remarkable and well-

well-known case is detailed in the Note at the bottom of the page, in the words of the respectable gentleman in whose person it took place, who published a short account of it in the Gentleman's Magazine, to satisfy the many personal inquiries made to him concerning the means by which his complaint was removed *.

The

Chisholme, Roxburghshire,

* Mr. URBAN,

20th Nov. 1799.

Having had a wen of the steatomatous kind, of large size and long standing, upon the side of my face, immediately before and below my right ear; I was informed by different people, that, if I would apply salt and water to it, I should get rid of it. In August 1798 I put a quantity of salt and water into a saucepan, and boiled it for four minutes, with which I bathed the whole surface frequently while it continued warm, as also after it became cold, so often as ten or twelve times daily; always stirring up the salt at the bottom of the basin, and incorporating it again with the water before I applied it. On the eleventh day from the first application, while shaving, I observed a small discharge; which assisting by a gentle pressure, the whole contents were soon emptied, without the smallest pain, and without blood. Being informed of some others who had been benefited in like manner from the same application, and

knowing

The repeated application of the salt and water seems in these cases to operate by inflaming the skin, which at last ulcerates, and the contents of the cyst are gradually evacuated; its sides at the same time concrete, and the cavity is obliterated. One other instance I have myself seen, of a wen situated between the corner of the jaw and the ear, being removed by the application of water impregnated with salt. The discharge of the contents of the tumour, which exuded through several small apertures contiguous to each other, did not take place till the application had been

Knowing myself of some late instances under my own immediate direction, I feel it a duty thus to make it public; being convinced it can produce no bad effect, and every person having it in their power to make the trial. At the same time I beg leave to caution, that no one should be disheartened from the length of time it may be necessary to continue the application, as in some cases it has required three or four months, though in the last only thirty days; but in all, without pain or inconveniences of any kind, or any previous notice of the discharge, till it actually took place.

WILLIAM CHISHOLME.
regularly

regularly persisted in for more than three weeks. When individuals have an insurmountable fear of the knife, or in cases where the peculiar situation of an encysted tumour renders the event of an operation precarious, surely the effects of this simple and easy remedy merit a trial.

Among those who have attained to a very advanced period of existence, experience has shewn that the proportion has been greater of such as have been much exposed to the open air, and have led what may be termed rather a hardy than an effeminate life. The oldest man of modern times, HENRY JENKINS, who lived 169 years, we are informed, "was a fisherman, and used often to wade in the streams, and frequently swam in the rivers after he was passed the age of 100 years*." Though it be not unreasonable to suppose that by accustoming the living body to sustain with impunity frequent and sudden vicissitudes of temperature, the constitution may be enabled to resist some at least of the minor train of ills

* Philosophical Transactions, vol. xix.

that flesh is heir to, we are perhaps not possessed of sufficient data to prove that the practice of cold bathing is decidedly favourable to longevity. Such, however, was the opinion of the wise BACON, in whose History of Life and Death the following aphorism, respecting the means of attaining long life, is contained: "LAVATIO CORPORIS IN FRIGIDA, BONA AD LONGITUDINEM VITÆ."

ON SOME OF THE BAD EFFECTS OF SEA BATHING.

UNDER this title it is not my intention to notice all those complaints and peculiarities of constitution where bathing does neither good nor harm; but rather to point out those diseases, or tendencies to disease, in which sea bathing has been ascertained by experience to be prejudicial: being persuaded that many people, annually, not only injure themselves by imprudently bathing in the sea, but waste the time and money, which, properly bestowed, might have enabled them to obtain that renovation of health, in search of which, for want of better information, they have pursued an erroneous path.

In all febrile complaints, accompanied with local inflammation, cold bathing is hurtful. In those languid and enfeebled states of the constitution, in which the use of the cold bath
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is found to be most eminently serviceable, its beneficial effects seem in a great measure to depend on encreasing the energy of the vital functions, and giving a general tendency to somewhat of an inflammatory habit; but where too much action is already present, any means tending still farther to augment the vigour of the constitution, ought certainly to be avoided. Did not the strange inconsistent conduct, which people labouring under various modifications of disease daily exhibit, induce a belief that there is no kind of imprudence of which the sick may not occasionally be guilty, it would hardly appear requisite to caution persons against venturing into the cold bath, while affected with any symptoms of PLEURISY, INFLAMMATION of the LUNGS, of the LIVER, or of the INTESTINES.

In almost every treatise which I have perused on this subject, sea bathing is recommended as a remedy for certain diseases of the skin. This opinion appears to be founded rather on theory than experience. At one period every species of cutaneous defadation was comprehended

hended under the term scorbutic : and, from some general notion of sea water being a remedy for every thing that came under the denomination of scurvy *, it was supposed to be beneficial in all eruptive complaints. Or perhaps a too submissive deference to the judgment of Hippocrates, who recommends sea water as useful in cutaneous itching accompanied with acrid discharges, has in this instance influenced the opinions of medical men. “ *Aqua marina his qui pruriginem sentiunt, et qui ab acris humoribus vellicantur, tum balneo, tum fotu calida prodest.*” But it is to be observed, that the Father of Physick confined his recommendation to the use of *warm* baths, or fomentations of sea water.

That species of cutaneous inflammation called ERYSIPELAS, OR ST. ANTHONY’S FIRE, is frequently renovated, in those who have previously suffered from attacks of this disease,

* See an Essay on the SEA SCURVY, wherein drinking sea water is proposed as an easy METHOD of curing that disease at sea. By ANTHONY ADDINGTON, M. D. READING, 1753.

in consequence of immersion in the sea. Two examples of relapses in this complaint, in consequence of bathing in the sea, are recorded by SPEED. One person, unwilling to credit that the recurrence of the disease was occasioned by immersion in the sea, repeated the experiment three several times, and each time he again experienced a repeated attack of the same complaint. Those who are constitutionally liable to ERYSIPELATOUS AFFECTIONS should therefore abstain from bathing in salt water.

As far as my experience has enabled me to form a correct judgment, CUTANEOUS DISEASES not only are not benefited, but in general they are rendered worse, by bathing in the sea. As many people, however, with complaints of the skin, either of their own accord, or by the advice of others, do resort to the sea, I have omitted no opportunity of making enquiries among those persons, who, from their situation, were likely to afford me information concerning this subject: and though some have told me that bathing in the sea must do good in eruptive complaints, because it makes them come out,

that is, renders them worse, I have not discovered any good grounds to induce me to alter the opinion now stated.

There is an eruptive complaint which frequently appears on the legs, and occasionally on the back part of the hands, accompanied with an exudation of moisture, that has been very commonly called scorbutic. Persons affected with this complaint frequently resort to the sea-side in expectation of receiving benefit from the external or internal use of sea water. But in every instance that has come within my notice, the disease has been uniformly exasperated by bathing in the sea; the eruption has spread, and the discharge has been augmented.

This being a complaint of very frequent occurrence, and which often proves tedious and difficult to cure, I am induced to mention a mode of treatment that I have frequently seen practised with success. After the leg has been well fomented with an infusion of bran of a moderate degree of warmth, let the whole

whole of the diseased part be thinly covered, by means of a feather dipped in a liniment composed of equal parts of lime water and fresh linseed oil. This application should be repeated twice a-day. The limb ought not to be bandaged; nor should it have any other covering than a gauze thread stocking. Under this management I have observed many such cases do well.

ULCERATIONS OF THE LEGS, which are of various kinds, and require very different modes of treatment, are, I believe, without exception, injured by the contact of sea water.

During a course of sea bathing, many of the female sex observe that their ancles are inclined to swell a little towards evening, and to retain the mark of the impressed finger. This appearance seems to originate from a temporary torpor of the absorbent vessels of the extremities, occasioned by the coldness of the bath; and, in some individuals, probably arises from taking more exercise during a residence

residence at the sea-side, than they are in the habit of doing at home. These slight œdematous appearances generally soon subside after resuming the usual modes of life; and they may always be removed by going a few times into the warm bath, a fact first mentioned by Dr. DARWIN, and since insisted on at more length by Dr. REID, in his Directions for Sea Bathing.

When symptoms indicate the presence of pulmonary consumption, no person would surely think of venturing into the sea; and from what I have had occasion to observe, I am convinced that even breathing the sea air tends to accelerate the fatal termination of this complaint, when it is fully confirmed.

There is a peculiar state of the constitution, characterized by general irritability, indigestion, and irregularity of the bowels, and frequently accompanied with a brown tinge on the tongue, and a yellowish appearance of the white part of the eyes. These symptoms it is at present the fashion to denominate by the term

term BILIOUS, if that word, as applicable to the general state of health, has any definite meaning. It is in fact the result of habitual indulgence in rich and high-seasoned food, combined with the stimulant effects of fermented, and perhaps of spirituous liquors, and can only be removed by temperance, exercise, and duly regulated evacuations. Although persons of this habit of body may have the appearance of being in high health, they are in fact nearly verging on a state of disease, and the system should not be exposed to the hazard of any such violent impressions as result from plunging into a cold bath; or, if determined to venture into the sea, they ought previously to take care to diminish the quantity of the circulating fluids by the operation of cupping.

While the living body is advancing towards maturity, it has been determined by physiologists that the blood-vessels termed arteries are more numerous, in proportion, than the veins; but that, after it has attained its acmé, the finer arteries become obliterated, while the

coats of the veins dilate, and give rise to what has been termed a venous plethora. The gradual approach of this revolution in the animal œconomy indicates itself by the enlargement of the cutaneous veins, which takes place as people advance in life. Those of the legs frequently become varicose. But the head is affected in a particular manner. The circulation of the blood through the brain becomes sluggish, occasioning a sense of fulness in the head, and the coats of the distended veins are liable to give way on the slightest augmentation of pressure from their contents. In this state of health, the temporary determination of blood towards the head, which is always in some degree produced by plunging into cold water, may be productive of the most serious consequences.

Sea bathing is, upon the whole, to be considered as a remedy much more adapted to the early, than to the more advanced periods of life. Those who have been accustomed from their infancy to the use of the cold bath may persevere in it during the whole

whole course of life with safety, perhaps with advantage. But persons after a certain age ought to be very cautious how they commence the practice of plunging into cold water. Even in earlier life, the probable utility of bathing is chiefly to be determined by its more immediate effects. If by any means the constitution has been so enfeebled as to be incapable of that re-action which gives rise to the glowing warmth on the surface of the body after immersion, the practice of bathing ought not to be persisted in.

The unusual degree of exercise in the open air, taken by most people during a residence on the sea-coast, by augmenting the quantity of insensible perspiration, compensates for the larger share of food which the increased appetite generally experienced in that situation, induces them to indulge in, and prevents any injurious degree of plethora from taking place. But after reverting to their comparatively inactive, and even sedentary modes of life, if this habit of full living be persisted in, it may produce very unpleasant

consequences. On returning to town after residing a few weeks on the sea-coast, I have heard many people complain of a dull heavy pain in the head; a symptom which Nature, especially in the more early periods of life, sometimes tries to relieve by a copious discharge of blood from the nose. Hence may be deduced the propriety of continuing to take as much exercise as possible in the open air, for some time after returning from the sea-side. To those who can make it convenient, going into a river or a cold bath once or twice a week would gradually tend to accustom the constitution to the disuse of sea bathing. Those who, by peculiar circumstances, may be prevented from pursuing either of these plans, ought to beware how they indulge that inclination for food, which the general improvement of health, arising from a temporary residence on the sea-coast, frequently occasions.

ON THE INTERNAL USE OF SEA WATER.

THE quantity of salt contained in sea water varies in different latitudes. The sea is less salt in cold regions near the poles, and saltier towards the equator. The difference in the quantity of salt contained in different parts of the ocean seems to depend on the greater or less degree of evaporation. From the power of the vertical sun, the evaporation is greatest under the line ; and great part of the vapours generally moving towards the pole where they descend in frequent showers, tend, by in some measure diluting the waters of the ocean, to render them less salt. And such is the arrangement and regularity of Nature, that as this salt seems mixed with the waters of the sea to prevent its putrefaction, so it is mixed in the greatest quantities where the heat is greatest, and where, for this reason, there is

the greatest danger of putrefaction. In the northern parts of the Baltic, a pound of sea water scarcely contains two drams of salt; on the British coasts, it contains nearly an ounce; in the Mediterranean, two ounces; and in the Atlantic, near the line, it contains nearly three*.

The following accurate analysis of sea water, made by that excellent chemist, Dr. BRYAN HIGGINS, must be more satisfactory to those who are desirous of being acquainted with the precise contents of sea water, than any chemical information that rested solely on my own authority:

“ A Winchester gallon of sea water, taken up on the 14th of August 1781, at the distance of 400 yards from the low water mark off Brighthelmstone, the wind being strong from the south-east, and the tide flowing, was found to contain

* See Lectures on the Elements of Chemistry, by Dr. Joseph Black; article, Common Salt.

INTERNAL USE OF SEA WATER. 139

	Oz.	Dwt.	Gra.
Of sea salt	3	13	11½
Of muriate of magnesia	1	11	19½
Of sulphate of lime	0	3	19½

It moreover contains, of carbonic acid gas, separable in the heat of boiling water, one ounce measure, and of oleagenous and phosphorescent matter, a quantity too small to be measured. Agreeably to these proportions, a pint of sea water will be found to contain :

	Grs.
Sea salt	220.43
Muriate of magnesia	95.47
Sulphate of lime	11.4
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	327.3
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This analysis Dr. HIGGINS accompanies with his opinion of the particular ingredient on which the medical efficacy of sea water, internally used, appears to him to depend. "The preceding analysis," says he, "affords a great deal of useful information, and points out a new medicine. Those who use sea salt freely in their food, and yet contract diseases curable

curable by sea water, have little or no reason for ascribing their cure to the sea salt of this water. But since the only other medicinal ingredient which sea water contains in efficient quantity is marine salt of magnesia, which is very active, and is to the sea salt in this water nearly as 8 to 18½; I am of opinion that the cures expected from a course of sea water might be more expeditiously and certainly effected by *magnesia muriata* dissolved and sufficiently diluted."

Without stopping to inquire whether the Doctor's opinion, which certainly is entitled to due respect, concerning the peculiar virtues of the muriate of magnesia, be well founded, it may be observed, that the peculiar bitter, disgusting taste of sea water, is chiefly owing to the admixture of this saline compound. The intense thirst frequently consequent to drinking sea water depends on the same cause; for pure crystallized muriate of soda or sea salt, dissolved in equal quantities in water, neither is so unpleasant, nor does it occasion an equal degree of thirst. A knowledge of this fact explains

explains the reason of that incessant drought which many people complain of being affected with during the whole time of their residence at the sea-side, and which they do not experience elsewhere. This symptom is sometimes attributed to the inhalation of the sea spray; but I believe it is produced by the practice of some bakers residing near the sea, who, perhaps ignorant of their different effects, and to save expence, use sea water in the formation of their bread, instead of the common crystallized salt.

Sea salt is a material peculiarly agreeable to the taste of mankind, as well as to many other animals; perhaps it is necessary to the support of their existence. The great quantities of this substance found in a fossil state in various parts of the world, as well as the immense magazine of it contained in the ocean, afford strong presumptive proofs of its general utility. The use of salt is known to cure the rot in sheep; and the peculiar healthy appearance of the cattle near the sea, who necessarily take more salt along with their provender than in other situations,

situations, must have been apparent to every person. All the graminivorous and granivorous animals are fond of salt; and the use of it appears conducive to their health. In the inland parts of America the wild animals are found to resort, in incredible numbers, to places where they may have an opportunity of licking salt, or of drinking salt water. Salt is often used as a bait for deer; and an offer of salt is a greater temptation to horses running wild in the American woods, than an offer of corn. To animals purely carnivorous, salt is said to be a poison; but as man, in his general structure, as well as in his habits of living, approaches much nearer to the granivorous than the carnivorous class of animals, salt may be considered not only as an agreeable, but as an useful condiment to him.

Used in moderation, as a part of diet, salt excites a regular and healthy action of the bowels, acts as a gentle stimulus to the absorbent vessels, and tends to promote a free perspiration. Persons who, influenced by caprice, or for the sake of experiment, abstain totally
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from the use of salt, have generally a clammy skin, and their perspiration has an acid or foetid smell. By advising people to increase a little the proportion of salt they were accustomed to take along with their food, I have frequently removed want of appetite, indigestion, and other slight disorders of the stomach, and intestinal canal.

When sea water is taken with the view of acting as a brisk cathartick, the general custom is to drink about a pint in the morning before breakfast, at two several times, with an interval of half an hour, or an hour, between the doses. When, however, this quantity does not pass off briskly, it heats and irritates the habit, and deranges the system for the whole of the day. It is a much preferable practice to drink half a pint at bed-time, and the same quantity, mixed with as much boiling water as is sufficient to warm it, the following morning. Taken in this manner, I hardly ever knew it disturb the bowels in the night; while it never fails, taken even in a smaller quantity, to produce the desired effects, and
is

is seldom productive of that distressing thirst, which is the consequence of taking, the whole measure requisite, at once.

Even for those who are in good health, a single purge of sea water, taken in the manner now directed, is a very proper prelude to the use of the bath, which, when it operates duly, like other saline catharticks, leaves the body cool and active. But as the operation of a purgative always diminishes the general vigour of the system, it is very improper to bathe on the same day the water is used internally; a precaution which is too often neglected.

Sea water is a purgative by no means adapted to every variety of constitution. When the bowels are loaded with viscid phlegm, it answers particularly well, and the use of it frequently restores health and appetite. But in irritable, hectic, and what are termed bilious habits, it heats the body, and occasions considerable and sometimes permanent disorders of the organs of digestion. When purgatives are previously known to disagree

disagree with the constitution, the use of sea water internally should not be ventured on.

Where the water does not pass easily, its action may be assisted by adding to it a dram or two of magnesia vitriolata, or by taking afterwards a few cups of infusion of fenna. Those who are aware of its being apt to remain in the bowels, may obviate that circumstance by taking a table spoonful of castor oil, or of tincture of rhubarb, at bed-time, the evening previous to drinking the water.

The thirst occasioned by drinking sea water produces an eager desire for the usual breakfast of tea. It is much better, however, to postpone the time of that meal till the purgative operation of the water is over, and to alluage the thirst by some thin gruel, whey, or, what answers the purpose most effectually, a slight infusion of tamarinds. Sea water, like every other purgative, deranges for a time the functions of digestion. If the customary breakfast of tea, with bread and butter,

be taken within too short a time afterwards, instead of undergoing the regular process of digestion, the different ingredients separate from each other, and the oily parts floating uppermost, irritate the cardiac orifice of the stomach, and occasion a distressing kind of rancid heartburn. This unpleasant sensation may in general be removed, by permitting some gum arabic to dissolve in the mouth, which, as it gradually descends into the stomach, causes the mechanical reunion of the aqueous and oleaginous parts of the aliment.

Those who do not labour under any particular disease for which the internal use of sea water is considered as a remedy, should not have recourse to it as a purgative oftener than once in eight or ten days. It is, moreover, to be observed, that the use of sea water is not, like many other purgatives, followed by a torpid or constipated state of the bowels, but is rather productive of an increased action of the intestinal canal, which continues for some days.

Salutary

Salutary effects frequently result from taking sea water, in smaller quantities, as an alterative. A wine glassful taken every evening at bed-time seldom operates as a purgative, or occasions thirst; but, by keeping the bowels regular, tends to amend the appetite, promote digestion, and improve the general health, especially of those inclined to what has been termed the phlegmatic temperament.

Taken in this manner for some length of time, I have repeatedly known sea water prove a remedy for that troublesome species of intestinal worms, termed ASCARIDES.

In one case of FISTULA IN ANO, which came under my own observation, the complaint was much ameliorated by taking a small glass of sea water every morning and evening for some weeks; and there was reason to believe a complete cure might have been effected, had the patient's situation enabled him to persist for a sufficient length of time in the use of this remedy, combined with bathing.

IN SCROPHULOUS COMPLAINTS, where the internal use of sea water, as imparting a salutary degree of excitement to the absorbent vessels and their glands, has been found eminently useful, this alterative mode of employing it is to be preferred to occasional more copious purging, particularly as it does not interfere with the regular practice of bathing.

If children can be induced to take the sea water in this manner, which may sometimes be effected by mixing it with milk, it generally succeeds in evacuating worms, if any be present, as well as in removing the peculiar disposition of the intestines to secrete that slimy matter in which these animals breed. There is a species of coralline very common on the coasts of the Mediterranean, the pores of which are replete with saline crystals, which is greatly confided in, as a vermifuge, on various parts of the Continent. Much of its remedial virtue probably depends on the salt, though no doubt some efficacy is to be attributed to the mechanical action of the hard particles of the coral.

coral. Dr. RUSSEL, in his *ŒCONOMIA NATURÆ*, recommends a medicine composed of what he terms *pumice*, triturated with sea salt, which probably acts on similar principles, as being useful in cases where the intestinal viscera are loaded with phlegm.

The internal use of sea water, taken daily in small quantities, may be persisted in for a long time, without debilitating the body, or in any way injuring [the constitution. On the contrary, I have observed many persons acquire flesh and strength during such a course.

Various CUTANEOUS COMPLAINTS, which are injured by bathing in the sea, are cured by the internal use of sea water.

An instance of OBSTINATE JAUNDICE having been cured by the internal use of sea water, combined with soap, is narrated by Dr. RUSSEL.

Sea water is found to be an excellent purgative in PARALYTIC COMPLAINTS.

Dr. SPEED, in the work already quoted, mentions the case of an old man, who, after having been forty years afflicted with NEPHRITIC complaints, was restored to health by drinking salt water, which caused the discharge of a vast quantity of gravel and fabulous matter from the kidneys.

In the ATROPHY of children, which has been described as originating from scrophulous obstruction of the mesenteric glands, the internal use of sea water, as an alterative, is frequently productive of the most beneficial effects, by removing the viscid phlegm with which their bowels are loaded, and exciting the action of the absorbent vessels. But if this disease has reached that period when it is accompanied with hectic fever, the internal use of sea water is not advisable.

Sea water taken up at a great distance from and, and from some fathoms under the surface, although intensely salt, is free from that nauseous taste it possesses when procured near the shore. Much of the loathsome taste of sea
water

water depends on the presence of the various putrescent animal and vegetable matters contained in the ocean, which swell on the commencement of the putrefactive process, and rise to the surface. To those who drink sea water medicinally, it is, therefore, an object of some importance to have it collected as far from the shore, and at as great a depth as possible. Sea water, kept in close vessels, becomes in a short time extremely putrid, and the gas which separates from it is highly foetid, and may prove deleterious, if suddenly received in considerable quantity into the mouth and nostrils.

The salutary effects expected from the internal use of sea water may be entirely frustrated by want of attention to the proper mode of obtaining it. While at WORTHING, I one day took the quantity of water which I knew by previous experience to be adapted to my constitution, without its producing any other effect than occasioning thirst, and loading the stomach. I was soon, however, enabled to explain this circumstance, by observing that

the sea water intended for drinking was taken up from the margin of the sea, nearly about the time of high water. The rising grounds in the neighbourhood of Worthing consist of immense masses of calcareous matter resting on a stratum of blue clay, which is visible near the limits of high water, where the calcareous masses terminate. Some way inland, where the country begins to rise, the wells are proportionably deep, as the rain and dews percolate the pores and fissures of the chalk, and are not stopped till they arrive at the stratum of clay, to the surface of which the wells must likewise necessarily reach. But the fresh water, which, gliding along the upper surface of the stratum of clay, is continually issuing in considerable quantities where the chalky matter terminates near the edge of the ocean, being lighter than the salt water, floats on the surface of the sea, and considerably diminishes the quantity of saline matter contained in it, as I found by evaporating a quantity of the sea water obtained in this situation. This circumstance is noted, because some similar unobserved admixture of fresh water may, in other situations,

situations, disappoint the expectations of the beneficial effects of the internal use of sea water. After heavy and long-continued rains, the specific gravity of sea water is considerably less; and the proportion of salt, contained in an equal quantity of it, diminished.

By permitting sea water to remain at rest twelve hours before it is used, it depurates itself, the lighter fœculencies rising to the top, and the sand, which is often mixed with it in considerable quantity, subsiding to the bottom: if it be then drawn off by an aperture near the lower part of the vessel in which it is contained, the nauseous taste will be found much less perceptible.

ON SEA BREEZES.

MAN can live some days without food; but if he be prevented, even for a few minutes, from taking a fresh portion of atmospheric air into his lungs, he ceases to exist. Modern chemistry has discovered, that the air of the atmosphere, so essentially necessary to the support of life, consists of a mixture of various vapours, some of which are salutary, and others extremely deleterious to animated beings. A combination of certain proportions of two of these vapours, or gases, as they are termed, appears best calculated to support the life, and maintain the health, of human beings. Of this compound the great mass of the atmosphere consists; and in proportion as it is free from the admixture of other vapours, the air is said to be pure, or best fitted for the purposes of respiration, and most congenial to the well-being of animals.

But

But the purity of the air is liable to be diminished by a variety of circumstances. During the processes of combustion, of putrefaction, and of animal respiration, which are perpetually going on to an immense extent over the whole surface of the earth, the purer part of the air is consumed, and a variety of vapours, noxious to animal life, are evolved, which mix with, and contaminate, the great mass of the atmosphere. These gases may be divided into two general classes; one of which, being lighter than common respirable air, rises through it, and forms the superior stratum of the atmosphere, consisting chiefly of what is called inflammable air; which, when by any accident it happens to be ignited, produces many of those luminous appearances called meteors.

Of those vapours which are more ponderous than the common air, the most abundant is what used to be called fixed air, but is now known by the name of carbonic acid. It is produced in abundance by fermentation, the burning and putrefaction of vegetables, and the respiration of animals. That dense vapour
which

which rests upon the surface of vessels containing malt liquor, in a state of fermentation, affords a good example of the appearance of this gas; and the many fatal examples of persons being destroyed in these situations, by incautiously drawing it into their lungs, demonstrate its noxious effects on the animal economy. The specific gravity of carbonic acid exceeds that of common air by about one half. Of course it subsides through the general mass of the air; and, in all situations where it exists, constitutes the lower stratum of the atmosphere. It is this vapour which covers the bottom of the celebrated Grotto del Cani. If a dog thrown into this cavern be able to keep his head above the level of the surface of the gas, he remains uninjured; but if he be forced to breathe a portion of it, he instantly drops down insensible.

The principal means, provided in the economy of Nature, for preventing the contamination of the air by the gradual accumulation of these vapours, and for maintaining the atmosphere in that state of purity best calculated

lated for the support of human life, are vegetation, and the operation of the waters of rivers and lakes; but chiefly the action of the great mass of aqueous fluid constituting the ocean.

Some of those gases which are most injurious to animal life, form the nutriment of vegetables, by whose absorbing vessels they are greedily imbibed, and which in return pour from their leaves, while under the influence of the sun's rays, streams of pure air, or what is now named oxygene. Hence the utility of planting trees and shrubs in every possible situation in great cities; which, according to this admirable arrangement in the œconomy of Nature, operate as perpetual correctors of air, vitiated by the processes of respiration, putrefaction, and combustion.

If water be briskly agitated in contact with fixed air, the water will absorb a quantity of that vapour equal to its own bulk. This being the species of gas with which the inferior stratum of the atmosphere is principally
contami-

contaminated, the perpetual absorption of it, by the water of lakes, and of running streams, enables us to account for the peculiar freshness and purity of the air in their more immediate vicinity.

During the summer of 1803, I endeavoured to determine by experiment, whether sea water, agitated in contact with foul air, possessed any superior powers of purifying it, to those of fresh water. With this view, a quantity of air, contaminated as much as possible by having been repeatedly respired from a bladder into the lungs, was introduced into a capacious graduated tube, previously filled with sea water, and immersed in a large vessel of the same. I agitated the tube strongly, so as to bring the air contained in it, as much as possible, in contact with fresh portions of the water, during ten minutes. After the apparatus had remained some time at rest, I observed that a certain measure of the air had disappeared, that is, had been absorbed by the water. This portion is known, from other experiments, to consist of the fixed air that is discharged

discharged from the lungs of animals during the process of respiration. On repeating precisely the same process with water recently taken from a well, I could discover no perceptible difference in the quantity of air absorbed during an equal time of agitation.

After a storm, by which the inferior stratum of the atmosphere has been thoroughly mixed with the surface of the water of the sea, the air is commonly observed to be more pure and salubrious: and I have heard, from persons who had long resided in the West Indies, that the healthiness of these climates is generally greatly improved by a hurricane. Thus, while contemplating the tempest, that in its rage appears to convolve sea and sky, we learn to revere the Author of Nature, who in his wisdom has ordained this awful instrument, which, while it sweeps from the surface of the earth that noxious vapour whose accumulation would eventually put an end to animal existence, blends it with the agitated waters of the ocean, in whose bosom it becomes harmless,

less, and is probably rendered subservient to some useful purpose.

People in general enjoy the best health, and breathe with most facility, in high states of the barometer, that is, when the atmosphere is comparatively most ponderous, which generally is the case during a clear frost. The more dense the air, the greater is the proportion of the pure or vital part contained in it, and the better does it support the combustion of fuel, as well as animal life. But as the sea is considered as giving the average level of the earth's surface, from which altitudes in general are measured, the barometer will be found, in all states of the weather, to indicate a greater pressure of the air in the immediate neighbourhood of the sea, than at any distance from it.

The ocean appears also to be the great instrument appointed by the Author of Nature to regulate the temperature of the world, and to render the various regions of the earth habitable.

habitable by man. The transparency of the atmosphere prevents it from being heated by the rays of the sun as they pass through it, which excite heat only in opaque bodies. That the heat of the atmosphere emanates wholly from the surface of the globe has been ascertained by those who have ascended to considerable heights, either on mountains, or by means of the balloon. At a certain distance from the surface of the earth, which varies in different latitudes, a region of perpetual frost is constantly found to exist.

During the heats of summer, a continual evaporation is going on from the surface of the sea. In the process of converting water into vapour, a certain quantity of heat disappears, or becomes latent; by which means the surface of the water, and consequently the superincumbent atmosphere, must necessarily be cooled. When these vapours have ascended to the colder regions of the atmosphere, they are condensed into clouds, which again descend on the earth in the form of prolific showers.

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In winter, the particles of water forming the surface of the sea, being deprived of a certain portion of their heat, become more dense, and sink through those immediately beneath them, which rise and occupy their place, and, immediately on coming in contact with the cold air, impart to it their superior heat. This circulation of particles of different densities, gradually extending to greater depths, the heat, which the sea had acquired from the action of the rays of the sun during summer, is again, not all at once, but gradually, given out, tending to attemperate the winter's cold. Winds that blow over extensive tracts of sea, are observed to be less cold in winter, than those that pass over land; and the average annual temperature of islands, on account of their being on all sides surrounded by water, is more equable than that of the Continent.

These speculations concerning the healthiness and purity of the atmosphere upon, and in the vicinity of the sea, are confirmed also

by more direct observation. At the request of the late Sir JOHN PRINGLE, the ingenious DOCTOR INGEN-HAUSZ made a number of experiments, to discover the relative salubrity of the air at sea, on the coast, and inland *. As far as this point is capable of being determined by experiments made with the eudiometer, the DOCTOR found that the air was most pure at sea, next in purity on the coast, still less so, with some exceptions, in the interior of the country, and worst of all in the neighbourhood of marshes and swamps; and that the healthy appearance, and particularly the appetite of the inhabitants, varied in a similar ratio. But the eudiometer as yet remains only an imperfect instrument. Although it indicates how much pure air is con-

* NOUVELLES EXPERIENCE et OBSERVATIONS sur divers Objets de Physique. Par Jean Ingen-haufz, &c. Paris, 1789.

The Doctor attributes the extraordinary appetite of the people of VIENNA, whose inhabitants, he says, eat more than those of any other capital in Europe, to the purity of the air. A stranger, after a few weeks' residence, becomes sensible of this peculiar effect of the air of that city.

tained in a given quantity of that of the atmosphere, it possesses no power of determining in what degree the different vapours, by which the air may be contaminated, are noxious to the powers of life. Nor has the ingenuity of man hitherto discovered a scale, by means of which the relative healthiness of the air of different situations can be accurately determined. But the salubrity of the sea breeze is most clearly indicated by the ruddy complexion, the animated look, and the elastic frame of those by whom it is habitually respired. Small islands, and places nearly surrounded by the sea, are observed to be particularly healthy. Few diseases comparatively prevail at Gibraltar; and the inhabitants of Malta are said to be in general healthy, and many of them long-lived. The same observation applies to the isle of Thanet*.

Many diseases, it is generally allowed, admit of being mitigated, and some even cured, by change of air; and still further advantages may be expected from that change, when the

* See the cemetery of ST. PETER'S.

patient can with certainty remove into an air, more pure, more dense, and more temperate, than what he has been accustomed to breathe, such as is to be found in the neighbourhood of the sea.

But sea air has somewhat more than merely its purity to recommend it as a remedy for certain diseases. The breeze that comes from the ocean bears along with it a number of minute particles of salt, as may readily be discovered by the saline efflorescence discernible by applying the tongue to the surface of the leaves of plants, even at the distance of some miles from the coast; especially after a storm. Though the ragged foliage, and the stunted appearance of trees growing within the influence of winds loaded with the spray of the sea, and the manner in which they point their branches towards the opposite quarter from that whence it most commonly blows, proves that, something comes along with it inimical to the leaves of plants, which naturalists suppose to be their lungs; yet gales so impregnated appear, in many cases, to

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have

have very beneficial effects on the organs of respiration of animals.

There is a peculiar species of catarrhal affection which attacks many people, especially those who reside in great towns, towards the latter end of summer. This complaint is characterised by an increased secretion of the mucus in the bronchiæ, which the patient is perpetually endeavouring to bring up by a short heaving cough. This being a voluntary effort, it rarely occurs during the night. The pulse is quick and feeble, and the body becomes emaciated. This disease, which may be termed a chronic catarrh, appears to be the consequence of the heat of summer relaxing the vessels diffused over the internal surface of the lungs, so that they pour forth the fluids they secrete in augmented quantity. Having experienced repeated attacks of this complaint myself, I may be permitted to state, that for my own case I could never discover any remedy but a change of air; and have always found that, after having breathed the air of the sea for twenty-four hours, the cough has not
even

even once recurred. And I can add with truth, that I have occasionally recommended the same plan to many others in a similar situation with equally salutary effects. Navigators have observed, that catarrhal complaints never occur while passing over long tracts of the Atlantic or Pacific Ocean; and that they are often enabled to judge of their approach to land, by the appearance of coughs and colds among the ship's crew, which they attribute to the effects produced by a mixture of the land air with that of the sea on the human body.

It is a curious fact, well known in many of the northern districts of this country, that persons who obtain a livelihood by collecting limpets, and other shell-fish, and whose occupation necessarily obliges them to the constant inhalation of the sea spray, are never affected with cough. The same observation holds good respecting the people employed in the manufacture of salt, who are observed to escape coughs and colds, even when they are epi-

demic in the neighbourhood; and it is not uncommon for persons labouring under a bad cough to pass some hours daily in a salt pan (the building in which the sea water is evaporated being so called), with a view to obtain a cure of their disease.

Cases of catarrhal affection, where salutary effects are to be expected from breathing an air loaded with saline particles, must be carefully discriminated from the genuine phthisis pulmonalis. Melancholy experience having convinced me, that where ulceration had fairly taken place in the lungs, the respiration of sea air aggravates the sufferings, and accelerates the death of the patient.

Scrophulous affections being certainly most prevalent in situations where the atmosphere is loaded with moisture, and contaminated by other impure vapours, there is reason to suppose that a residence in a pure and dry air, together with a due attention to exercise, a point of much importance in such complaints,
may

may tend to remove them. Scrophula is comparatively indeed a rare disease among the inhabitants of the sea-coast, especially in situations where the soil is calcareous; which, by its absorbent powers, tends still farther to purify the superincumbent atmosphere.

The opportunity which a residence on the sea-coast affords, for taking an occasional excursion on the water, ought by no means to be wholly neglected. Besides the opportunity thus obtained of breathing the sea air in its utmost purity, I have known many instances of persons labouring under indigestion, and its usual concomitant hypochondriasis; who, after a smart fit of sea sickness, rapidly recovered their appetite; and, with it, their strength and flesh.

In fine, though certain states of the constitution occur, in which bathing in the sea may be attended with dangerous and even fatal consequences, perhaps there exists no modification

cation of impaired health, confirmed pulmonary consumption excepted, in which the invalid may not reasonably expect to derive benefit from breathing the salubrious and invigorating breezes of the sea.

REMARKS
ON THE
USE OF THE
WARM BATH.

Calida lavatio et pueris et senibus apta est.

CELSUS.

AN attempt to enter upon a complete detail of the advantages to be derived from the practice of warm bathing, and to discriminate the various states of diseased action which the use of the warm bath is adapted to remove, might afford ample materials for a separate volume, and would extend the present publication far beyond its intended limits. But as a favourable opinion of the utility of warm bathing is daily and very properly gaining ground, accommodations for that purpose being now established

established at almost all the situations which are resorted to for the purpose of bathing in the sea, some general account of the effects of warm baths on the living body, together with a few requisite cautions respecting their due temperature, and other circumstances relative to the most proper manner of using them, will not, I trust, be deemed here wholly misplaced.

Although, in regard to the irritation of the cutaneous surface by the particles of salt deposited upon it, repeated immersion in a warm bath of salt water may differ in its more remote consequences from those of one of fresh water, the immediate operation of both is, without distinction, to be referred to the effects of temperature on the living body,

On entering a bath heated to upwards of 90°, a sensation of warmth is perceived, though the temperature of the water may be some degrees inferior to that of the body. This sensation is in part to be referred to the augmented heat of the medium in which the
body

body is now immersed, compared to that in which we are accustomed to live. But the perception of warmth is not merely ideal. Soon after immersion in a bath at 93° , I have observed the thermometer, previously placed in the mouth, to rise from 98° to full 100° . In about a quarter of an hour, during which there was no perceptible alteration in the heat of the bath, the thermometer again indicated 98° , where it remained stationary as long as the experiment was continued. This effect may perhaps be explained, by supposing that the operation of the animal economy, by which heat is evolved, does not immediately accommodate itself to the change of the external medium. The heat of the body, therefore, accumulates, while the process of transpiration, which regulates its temperature, is for a time impeded; but as soon as these mutually compensating powers recover their equilibrium, the heat of the body reverts to its usual standard.

Respiration, while in the warm bath, is more slow than usual. The additional weight
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of water to be displaced on each inspiration renders some degree of voluntary effort requisite to elevate the ribs, and distend the thorax; when this effort ceases, the° chest suddenly subsides, and the air issues from the lungs with a sort of jerk.

A bath of a temperature under 90° , does not seem entitled to the epithet of *warm*. But when heated above this point, the increase of a few degrees of temperature is productive of a considerable difference in the effects of the bath on the living body. My observations concur with those of Dr. CURRIE, that when the heat of the bath approaches 98° , the temperature of the human body, it generally accelerates the pulse, and that this effect takes place at a lower degree of heat in the evening than before dinner. The soothing and refreshing effects of the warm bath are chiefly to be expected at a temperature from 90° to 95° ; and at this degree of heat it may always be used with safety and advantage. If the warm bath be intended to excite perspiration, it should gradually be heated, while the person remains

remains immersed in it, till towards 100° . This temperature will be found to accelerate the pulse, and the augmented perspiration will become visible on the face, which may be kept up for some time if the person be immediately conveyed from the bath to a warm bed. These observations shew the propriety of always regulating the heat of the bath by means of a thermometer. The sensation of warmth is very fallacious; and, by gradually increasing it, the body is rendered capable of sustaining a great degree of heat, with feelings rather of pleasure, than of pain. An instance lately occurred to me of the danger of trusting to the senses. A gentleman was ordered to use the warm bath; finding the sensation of heat very agreeable to him, he, of his own accord, opened the cock through which the warm water is discharged; the inordinate heat of the bath, which, however, was not measured, augmented the force of the circulation to such a degree, as to induce an immediate slight paralytic affection.

The best criterion to regulate the warmth of the bath, when used merely for refreshment, is, that the temperature should be such as not to accelerate the rate of the pulse. Dr. MARC-
CARD, who has lately published an elaborate work on the use of warm baths *, asserts that in a bath, the temperature of which does not exceed 96°, the frequency of the pulse is uniformly diminished. This position, observation convinces me, is to be modified by a variety of circumstances, some of which are relative to the constitution of the person who bathes, and others dependent on the time of the day when the bath is resorted to.

The pulse of people even in perfect health is considerably accelerated towards evening. Whether this be attributed to the stimulating effects of food, or to the debility consequent to the exertions of the system during the day, the warmth of the bath appears to coincide with and increase this state of irritation; and

* De la Nature et de l'Usage des Bains. Par HENRI-MATHIAS MARCARD. A Paris, 1801.

when used late in the evening, instead of soothing the system, and inducing repose, it is often followed by a restless and watchful night.

The most proper time for using the warm bath is an hour or two before dinner. People appear in general to be deterred from having recourse to the warm bath at that time of the day by their fears of taking cold afterwards, in consequence of exposure to the air. This opinion, which is totally erroneous, appears to have been derived from observing, that persons were liable to injury from exposing themselves to the cold air, after having been heated and fatigued by exercise. But the state of the living body, after having been in the warm bath, is very different. In the one case the body, debilitated by fatigue, is parting with its heat fast by increased perspiration; in the other, being surrounded with a medium of nearly its own temperature, the heat of the system is prevented from escaping, and has rather a tendency to accumulate. By this means the living body is better qualified to resist the action of cold immediately after
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coming out of a warm bath, than perhaps in any other given situation. A person has in fact no more occasion to dread catching cold after having been in a warm bath, than he has from going into the open air, on a frosty morning, after leaving a warm bed.

The result of the experiment which the celebrated COUNT RUMFORD made in his own person, is so decidedly in favour of the mode of employing the warm bath now recommended, that it would be improper to omit an account of it *.

“ Being at Harrowgate on account of my health,” says the COUNT, “ I at first went into a bath warmed to about 96° of Fahrenheit’s thermometer every third day. At first I went into the bath about ten o’clock in the evening, and remained in it from ten to fifteen minutes; and, immediately on coming out of it, went to bed, my bed having been

* Observations concerning the Salubrity of Warm Bathing, &c. By BENJAMIN, Count of RUMFORD.

well warmed, with a view to prevent my *taking cold.*

“ Having pursued this method for some time, and finding myself frequently feverish and restless after bathing, I accidentally, in conversation, mentioned the circumstance to an intelligent gentleman, who happened to lodge in the house, and who had long been in the habit of visiting Harrowgate every year. He advised me to change my hour of bathing, and to stay longer in the bath, and, above all, to avoid going into a warmed bed on coming out of it. I followed his advice, and shall have reason, all my life, to thank him for it.

“ I now went into the bath regularly every third day, about two hours before dinner, and staid in it half an hour; and on coming out of it, instead of going into a warmed bed, I merely had myself wiped perfectly dry with warmed cloths, in a warmed room adjoining to the bath; and dressing myself in a bed-
 gown,

gown, which was moderately warm, I retired to my room, where I remained till dinner-time, amusing myself with walking about the room, and with reading or writing, till it was time to dress for dinner.

“ The good effects produced by this change of method were too striking not to be remarked and remembered. I was no longer troubled with any of those feverish heats, after bathing, which I experienced before ; and so far from feeling *chilly*, or being particularly sensible to cold on coming out of the bath, I always found myself less sensible to cold after bathing than before. I even observed repeatedly and invariably, that the glow of health, and pleasing flow of spirits, which resulted from the full and free circulation of the blood which bathing had brought on, continued for many hours ; and never was followed by any thing like that distressing languor which always succeeds to an artificial increase of circulation, and momentary flow of spirits, which are produced by stimulating medicines.

“ I regu-

“ I regularly found that I had a better appetite for my dinner on those days when I bathed, than on those when I did not bathe ; and also, that I had a better digestion, and better spirits, and was stronger to endure fatigue, and less sensible to cold in the afternoon and evening.

“ As these favourable results appeared to be quite regular and constant, I was induced to proceed to a more decisive experiment. I now began to bathe every *second day* ; and finding all the advantageous effects which I had before experienced from warm bathing, still continued, I was encouraged to go one step further, and I now began to bathe *every day*.

“ This experiment was thought to be very hazardous, by many persons at Harrowgate, and even by the physician, who did not much approve of my proceedings ; but as no inconvenience of any kind appeared to result from it, and as I found myself growing stronger every day, and gaining fresh health, activity,

and spirits, I continued the practice, and actually bathed *every day*, at two o'clock in the afternoon, for half an hour, in a bath at the temperature of 96° and 97° of Fahrenheit's scale, during *thirty-five days*.

“ The salutary effects of this experiment were perfectly evident to all those who were present, and saw the progress of it; and the advantages I received from it have been permanent. The good state of health which I have since enjoyed, I attribute to it entirely.”

When a knowledge of the simple, easy, and effectual method of heating water to any requisite degree, in vessels of every description, by the assistance of steam, devised by the COUNT, becomes more generally diffused; by facilitating the means, it cannot fail to extend the salutary practice of warm bathing.

But the effects of the warm bath are not to be attributed solely to its preventing the escape of heat from the living body. The copious secretion constantly going on from the surface
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of the body has already been adverted to. The nature and relations of this function of the living body has of late been investigated, with great accuracy, by M. SEGUIN, in conjunction with the celebrated LAVOISIER *. By enclosing his whole body in a case of varnished silk, made to adhere closely by means of cement round the aperture of the mouth, he discovered the relation between the pulmonary and cutaneous perspiration; and by weighing the body in an accurate balance, he determined the quantity of matter discharged from the human body by means of both those emunctories, in a

* The Memoir containing these interesting experiments was read before the French Academy in April 1790, and constitutes the last of the chemical labours of the respectable and unfortunate LAVOISIER. The turbulence of the times, which, in France, followed this period, has rendered the last volume of the Memoirs of the Academy of Sciences, in which this Dissertation is published, difficult to be obtained in this country. I owe the opportunity of perusing it to the liberality of SIR JOSEPH BANKS, who is pleased to render his extensive library subservient to every attempt to diffuse useful knowledge.

given time. A mean of the whole quantity which transpires from the surface of the body and of the lungs, taken together, of a man not using laborious exercise, amounts to 18 grains *per* minute, two ounces two drams *per* hour, and 54 ounces in the course of 24 hours; supposing the rate of the discharge to continue always the same. The limits of this secretion, however, admit of considerable latitude, the quantity of it being greatly increased by exercise and by heat.

Previously to the experiments of M. SEGUIN, it had always been supposed, that when the body was immersed in warm water, part of that fluid was absorbed; and by impregnating baths with nutritious substances, attempts had been often made to support life, in cases where disease had precluded the possibility of taking food into the stomach. Even Dr. MARCARD, the latest writer professedly on the subject of warm bathing, takes this matter for granted, and reasons upon it, as if it were a datum that did not admit of a doubt.

By immerfing himfelf, during a confiderable length of time, in a folution of corrofive fublimate, and of other matters, the operation of which, when received into the human body, are afcertained, as well as by other judicious and decifive experiments; Mr. SEGUIN difcovered, that while the external cuticle remains unimpaired, in no cafe whatever does abforption, either of fluids or of folids, take place from the external furface of the body. In the laft edition of Medical Reports, Dr. CURRIE has alfo brought forward fome curious experiments made by Dr. ROUSSEAU of Hifpaniola; which prove, that there is no inhalation from the furface; an opinion which the Doctor himfelf likewife appears to entertain.

Among a variety of new and practically ufeful views of various functions of the animal oeconomy, which a knowledge of this fact difclofes, it enables us to account, in a fatisfactory manner, for that foothering fenfe of refreshment confequent to the ufe of the warm bath. By accurately weighing the body after
having

having been for some time immersed in a bath of such a temperature as not to accelerate the pulse, the quantity of matter perspired was found to amount to nearly two thirds of what would have been lost, had the person remained, during an equal length of time, exposed to the open air. While in the bath, the water of which prevents the access of air, the proper solvent of the perspired fluid, the cutaneous perspiration was in fact suspended, while the pulmonary went on as usual. Probably it was the trifling loss of weight sustained by the body, while immersed in the warm bath, compared with what takes place in the open air, that may have deceived less accurate experimenters, who were not aware of the temporary suspension of cutaneous perspiration; and led them to believe, that part of the fluid contained in the bath was actually absorbed. Hence also we are enabled to explain the fact of thirst being allayed by immersion in water; not by supposing that any thing is received into the system, but that the usual loss by cutaneous perspiration is put a stop to.

Mr.

Mr. SEGUIN moreover found, that when the heat of the water was raised so high as to accelerate the circulation, and stimulate the exhalants to discharge their contents in form of perspiration, or rather of sweat, notwithstanding the pressure of the dense medium with which the body was surrounded, the loss of weight even in the bath was considerably augmented.

Without pursuing any farther the detail of these interesting experiments, it is easy to conceive why, after the body has been exhausted by exertion, going into a bath of the temperature of 90°, or a few degrees higher, should prove so soothing and grateful. By checking the further waste of perspirable matter, and also preventing the loss of heat, with which the human frame in that situation so easily parts, the immediate causes productive of lassitude and fatigue, are in fact removed. In this state of the living body, the use of the warm bath is no less safe and salutary, than immersion in cold water has been shewn to be injurious.

For the purpose of refreshment after fatigue, the warm bath was principally employed by the ancients. And as we learn from that faithful record of the domestic manners of the Grecians, the ODYSSEY of HOMER, to conduct the stranger guest to a warm bath, and anoint him with fragrant unguents *previously to offering him food*, formed an important part of the rites of hospitality. In the eighth book, where the reception of Ulysses at the court of King Alcinous is described, after minutely detailing the whole process of heating the water, the poet speaks of the luxurious enjoyment and the invigorating effects of the warm bath in the following words :

——“ The bath the king ascends ;
Where, happy as the Gods that range the sky,
He feasted ev’ry sense with ev’ry joy.
He bathes : the Damsels, with officious toil,
Shed sweets, shed unguents, in a shower of oil :
Then o’er his limbs a gorgeous robe he spreads,
And to the feast magnificently treads.”

Subsequent to the violent gymnastic exertions of the palæstra, the Athletæ sought for refresh-

refreshment and renovation of their exhausted strength in the tepid bath; and the thermæ, or natural warm springs, which were, in every practicable situation, employed to supply the warm baths, were gratefully dedicated to their patron god HERCULES.

After having thus seen, that the warm bath was formerly considered as the solace of toil, and resorted to with a view to renovate vigour exhausted by exertion, it becomes a curious object of inquiry, at what period, and for what reasons, the practice of warm bathing first began to be considered as having a tendency to debilitate the body, and acquired the appellation of a *relaxant*; a term that, in latter times, has tended to diffuse very erroneous and improper notions concerning the real effects, as well as to prevent the proper employment, of warm baths.

The partiality of the Roman people for this favourite gratification, afforded to the more early Emperors an opportunity of acquiring

quiring popularity, by the establishment of public accommodations for the more complete enjoyment of the luxury of warm bathing. They accordingly constructed magnificent baths, the very ruined remains of which astonish modern times, furnished with every convenience calculated to gratify the taste of the sensual, and ornamented with all such productions of elegant art as might apologize for the resort of the more refined. The crowds allured by these inducements to pass their time in frivolous amusements, or idle conversation, might afford the more rigid moralist grounds for asserting, that the warm baths relaxed, not indeed the persons, but the minds and manners of the people.

But as the pleasure derived from every impression made on the human body diminishes in proportion to the frequency of its repetition, those who employed the warm baths merely as an instrument of luxurious enjoyment, perpetually required their heat to be augmented.

During

During the times of the republic, we learn from HIERONIMUS MERCURIALIS, that it formed a part of the duty of the officers called *Ædiles*, to enter the baths, in order to judge of and regulate their heat, before the public in general were admitted. With the universal corruption of manners, that accompanied the struggles of the various competitors for supreme power, this salutary custom fell into disuse: and, as PLINY informs us, the people were at length accustomed to enter the baths at almost a boiling heat;—" *balnea tunc similia fere incendio.*" That debility and disease should be the consequence of frequently exposing the body to the operation of such violent stimuli, cannot excite much surprise.

The Romans attempted also to render the use of the warm bath, in another mode, subservient to purposes of the most gross sensuality, by employing it to excite artificial appetite, and, to liberate the constitution, more speedily than by the regular course of Nature, from the oppressive effects of an overloaded stomach. The crapulous glutton entered a

small

small chamber, which was heated to as high a degree as the person could possibly endure, by means of lamps, or of flues conducted round the walls. The circulation of the blood being greatly accelerated, and the solvent power of the air much increased by this dry heat, a copious flow of perspirable matter ensued, and artificial hunger and thirst succeeded this unnatural mode of depletion; while appetite, thus excited, was gratified by a return to the festive table. The ancients, it is well known, were in the disgusting habit of using emetics, in order to effect a similar vile purpose*.

This

* Dr. CURRIE expresses some doubts by what method the ancients relieved themselves from the oppression of an overloaded stomach, by means of the application of external heat; and observes, that the practice must have been attended with some hazard, and great inconvenience. (MEDICAL REPORTS, vol. i. p. 283.) Had the Doctor's more important occupations allowed him leisure to pursue the inquiry, he might easily have satisfied himself concerning the means by which this purpose was attained.

From

This short sketch of the abuse of warm baths may tend, in some measure, to account for

From CELSUS we learn, that "*sudor duobus modis elicitur, aut sicco calore aut balneo; siccus calor est et arena calide, et laconici, et ciliani.*" The effects of these dry heats must have been to elicit profuse perspiration. That they were used for the express purpose of expediting the process of digestion, appears evident from a note of BEROALDUS, in the *Scriptores de re rustica*: "*In balneis erant tepidaria, caldaria, frigidaria; erant et sudatoria, quo ex genere est laconicum; ubi sudando exercendoque corpus, cruditatem digerebant, et appetentiam edendi provocabant.*"

COLUMELLA draws a glowing picture of the purposes and abuses to which these heated chambers were perverted. "*Mox deinde ut apti veniamus ad ganeas, quotidianam cruditatem laconicis excoquimus, noctesque libidinibus et ebrietatibus, dies ludo, vel somno, consumimus; ac nosmet ipsos ducimus fortunatos quod nec orientem solem videamus, nec occidentem. Itaque istam vitam socordem persequitur valetudo, nam sic juvenum corpora fluxa et resoluta sunt, ut nihil mors mutatura videatur.*" (In *Præfat. ad Lib. i. De re rustica.*)

SENECA, censuring the luxury of the age, exclaims, "*quid mihi cum illis calentibus stagnis? quid cum sudatorii?*"

for the neglect of warm bathing, as well as to explain the source of those erroneous opinions concerning the effects that immersion in warm water has on the living body, which have very generally prevailed. A due attention to measure the temperature of the bath by the thermometer, which should never exceed the heat of the human body, namely 98° , except when otherwise ordered with the intention of removing some particular state of disease, will, it may be presumed, prevent the practice of warm bathing from again falling into disuse, and prevail with mankind to lay aside those prejudices which have, in this country at least, in a great measure prevented the enjoy-

torius? In quæ siccus vapor corpora exhausturus includitur, omnis fudor per laborem exeat."

The danger attending these modes of getting rid of crudities is indicated, as well as the frequency of the practice pointed out, by JUVENAL, Sat. i. l. 143.

"*Bœna tamen præfens, cum tu deponis amictus
Turgidus, et crudem pavonem in balnea portas:
Hinc subita mortes, atque intestata senectus."*

ment

ment of an innocent luxury, which is no less salutary, than it is agreeable.

I shall now proceed to point out certain peculiar states of the constitution, and mention some of the complaints, in which the use of the warm bath has been found peculiarly beneficial.

Although no people in the world equal the inhabitants of this country in the general neatness of their domestic œconomy, and the accurate cleanliness of their apparel, yet due attention to strict purity of person is too often neglected. The matter thrown out by the exhaling arteries is frequently permitted to accumulate for a long time together on the surface of the skin. By obstructing perspiration, this matter is with justice supposed to give rise to a variety of cutaneous diseases, which might be prevented, as they are frequently known to be cured, by simple ablution with warm water. The quantity of white scaly matter, that may be observed floating on the surface of the bath, after a person, not

in the habit of bathing, has remained some time in it, affords sufficient evidence that something was adhering to the skin, which required to be removed. While in the tepid bath, the ancients were accustomed to rub the surface of their bodies with mallow leaves, and with the dry flower of the CICER, a species of the chick pea. This farinaceous substance uniting with the oily part of the perspired matter, would no doubt tend more effectually to remove any fordes from the cutaneous surface. Common bran, or what is called almond meal, may be used with advantage for a similar purpose. The skin certainly feels more soft and pliant when it has been rubbed with something of this kind, than after simple immersion in warm water. Every person attentive to the preservation of his health, ought occasionally to use a bath of a temperature from 85° to 95° , as a salutary purifier of the cutaneous surface.

During the earlier periods of life, the occasional use of the tepid bath appears highly conducive to the due developement of the corporeal

corporeal organs, as well as to maintaining the skin in that state of softness and permeability, which is not only a sign of good health, but which certainly tends to facilitate the eruption, and consequently to diminish the danger, of the various cutaneous diseases, to which infancy is so obnoxious. The custom of plunging children into cold water has probably been carried too far in this country, as if, to use the words of GALEN, the elasticity of the living fibre, like that of steel, were capable of being increased by means of sudden transitions of temperature.

The approach of old age is chiefly indicated by a general diminution of the irritability of the system. The various secretions are carried on with less vigour, and in no function of the living body is the decrease of activity more apparent, than in the suppression of the cutaneous perspiration, which gives rise to that fordid appearance, and harsh feel of the skin, so commonly perceived in advanced life. A bath of a temperature nearly equal to that of the living body, not only removes those decay-

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ing parts of the cuticle, which obstruct perspiration, but, by temporarily suspending the exertion requisite to support the heat of the body, hushes the strength, and tends to retard the progress of senescence. The habitual use of the warm bath ought, therefore, to be regarded as the most grateful solace of declining life.

Lord BACON has hinted, that the tradition of ÆSON being restored to youth by means of the medicated cauldron of MEDEA, was in fact an allegorical representation of the effects of the warm bath in retarding the approach of old age. In a note to the Loves of the Plants, Dr. DARWIN has farther expanded this idea in the following words :

“ The story of ÆSON becoming young from the medicated baths of MEDEA seems to have been intended to teach the efficacy of warm bathing in retarding the approach of old age. The words *relaxation and bracing*, which are generally thought expressive of the effects of warm and cold bathing, are mechanical terms,

terms, properly applied to drums or strings; but are only metaphors when applied to the effects of cold or warm bathing on animal bodies. The immediate cause of old age seems to reside in the inirritability of the finer parts or vessels of our system; hence these cease to act, and collapse, or become horny or boney. The warm bath is peculiarly adapted to prevent these circumstances, by its increasing our irritability, and by moistening and softening the skin, and the extremities of the finer vessels, which terminate in it. To those who are past the meridian of life, and have dry skins, and begin to be emaciated, the warm bath, for half an hour twice a week, I believe to be eminently serviceable in retarding the advances of age."

On this principle the Doctor informs us (*Zoonomia*, p. 686.), "When Dr. FRANKLIN, the American philosopher, was in England many years ago, I recommended to him the use of a warm bath twice a week, to prevent the too speedy access of old age, which he then thought that he felt the approach of;

and I have been informed, that he continued the use of it till near his death, which was at an advanced age.'"

In all complaints where there is a wasting of the body, accompanied with a pulse increased in velocity, and at the same time diminished in strength, a state of the constitution which has been usually denominated **HECTIC**, whether these symptoms arise from a constitutional, or a local irritation, the warm bath will be found an useful remedy.

In that species of **ATROPHY**, which is marked by a quick pulse, sleepless nights, and a peculiar dirty, shrivelled appearance of the skin; a collection of symptoms which has by some authors been denominated **NERVOUS FEVER**, and by others **CHRONIC WEAKNESS**, and which, though unmarked by any appearance indicating particular diseased action, frequently resists the application of all the more usual instruments of medicine; decided benefit is frequently to be derived from the use of the warm bath. In this state of
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the constitution, it ought not to be omitted, that cold bathing is in general injurious.

In various chronic affections of the organs subservient to the secretion of urine, the warm bath affords considerable relief. The utility of immersion in warm water, in facilitating the passage of gravel, when stopped by spasmodic contractions in the ureters, or in the urethra, as well as in assuaging the pain during a fit of the stone, has been frequently experienced, and is generally acknowledged.

In FISTULOUS ULCERATIONS of the PERINEUM, the beneficial effects of the warm bath are peculiarly obvious. By remaining daily for an hour immersed in water of such a temperature as to be agreeable to the feelings of the patient, I have known examples of much of the irritation and pain attending this truly distressing complaint alleviated, and a general disposition to heal produced in the ulcerations.

The utility of the warm bath in diminishing the violence of the pain produced by the stoppage of biliary calculi in the duct of the gall bladder is generally known; as well as in alleviating that species of cholic produced by the poison of lead. In all fixed internal pains of the abdomen, the warm bath may in general be employed with advantage.

In suppression or irregularity of the menstrual discharge, which is frequently accompanied with hysterical symptoms, the use of the warm bath affords the most salutary relief. But when, by this means, that secretion has been re-established, bathing in the open sea tends to fortify the constitution, and to prevent future deviations from regularity.

The effects of warm bathing in removing the swelling of the legs, to which many females are liable during a residence at the sea-side, have been already pointed out. The same remedy might probably be employed with advantage in anasarcaous swellings, proceeding from

from other causes; and most likely, as Dr. DARWIN has hinted, in all cases of general debility accompanied with cold extremities.

SPASMODIC COUGH, and other nervous affections are frequently relieved by the warm bath. Dr. WHYTT observes, in his Treatise on Nervous Complaints, "that even partial warm bathing of the legs and thighs is the best remedy for those convulsions which sometimes precede the eruption of the small-pox; and for that general tremor of the whole body which often happens towards the end of that disease, when the pustules are of a very bad kind."

I am not acquainted with any species of cutaneous complaint which is benefited by a warm bath of sea water; though many diseases of the skin admit of being removed by a tepid bath of fresh water, either simple, or impregnated with appropriate medicaments. As it is now determined, that there is no cutaneous absorption while the cuticle remains unbroken, the effect of whatever material may be mixed with

with the water of the bath must be referred to its immediate action on the surface of the skin,

In the *ŒCONOMIA NATURÆ*, Dr. RUSSEL relates three cases of inveterate moist leprosy, all of which, after being aggravated by bathing in the sea, were cured by bathing in warm fresh water, in which mallow leaves and bran were infused. The patients at the same time used sea water internally, and frequently washed the eruptions with a lotion consisting of a quart of sea water added to eight ounces of tar, and strained, after infusing twenty-four hours,

There is a particular kind of troublesome itching of the skin, that first appears in form of watery vesicles, which, if scratched, form little red scales. This complaint is very difficult to remove; but it is greatly alleviated by the tepid bath. This disease is frequently mistaken for the true itch; from which, however, it is distinguished by not being infectious.

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The itch itself may in general be cured by going a few times into a warm bath, in which half an ounce of kali sulphuratum (liver of sulphur) is dissolved.

The utility of warm bathing in various modifications of GOUT, RHEUMATISM, and PALSY, is sufficiently proved by the numerous examples of persons afflicted with these complaints, who annually receive benefit from the warm springs at Bath. There can be little doubt, that baths of either salt or fresh water, heated to an equal temperature, would have similar effects.

The HECTIC FEVER accompanying phthisis pulmonalis is temporarily alleviated by immersion in the warm bath. Though I am inclined to think, that if ever the art of medicine obtain any mastery over this dreadful disease, it will be by operating some change on the external surface of the body, with which the state of the organs of respiration appears to be so intimately connected; the palliative effects of the warm bath should not induce us to
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postpone till too late the administration of more efficient remedies. At an early period, an attack of this insidious complaint may sometimes be averted by a strict attention to proper diet, and particularly by the assiduous use of exercise in the open air; but it is to be feared, that a specific remedy for tubercles of the lungs will long continue to be sought for in vain. Even Dr. MARCARD, a sufficiently strenuous advocate for the use of the warm bath, considers it as a remedy of no eventual promise in the cure of true pulmonary consumption, and he appears to speak from experience: “Ce seroit folie de baigner un phthique, malgré, comme je l’ai éprouvé, que la fièvre en soit relentie pour quelques heures; ce qu’on y gagnerait seroit fort insignifiant, et l’on risqueroit d’augmenter la grande disposition à l’enflure et aux sueurs *.”

The use of the warm bath has long been common among the French inhabitants of the West-India islands, and their exemption from some of the more fatal diseases of these climates,

* De la Nature et de l’Usage des Bains, p. 121.

compared with the British, is probably, in some measure, to be attributed to the frequent custom of warm bathing. The same practice, attended with similar advantages, is now said to be obtaining attention in our islands; the mode in which the warm bath tends to counteract the debilitating effects of intense heat, and profuse perspiration, has been already explained.

In every situation, after a person has undergone much fatigue, especially in hot weather, immersion in a warm bath is to be considered as a safe and salutary practice. The warm bath should never be used on a full stomach; nor should the temperature of the water ever exceed the standard heat of the human body. When these few simple precautions are observed, this pleasing remedy will in general be found to retard the rate of the pulse, alleviate the sense of fatigue, and be followed by sound and refreshing repose.

THE END.