

A treatise on the effects and properties of cold : with a sketch, historical and medical, of the Russian campaign / by Moricheau Beaupré ; translated by John Clendinning ; with an appendix by the translator.

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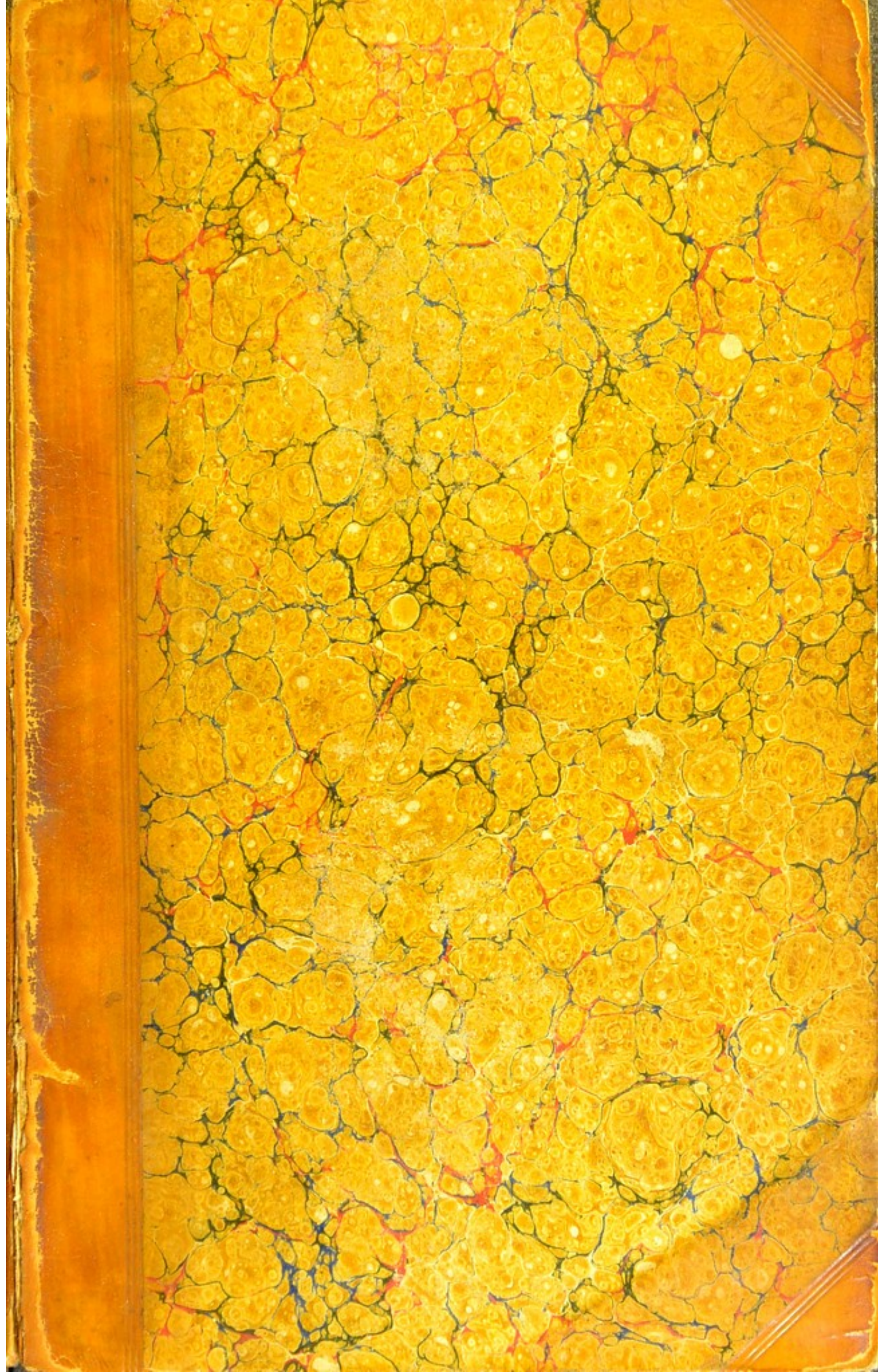
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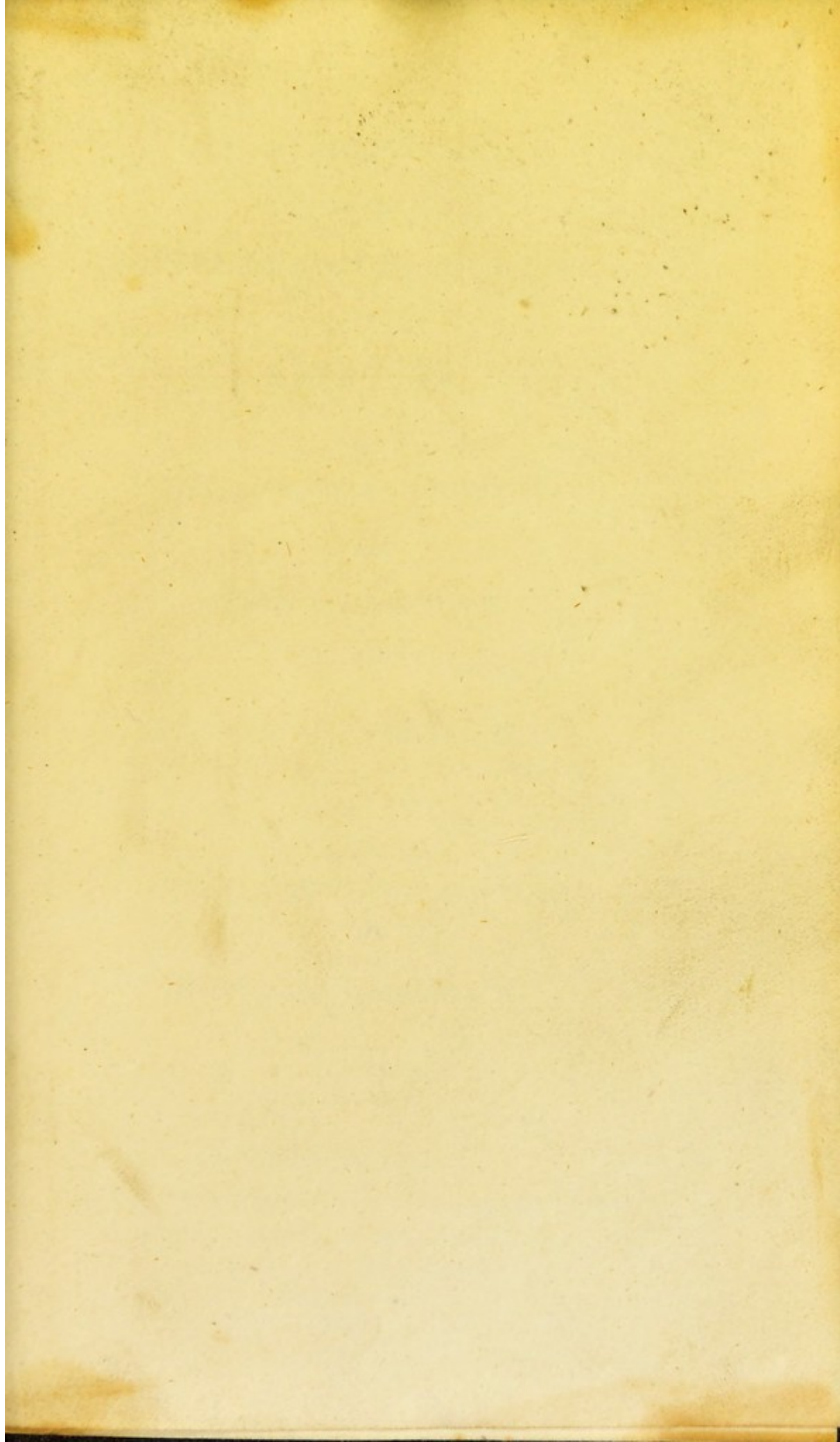


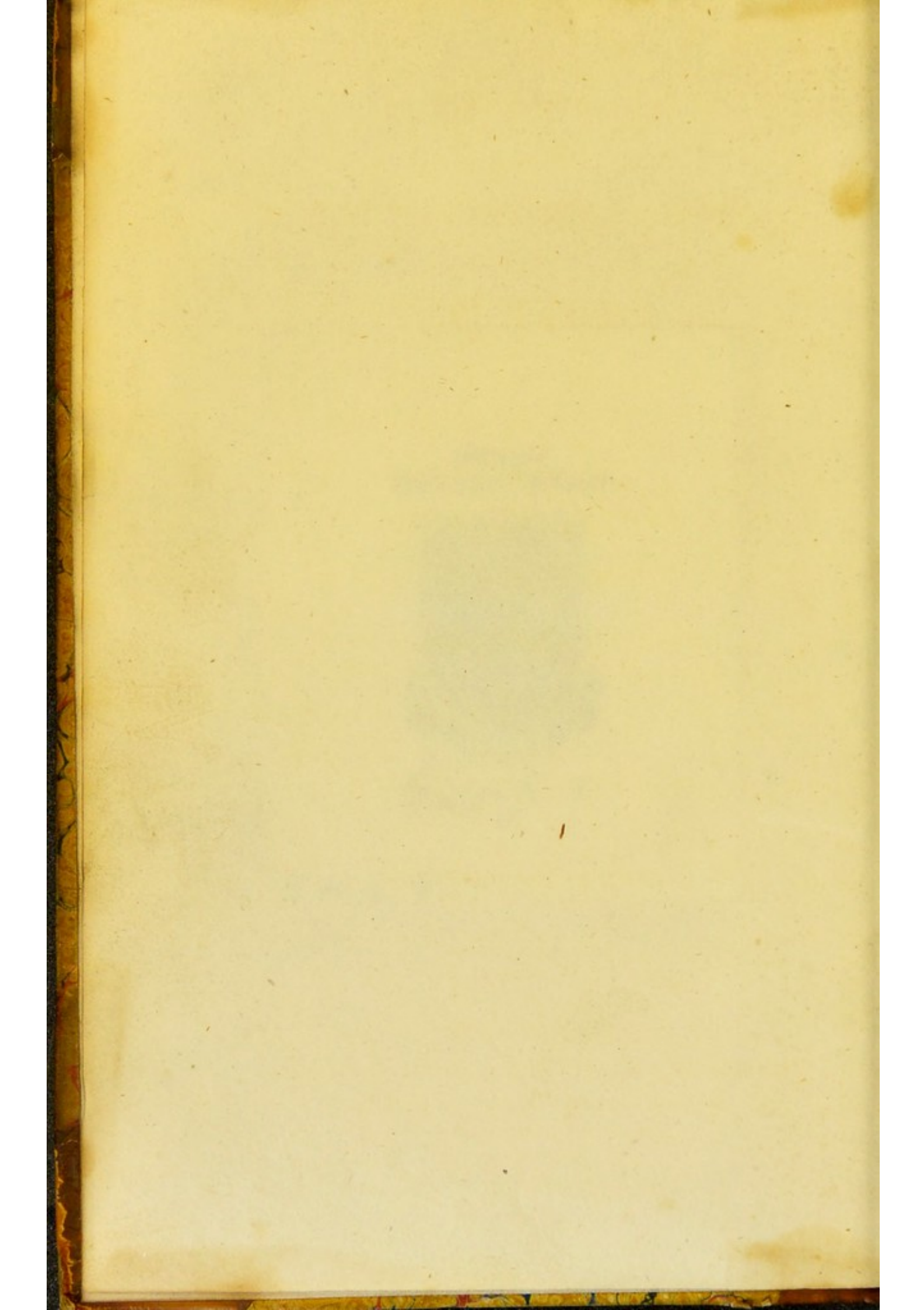
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A TREATISE
OF THE
EFFECTS AND PROPERTIES
OF
COLD.

WITH A
SKETCH HISTORICAL AND MEDICAL
OF THE
RUSSIAN CAMPAIGN.

MORRHEAD TRAVERS, M.D.
ASSISTANT SURGEON OF THE FRENCH ARMY.

TRANSLATED BY
JOHN CLENDINNING, A.B. & M.D.

WITH AN
APPENDIX BY THE TRANSLATOR.

EDINBURGH

PRINTED FOR MACLACHLAN & STEWART, EDINBURGH.

AND JOHN HARRISON, 4, NEW, LONDON; AND

WILLIAM B. M'ARTHUR, DUBLIN.

1854.

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BY
MORICHEAU BEAUPRÉ, M. D.
REGIMENTAL SURGEON IN THE FRENCH SERVICE.

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Frigus amicum et inimicum.

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OF

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WITH A

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OF THE

RUSSIAN CAMPAIGN

BY

MORCHAU BRILLIANT, M.D.

PHYSICIAN IN CHIEF TO THE RUSSIAN ARMY

TRANSLATED BY

JOHN CLENDINNING, A.M. &c.

WITH 24

ILLUSTRATIONS BY THE TRANSLATOR

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ROBERT & MARY, EDINBURGH.

1856

TO
DR. A. JACKSON, OF DUBLIN,
STATE PHYSICIAN,
HON. FELLOW OF THE COLLEGE OF PHYSICIANS,
&c. &c.

THIS VOLUME IS INSCRIBED,
IN TESTIMONY OF THE HIGH ESTEEM FOR
HIS PROFESSIONAL AND PRIVATE
CHARACTERS;
AND OF THE LIVELY RECOLLECTION OF HIS
MANIFOLD KIND AND FLATTERING ATTENTIONS,
ENTERTAINED BY HIS GRATEFUL FRIEND
THE TRANSLATOR.

DR. A. JACKSON, OF DENVER,

OF THE

NEW YORK COLLEGE OF THE ARTS AND SCIENCES

OF NEW YORK

THIS VOLUME IS PRESENTED

IN TESTIMONY OF THE HIGH ESTEEM FOR

HIS PROFESSIONAL AND PRIVATE

CHARACTER

AND OF THE LIVELY REGRET OF HIS

DEPARTURE FROM THE CITY OF NEW YORK

PREPARED BY HIS GRATEFUL FRIENDS

THE TRANSLATOR

TRANSLATOR'S PREFACE.

IT is now twenty years since any systematic account of the medical properties and uses of cold has been given to the English public. During that period, medical men have not been inattentive to the subject. Military practitioners, in particular, have enjoyed extraordinary advantages for the prosecution of inquiry respecting it. Several works have lately appeared in France and Germany, containing very interesting results of observations made under the most favourable circumstances. The consequence has been, that cold has risen even above its former eminence as a remedy. The writings of Lombard, Kern, Percy, Brandis, Beaupré, Tanchon, Horn, &c. bear testimony to this. In the journals also, many valuable facts have appeared within the above period, that throw new light on the powers of cold, or confirm what was previously known with respect to it.

The author of the present work served under Napoleon, as Regimental Surgeon, in Italy, Germany, Poland, Russia, &c. His opportunities of observation have been very great.

He divides his work into nine chapters, of which the third, fifth, seventh, and ninth, are the leading ones. In the third chapter he considers cold physiologically. In the fourth chapter, he gives a rapid sketch of the Russian expedition, the most gigantic, unhappy, and instructive of modern times. Our author was taken prisoner at the passage of the Beresyna, and remained some time in captivity. In the 7th chapter, he answers the query—How many different indications may cold be employed to fulfil? He points out seven modes of acting on the organism; in other words, seven different therapeutical effects which cold is capable of producing, when properly employed. Those modes of acting he calls “properties of cold,” distinct from each other, although so combined, that,—in general, without considerable address, or else good fortune,—no one of them can be brought into operation, so that its effects can be observed altogether unmixed with those of more or fewer of the rest. The ninth chapter, comprising more than one-third of the volume,

he devotes to the therapeutical history of cold. In this chapter, instead of choosing the arrangement best calculated to illustrate his views as to the varied operations of cold, he has imitated preceding writers, in adopting a nosological order, (similar, in this case, to that of the “*Nosographie Philosophique*”) which seems to have no advantage but that of facility to the author.

The subjoined notes are, for the most part, either intended to strengthen some positions of the author, which appeared to need farther evidences, or as *riders* on clauses in the original, containing decisions too exclusive and unqualified. The latter consist principally of facts from obvious sources, evincing the necessity of restricting the textual positions to which they relate.

With respect to the translation: a translation may, according to circumstances, be close, abridged, free, or paraphrastical. Each has advantages and disadvantages. The present is a close translation.

The therapeutical energies of cold are, on all hands, admitted to be considerable. In respect to particular diseases, or species of diseases, however, its value as a remedy is matter of much difference of opinion. In fevers, for example, some have prohibited it altogether; others relied

on it as a principal means of cure. Some have limited its external use to those cases in which the skin is dry, and, according to the evidence of the thermometer, warmer than in health; others, altogether disregarding this condition, have maintained that ready susceptibility of impression, conjoined with capability of due re-action, is the state to be attended to, with a view towards establishing a salutary process, and the application of cold. In scrofula again, some have declared cold bathing the most useful remedy within their knowledge; whereas a few estimable writers have allowed it but little merit, or have denied it all positive efficacy. In inflammatory and irritative diseases of the abdominal cavity, for a third example, some have lauded cold as almost a specific, while others, of the first class for learning and judgment, have condemned it without qualification.

He that would furnish a complete medical history of cold, must attempt to reconcile such conflicting evidence, and to point out the fallacies that have vitiated the inferences of either party or of both. That task Dr. Beaupré has not fully performed: what he has omitted, the Translator does not undertake to supply. He will, however, hazard a few observations, principally with

a view to help the student in this matter to a clearer conception of the real state of knowledge, as contrasted with opinion ; with the real merits of cold, in short, as opposed to the estimates of haste and prepossession.

It does not appear that there is any medical agent possessed of an efficacy independent of circumstances, as of peculiarities of sex, age, lineage, mode of life, temperament, &c. &c. Mercury perhaps requires, for success in syphilis, as few conditions that are not to be met with in every human being, as almost any remedy in any disease whatever ; yet it disagrees with some syphilitic patients, and aggravates their complaints. Free exposure to cool air will probably, in many bad fevers, be found to excite as uniformly, and produce morbid irritation as rarely, as any stimulus whatever ; yet many have been lost in fever, owing to being translated from filthy damp cellars to clean airy wards. Many inflammatory complaints have scarcely borne bleeding ; many persons cannot use opium, cantharides, &c., though the general utility of those medicines is unquestionable. In the case of each of those, it appears from experience, that certain preliminary steps might have been taken, by which the operation of the agent or medicine

might have been facilitated, and the number of exceptions to its general mode of action greatly lessened. Bleeding, low diet, &c. favour mercurial action ; early ventilation, &c. lessens the irritating effect of free exposure to cold air ; ventilation, bathing, &c. prepare the way for bleeding ; depletion brings about a state of the organism favourable in acute diseases, to the salutary operation of opium, blisters, &c. This plan of *preparation* has been extended to most medicines in one disease or other, or by one physician or other. It has not, however, to the Translator's knowledge, been reduced to rule, and has been employed in practice, only so far as individual observation and sagacity have pointed out or detected its utility in the use of particular remedies in some individual diseases or stages of disease. It is plainly a principle applicable to most disorders and remedies, and also indicates a practice, the neglect of which must be productive of frequent failure and disappointment.

The foregoing observations will help us to understand how writers of acuteness and judgment have differed so widely respecting the utility of cold bathing. Most physicians have, it appears, recommended bathing pretty freely in

health, as have very many in disease likewise; and very often, at the same time, without pointing out precautionary measures suitable to the circumstances of the more delicate, and calculated to secure for them, the same agreeable results that the more robust obtain from the unassisted energies of nature. The consequence has been, that the infirm and morbidly susceptible have been often disappointed of that advantage they have been induced to expect.—There are cases also of weakness, delicacy, &c. of difficult diagnosis, that probably depend on organic states not removeable by cold bathing; and those, when subjected to cold affusion, &c. either find no alleviation of their complaint, or experience in it a decided deterioration. According then, probably, as the majority of bathers that have fallen under the observation of an author, have abounded or fallen short of the conditions necessary to the success of cold bathing, which evidently must often depend on what, so far as the prescriber is concerned, may be called accident,—so will his verdict be favourable or otherwise.

Some writers of distinguished learning and ability declare cold applications inadmissible in certain disorders; others acknowledge they have no experience of them in such. These physi-

cians treat those disorders without assistance from cold, as successfully as those others who most freely employ that agent. Is cold, therefore, superfluous in the *materia medica*? Assuredly not.

The exclusive partiality with which therapeutists usually regard their own modes of treatment, leads them often to depreciate other curative plans. A physician who is enamoured of his old methods, is not likely to put new ones to the test of experience. He will, however, often not abstain from passing sentence, although he has not assisted at trial.

What disease is it that yields to one remedy, or set remedies only? Take syphilis and pleurisy. We have evidence that an ordinary syphilitic affection may be treated almost indifferently three different ways. By that of hot countries; that of Hunter and Sydenham; or that of Drs. Thomson and Hennen, and Messrs. Rose and Carmichael, and others.—There is reason to believe that an ordinary pleurisy would, in many cases, yield to any one of three or four, or perhaps half a dozen plans of treatment, or sets of remedies;—from the practices of Drs. Hamilton (Lynn Regis), Cyrillo, Brown, Rasori, Broussais, Pring, Pinel, &c. compared with the treatment most generally adopted in inflammatory diseases in this country, this seems deducible.

Neglect, therefore, of a remedy by practitioners who have equivalent means at hand, can afford, in respect to it, no unfavourable inference.

The undue preference above alluded to, given by eminent physicians, to some one of several remedies, or curative plans, is, though inseparable from humanity, injurious to medicine. Diminution of his resources by arbitrary amputation of an active member of the *materia medica*, is, it is true, less felt by the city physician. He can avail himself of many minor aids. But the inconvenience falls heavily on the practitioner remote from large towns. He has not books nor leisure for systematizing and speculating; he must, therefore, look to the city for his theories. Theory must ever guide practice. The country practitioner will often find great advantage in knowing how to turn to account the medicinal properties of the various bodies that surround him; of none more frequently than water. Palm upon him a theory, whether physiological or pathological, that excludes cold from the treatment of a complaint, for which it is in reality proper, and what injury may you not do him! Even in cities, peculiarities of physical and moral habitude will be met with, rendering some one measure, or set of measures, more convenient than those usually

resorted to by the physician. Some will not bear the lancet; others leeches; others cupping; others blisters; others opium, &c. &c.—the exclusion, therefore, of cold, from the treatment of several acute and chronic disorders, is, if ill founded, an error liable, in some cases, to very disagreeable consequences.

Another consideration must be attended to. One positive observation, accurately noted, of successful use of a remedy, is equivalent to several negatives. The successful result proves the practice not incompatible with favourable issue of the disease, and proves further, that it is capable of curing such. Whereas, on occurrence of a negative, the query remains,—might not better management, by preparation of the patient, or combination of the remedy with some corrective, have procured a better result? For example, might not preparation by cinchona, bleeding, catharsis, or other means, render cold freely admissible in gout, rheumatism, &c.? Might not friction, exercise, hot drinks, stimulants, &c. before or after, or both before and after bathing, render that remedy more generally safe and extensively useful? Might not bleeding, &c.—hot applications, stimulating fomentations, &c. to the abdomen, render cold epithems less liable to ob-

jection, on the part of those who prohibit their use in enteritis, &c. ?

These observations, the Translator has ventured to offer as a sort of general solution of the doubts which, owing to the contradictory nature of the reports of different observers, must embarrass the young reader. For a detailed and satisfactory elucidation of those difficulties, no ordinary extent of reading, observation, and leisure would be sufficient ;—that must be left for those who enjoy the necessary means.

The Translator, before concluding, cannot refuse himself the pleasure of declaring his grateful sense of the accommodating spirit and gentlemanly liberality of Dr. A. Duncan, junior, Professor of *Materia Medica*, &c. and of Dr. E. Milligan, Lecturer on Physiology and Therapeutics, &c. Edinburgh. Unknown to these accomplished physicians, unless as a student ; connected with them only in the common relation of pupil, he gladly avails himself of this earliest opportunity of expressing his thankful acknowledgments of recent and former civility and kindness.

AUTHOR'S PREFACE.

I HAD scarcely conceived the design of examining the influence of cold on the animal economy, when the numerous difficulties that surround this question in Physiology and Therapeutics, which has been, and still is, the subject of so much disputation, presented themselves to my mind. I foresaw I should have to reconcile opposite opinions, without deviating from the principles of sound medical doctrine. Nothing more was required to make me hesitate about attempting the subject; but I had had manifold opportunity of observing the action and properties of cold; and though, while occupied in professional attendance on soldiers, in climates of very various temperatures, I had in various circumstances made use of cold applications with success, I confess still, that for want of analytical examination, I had not always been able to explain exactly their physical effects, or manner of acting on the animal economy. The Russian campaign, the sight of the sufferings originating from cold, of which I have been unhappily witness,—what

I have myself endured,—what I have read, in short, have induced me to reduce to writing various reflections on this agent, which exercises such great influence over man in health and disease, and to add to them a number of facts from my own observation, or scattered here and there, and which became necessary as a basis for reasonings, and source of useful inferences. It has been my object to make a practically useful work, and to rectify the conclusion still adhered to by some physicians, who, from over-confidence in Brunonian principles, persist in recognising in cold only an absolutely debilitating property. This double motive gives me some claims on the indulgence of the reader.

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ON THE
EFFECTS AND PROPERTIES
OF
COLD.

CHAPTER I.

ON CALORIC AND HEAT.

THE maintenance of life is the result of the action of natural excitants on the vital powers with which all the organic systems of the animal economy are endowed. It is those excitants that maintain that continued state of energy and vigour that constitutes health; increase or decrease of their ordinary effects, certain peculiar modes of action, peculiar modifications of their constitution, their partial or total abstraction, determine those unusual changes or phenomena which indicate disturbance of the natural harmony of the functions and characterise disease.

The effects of stimuli seem to depend on the re-action of that principle which regulates the properties inherent in the living solid, to which, indeed, must be referred all that occurs in the physical constitution of man. Since that first cause eludes all research, we must limit our inquiries by that best established rule of physiological investigation, which forbids us to inquire beyond sensible phenomena; such are, among the rest, the effects of exciting and debilitating agents.

Amongst stimuli, caloric occupies the first rank. The vital principle, highly sensible to its action, seems, may we say, to associate and identify itself with it as by a law of affinity. Caloric seems, in its effects, to distribute motive power; to diffuse it from the centre to the circumference, and *vice versa*. At the highest degree of exaltation of the animal powers, as well as at their greatest depression, the vital principle and caloric maintain their correspondence,—a sort of mutual relation and dependence. The calorific power increases or diminishes in proportion to the general strength or weakness; great heat enhances the energy of the principle of life, just as an immoderate cold weakens and extinguishes it. Before treating of cold, I have thought some remarks on caloric and heat, necessary.

Caloric, the material cause of heat, according to the hypothesis received by the great majority

of natural philosophers, is an elementary fluid, very subtle, invisible, imponderable, elastic and expansible, diffused through all nature, whose properties are known only by its effects. It tends constantly to place itself in equilibrio; it dilates every thing it penetrates; it augments the volume of bodies, and makes a great number pass from the solid to fluid and aeriform states; it is free or latent. It is of free or sensible caloric we here treat. The sensation it produces on our organs, makes known to us its presence in greater or less quantity; it is called heat, a word appropriated to expressing the effect of which caloric is the cause. Some physiologists have been disposed to consider that sensation as the effect of some dilatation, which, as they think, it effects in the tissues; but it is, like all others, determined by the peculiar nature of the relation of sensibility to the agents that affect it; the word heat is employed likewise to designate the amount of the fluid in a given space. Thus the air and all surrounding bodies are called hot or cold, according as they contain actually more or less caloric, or as is their temperature relatively to the state of our bodies. Those qualities we express by the words heat and cold. Animal heat is the result of the continual extrication of a certain proportion of caloric from the internal and external surfaces of all the organs. This caloric, from a combined

state becoming sensible, has, as well on account of the source from which it flows, as of the laws to which it is subjected, deservedly obtained the name of animal or vital heat. Its production seems owing, as well to the action of all the organs, as to the decomposition or disoxygenation of the air in the lungs. In this latter particular physical and chemical philosophers have attributed too much to the principles of their sciences, and have completely misunderstood the effects of vital power. The most decisive proofs that can be adduced to establish the influence of organic action on calorification, are that internal and external stimuli, locomotion, and the exciting passions, augment animal heat, while every thing that enfeebles and enervates, repose and debilitating passions, diminish it. How, as Barthez has remarked, could the body resist, surrounded by a cold and freezing atmosphere that rapidly abstracts caloric, did not the vital principle continually exert itself in its reproduction? Nature then seems to employ double means for maintaining animal heat. The theory which places calorification or caloricity in the capillary system, and explains it by chemical combinations and decompositions, is still far, as I think, from bearing the stamp of truth, or of that probability, with the air of which, some physiologists have succeeded in investing it.

That caloric, disengaging itself constantly from the surface of our organs, is lost in the air, which it heats, and communicated to all the bodies which surround us, and are applied immediately to us. In proportion as it escapes, united to the humours whose excretion it favours and maintains, it is replaced by that which is developed internally, since the living tissues enjoy in a high degree the power of conducting. It is therefore rather to retard and intercept its transmission, than to moderate the action of the cold air on the skin, that we carry, in winter, clothing of a material ill calculated for conducting the principle of heat.

The vital power of generating heat maintains in the economy a temperature isolated from or independent of that of the atmosphere, which amounts to from 96 to 98 degrees of Fahrenheit. The vital principle or active force of vitality, by repelling the caloric of a higher temperature, enables man to live in climes where the atmospheric heat far surpasses that of his blood. On whatever point of the globe's surface this being, privileged by nature, may be placed; at the extremity of the frozen regions of the north, or amidst the burning countries of Africa or Asia, he owes to that principle, which watches for his preservation, the power of alike resisting violent cold and excessive heat.

This incontrovertible physiological fact proves

the defectiveness of physical principles in respect to the equal diffusion of caloric, and the penetrability of all bodies by it; I mean it shows them to be inapplicable to the living body, so long, be it understood, as it preserves its energy and natural temperature; for, when by gradual enfeeblement of the vital principle, such for example as occurs in the congelation of a limb, calorification diminishes, and is almost totally extinguished, the part, cold and insensible, approaches by that very circumstance to the nature of inert tissues, and suffers penetration by external heat. Thus the result of the continual combat for place, between the vital and atmospherical matter of heat, varies according as the vital energy of the skin and subjacent tissues is defective or otherwise.

Whether we consider animal caloric as emanating from the solar rays, its natural source, or from heated bodies, burning or fermenting,—or whether it be regarded as the product at once of combustion in respiration and of universal vital action, it is the same thing; and considered abstractedly from its laws, and peculiar and relative properties, its action on the human body proves essentially stimulant, and it must be regarded as one of those agents that most enliven the animal economy. Life is a lover of heat. He that is asphyxiated by cold can look for his salvation to heat alone. It is when he perceives

the temperature maintaining itself nearly as in the natural state, in a member whose circulation has been intercepted by ligature, and then only, that the surgeon conceives hope, and acquires a nearly perfect assurance of preserving it.

All organic beings are sensible to the action of caloric, and every thing in nature attests its active power. Observe its wondrous effects, when, in spring, the sun, travelling towards the equator, approaches our planet, coming to shoot directly on us his fires. Nature throws off her weeds; every living thing experiences the benefits of that radiating principle, which strikes and penetrates the soil, or is partly reflected and diffused through the air; the fields recover verdure; the vital seminal germ revives and expands; the sap climbs from the roots to the trunks; the plant bedecks itself with leaves and flowers, and prepares to bestow the rich and delicious gifts of summer and autumn. By artificial production of caloric, we enjoy the pleasure of rearing those exotics we (so much) admire. It is thus the inhabitant of northern regions grows and procures, at great expense, in his immense hot-houses, those fruits which his austere and ungrateful clime deny him.

At the return of the fine season we perceive animals manifestly sensible of the stimulating action of caloric. Insects abandon their obscure retreat; the chrysalis disengages itself from its

defensive cover and presents itself in a form elegant and animated ; the squatted reptile and hybernating quadruped, the dormouse, marmot, bat, &c. awake from the lethargic sleep in which the cold had plunged them ; the fish regains the surface of the waters ; the bird, perched amid the foliage, feels himself exhilarated by the fire of the radiant star, and gaily sings his listening mistress. All animals in short, animated as it were anew, are impelled to satisfy the imperious desire of reproducing their species. Those wondrous effects, that grand movement of nature, are due, without doubt, to the new portion of caloric superadded and diffused throughout—they furnish evidence irresistible of its great exciting and vivifying power.

Man, guided by instinct as well as sense to seek pleasure and eschew pain, appears not less sensible to the presence of caloric than any other organized being that it vivifies and enlivens. In cold and temperate climes the same cause that obliges him to provide himself with heat in winter, leads him in spring to court the beneficent solar ray ; he then marks the departure of that crowd of morbid affections which tormented him during the past season ; an increase of force and energy steals as by magic through his frame ; his blood moves faster ; his motions are more easy and his sensations more lively.

It is after being exposed to the action of in-

tense cold that we feel the effect of a moderate portion of heat delicious. The tissues, pleasantly excited, expand and swell gently owing to a slight turgescence; the dryness and aridity of the skin vanish; the sharp pain disappears and is immediately replaced by an agreeably radiating sensation. When cold goes so far as to cause general numbness and suspended animation, the means employed to remove that state are stimulant and calorific. The heart pushes the blood with more energy from the centre towards the surface, and even into the capillary system where its course has been suspended; the pulse gives gradually stronger strokes; the vital heat disengages itself owing to re-action; the skin becomes coloured; a heat equable and grateful diffuses itself, accompanied by a slight moisture indicative of re-established perspiration and of the complete return of vital movements to the skin; benumbed sensibility recovers its rights; the senses resume their activity; the muscles recover their play and vigour; a certain feeling of well-being thrills through the whole frame; the countenance is again composed and animated. In short, calmness and serenity revisit the soul with new power and fascination.

It were easy to adduce further and new evidence of the stimulating effects of caloric, drawn from observations made in tropical climes. All beings there show a certain superiority in physi-

cal qualities over those of northern countries. Confining ourselves to man, we shall only remark, that the action of caloric, more powerful and prolonged in hot countries, produces high excitement in the physical frame, on the nerves, brain, senses, heart and vessels; that it causes an exaltation of sensibility and irritability, a vivacity quick and hot, of the movements, thoughts and passions.

The advantages that prophylactic and therapeutical medicine derive from caloric still further declare in favour of its stimulating agency.

I conclude those general remarks by observing, that the quantity of caloric proper for the support of life, and of the equilibrium of health, is always moderate; that if its too great diminution be pernicious, so likewise is its excess; whether it excite too powerfully from external accumulation, or from preternatural increase of animal heat owing to morbid exaltation of the vital movements. Protracted exertion, insolation, hot and spiced dishes, spirituous drink, violent passions, increase the heat of the body. Excessive heat desiccates, irritates, reddens, inflames, and even disorganizes the parts, acts on the blood and humours, which it rarefies, and to which, during too protracted hot seasons, and beneath a burning sky, it communicates a tendency to that diminution and loss of their vitality,

called putridity.* The prolonged action of an atmosphere surcharged with that principle, relaxes the fibre, and diminishes its contractility or

* It is certain, that in cold weather we do not observe those sudden decompositions of the mass of the blood, that rapid dissociation of the organic elements, that occur from excessive and prolonged heat, which I regard as their true cause. To more skilful physiologists I leave it to explain how it then acts on the solids and fluids; I shall only offer a very curious fact:—Towards the end of July, 1811, during my evening visit, there was brought to the military hospital of Treviso a Dalmatian soldier twenty-six years old, who, by his comrades' account, had suddenly fallen senseless on the rampart where he had been two hours on guard exposed to the whole power of the sun; in that condition he was found when they came to relieve him. I examined him; the extremities were almost as warm as in the natural state; the face pale and leaden; there was total loss of motion and feeling; black dissolved scorbutic-like blood flowed from the nasal fossæ, which I immediately plugged up. In separating the jaws I perceived not only the cavity of the mouth filled with blood, but also the whole mucous membrane of the lips, gums, cheeks and tongue chequered with livid spots, resembling nothing more strikingly than scorbutic spots. I found the belly somewhat inflated, and the hypogastria distended; I introduced a catheter, and there came out a litre and a half at least of black blood mixed with urine; the pulse was small and very feeble. I had a fomentation of cold water immediately applied to the abdomen; I prescribed a potion of decoction of cinchona, tincture of cannella, and sulphuric acid with alcohol; I had, besides, blisters applied to each of the extremities. The patient died six hours after entering the hospital. On dissection, I found the bladder filled with putrid fetid blood; the whole extent of the mucous membrane of the nose, pharynx, œsophagus, stomach, intestines and bladder, presented the same livid spots as the inside of the mouth; the putridity of the corpse rendered quick burial necessary. The information I procured respecting that soldier showed that he had not been sick, and had even, during his whole time with the army, enjoyed perfect health.

elasticity ; it provokes abundant sweats that exhaust the body ; it causes the powers to languish, and sometimes even causes death. It is a fact, that life wears out faster at the line than in the north, where fewer examples of premature old age, and many more of longevity are to be found.

From the known effects of heat on our frames, we cannot, without risk of error, infer that those of cold are diametrically opposite, and that it ought to be essentially debilitating. It is proper therefore to examine cold in respect to its nature, its causes and its effects ; this analytical method will explain to us its properties.

CHAPTER II.

OF COLD IN GENERAL.

WITH a view to accuracy of reasoning, it is convenient, in physiology as in all other sciences, to begin with definition of terms. In treating of cold, we often express by the same name the cause and the effect ; sometimes the temperature itself, and sometimes the sensation it produces on our organs.

“ Cold ” is the state of temperature marked by a less portion of caloric in the air, as well as in all

the other bodies solid and fluid with which man has constant relations, and which, by the law of equilibrium, tend to rob him more or less rapidly of his caloric. "Coldness" is applied to the characteristic quality of the air, the season and the climate.

We understand also by "cold," the peculiar sensation, "*sui generis*," produced by contact with our organs, of bodies of temperatures lower than theirs; or which comes to the same, bodies that contain much less caloric than they are provided with when they cause a quite opposite sensation, which is that of heat. It is between the 60th and 66th degrees that the human frame is in a just medium, *i. e.* in equilibrium with the atmosphere, so that it neither experiences the sensation of heat or cold; when the atmospherical temperature falls below "temperate," and the mercury descends to 20° or 16°, Fahrenheit, then cold becomes sensible; we complain that "*it is cold*." The same holds good of the sensation we derive from all bodies really cold, or which we find such owing to relative difference between their temperature, which is variable, and that of our bodies, which, at the surface, is frequently so in health and in disease. It is that comparative sensation which makes us feel the air of caverns warm in winter and cool in summer, although their temperatures be at all times nearly alike; our sensations would be bad mea-

tures of the heat which we determine by aid of the thermometer ; that instrument, perfect as we can desire, which informs us, day and night, of its variations whether ordinary or unusual.

If the sensation of cold be limited to a slight impression, it is supportable, but if it be intense and prolonged, the pain, *dolor algidus*, which is propagated along the course of the nerves, becomes acute and very distressing ; *ceteris paribus* the sensation of cold is more disagreeable when it affects but one point, than when diffused over an extensive surface ; who is there that has not experienced the unsupportableness of a blast from a chink ? we suffer less by submerging suddenly and entirely in a cold bath, than by entering slowly or partially ; if you plunge your hand into a vessel filled with iced water, or with mercury, the sensation is so acute, that you withdraw it in great haste ; there are few persons capable of holding ice for a long time in their hands, so true is it, that every painful sensation, carried to excess, becomes intolerable, and may even force from us an avowal disavowed at once by head and heart ; we know the effects of tickling the soles of the feet, on the reformed of the Cevennes, to force them to abjure their faith, as well as those of the horrible torture employed by the infamous “ *Chauffeurs de Pied.*” The fatiguing sensation the long application of ice to the feet, would produce, would

be truly torturing to some persons. This we may account for, 1st, By the very lively and disagreeable sensation, owing to the great quantity of nervous ramifications spread over the foot-soles ; 2dly, The sympathy of those parts with the brain, on which impressions are reflected ; 3dly, By the duration of the painful sensation, and the difficulty the inferior extremities find in warming themselves, while in repose and lying horizontal. Cold to the feet during the night, disturbs and interrupts sleep ; it is often the cause of the restlessness and cries of the cradle infant, and even sometimes of the derangements of its digestion. By day, it influences the mind and manner ; causes melancholy, carelessness, taciturnity, and bad humour. It is these effects, no doubt, that have given occasion for the opposite remark of one that loves gaiety and laughter, " he has warm feet."

All animals are sensible to cold, and find its effects on their organization vary, according to the kind and degree of sensibility allotted them ; as for man, the sensation is always relative to his age, sex, temperament, physical constitution, and exterior bodily habit, to the country and situation of his residence, the sort of food he uses, and his kind of life, whether active or sedentary.

The unequal allotment or difference of individual sensibility causes such varieties in the

sensation of cold, that we may say that each person has a peculiar manner of feeling it. In a general way we remark, that, owing to its constant relations with the circumambient air, the body contracts, from the moment of birth, and successively during the first years of life, a certain habitude of sensibility, which familiarises it with the impression of heat and cold, so that it may be said, each people has its own moulded by its climate ; hence the difference of our judgments respecting temperature, and our greater or less capability of supporting it. Cold, which at nine or twelve degrees, is to a Frenchman sharp and rigorous, would be to a Dane or Russian very moderate. At Petersburg they consider the temperature ordinary and agreeable, as long as the thermometer marks but two, nine, or thirteen above zero. Habit, which, however, in each individual is modified by many causes, physical and moral, blunts sensibility. * The inhabitant of hot climes, transported to the north, becomes gradually acclimated ; his sensibility must gradually accommodate itself to the temperature of the new atmosphere he inhales ; he, however, that is native there, has that habit of sensibility of which we have just spoken, which

* This proposition is not invariably true, since habit perfects some senses. Does this difference arise from variety and succession of impressions, while prolongation of the same tends to a contrary result ?

enables him, with ease, to encounter the rigour of the cold. Infants in the north play on the snow and ice; they are accustomed at all times to pass from one temperature to another. Men and women come frequently, day or night, out of their houses, with breast uncovered and arms naked, in a cold of two, thirteen, or thirty-six below 0° , without seeming to perceive that it is cold. The Russ, steeled as well by his almost Spartan education, as rigid climate, travels alike by day and night; the peasant, be he where he may, wraps himself up in his pelisse, and sleeps profoundly at full length on the snow. The Norwegian works with breast uncovered in a freezing atmosphere, and the Canadian savage, in defiance of his rigorous climate, goes to the chase but lightly clothed. In the rudest winters the Swiss keep the breast uncovered, and their children sport on the snow. In Russia, I have been astonished on observing those numerous wandering families of Zigeuners or Bohemians, (Gypsies) ill clothed, travelling during winter, encamping on the snow in the middle of the plains, with but felt to sleep on, and sheltered by a bad tent, under which they make fire of a resinous fir that envelopes them in smoke.

Certain usual practices further illustrate how easy it is to accustom us to cold; we might cite the example of those persons, who, at whatever season, use only the coldest water in their ablu-

tions. The eastern Mahometans, with all the scrupulous precision enjoined by their religion, practise ablution with cold water on various parts of their bodies, alike in summer and winter. Souvaroff, who enjoyed robust health, and endured, like a true soldier, the fatigues of war, was in the habit, in the course of his many campaigns, of having, daily, and at all seasons, a pail of cold water thrown over him.

Such are the great effects of habit, natural or acquired; of the custom, however, of the Russian or Finnish peasant, a different explanation must be given; he comes reeking from his stove-bath to throw himself, in the gaiety of his heart, into the water, or roll himself in the snow, and with as much pleasure as a Sibarite stretches himself on his bed of roses; we must know that he passes with impunity from a very high to a very low temperature, only because his skin is highly excited and reddened by the heat of the bath, at a temperature of 122, 145, or 167 degrees. In that state the cold has much less positive efficacy. Before leaving the bath, and as a finishing stroke, the Russ nobleman has several large vessels of cold water thrown on his body, beginning with his head. I was desirous of trying this affusion. I expected a very strong impression. I felt the first time but a lively coolness, the second time, having taken the bath warmer, I found the sensation agreeable; the

stronger the heat one is exposed to, the less sensible is the cold impression. By that method the Russians prevent the delicacy and relaxation which the repeated use of hot baths so exciting, would produce; it renders likewise the body less impressible by the external air, and diminishes its disposition to catarrhal and inflammatory disorder from suppression of perspiration.

Newly born, or sickly children,—lean and weakly persons,—individuals old or very impressible and irritable,—valetudinaries or exhausted debauchees,—convalescents,—those who have been tenderly reared and early accustomed to warm themselves,—those who habitually practise warm bathing, who perspire much, and do not regulate their clothing by the season,—the poor, who are ill clothed and nourished,—persons of morbidly changed sensibility, such as hypochondriac or hysterical persons, or those affected with organic lesion, as the phthisical, scrofulous, &c.; all those dread cold, and show themselves very sensible to it; children fear it less than adults, men than women; those of sanguine or bilious temperament are less chilly than those of the nervous or lymphatic. The fatty covering which clothes the extremities of the nerves, and retains the heat, shields from cold those who enjoy a succulent fulness of person. The animals of polar regions are loaded with fat, which fatness is no doubt necessary to them as a protection from cold.

Facts not less curious than surprising, evince, that sensibility is diminished by every thing that affects or strongly engages the feeling principle ; the continued and obstinate direction of the intellect and passions towards any one object, such as that caused by a strong affection, by political fanaticism, or military, or religious, by grave and serious occupations, by impassioned attachment to art or science, &c. while it concentrates the sensibility, renders the body inaccessible to the various external impressions, and even to the action of cold. An instance has been mentioned of a fanatic who made for himself a bed of snow to mortify his flesh. It has not been very rare to see persons plunged in profound meditation, remain insensible to the keen darts of an excessive cold. The lover, who, but that he burns with passion, would tremble for cold, braves the rigour of a freezing night, watching till the delicious moment of meeting. The fashionable lady, lightly clad as in the warm days of summer, fully possessed with desire of pleasing, and the brilliant effect of her finery, endures, without complaint, a temperature, which, under any other circumstances, would make her shiver, and often receives the arrow of death without perceiving it. The indefatigable hunter forgets every thing for the satisfaction of his passion ; we see him expose himself to the piercing north-east wind in the depth of the rudest winter,

plunge into icy marshes, impatient to surprise the aquatic bird; he traverses the valley, cold and wet, penetrates the woods, amongst the brambles in pursuit of the timid hare and nimble roe-buck. It is of him Horace has so gracefully sung,

Manet sub Jove frigido,
Venator, teneræ conjugis immemor.

Figure to yourself again, Charles the XII. asleep at midnight, in December, on straw on a plank, at the siege of Frederickshall, in Norway; there, as in the Ukraine, you see him insensible to the assaults of the freezing element, and entirely absorbed in his plans, his projects, and his situation.

It is to an absolute defect of sensibility that we are to attribute the indifference of Cretins to extremes of temperature. An affection of the sensitive powers more or less profound, as in certain cases of ataxic fever, of mania without or with delirium, of sadness, melancholy, &c., from the same cause, renders our frames less, and even not at all impressible by cold. Such is the case of the maniac noted by Pinel, who could wear no clothing, and ran in his shirt through the hospital in a cold of -4° , in January, 1795, and with delight applied ice and snow to his chest. Mention was made in the journals of 1814, of a woman found quite naked, during winter, on the high mountains of the Canton of Vic-des-os, in

the Pyrenees ; she fled when one attempted to approach her ; and was ultimately caught, and brought to a neighbouring chateau, where she perished miserably a little after. Her name has never been discovered, and the journals have advanced nothing but conjectures respecting that wretched creature, who lived like a savage amid rocks and precipices. Her altered physiognomy, her mute and sorrowful posture, expressed grief and profound melancholy, which occasionally gave place to maniacal delirium. Without supposing defect or abolition of external sensibility, it is impossible to conceive how that female could, without clothing, and with bad nourishment, have resisted the rigour of a cold, in winter, almost as sharp on those high mountains as on the plains of the north. Should we admit an augmentation of intensity of animal heat, in order to explain the facility and constancy with which mad persons endure a rigorous cold? I think not, or at least this cause does not appear so probable as the peculiar condition of sensibility with those individuals. Besides, the thermometer evinces, that the temperature of their bodies is not at all preternatural.

The physical and usual cause of cold, is the diminution of caloric at the surface of the earth, and in the atmosphere which clothes it ; all bodies, by consequence, experience progressive refrigeration, proportional to its degree and du-

ration. Cold succeeds heat, owing to that revolution of the sun, which, by fixing invariably the admirable order of the seasons, recalls constantly the same changes of temperature under all corresponding latitudes. We have, in winter, under the temperate zone, a greater cold, because the sun remains a shorter time above our horizon, and shoots his rays more obliquely than in any other season of the year. It is the meridional declination, and the flattening of the earth towards the poles, that renders the cold more intense and durable in proportion as we advance from the temperate towards the polar regions. A great variety of causes contribute in producing differences of temperature under neighbouring latitudes, and even under the same. In France, where the north-east is the harbinger of hoar-frost, the cold is moderate, and rarely, in common years, exceeds nine or fourteen degrees. In 1709 and 1776, however, it reached -2 , and in 1788, -9 degrees. When the winds of the east, north, north-east, north-west, which predominate in winter, particularly in certain countries, blow impetuously and long, they increase sensibly the cold, by rapidly subtracting the caloric. From whatever point they blow, the winds are always colder in proportion as they approach due north. At Montpellier, where the climate is soft and agreeable in winter, and where a lovely sky rivals those of Naples and Greece,

we are sometimes incommoded by the blast of the north or north-east, which brings sharp cold, which again is rendered still more piercing by its passage over the snowy mountains of Lozere and Cevennes. We read in the memoirs of the academy of sciences, that, in 1709, when the winter was so severe at Paris, the cold was most acutely sensible, although the south wind had blown for several days; but that warm wind traversed the Auvergne mountains, then covered with snow.

Mountainous countries, districts situated northerly, or at a small distance from snow-clad mountains, have a very low temperature. This coldness is in the direct ratio of the elevation of the surface over the level of the sea, and of the rarefaction of the air, which accounts for the great cold perceived on the heights, the Pyrenees, and the Cordilleras. The cold is very sensible also along rivers, streams and lakes. In Russia, it is sharper along rivers that remain frozen for five, six or seven months in the year. The Neva and the marshes neighbouring Petersburg, render that capital much colder than it would be otherwise. It is the enormous accumulations of ice flakes which take place on the banks of rivers in the most northerly regions, at the frightful period of breaking up, that prolong the cold in the vicinity until their complete dissolution. Adventurers in the north seas, relate, that they are

made aware of the neighbourhood of ice mountains, which are eternal in those regions, by the change of temperature, which, from warm, become usually very cold. It is well known that the environs of alpine glaciers cannot be inhabited by man. Thus, the beginning and intensity, duration and cessation of cold seasons, are not only subject to degrees of latitude, but also to causes and changes independent of the return, and fixed and constant march of winter, such as topographical situation, nature of soil, its cultivation or nakedness, unevenness of the ground, disposition of plain and mountain, vicinity of waters, predominating cold winds, draining of marshes, cutting down of woods, exposure to the north, or protection from that quarter by forests or chains of hills.

It is certain that clearing has in some countries influenced the advance and duration of winter, as well as the intensity of the cold ; for a soil wooded and cultivated, is colder than one barren and naked. The plain of Lombardy and Piedmont, whose vast basin is partly bounded by snow-clad mountains, presents a soil well cultivated ; you there see no untilled ground ; plantations of trees are in great quantities ; rivers, streams and irrigating canals cut it in every direction ; add to those the numerous rice-fields, the constant humidity of the soil arising from inundations artificially produced in summer, and you

will have an idea of the causes to which are owing the sharp and disagreeable cold that you experience in that part of Italy. Hence the stranger transplanted in winter beyond the Alps, is, and not without reason, quite astonished at missing that softness of climate that has been so much vaunted.

The forerunners of the season, which, announcing itself with sad and sombre hues, ushers in cold weather, sadden us and afflict all nature. Quickly we perceive towards the end of autumn the feeble heat of the solar ray, and the already sensible refrigeration at the surface of the little spot of earth we inhabit. The atmosphere is colder in the morning and evening than at mid-day; aqueous vapours, emanating from the earth, condense and obscure the air, the mists are cold and penetrating, those vapours form hoar-frost; all inorganic bodies lower their temperature; the trees grow yellow; that first coldness causes and hastens the discoloration, desiccation and fall of their leaves, as well as the death of herbaceous and annual vegetables. Man shivers; all animals warned by the first impression of cold, begin to provide for their preservation. In a word, the sad equipage of frost displays itself, snow falls in flakes and covers the ground; the waters congeal to a greater or less depth. Such is winter; it seems as if, hostile to nature, it would torpefy all; suspended vegetation offers to the

eye, dazzled by the resplendent whiteness of the snow, but dried skeletons of a few vegetables or plants, whose dying trunks are sadly bent to the ground, and whose sap is either congealed, or concentrated towards the roots.

Winter depopulates, as it were, the earth of animals, it sends to a distance and disperses and puts to flight some, while others it throws into torpor, or reduces to nothing; it benumbs the molluscæ, and a great number of oviparous quadrupeds; for a time it suspends vital activity in the species, called on that account, sleepers, or hybernating animals, until the return of heat dissipates their periodical somnolency; even the bear of the Pyrenees buries himself in a cavern, or hollow tree, and remains for a month or two sunk in inaction and slumber; but his sleep does not seem to resemble that of the hybernating animals. The fishes retire to the bottom of the water, into the mud, where they recover a temperature less cold than at the surface; there are some also that pass months plunged in torpor at the bottom of their humid home. Fabricius (*Fauna Groenlandica*) says, that the *salmo nivalis* hybernates in the mud, where it remains almost indurated and motionless. Fish, though cold-blooded, resist a very high degree of cold, and in the waters of rivulets and ponds which congeal entirely, do not perish from cold, but of asphyxia from want of air.

Cold awakens the instinct of animals, and leads them to seek protection ; they are observed at the approach of winter betaking themselves to sites where the temperature is less rigid, to retreats that will shield them from the rigour of the season ; some hide and squat themselves down in subterraneous dwellings, or take refuge in obscure caves ; others approach the towns, the habitation of man, and partake with him the same roof. Several kinds of birds emigrate, traverse mountains and seas, seeking the enjoyment of the softness of a warmer climate. Cold would expose to destruction those animals it surprises, and which could not find suitable shelter against its extraordinary intensity, if nature, sage and provident, had not provided them, according to the climate, with coverings of down, feathers, hairy or woolly furs more or less bushy, which grow thicker at the approach of winter.

Man likewise begins to think of arming himself against an agent, which, however, is, as we shall see, injurious to him only in proportion as it is immoderate in duration or degree.

The farther we advance northwards, the more industrious, in direct proportion to his relative wants, do we find him. He gives his habitation less elevation, he even hides it under ground, and there maintains a strong heat ; he adds skins of beasts to his clothing, the better to defend himself. By aid of these protective means he

resists the intensest cold, since, according to the celebrated naturalist Gmelin—(*Flora Sibirica*)—man is there observed to live where cold is known (calculated?) to reach 108, 144 and 157 degrees. In every clime the vital principle increases its efforts, and labours constantly, according to occasion, for the preservation of the individual, and it is in extreme cases only that it perishes in the unequal contest.

As we remove from moderate climates, and advance beyond 70° north latitude, we perceive on all things traces of excessive cold, and obtain irrefragable proofs of its noxious power, increased as it is by absence of the polar light, of which the people neighbouring to, or beyond (beneath?) the pole, are deprived for whole successive months. Animals and vegetables become rare and degenerate; even the human race suffers degradation physical and moral. The inhabitant of temperate or moderately cold latitudes, must esteem himself happy, when he compares his existence and enjoyments with those of the black African, whose greasy skin is torrefied beneath the equator, by the rays of a burning sun, or with those of the boorish Kamschatkadale, or with the filthy and stupid Laplander, benumbed amid eternal snows.

We shall divide cold into real and sensible.

Real cold is produced by an external cause, viz. by the air and other bodies, whose temperature is much lower than that of the blood. All

healthy individuals feel and appreciate its effects; it must be considered as either absolute or relative. It is absolute after the temperature passes below 32° . In this case, no doubt, zero is a conventional term, for there is still caloric remaining; there is, therefore, physically speaking, no absolute cold, or total absence of caloric; but waving the precision of physical logic, we shall regard cold, from 54° to 32° and below, as absolute, in respect to its active and permanent power over the body, whose natural temperature it tends to depress. In winter the air possesses an absolutely cold quality; so likewise the cold bath at 66° , and all bodies that have a positively cold temperature, whether natural or artificial.

Relative cold is always proportional to the greater or less difference of temperature that exists between our bodies and refrigerating agents. We experience its action in passing from heat to cold; an infinity of causes that effect sudden refrigeration of the atmosphere, as an icy north wind blowing suddenly in summer, the formation of snow or ice, cold rains, storms, extreme coolness at night succeeding burning heat by day, produce this relative cold. Such also is the effect on the variolous infant, devoured by great heat, when exposed to a current of air; cold iced drinks, administered in fevers to moderate thirst and heat, act relatively, by subtracting stimulant caloric.

This distinction has seemed necessary to me, as cold acts on the body in a manner injurious or salutary, sometimes by a positive or absolute refrigerant power, sometimes by a quality merely relative.

Sensible or morbid cold is what most affects the sick; it does not belong to the doctrine of real cold, since it is exclusively the effect of the modification or alteration of the vital properties; of this nature is that which accompanies the neuroses, and which likewise shows itself at the beginning of continued, remittent and intermittent fevers; it is not relative to the season; the patient feels it in the midst of summer, or in winter, in a well-heated room and beneath a load of bed clothes.

Real cold is dry or humid.

Dry cold is a sign of a durable or little variable atmospherical state; the northern breeze ordinarily prevails; the thermometer descends more or less below 32° ; no evaporation from the ground occurs; the heavens are serene, the air light, cheering, pure, and clear; this condition is salutary to man.

Humid cold is characterised by a less depression of temperature; the air holds dissolved more or less aqueous vapour; the sensation it causes, at an inferior degree, is more piercing, painful and insupportable than that of dry cold, because it relaxes the epidermis, and hastens by immediate application to the skin, and by eva-

poration, the abstraction of caloric; the humid cold state is very noxious; it is the most dangerous enemy of the animal economy; it produces effects altogether opposed to those of the former; of this we are convinced by comparison of an inhabitant of a humid cold, with one of a dry cold country; the one is dull, bloated, phlegmatic, the other robust, nimble, active.

Different opinions have arisen on the nature of cold, and have for long enveloped it in great obscurity; but now we have determinate notions on that head, and we must bury in profound oblivion the existence of frigorific particles, of which there is no evidence. Those natural enquirers made great advance towards truth, who first, instead of admitting, as its cause, a principle different from caloric, said that cold seemed to be but a quality opposed to it. Modern physics have developed this proposition, and proved that cold is not a positive state, but a negative one—in other words, a less heat.

Physics and chemistry have taught man to imitate nature, and produce cold to serve his various ends. Whatever cause produce it, and determine its degree of temperature, it must always be regarded, by the physician, as a positive state; it acts constantly as such, and produces, by its influence on the animal frame, a series of effects which we are about to review.

CHAPTER III.

OF THE EFFECTS OF COLD ON THE ANIMAL
ECONOMY.

ALL organic systems feel less or more the salutary or injurious effects of cold. The whole constitution is equally subject to the influence of this physical cause, whose mode of action, on the animal economy, has been hitherto too imperfectly ascertained, to allow of dogmatical decision respecting its properties ; it does not, however, appear difficult to perceive, that we have generalized too much, or not inquired with adequate minuteness respecting the effect of cold. If Brown and his disciples had taken the trouble of analyzing, in every point, its action on man, they would have been induced to acknowledge, that the debilitating effects, which they attribute to it above all, occur only when it is excessive in degree or duration, and moreover aided by concurrent causes. It is from not having divided cold into moderate, rigorous, and immoderate,—from not having considered man in repose and in motion,—from having regarded cold as an agent isolated from re-action, and having neglected to ascertain the share due to the different states of body respectively, to that

condition of the powers, which always supposes energy or debility, the possibility or impossibility of re-action,—that the Scotch physician has, as we think, pronounced a judgment too exclusive. Facts rather than reasoning will, perhaps, help us to render opinions, respecting the tonic or debilitating effect of cold, less discordant. This point of doctrine interests the practitioner as much or even more than the physiologist.

Atmospheric cold is moderate from 44° to 22° ; it becomes rigorous when it exceeds that term ; if it descend below 9° , it is then reputed excessive or immoderate. Cold cannot, under the temperate zone, be considered moderate, rigorous, or immoderate, without reference to each particular climate, and diversity of individual sensibility. It is truly immoderate, when exceeding by a third its average annual degree ; a healthy man, however, resists that unusually intense temperature. It is otherwise in countries placed under the icy zone ; there, ever reigns an extreme cold, to whose energy the vital power is disproportioned. There the inhabitant drags on a frail and pitiful existence ; he is forced to redouble his precautions to avoid surprise and exposure to destruction ; he appears timid and fearful, in constant combat for life against an element ever on the offensive.

There is, in short, a limit of latitude beyond which it is impossible for man to live.

Cold rouses, whets our organs, and penetrating more or less deeply, irritates and excites them to re-action, to repel a disagreeable sensation, and generate caloric destined to replace what has been abstracted. It is from that action of cold on the fibre, and from the primary or consecutive re-action, that we derive the tonic energy of the frame, which is always increased by a cold temperature : this we shall prove farther on.

The salutary influence of cold on the economy, being dependent on the re-action in question, man, in a state of repose, when his organs react feebly or not at all, cannot, on that very account, resist a rigorous, and still less an immoderate cold. All persons, on the contrary, that lead an active life, whose occupations and pursuits involve exercise, feel themselves, and really are stronger than those that exercise little, and adopt a sedentary way of life. When, in winter, I cast my eye on the tradesman busy in his shop, or the school-boy absorbed in his game, or the slightly-clad dandy quickening his pace, or the sentinel rapidly traversing his watch-ground, or the sailor impatient on the deck, or the rustic beating his sides, I perceive in each, one that tries, by motion, to cause re-action against the cold, and to develop caloric.—Young people, males strong, vigorous, and athle-

tic, are most proper to resist cold for long, as they re-act against it most vigorously. This is observed in mountainous countries and northern regions, where robust persons with impunity brave excessive cold, while feeble individuals succumb. The feeble re-act less than the strong; they support with pain the action of cold, and without receiving from it the usual increase of vigour—thus the debilitating effects of that agent are permitted to exercise over them their destructive domination.

We must not limit the idea we must form of the effects and influence of cold on the economy, to the action of the air, but extend it farther, by analogy, to all bodies, that, acting internally or externally, give the sense of cold, as water, snow, ice, cold drinks, iced ditto, &c.

Before examining the particular influence of cold on the different systems of the animal economy, we shall declare its general effects; we shall analyze it, the better to discover, if that be possible, its true mode of acting on the living fibre. All parts of the body, the face, hands, and female neck excepted, are defended by clothing from the impression of cold; those who are continually exposed to it prove, on that account, insensible to it; it would not be so with one habitually covered, who should be unusually exposed to it. Let us then suppose a healthy vigorous man exposed naked to the air, the

thermometer standing at 32° ; the effects of cold on the body will vary according as its action is momentary or prolonged: this gives occasion to distinguish two times.

During the first, the person in question presents the phenomena following:—He is seized by a general feeling of horripilation, and experiences a pain acute and distressing; the true skin or chorion contracts by a sort of concentric movement, owing to which it thickens; the skin becomes dry and wrinkled, and forms what is vulgarly called the gooseskin (*cutis anserina*); the hairs erect themselves in their bulbs; the constriction of the skin cramps and retards the circulation in the capillary vessels; the surface of the body grows pale; the superficial veins disappear; heat and sensibility diminish; the whole body falls into a kind of spasmodic stiffness; the pulse becomes concentrated; this incipient disturbance of all the functions is evidently the effect of the oppression of the powers, and of their morbid concentration. If, at this time, the subject withdraw from the action of the cold, if he cover himself promptly, re-action declares itself, the skin becomes red, and all the organic movements are re-established with more than former force and energy. On the contrary, if the individual remain exposed to the action of the air, his oppressed powers are unable to re-act; their annihilation is imminent, and death arrives

in a way we shall describe in treating of asphyxia from cold.

A person plunged in a cold bath of 54° , presents analogous effects. Some peculiar symptoms, however, deserve mentioning, such as the chattering of the teeth, hurried and irregular respiration, a voice weak and tremulous, distressing anxiety, feeling of weight on the chest, sensation of freezing extending to the bones, desire of making urine. If the subject come out of the bath after three or four minutes, if he wipe and dress himself quickly, all symptoms gradually vanish; the skin reddens; a feeling of general heat and well-being supervenes; the pulse increases in frequency and strength. If, on the contrary, the subject prolong his stay in the bath, particularly if seated and in repose, a new shivering comes on, and he experiences the following symptoms: progressive refrigeration of the whole body, weight of head, numbness or pain in the limbs, infrequency and smallness of pulse, stupor, somnolence. If not withdrawn, his death will certainly ensue.

Athill pretends, that the pulse increases in force and quickness on entering the cold bath, but he has probably suffered himself to be deceived at that moment, by a variation, which is the effect of the nervous shock caused by the impression of cold, which extends its action to the heart itself.

This picture of the effects of cold on the entire frame, is, of itself, calculated to give an idea of its manner of acting on the animal economy. The principal phenomena resulting from its action on a small surface are absolutely the same; they are very apparent after rubbing for a moment a piece of ice on a part. Too protracted application of those substances brings on numbness and gangrene.

The effects of internal cold are not less worthy of attention. Iced drinks cause some that are not merely local, but that propagate themselves also to a distance. After a cold draught one feels a lively sensation in the mouth, pharynx, œsophagus, and stomach, extending through the whole epigastric region; a re-action takes place which causes a feeling of heat and well-being that effaces the former sensation; there is an increase of urine.

If the cold draught or the ice be too often repeated, or taken in too great quantities, if the stomach be weak and not in a condition to react, the sensation caused by the cold becomes distressing, and is accompanied by weight at the epigastrium; shivering comes on, and anxiety, flatulence, abdominal pains, borborygmi, and general debility. All these phenomena depend on the spasm or on the exhaustion following.

We shall consider the various effects of cold on the vital properties under the following heads:—

1, Sensation; 2, Abstraction of caloric; 3, Stimulus; 4, Contraction; 5, Spasm; 6, Reaction; 7, Benumbing; 8, Condensation of fluids. The particular examination of each will enable us better to appreciate the powers, salutary and noxious, of cold, over man in the state of health, and to attain to the distinguishing of its properties.

1. Sensation. This is the first effect of cold; it precedes all others; the impressions which cause it are transmitted more or less promptly to the sensorium, as the organs are more or less susceptible, owing to the ever-varying modifications of sensibility. According as that impression is hasty or slow, gentle or strong, it agitates more or less the nervous system, and produces a sort of shock through the whole body; it rouses the organs that depend on animal sensibility; it restores consciousness of existence, and causes in the soul feelings agreeable or disagreeable, which, as sources of pleasure or pain, influence the vital motions and moral condition. The sensation seems owing ultimately to the abstraction of caloric and the peculiar impression resulting.

2. Abstraction of heat. In whatsoever way cold be applied to the body, it deprives it of caloric. There is therefore an equilibrium established, between the refrigerant, which absorbs caloric, and the part refrigerated. This abstraction

is influenced, 1st, by the degree of cold. 2^{dly}, By its duration. 3^{dly}, By the rapidity of its generation. 4^{thly}, By the extent of surface refrigerated, whether of a part, or of the whole body. When it is not excessive caloric that is carried off, the abstraction is at the expense of the natural heat. We must refer to the same principle the effects of cold drink, ices, bathing, ventilation by fanning, currents of air, the cool and agreeable air of caves, grottos, and groves, in summer.

3. Stimulus. Cold stimulates the fibre the more briskly, as it is dryer, and as its degree is more intense, and its action less prolonged; it irritates, it excites the extremities of the nerves, and brings into play, but without evident exaltation, irritability and organic contractility.

Cold does not confine its agency to the part it strikes; its influence is sympathetically reflected over all the systems, from circumference to centre and *vice versa*. Far and near the vital properties rouse themselves to action, or are modified in various ways under the influence of the irritation the cold occasions. Thus a few drops of cold water, sprinkled on the face, suffice at once to stop syncope, or awaken a sleep-walker. Hibernating animals are instantly dragged out of their lethargic sleep by sudden immersion in an iced water bath. We sometimes succeed in ascertaining a doubtful pregnancy by applying the cold hand on the abdomen, which causes motion of the child. It is to the same, I think, we must

refer the desire to make water, which we feel in a cold bath, or when walking on a marble pavement. This explanation is more satisfactory than that of Brown, who sacrifices all to his relaxing or debilitating property of cold. It is moreover the stimulus which causes contraction of the uterus in certain female animals, on whom it is usual to throw cold water immediately after coition.*

Stimulus, too strong or too long applied, exhausts the contractility of the fibre.

4. Contraction or astringency. This is the proper effect of transient increase of contractility, owing to stimulation, or perhaps by abstraction of the caloric that dilated the living tissues, as well by a mechanical action, as by an agreeable vital excitation. All soft parts participate in this contraction; but the skin enjoys this contractile property pre-eminently; cold contracts it and deprives it of its suppleness and usual laxness; it forces it as it were to exert mechanical compression on all the parts it covers; the meshes of the cellular net approach each other, and are

* La stérilité de certaines femmes peut être, je crois, attribuée à leur constitution molle et lâche, à un défaut d'énergie vitale, et à ce que l'utérus, partageant cet état, jouit de peu d'activité dans l'acte du coït, et ne retient pas le sperme dardé vers son orifice. Ne pourrait-on pas déterminer un certain mouvement de contractilité dans la matrice, en appliquant, aussitôt après la copulation, une serviette imbibée d'eau à la glace sur l'abdomen? Il serait peut-être plus avantageux que la femme s'immergeât de suite dans un demi-bain froid à 10 degrés.

condensed; the fat, more firm, is almost solidified in the adipose tissue. Nothing is more observable than the effect of cold air or water on the habitually flaccid scrotum; it contracts and puckers immediately, so that, aided by the simultaneous contraction of the cremaster and dartos, it presses the testes strongly against the ring. An Italian lady, somewhat aged and damaged by coquetry, begged of me once to point out some way of hardening her breasts; being disposed to indulge her foolish vanity I advised her to apply to them some pounded ice, between cloths, for a moment, three or four times a-day. I was indeed far from thinking any one would have courage to employ such a remedy; but I learned shortly after from the maid, that the lady of the house was well satisfied with it, and recurred to it from time to time.

Whether the contraction be limited to a simple obscure and imperceptible trembling of the fibril, or that the movements of the fibre prove energetic, still every tissue acts according to its natural mode of existence. Thus the skin, as we have just said, contracts and thickens; the muscle shortens itself and becomes more firm; the cellular tissue sinks and condenses; the vessel shrinks and grows narrow. By this increase of contractile force cold prevents excessive dilatation of the different tissues; it diminishes the cavities; it causes the solids to act on the fluids,

which it compresses, and whose course it retards or interrupts. It sometimes happens, that the surgeon cannot succeed in introducing the sound into the bladder, from having neglected previously to warm it, above all in winter, by holding it in warm water for one or two minutes. Contraction explains, *1st*, The greater cohesiveness of tissue of every part, when it is cold. *2dly*, The diminution of the volume and circumference of the body : it is on this account that a ring, though narrow in summer, is too large in winter, or after the cold bath, that even the clothes seem too large ; that shoes, &c. fall easily from the feet of persons violently affected by cold, or perishing by asphyxia from that cause.

Contraction, too energetic or prolonged, prevents re-action.

5. Spasm. This is the consequence of the sensation and stimulus of cold on the nerves, which are disagreeably affected by it. Those organs have, from their common centres to the last expansions of their numerous branches, a constant and uniform mode of action. When sensibility, that vital property of which they seem the depositaries, is vitiated, or is destroyed by a sudden impression, the organic systems participate unequally in the false direction that disturbance causes in the vital motions. There result from it those frequent contractions, unusual, irregular and preternatural, which surely character-

ise spasm. There is concentration or unequal distribution of the powers, disorder at once in sensibility and contractility ; the movements are diminished in one point and increased in another. Thus wherever cold acts spasm inevitably succeeds ; if slight and of short duration, it quickly exhausts itself by its vital efforts alone ; such is that caused by the impression of cold air, or of a cool bath ; but if the impression has been very lively, rapidly induced, and prolonged, and if unsuitable to the previous state of the constitution, there supervenes a profound and painful sensation, paleness, shivering, trembling, distressing and increasing constriction at the epigastrium, anxiety, jactation ; respiration is suspended ; the contractions of the heart are disturbed ; finally, the equilibrium is broken, and the harmony of all the functions deranged. The aphorism of Hippocrates, "*Frigus nervis inimicum*," proves sufficiently that cold does not agree with the nerves : it is then not surprising, that they should revolt against the disagreeable and perturbing impressions of an offensive agent.

Spasm, caused by cold, is propagated either by continuity or sympathy, even to the most distant parts, whose contraction it excites, causing in them disordered motions of greater or less violence. We shall cite some examples in proof. Tissot relates, that in one case of a patient plunged in the cold bath, the spasmodic contraction of the

belly was so lively, that a large portion of the rectum came out at the anus. I was once called to see an individual, who had retention, owing to the spasmodic permanent contraction of the neck of the bladder, which had supervened after the application of a cold rain to his body, while sweating on a forced march: the introduction of the catheter was impracticable; but the warm bath quickly restored the flow of urine. Zimmerman writes of a lady, who, after a cooling, experienced terrible general cramps. Hoffman informs us, in his "Consultations," of a man, who, having drunk a glass of cold water after a fit of anger, was affected with pain at the ankle, stiffness of the sinews, and spasmodic agitation of the upper extremities. Pinel relates, in his "Clinical Medicine," that vomitings supervened in a woman after immersion of the feet in cold water. Persons who expose themselves to cold during the operation of a purgative, are frequently attacked with severe colics and obstinate constipation. This recalls to my mind the very great difficulty I found in re-assuring a merchant of Marseilles, settled at Kafa, for whom I had prescribed forty-five grains of the Belloste pill, and whom I found some hours after taking them, tormented by violent colic, with a sensation of constriction in the lower belly, and unable to go to stool, although, as he said, strongly inclined; he was in extreme agitation of mind and body, sup-

posing himself poisoned by mistake of the apothecary. His condition arose from having imprudently exposed himself to cold air, being but lightly clad. A warm bath dissolved the spasm as if by magic.

The general spasm from cold, may, owing to too great nervous susceptibility, or to the sudden interruption of the increased vital motions, go so far as to suspend, or even destroy life. It is notorious that Alexander the Great narrowly escaped death from constrictive spasm, owing to his having imprudently plunged into the Cydnus while in a copious sweat. Tissot says that a man, being warm, died at the foot of a fountain whither he went to quench his thirst. Hippocrates, Scaliger, &c. relate similar instances of sudden death. Is it not probable then, as Marcard remarks, that persons supposed to be drowned for want of skill in swimming, have really perished by the rapid and violent action of spasm, or its consequences.

Spasm is, therefore, a perturbation of the vital motion, whether natural or exalted.

6. Re-action. Nature is very powerful as to her conservative means, and her authority manifests itself, in that respect, with more or less energy, in every system of the frame: if she is attacked, she tries to defend herself. Pain seems to be her signal for rousing the vital properties, to excite them to re-act against noxious

agents ; and the synergical movements she displays, consisting of simultaneously increased sensibility and contractibility, are so many conservative or curative efforts. Re-action against cold is a manifest increase of those properties ; it occurs in those spontaneously whose organs are not too feeble or exhausted, who, after the action of cold, find themselves gay, strong, vigorous, and feel an agreeable sensation at the skin. When the vital faculties have been for a moment enfeebled, disturbed, concentrated, and as it were enchained by spasm, re-action succeeds by the unaided efforts of nature. Every organ participates ; the skin seems its principal seat ; the powers are developed ; the humours resume their fluidity ; the parts their natural volume ; the lively oscillatory sensation which indicates the return and afflux of the blood into the capillary system, and which sometimes amounts to pain, is the effect of the energetic renewal of the vital action which had been suspended, and of the effort which the blood makes to surmount the resistance of the solids. The caloric, which was concentrated, re-appears, the skin grows red and warm, and insensible transpiration is excited and increased. If the re-action be general, the pulse increases in force and frequency : there is then an increase of energy in every organic system. The vital movements may rise so high as to simulate the second stage of ague, and even

amount to phlogosis. Re-action is livelier in proportion as it is more confined in space. The observation of Pelletier, cited by various authors, is curious, and deserves a place here. That chemist took into his hand a piece of mercury he had congealed; the instant it began to melt, he felt in the spot a cold so insupportable, that he was forced to throw it away with precipitation. Pain and phlegmon supervened in the spot that had been chilled.

In some cases re-action is directly excited by stimulus; I am even of opinion that, in the healthy vigorous man, stimulation and re-action are united, and take place together.

7. Torpefaction or benumbing. Is it to abstraction of caloric, or to some other peculiar agency of cold, that its directly benumbing effect is due? The matter is difficult to determine. Cold, excessive or prolonged, weakens suspends and extinguishes the vital properties. We perceive easily and gradually its torpefactive effect, when we remain motionless in winter in an apartment not heated; we experience an oppression and feeling of uneasiness, yawn, remain silent, feel propensity to drowsiness, and end by becoming sleepy: hence the vulgar saying, cold lulls to sleep. This torpefaction resembles closely that produced by substances, which, whether applied internally or externally, bring on the calm insensibility and torpor which

precede destruction of the vital principle. Pallas has produced artificial somnolency in certain animals, by keeping them shut up amid ice for a certain time.

8. Condensation of fluids. Cold does not confine its action to the solids ; it acts also on the blood and humours, whose molecules it causes to approximate. It is probable that it exercises, when moderate, an advantageous influence on the vitality of the blood ; but when excessive and prolonged, it diminishes not only its volume, its fluidity, and natural expansive movement, but also those of all the humours ; it condenses the serous part of blood, and gives the fibrine firmer consistence ; it thickens the lymph, and thereby retards its progress in the vessels and through the glands and white tissues. In local asphyxia there is no proper congelation ; the fluids are only coagulated in their respective canals.

It is not sufficient to have analyzed the physical effects of cold, depending on its application or immediate contact with our bodies ; it is further proper to pursue their history in their influence on different systems and functions, and in the following order :—1. On the cutaneous system ; 2. On absorption ; 3. On the digestive system ; 4. On respiration ; 5. On the circulation ; 6. On nutrition ; 7. On the excretions ; 8. On sensibility ; 9. On muscular action ;

10. On generation; 11. On the general constitution.

1. Influence on the cutaneous system. The vitality of the skin is less in winter than in any other season. The density of its tissue, the contraction of its pores and exhalants, the slowness of its capillary circulation, the most ordinary effects of the agent in question on the common covering of the body, are the reasons, *1st*, Of its dryness, roughness, and chaps during the cold season; *2dly*, Of the change of cuticle, which scales off, becomes powdery or furfuraceous, and is renewed by small portions; *3dly*, Of the rarity of cutaneous diseases in the north; *4thly*, Of the periodical disappearance of darts affections, efflorescences, pustules, rednesses, wine-spots, during winter, as well as of the danger of eruptive or exanthematic disease in that season, above all in cold countries.

Dry sharp cold dessicates and thickens the skin, and at length hardens it through its whole extent. All northern people have that part less supple, fine, and soft, than southern. The Laplander, whose cutaneous organ is hardened and callous, has but an obscure and rude touch; but, as a compensation, that hard and tanned skin is an excellent defence for him against the piercing cold of his country. The inhabitants of the north, though almost all fair, have not the skin so white as is said, and the action of

cold seems, like that of heat, to tan it and give it a shade somewhat dark; it is even tawny amongst the inhabitants of the frozen zone.

By its power of causing contraction moderate cold maintains the firmness of the skin, and by that of causing re-action it draws the blood into the capillary network. Ladies say, from experience, that cold water is better for the toilette than warm. The custom of washing with pure cool water preserves long the brilliant colouring of a complexion of lilies blended with roses; it retards the formation of those horrid foldings of the skin, those frightful wrinkles which indiscreetly divulge the number of our years, or the outrages of time, and which nature, wittily remarks one of our female writers, "*eut bien fait placer sous les talons.*"

The nose, cheeks, ears, hands, &c. although usually uncovered, present sometimes, after being exposed for long to a cold and piercing air, a permanent redness, which is not accompanied by a sensation of heat; though this colour be a sign of the re-action that has taken place, it indicates ultimately a passive state of the skin, whose sensibility and contractility the cold has, by its permanence, benumbed. The circulation remains struck, as it were, with a sort of stupor in the capillary system; the blood stagnates there, or flows through with extreme slowness. The skin, of a deep red, and sometimes violet or

bluish, is cold and glossy ; the erythema vanishes and re-appears slowly beneath the finger ; re-action is, as it were, asleep, and smothered by that same action of cold, whose ulterior effects we shall see in treating of asphyxia.

The irritation of sharp and prolonged cold sometimes causes disagreeable and painful lesions of the skin. Captain Wood says, in a narrative, that some English, having passed the winter in Greenland, had their bodies ulcerated and covered with blisters. According to the account of voyagers, the cold of Hudson's Bay is so sharp, that the air is brilliant and charged with morsels of ice that prick the skin like needles, and excite blisters, at first white, but becoming at length hard as horn. I may say I have experienced something similar, in 1812, in Russia. I have felt painful prickings, that may be compared to what little sharp bodies, forcibly penetrating the skin of the forehead, nose and lips, might produce.* Those whose skin is lax, fair, fine and

* Very sharp cold irritates the surface of the eye, and excites secretion of tears. The contraction of the puncta lacrymalia prevents their passing into those ducts, and forces them to diffuse themselves over the cheeks. In Russia I experienced a singular effect of this discharge of tears, while travelling in a cold of minus xi°, with a northern icy wind that cut my face ; the tears froze on my cheeks and eye lashes. When I shut my eye, the eyelids remained sticking together, as if agglutinated by matter as in small-pox, and it was not possible to open them without rubbing the surface to liquify the solidified or congealed lacrymal humour.

The action of a very dry cold wind, striking directly on the pituitary membrane, is also sometimes sufficient to excite sneezing.

delicate, whose hands and arms are plump ; infants, women, individuals above all of lymphatic temperament, are subject to that sort of inflammation of the skin and cellular tissue, known by the name of chilblain, caused generally by passing from cold to heat. This phlegmonous erysipelas assumes more frequently the slow or chronic character, than the acute inflammatory. Washerwomen, whose hands and arms are almost always very red in winter, on account of passing frequently from a boiling lye to very cold water, are remarkably liable to it.

It frequently happens that soldiers, after suffering cold in the feet in winter bivouacks, are attacked with chilblain. In some countries under the torrid zone it is so cold at night as to cause the same complaint in Europeans. In the north, chilblains, far from being common as some authors affirm, are, on the contrary, very rare. Habitual exposure to a rigorous cold, and the density of the skin, render the organ incapable of morbid actions, such as the frequent alternations of cold and heat, and *vice versa*, cause amongst us.

Cicatrices, possessing an exquisite sensibility, which renders them very sensible to the smallest atmospherical variations, are painfully affected by cold, when not, by way of precaution, kept warmly covered. The feeblest re-action is sufficient to inflame those membraniform pellicles, whose fine and delicate texture, and more or

less intimate attachments prevent them from yielding to the distension they suffer, from the intumescence of the tissues they cover.

Parts denuded of epidermis, or recently ulcerated, are much more sensible still to cold. The sudden and intense pain, caused by the action of cold air or of a cold fluid on a carious tooth, proves how hostile denuded nerves are to an agent uncongenial to their nature : here is a fact that evinces it. I had recommended to a young surgeon, labouring under chronic ophthalmy, the application of a blister on the nape of the neck. One of his comrades, whose assistance he had accepted of, had not the sense, at the first dressing, to have the linen, the cerate was spread upon, a little warmed ; he applied it cold to the sore ; it was in winter ; the impression was so lively and painful, that the patient cried out, ground his teeth, and grew pale ; he was seized with convulsion, trembling, and trismus ; that state lasted four minutes.

During dressings that last long, in cold apartments, in hospitals, where the rooms are rarely sufficiently warmed, the patients feel strongly the impression of cold on their sores and ulcers—that caused by improper application of linen, and of cold topical remedies, is not less injurious to those external lesions, in as much as it alters or suppresses the matter they discharge, inflames them, makes them painful, and retards their ci-

catrisation. I have twice witnessed mortal metataris, caused by the action of cold air on wounds in full suppuration.

2. On absorption.—That which occurs on the gastro-intestinal mucous surface belongs to the digestive system. I speak here of cutaneous absorption, which I believe to be retarded by cold, and less active, by consequence, in winter than in summer—the density of the teguments, their dryness, the slowness of the external movements, seem to favour that opinion; and if, as there is little reason to doubt, the absorbents of the skin partake of that spasm of the surface, so irregular, transient, and frequently renewed by impression of cold,—it is then more than probable that the sensibility and contractility of those vessels are disturbed and benumbed, and that a diminution of their functional activity must follow. We know, on the contrary, inhalation is very active when the skin is supple; we even try to restore it to that suppleness when lost, by warm baths and oily frictions; although there is no experiment to prove that a person plunged in a cold bath does not absorb water, I am disposed to think that when the cold is intense, at 10° for example, there is no absorption. Cruickshank says it takes place in the cool bath*.

* Cutaneous absorption is proved by holding a new-born puppy for a quarter of an hour in warm ink; the urine made afterwards is coloured. This simple experiment will serve equally to ascertain

I shall allege further, in favour of my opinion respecting the diminution and even interruption of cutaneous absorption by the agency of cold, that the absorbents are less ready in winter than in summer to pump in from the atmosphere the fluids and various molecules there diffused, and that, in that season, they prove much less eager to possess themselves of soft or liquid substances spread over the skin, above all if they are cold. It is certain also, that we are much less disposed, in winter, to absorb contagious miasms. Is it not cold that diminishes the efficacy of vaccine virus introduced under the skin? I have observed that fewer itchy persons have applied for medicine at the hospitals during winter; that great care and pains are required to secure the success of an antisymphilic course by mercurial friction, which shows that, owing to the unfavourable predisposition of the skin at that season, we must doubt respecting the sufficient and regular activity of the absorbents. The difficulty of curing general dropsy of the cellular tissue, in winter, when the sick feel acutely the cold of the season, gives additional evidence of it. In such cases, the exhalents and absorbents require very vigorous stimulation, by all proper means, to revive their enfeebled vital properties, and to excite the

the effect of cold on absorption; it is but keeping the animal in cold ink an equal time. It will be proper to move him about in it, lest he become benumbed.

skin, which is cold, and evolves but very little caloric.

3. On the Digestive System.—The digestive organs evince, by increase of activity, that they are the first to feel the effects of a cold temperature. *Hieme ventres sunt calidiores*—Hippocrates. The appetite increases ; digestion is quick ; hunger returns sooner, particularly if one spend an active kind of life, and take exercise in the open air. The skaiters in Holland are often seized with hunger ; before that exercise, therefore, they have the precaution to fortify their stomachs. Huntsmen are equally exposed, in winter, to feel this want ; the air that reaches the stomach stimulates, probably, the mucous membrane ; but it is to its action on the skin principally, and its effect on the viscera by sympathy, that the energy of the assimilative function is due. Not only does the increased tonicity or contractility accelerate, by its oscillation, the course of the food in the digestive tube, but further, the increased power of absorption binds the bowels, so that, considering the quantity and quality of the aliments taken in each season, the excrement is less abundant and harder in winter than summer. In some persons the bowels are constipated ; there are even instances of pure atonic diarrhœa arrested by the influence of cold dry weather. Hippocrates aph. 17. sect. 3. says, “*Quotidiane constitutiones aquiloniæ alvos sic-*

cant." All physicians are aware that moderately cold dry weather is the most salutary to the frame; there is no one exempt from important disease but feels its good effects. Persons who have little appetite, whose digestion is feeble and languid during heat, feel better on a change of the weather. It is observed that one eats much more in winter than summer, in cold than in hot countries. Boarding-house keepers, ever attentive to the differences of consumption at table, have remarked, that the boarders eat more in winter than at any other season; it is not rare, during winter campaigns, to hear the soldiers complain, that their rations are insufficient, and I am persuaded, some would not be adequately nourished without the resource of plunder. Northern people require solid consistent food, corresponding to the energy of the digestive powers they owe to their climate. Richerand says with truth, that they are voracious from instinct as well as necessity. According to the opinion of Deblanc and Hunter, the digestive faculty is, in the north, in the inverse ratio of the sensitive. The inhabitants of the south, who visit those regions, acquire an excessive appetite; that of the Austrian, on the contrary, diminishes in Italy; the Russian and Swede never eat so much when not under the influence of their climates; an Italian or Spaniard eats one half less than a big German, who dines with unbuttoned clothes; and Crevier

was not altogether wrong in satirically calling Germany the belly of Europe.

Cold increases so far the activity of the digestive powers, as to carry the sensation even to pain, when one has no food to introduce into the stomach; thence results that sort of nervous affection called Bulimia, which brings on languor, inappetency, faintness, and death—what a cruel torment, when sharp cold comes to whet an appetite one has not means to satisfy! Plutarch, (*Lives*), relates that in a mountainous country, and under great cold, M. Brutus experienced an attack of Bulimia and narrowly escaped perishing—the Greek Soldiers, led back by Xenophon from the extremity of Asia, were preyed upon by a distressing and painful sensation of hunger, as they traversed the snow-clad mountains of Armenia.

4. On respiration. As long as the impression of cold is slight and moderate, even under the influence of cold and rigorous weather, respiration does not seem to suffer, provided the body be sufficiently protected by good clothing and by exercise—the motions of inspiration and expiration are performed without pain and with perfect regularity. I have, however, several times observed, that air too cold and very dense, compressed the ordinary efforts to dilate the chest.

The mucous membrane of the bronchiæ, so irritable (when diseased?) by a very cold atmospheric temperature, presents, in health, a peculiar

character; viz. it is not disagreeably affected by the impression of the most excessively cold air; it is capable of supporting the cutting action of an icy atmosphere of -13 , -36 , -112 , or even of -157 deg. as well as of that whose temperature is but 32° . When its vital properties come to change, it is only by very rapid transitions of temperature, or by physiological modifications, which suddenly throw it out of its natural relations of sensibility with the fluid which is habitually applied to every point of its extent.

It seems that dry cold air, which in less volume is richer in oxygen, stimulates the surface of the bronchia, and accelerates the oxygenation of the blood; that it is one cause of the greater concentration of heat internally in winter. It is easy to perceive that the inhabitants of high mountains have, in winter, a very strong and warm respiration; its infrequency, perhaps, rather favours the air's action on the lung. It is further, I believe, to that focus of internal heat, that the pulmonary organs are indebted for the power of supporting the action of intense cold, which, notwithstanding, in northern regions, when the temperature is unusually rigorous, excites briskly the surface of the bronchiæ, particularly in strangers not yet acclimated, in whom it causes a sort of constriction, with feeling of dryness in the chest, attended sometimes by pain, either transient or fixed and lacerating. Those who have deli-

cate chests, or are subject to asthma and dyspnœa accommodate themselves very difficultly to such an atmosphere, and have every thing to dread from it.

If the cold be excessive ; if inaction, a blast, want or insufficiency of means of defence increase its effect on the body, prolonged shivering determines in the solids a spasmodic contraction of which the pectoral muscles partake ; the retardation of that mechanical action of the thorax which is performed by alternate contraction and dilatation of the diaphragm, dentated, pectoral, and intercostal muscles, singularly increases the embarrassment of the circulation ; the blood traverses but lazily the pulmonary capillary system ; gradually an accumulation of black blood forms in the brain, and respiration is finally performed very slowly by means of the diaphragm ; the free exercise of the chemical phenomena of that function being dependent on that of its mechanical powers, the decomposition of air becomes slower and less perfect ; the blood, expelled in small quantity from the left ventricle, and losing gradually its primitive arterial character, becomes unfit to excite the organs of sense and motion ; all vital phenomena are interrupted, and life is extinguished.

5. On the circulation. In hot weather the heart and blood vessels, whose action is increased and often hurried on, owe this increase of ac-

tivity to the presence of a greater portion of caloric in the atmosphere ; the pulse is strong, frequent, full, rather soft than hard. In winter it is the reverse ; the play of the circulatory system is not so lively ; the progress of the blood is less rapid ; the hard full pulse is less frequent ; it is even infrequent and slow in rigorous cold, principally in the most northern climates. Blumenbach says, that, amongst the Greenlanders it beats but 30 or 40 times per minute. Galen, a great observer of the pulse, has noted its condition in winter,—*hieme pulsus duriores et paulo vehementiores, tardiores fiunt*. The temperature of the blood falls usually 3 or 4 degrees.(?)

Although, in healthy man, cold weather causes the heart and vessels to be less stimulated from sympathy ; though there be less vivacity in the circulation, and owing to the lowering of the temperature, the pulse beat comparatively more slowly, we still cannot, from those circumstances, infer diminution of physical force, but merely less excitation of the nervous power, whose fluctuations cause so many modifications in the vital motions. The fulness and hardness of the pulse so conspicuous in winter, in dry cold weather, in the inhabitant of high mountains and northern regions, particularly where northern winds prevail, evince, that the contractions of the heart are vigorous, and that there exists, in the whole circulating system, an increase of tonic power—the

predominance of the arterial portion of the vascular system, as well as that also of the sanguineous temperament, which is connected with the former, seem to be, amongst the people of those regions, the effect of continual re-action.

Sharp cold, by contracting the tissues, concentrates the powers of the sanguinary system, and forces them to retire towards the internal organs. A fact in many respects important to be re-remarked, is the slowness of the circulation at the surface, and inadequate distribution of the blood through the capillary system, particularly in a person in repose, or who takes little exercise ; that fluid is then carried in greater quantity towards the organs of the head, chest, and abdomen ; their vessels are fuller and more distended by the accession of the blood, which even tends to oppress them, and against which their tunics endeavoured to re-act ; the capillary system is more developed on the serous and mucous surfaces, and the contractions of the heart are sensibly stronger and more powerful.

Such are the principal effects of cold air on the circulating system ; we find amongst them the material cause of exquisite inflammatory diseases ; of sanguineous congestion ; of those active hemorrhagies so common in winter in northern countries, and of which youth, the sanguineous temperament, an athletic constitution, thickening of the blood, a sanguification rich in winter with

the products of a more active digestion, and the usually more stimulant quality of aliments appropriated to that season, are predisposing causes. Topographical observations prove, that pleurisies and peripneumonies prevail endemically in places elevated or of northern aspect. Hemorrhoidal affections, generally more frequent in winter than summer, are, in such a country, so common, that few are exempt from them. In Russia, I knew several strangers who had never been affected by them, become so after some years residence; though the fact has been considered referable to the habitual use of fluids, as coffee, tea, &c., which favour plethora and expansion of the sanguineous system,—drinks, besides, to which the climate invites, the desire for which it commands; still admitting their influence, we must, I think, consider the intense and prolonged cold of those regions, capable of contributing to produce, ultimately, the reflux and stagnation of the venous blood in the hemorrhoidal vessels.

It is by destroying the equilibrium between the external and internal parts; by a sort of compression of the solids against the fluids, that cold produces the reflux of blood to the interior, and gives rise to plethoric engorgements, and various phenomena, nervous and vascular, which often prove fatal. Lunatics have been known to perish by inconsiderate employment of the refrigerating plan, at that period when the cure of

madness was attempted by prolonged detention in a cold bath, without taking into account the effects of a remedy so active, which must necessarily accumulate blood in the head, particularly in plethoric lunatics. What numbers of new born infants and young children have perished in consequence of sudden or prolonged immersion in cold water,—a practice which cruel religious and domestic customs have perpetuated to this day in the north, in despite of enlightened reason! Mauriceau says, in his treatise on obstetrics, that infants have died merely from baptism with cold water.

Idiopathic sanguineous apoplexy is more common in winter than summer, and its attack has been known to follow passing from a hot place into an intense cold. Such is also the sudden action of cold on the drunkard: observe that friend of Bacchus, his air is gay, his speech animated; he leaves the table to pass from a hot apartment to the external air; inebriety soon completely develops itself, owing to the concentration of movements and increase of cerebral plethora; his ideas are confused, his tongue embarrassed, his legs overpowered with wine, he staggers, falls, and sleeps. His condition may terminate happily; but if he have the misfortune to be exposed to rigorous cold, by day or night, he remains oppressed with lethargic sleep. Thus have I seen a cannoneer expire, who, for a bra-

vado, emptied a bottle of brandy without breathing. How many similar facts might be cited!

In every possible case, when immoderate cold acts on a person who cannot command the conditions indispensable for resisting it, the circulation slackens; the fluid blood, as we have said above, traverses the lungs in less quantity, and becomes less oxygenated; the heart lessens its pulsations in proportion to the scarcity and feebleness of its natural stimulus; the whole frame chills, the blood coagulates, and after death, the sinus's of the dura mater, the heart, and great vessels, are found gorged with blood.

6. On Nutrition. Cold air is more proper to secure good nutrition, and to maintain becoming plumpness, than warm air. Man, and all animals, are fatter in winter than in summer, in the north than in the south. Nutrition seems then to be as well the complement as the consequence of the activity of the two assimilating functions that precede digestion and sanguification. If you will but for a moment observe with attention the salient and rounded forms of the muscles, their degree of physical force, and energy of motion; if we remark that women who lose part of their bosom in summer, recover it when it grows cold; that meagre persons, who are exhausted by the perspiration maintained by the heat, regain, at the beginning of winter, their lost plumpness, and find, then, the

brilliant colouring that characterises its return, re-appearing on their countenances; we are not, surely, to regard the developement of the cellular tissue as a passive state; and the accumulation of fat, so long as it falls short of that exuberance that constitutes corpulence or obesity, as a feeble assimilation of nutritive principles. It is easy to distinguish this passive state of the adipose cellular tissue, that fleshiness so common in cold and humid countries; a defective action of the skin, whence atony of the inhalent system, causes the absorption of fat to be disproportional to the exhalation. True plumpness, healthy fatness, is better characterised and more developed in winter in a cold dry air, because the blood is richer in albuminous and concrescible lymph, and the arterial exhalent system deposits, in the parenchyma of the tissues, a greater proportion of nutritive and organic molecules. The body, losing less by the excretions, does not deprive the blood of materials which are otherwise employed. Sanctorius was convinced that the body weighed much more in cold weather; every one knows that wrens, red-breasts, larks, and thrushes, get fat after the first frost.

Immoderate or prolonged cold injures nutrition: the assimilating functions once disturbed, all other functions follow. The indigent and mendicant, who have not means of defending themselves from cold, are leaner in winter than

in summer. Children well managed otherwise, but not sufficiently clad, nor kept adequately warm, have been observed to grow visibly lean, and to be attacked by a slow fever that consumed them.

7. On the secretions. The excreted humours are products of sanguification, and either destined for divers ends in the organism, or unfit for assimilation. In the latter case, the blood throws them off as useless or superfluous principles, which, as well by their qualities as abundance, would be noxious in the animal economy. The cutaneous, pulmonary, and mucous exhalations and the secretion of urine, are the four grand channels open for that purpose. Cold has an influence so remarkable on their physiological state, that we cannot choose but take it into account. It is a point essentially necessary to observe, that when the air has a dry cold quality, the sum total of the excretions diminishes.

By impressing a certain degree of rigidity on the fibre, cold weakens the action of the superficial exhalents, whose orifices it contracts; it concentrates their movements, which in the usual state are from the centre towards the circumference, and prevents them from carrying the humours to the surface. The blood stagnates and thickens, whence the saying of Hoffman, *sanguinis stagnationes ob consuetas excretionem suppressas*. This further evinces what we have

already said on the subject of nutrition. Gef-
froi, in his *Hygeia*, has well depicted this effect
of cold,

Stringuntur tubuli pellis, coguntur et intus
Tot variis pellenda viis excreta, cruoris
Concrescit lento moles tardissima gressu.

But if some excretions are rendered less abundant by the cold temperature, others become more so than usual, and appear to supply their place ; thus the pulmonary exhalations and excretions of urine are more active in winter than in summer.

The functions of the skin diminish in direct proportion to the intensity of the cold. Notwithstanding the usual bodily exercise, heat of beds, living in warm apartments, and clothing adapted to the season, the cutaneous excretions remain constantly less during winter, than in any other season ; they are excited only by warm and stimulant drinks, and by violent exercise. The inhabitants of the north, whose winters are generally of a dry, keen, little variable and very prolonged coldness, perspire very little ; it is even difficult to obtain sweat in their diseases. Notwithstanding the frequent use of their stove-bath, whose effect on the skin is but momentary, that part remains constantly hard and dry, until change of season brings back a sort of laxness, suppleness, and vital expansion, favourable to

cutaneous exhalation ; the effect is in our climes nearly similar, but much less.

Cold prevents the cutaneous exhalation from diffusing itself in the form of insensible vapour in the circumambient air, and partly condenses it on the skin, conjointly with other fatty unctuous humours, excreted, or transuding through the pores. This condensation forms, in winter, that foulness more or less thick, black or yellowish, which accumulates and becomes so apparent on the face, neck, hands, and feet of uncleanly persons. This same matter existing often when unperceived, is no where so effectually removed as in the Russian baths, by means of rudely-practised friction with a handful of twigs of birch without leaves, and in the Turkish baths by friction with little bags of horse hair, or of coarse camlet, a species of cloth which, by scraping the skin, scours it perfectly.

The retardation of the cutaneous excretion, during cold weather, whether natural or morbid, does not always agree well with the animal economy ; nature replaces but partially this grand emunctory by which is effected the elimination of noxious principles. Although the organs have been prepared for the impression of cold, by the graduated passage of autumn into winter, man sometimes experiences from it derangement of health.

The effect on the valetudinary is still more

marked. Chronic infirmities become more numerous in that season, and are aggravated in a striking manner; the crisis of maladies is less perfect; the convalescences are longer. We observe, at the beginning of that season, rheumatism, gout, glandular swellings, syphilitic, scrophulous, scorbutic, and cancerous affections, engorgements of the viscera, dropsies, quartans simple or complicated, chronic catarrhs, &c. renewed, prolonged or exasperated. Cold injures infants above all, for the first two or three years of their lives; at that epoch, the lymphatic system predominates, and enjoys in those young beings great activity; they abound in humours, all which tend to fluxionary movements, from the centre to the circumference, in order to depurate the mass of the blood; the skin of the head, the surfaces strewed with mucous or sebaceous follicles, give passage to those humours, whose detention, or accidental disturbance in their course is very dangerous. Medical histories swarm with proofs of those fatal effects of cold; they evince the severity of the accidents that may sometimes result from them. I had occasion to see, at Odessa, a girl of fourteen, on whose hairy scalp a sero-purulent exhalation had remained after small-pox; an old aunt, to whose care she had been entrusted, thought she could cure it by washing the head with cold water; the running ceased in fact, but that imprudence

rendered the patient deaf, dumb, and almost blind. Linnæus pretends that epilepsy is common in the Swedish provinces, only because the peasants wash the yet crusty heads of their children with cold water. How many persons, to whom perspiration of the head or feet is a salutary discharge, pay dearly for the imprudence of washing themselves with cold water! It is not long since I was consulted by a master of a French vessel, who was habitually subject to strong perspirations of the feet, the suppression of which took place after washing them with cold water. The symptoms he presented were, a feeling of debility, paleness of the face, pain in the epigastre, loss of appetite, acid eructations and emaciation; my departure caused me to lose sight of that patient. If, while the function of the skin is active, as happens in the ordinary condition of the body, or if, during that increased degree constituting sweating, the cutaneous exhalation be disturbed by exposure to the wind, or a very cold blast, or by passing rapidly from a hot to a cold temperature, or by a cold bath, or iced drink, then is produced what is called suppression of perspiration, or, as is often improperly said, perspiration driven in or repelled; the momentary impression of cold is sufficient to pervert the natural order of the sensibility and contractility of the exhalents, according to the state of the skin. This disagreeable

consequence is sometimes owing to imprudence, but circumstances often prevent the most provident and cautious persons from securing themselves from rapid variations of temperature. If a slight difference be sufficient to injure, as we may every day see, what fatal consequences must attend sudden transition of the frame, heated and perspiring, into the cold temperature of the air or the bath? The disagreeable impression is accompanied by horripilation; the irritated skin contracts; the capillary extremities of the exhalents close, and are obliterated; transpiration is suppressed, and shivering follows the nervous shock; the movements, that were in a very active state in the skin, are arrested and reversed; they take another direction. The perspiratory humour, it has been said, transported, as if by metastatic movement, to the organs subsequently affected, plays then the part of primary cause, or material cause of irritation. We do not think so; the danger appears evidently to proceed from the disturbance of the fluxionary movement, which was carrying the humour to the skin, and the inconvenience that nature suffers, until she have completely re-established it, or provided a convenient temporary substitute for it. It is then more conformable to the laws of the animal economy, to replace that obscure notion of repercussion, or ebbing of the perspiratory humour, by that of the disturbance of the fluxionary

movement, and of a concomitant nervous irritation, which is transmitted from the skin to the organs, and fixes on one or other part, according to pre-existing sympathetic relations, or on account of previous debility—that nervous irritation, propagating itself particularly to the more sensible parts, causes various pathological phenomena. According to this theoretical principle, it is easy to understand the formation of the affections that succeed the injurious action of cold—the viscera, muscles, fibrous tissues, serous membranes, became the seat of maladies characterized by inflammatory, catarrhal or rheumatic elements. But, as it is with mucous membranes that the skin has the most intimate relations, it is on those membranes likewise, which are endowed with an exquisite sensibility, that the morbid irritation most frequently devolves, altering their vital properties, and giving rise to fluxions. The true or exquisite inflammatory element is much less common than the catarrhal: affections, bearing the latter character, are very numerous; the nasal, buccal, guttural, pulmonic, gastro-intestinal, vesical and vaginal mucous membranes become its seat.

Cold air does not act, in winter, on the lungs as on the skin, whose spasmodic contraction manifestly diminishes perspiration. A freezing air strikes the surface of the bronchiæ without alarming their sensibility, though extreme, or disturb-

ing their peculiar exhalation; otherwise, man would be subject to danger inseparable from every considerable depression of temperature below 32°. The lungs are supplementary to the skin; a more abundant pulmonary exhalation seems to be facilitated by a respiration warmer, and more active in its chemical operations. Since the pulmonary halitus carries off a good share of caloric, I imagine, it is with the view to save as much as possible, that a person exposed to cold, closes the mouth, avoids speaking, and breathes only through the nose.

In our climates, the halitus of the lungs does not become sensible to the eye before the thermometer sinks to 44 degrees; the exhaled humour condenses more as the cold increases beyond that degree. It is curious to see it in the north, though scarcely out of the mouth, present itself as a thick vapour, change into hoar-frost, and even form, by accumulation, little icicles, that adhere to the beard, to the point of the nose which is frozen, to the cravat, the hairs of furs, and the circumference of the nostrils of horses. It is only when the pulmonary exhalation is unusually increased, and that the relation or equilibrium between the sensibility of the membrane and the external temperature is broken, by the sudden and direct impression of cold air on the lungs, or by that which is sympathetically produced by an iced drink, that we expe-

rience the consequences inseparable from disturbance of respiration.

The mucous membranes, constantly secreting a somewhat viscous humour, are pre-eminently hostile to cold, which deranges their physiological state; they are particularly susceptible of being idiopathically affected by it, whensoever their secretion is more abundant. Inspiration of cold air, or iced drink may then do much mischief. The effects of that injurious action of cold on the pneumogastric membrane, are particularly felt by the serous exhalents, and the canals that excrete the mucus that lubricates it through its whole extent. If the irritation that supervenes establish itself mediately, the mucous membrane becomes the seat of a catarrh or inflammation. Almost all the soldiers of an infantry regiment, cantoned in a defile of the Friuli mountains, were attacked by catarrhal diarrhoea, caused by very cold water which was their drink, and which they took from a torrent fed by dissolution of snow. That irritation is still more dangerous, if, after violent exercise, it interrupt at the same time the action that existed at the skin. Tissot relates, that a young man was brought to the grave the third day by a violent pleurisy, owing to a very cold drink.

Soldiers on a march, during summer, oppressed with thirst and covered with sweat, run like parched hounds to the first water they see, with-

out their commanders being able to prevent them, and fill themselves with that fluid, which they find of course very cold: hence a cause of the various inflammatory and catarrhal affections so common amongst soldiers.

The mucous membranes participate in the general excitement caused by the heat of the season; their sero-mucous secretion is less abundant; they present an erysipelatous redness; they are in a state of dryness and irritation, whence the feeling of thirst and desire of cooling drinks. Cold then moistens, calms, and allays;—the mode of sensibility of the exhalents and mucous follicles being changed, the excretion destined to lubricate the membraneous surface is re-established.

8. On Sensibility. We must not, according to Fouquet, separate the physical from the moral sensibility. In accordance with that opinion, I combine sometimes the two ideas, in speaking of the influence of cold on the sensibility in general.

That faculty, so developed and active in summer and in hot countries, is much less in winter and in northern regions. Cold concentrates it, and, by impressing rigidity on the fibre, accumulating fat, and thickening the tissues which cover the nervous extremities, renders the frame less sensible exteriorly, and deprives the skin of its exquisite fineness of touch. Thus cold ba-

thing blunts and weakens that vital property. The other senses do not manifest any peculiarity, well marked and depending on cold. In northern countries, indeed, we observe hearing and smell diminished. If amongst us the latter sense is blunted in winter in some individuals, that depends on a too great dryness of the pituitary membrane, or to its habitually catarrhal state in that season. Hearing loses indeed somewhat of its delicacy, but that, I think, arises from the thickening of the cerumen.

It is by putting an end to the state of relaxation of the membrane of the tympanum, that the cold restores hearing to persons almost deaf in summer.

The contraction of the nervous filaments, and slight benumbing of the extremities of the nerves seems, then, to render them less capable of transmitting external impressions to the common sensorium; hence, no doubt, our sensations are less lively, and we are less susceptible of emotion in cold weather. If sleep is more prolonged during the season of frosts; if the inhabitants of the north are greater sleepers than those of the south, is it not to diminution of sensibility, arising from the action of cold and the less vivacity and duration of solar light, that we should attribute it?

In a state of health as well as disease, strong impressions are required to move us during winter. Life being more internal, the powers remain

in a manner more latent, if exercise do not come to set them in action ; and the desire of excitation seems, in fact, to carry man, in that season, towards every thing that can disturb the oppressive concentration of the forces, and render the movements more equal and uniform. He loves a good fire, he seeks a southern aspect, and the action of the solar ray which plays gently over the surface of his body, he surrenders himself with pleasure not to agreeable exercises only, but to those also which demand an exhibition of power ; he loves society ; he proves himself, in short, desirous of every thing that can act as an excitant on his physical or moral constitution. The inhabitants of northern climates, above all, have need of stimuli in winter, to counteract the stupefying effects of excessive and prolonged cold, in order to preserve the just equilibrium of the forces, which, notwithstanding the rigour of the climate, maintain their health. The Greenlanders, the inhabitant of Hudson's Bay, go every day to hunt. The Laplander and Jakout endeavour to animate themselves, by driving, with the rapidity of lightning, their sledges, drawn by reindeers, on the icy surface ; motion becomes then indispensable. On the other hand, we see all northern people use, in preference, exciting aliments, which determine to the skin, develop heat, and rouse the benumbed sensibility. Hence the predominance of animal diet, the decided

taste for hot and spiced meats, for fish salted and half-rotten, caviare and smoked viands, the great consumption of fermented liquors, spirituous drink, tea and coffee. It is usual in the north to offer rum or ratafia before sitting down to table, to rouse the obtuse sensibility of the stomach, and to excite that viscus fully to discharge its functions. The rich Russian noble, hospitable without ostentation, and polite without affectation, loves to see his table crowded with numerous guests, copiously supplied and covered with wines of divers qualities, which stimulate his palate, flatter his taste, enliven his humour, and make him with pleasure remind the stranger of some fortunate country in which he regrets he has not been born. The mougik or peasant, strongly disposed to spirituous liquors, can empty his bottle of vodki or grain-spirit (whisky) without being incommoded by it, and as easily as a French peasant his bottle of wine.—Such habitual diet, which would raise combustion in an inhabitant of hot climates, can suit only men whose sensibility falls short of that known in southern latitudes. All physicians that have practised in the north, have acknowledged that, in diseases requiring stimulus, strong doses are necessary; the pharmacopeias confirm it. It is positive, that poison takes less hold and effect on persons of those countries. Russia abounds in mushrooms, and enormous quantities

of them are eaten. Physicians have assured me, that they have never known poisoning to follow from those vegetables ; perhaps because some sorts are poisonous only in the south.* Guthrie, a French physician, who has practised at Petersburg, has transmitted to the Society of Medicine some observations, establishing the inefficacy of the sedative property of opium in the north.

We often find it written, that the inhabitants of the north are unimpassioned, sombre, indifferent, and apathetical, and, as it were, continually plunged in stupor and insensibility. It is certain, that the physical and moral qualities may always be judged of by the nature of the climate ; they must, therefore, be various as the latter, considered always in relation to the degree of cold proper to its particular latitude. What is generally said of northern people, cannot then

* Although the Russians eat several species of poisonous mushrooms, which they prepare, like sour crout, with acids and spices, in order that they may keep good to the end of the year, it is certain that they know the *agaricus muscarius*, a species extremely poisonous, and very common in the country. Several French soldiers died from having eaten some of them. In the environs of Smolensko, I arrived fortunately in good time to prevent the bandmen of the regiment I belonged to from poisoning themselves with that mushroom, of which they were about to cook a large dishful. Impatience, and the desire of satisfying their appetites, subtracted something from the weight of my opinion ; but after I pointed out some dead flies on the edge of the plate and on the table, they no longer hesitated about rejecting forthwith those dangerous vegetables.

be reasonably understood unless of the unfortunate inhabitants of the most icy climates, situate in the vicinity of, or beneath the pole, where the cold extinguishes the vital energy of stunted man, the most wretched and pitiable of creatures; it is to them only then, that we are permitted to apply the satirical hyperbole of Montesquieu, who says, speaking generally of the inhabitants of the north, that without flaying you cannot tickle them. The Pole, Dane, Swede, Russ would with reason be offended. They all enjoy sensibilities relative to their climates, and far beyond that so ridiculed. The Russians are lively, acute, active, industrious and enterprising; they are constantly found cheerful in a temperature which is their element; they have been not ill entitled the French of the north. The rigorous cold of their clime, and their long winters render them eager for amusements; the ordinary pleasures of society, in that season, though less various and brilliant than in happier climes, are not therefore the less keenly relished; their houses resound with them. The Russian amuses himself also with his ice mountains, and in sledge parties. The chase is considered an exercise as agreeable as salutary. Many nobles travel solely for pastime and movement's sake. French and English, who have lived in Tobolsk and Irkousk, have assured me, that they did not find in those two principal cities of Siberia, that insensibility

and apathy so causelessly attributed to the people of cold regions, nor the horrors that seem attached to the very name of that Province. According to Gmelin, the carnival of Tobolsk is very gay, and amid amusement and drunkenness cold is forgotten.

Cold, in consequence of the modifications it impresses on our sensibility, exercises an influence over the intellect, the imagination, and the passions; the sensitive faculty is less diffused and more concentrated; it thence derives a greater degree of interior force or energy, physical and moral. The soul, says St. Lambert, acts more on herself; she combines received ideas in a more abstract manner. It appears in fact, that in moderately cold weather, the soul is more active, and though the genius be less lively, it is calmer, profounder and more reflective; the exterior disturb less the interior movements. According to some observers, winter leads to emotions of hatred. I do not adopt the opinion of the author of the seasons, who pretends, that great crimes are almost always committed in winter. The death of Charles of England, the assassination of Paul of Russia, and the martyrdom of Louis of France, which have all occurred in winter, seem to lend to that opinion the appearance of truth; but we must consider those unfortunate events as relating to the origin, course, and successive march of conspiracies and revolu-

tionary times, or as those astonishing and terrific meteors which appear alike in all times and seasons.

There is none but feels his mind more disposed to study and meditation, his body to long labour and varied exercise, during cold weather. We are conscious of our vital energy, we feel our force physical and moral, and we experience more than ordinary desire to exercise them. This interior feeling speaks loudly in favour of the effects of cold. The soldier not only supports more easily the distressing fatigues of the trade of arms, but further maintains firmly his martial spirit for a longer time, amid the perils of battle. We find in the people of the north, a courage and intrepidity difficult to shake, enabling them to perform feats alike bold and extraordinary. It is then very evident, that weakness is allied to great sensibility, and that, on the contrary, a certain degree of insensibility is characteristic of that vigour, that enables to confront punishment, pain, danger, and death.

We must grant, that the genius and the passions are less lively and ardent in the north than in the south ; that grace and taste, force and sublimity of composition, and the brilliant colouring of fancy belong peculiarly to hot countries. It is but just likewise to remark, to balance extremes by comparative considerations, that profundity of thought and reasoning, constancy and

firmness in enterprise, and patience in execution, are qualities more particularly remarkable in people of cold countries, where the flambeau of civilization illumines the cultivation and progress of the arts and sciences.

The circulation being less active, and the nervous system less liable to excitement in northern countries, the passions are therefore calmer, desires less ardent, tastes less fantastic, minds less inflammable; hatred is less envenomed, forgetfulness of injury more quick, crime less frequent and atrocious. Nevertheless the history of northern nations depicts scenes proving, that brains are there susceptible of violent re-action, and that men of cold countries must not be regarded as altogether incapable of great commotions and fierce passions.

A masculine and rough education tends, as well as the clime, to give vigour to the northern frame, and to impress on it radically, a degree of physical insensibility, of which indeed the soul perceives the influence; for myself, I do not think that northern people, those near the pole excepted, are much to be pitied, who, at the expense of sensibility, enjoy robustness of frame, an appendage of strength and health to be envied by the indolent and effeminate of hot countries.—Since the nervous system is less impressible in cold regions, it follows thence that nervous diseases are rather rare.

9. On Muscular Action. Cold maintains a degree of cohesion in the muscular fibres, by virtue of which they are shortened and brought nearer one another, and which, by rounding their fasciculi, concentrates the action and doubles the tonic force of the fleshy masses they form. From that increased contractility arises the rarity of luxation in the inhabitants of the north, and the salient form of the muscles, which in winter express and define themselves energetically, beneath the skin that encloses and compresses them. It is true, however, that this increase of tonic force is purchased by loss of mobility; for the articulations, though firmer, are less supple; the muscular fibres glide over each other with less ease; locomotions are less rapid, free and precise. As compensation, they are more powerful and sustained, and if slower, are also more vigorous. The muscles then gain on one side what they lose on the other. The vigour of the muscular system is more slowly exhausted in winter than summer; man can give himself, in town or country, to the rudest and most fatiguing labours and exercises without being weakened. Porters hold out better at that season under the weight of enormous burdens.

Rigorous and immoderate cold quickly benumbs the muscles, in an individual remaining too long in a state of repose. Difficulty and loss of locomotion coincide with diminution and ex-

tion of sensibility; but a distressing sensation, from the nature of the action of cold, solicits the muscles to re-act against a destructive cause, and to turn its effects to their own advantage.

10. On Generation. Man differing from many animals, enjoys the privilege of reproducing his species without interruption at all seasons, in every climate. The icy cold of polar regions does not, in him suspend the desire of propagation. Montesquieu, (*Esp. des Loix*. B. 14. C. 2.) whose ideas respecting the influence of climates are not always exact, has erred, I think, in saying, that in northern countries physical love manifested itself but with difficulty. It appears, on the contrary, so much more energetic there, as the prevailing robustness of body, and sanguineous temperament favour it more, and as the constitution is not there early enervated, as in hot climates, by premature abuse of pleasure, and by the excesses of the voluptuary and libertine. Though the passion of love be less lively and unruly than in the south, its effects in respect to population are not less positive. In Sweden it is not rare to see women have twenty or thirty children. In traversing Russia we find marriages followed by a numerous progeny; we are surprised at the great number of children in the palaces of the rich, as well as under the humble roof of the poor. In that vast empire, the population must surely in-

crease unless prevented by great multiplicity of depopulating causes.

A cold climate extends its influence over the temperament, as well as tastes and passions, which are as its natural consequences ; for this reason the inhabitants of the north feel more late the spur of love ; and the girls are not marriageable so early, viz. not before sixteen, eighteen and twenty-one ; it is likewise not rare to find women pay the monthly tribute as late as fifty and fifty-five. We may, therefore, suppose that the sexes remain longer capable of procreation.*

In the coldest regions, approaching the pole, excessive cold retards the generative flame, and we may say extinguishes the lamp of love. Beyond the 65th degree population continues on the decrease, and ends at Spitzbergen and Nova-Zembla. Lapland and Iceland females are sup-

* It has been pretended, that there is in this respect no great difference ; it is, however, sufficiently characterized to be remarked. Notwithstanding their fires and very warm houses, the women do not entirely withdraw themselves from the influence of the climate. They evidently enjoy a strong and robust constitution ; there is in them a permanent tension of organic fibre, which is the proper effect of cold. Accoucheurs have even remarked, that women have less easy labours in the north than in the south. The fear of the impression of cold, and defect of habituation to vicissitudes of temperature, we may justly consider as among the causes that relax the frames of women and predispose them to diseases. We must not suppose that Russian, like French or Italian ladies, fear exposure to the action of cold. I have seen them going in open sledges, in a cold of 15 or 18 degrees below 0°, to pay visits at several leagues distance, and returning on the same day.

posed to menstruate very little. The Greenlanders are apathetic in love, and far from experiencing even an ordinary degree of that passion, so phlegmatic are their senses. The little shrill-voiced hoarse Laplander, that complacently offers his wife to the stranger, has surely never known jealousy nor the delirium of the lover.

11. On the general constitution. From the sum total of the effects of cold, on the various systems of the animal economy, we can with certainty deduce the salutariness or unsalutariness of its action on the constitution. Hippocrates, Galen, Huxham, recognise the active and advantageous influence of cold on man. Brown, denying the direct tonic effect, insists on regarding it as the result of the diminution of the excitement that consumes the forces. The opinion to be now admitted is, that cold fortifies directly and indirectly.—We shall recur to this.

If we observe for a moment the influence of clime, we shall be convinced it is in moderately cold countries that true physical force is to be found. Amongst the Swiss and Scotch mountaineers—amongst the Russians, Swedes, and Norwegians an athletic and immoveable frame is to be remarked; those tall people are hardened to the rudest labours, and much less impressible by any causes internal or external that painfully affect the inhabitant of the South, and so easily shake his constitution.

That influence of climate extends even to

domestic animals, which are known to be stronger in cold than warm countries, where they sustain less perseveringly long marches, fatigue, and privations.

It appears then incontestible, that cold acts on the frame both by concentrating the forces, opposing their too great dissipation, and by provoking through re-action their expenditure in exercise. It increases manifestly the tonic force, and annually gives the constitution a degree of energy and vigour which it enjoys at no other season. This vigour, when excessive, causes plethora, and disposes to inflammatory diseases. The inhabitant of the south, passing north, acquires a sensation of physical energy unknown to him; persons grown effeminate in moist hot climates and those who have a lax fibre, gather force in a cold dry temperature. According to De Thou, Henry III. lost his effeminacy and love of pleasure in winter, and again resumed a spirit of order and reform. According to Zimmerman, a lubberly Hollander is like the gayest Frenchman in cold weather. Huxham says the like of the Flemings.

A further advantage resulting from cold is, that the frame, being more robust, resists better a variety of morbid causes; it is matter of observation, that there are much fewer maladies in the north than in the south, and that they are every where less common in winter than in summer, in cold-dry than in warm-moist weather.

Navigators have observed, that in Greenland voyages, disease is scarcely known amongst the sailors. The Russians say they are never better than in cold weather.

The good effects of cold are always conditional; that is, they are reaped only where the frame enjoys adequate vigour, and the action of cold is seconded by proper clothing, exercise, nourishment, and temperature of habitation.

In those, on the other hand, that lead sedentary lives—who are old, feeble, cacochymic, or of lymphatic and relaxed habit, but above all, in the sad, dejected, ill-clothed, or ill-nourished, organic change takes place, cold, far from increasing, diminishes their forces and weakens the contractility of their fibres; it destroys imperceptibly the energy of the sensations, and vivacity of the mind. Paleness, uneasiness, weight, lassitude, loss of appetite, shiverings, are the harbingers of the deterioration of the constitution; the vital motions become irregular, the assimilative functions deranged, the body wastes, the vital powers languish, and asthenic affections manifest themselves; the duration and repetition of the distressing and painful sensation of cold which consumes life, the abstraction of caloric, the irregular spasm that perturbs the functions, the slow and gradual benumbing of sensibility and contractility in every case that the organs do not re-act, must cause cold to be regarded as a powerful debilitating agent, and

as a slow poison, undermining the forces and leading necessarily to death.

Thus we may complete our analysis by a parallel, cæteris paribus, tolerably accurate, between the effects of heat and cold on the body, effects, however, whose limits are very variable ; 1. Moderate heat, like moderate cold, excites organic action ; 2. Heat exalts sensibility, but diminishes contractility ; whereas cold diminishes sensibility, but exalts contractility ; 3. The moderate action of heat and cold are alike conducive to the support of life ; their immoderate effects alike injurious, since they annihilate both moral and physical power. Extreme heat throws into apathy and languor, causes dissolution of the blood and humours, gangrene and death. Excessive cold chills, benumbs, debilitates, and produces even sphacelus and death.

CHAPTER IV.

HISTORICAL AND MEDICAL VIEW OF THE RUSSIAN CAMPAIGN.

I SHALL not inquire whether distant expeditions are, in respect to climate, least injurious to military health in the north or south, in cold or

in warm countries. I am convinced, as must every one, that the extremes are alike disadvantageous, and must inevitably cause great sacrifice of men, not only on account of the untried influence of extreme temperature on individuals born in another climate, but also on account of the fatigues inseparable from traversing long distances, of an irregular, disorderly, and consequently often unhealthful way of life, in short, of a multiplicity of events and circumstances impossible to foresee, or which have at least not been foreseen, and which operate very unfavourably, morally and physically, on military persons. The expedition of the French army into Russia offers sad proof of this truth. Historians make mention of great misfortunes that have befallen armies carrying on war in winter in the north, though composed of soldiers natives of the climate. The author of the life of Alexander the Great traces for us a picture of frightful sufferings caused twice to his army by cold ; first, when that ambitious conqueror involved himself amid snows, in savage and barbarous regions of northern Asia, before reaching Caucasus ; afterwards, when, after having traversed that mountain, he passed the Tanais on his way to subdue the Scythians ; the soldiers were oppressed with thirst, hunger, fatigue, and despair, and a great number died on the road, or lost their feet by congelation ; the cold seizing on them, benumb-

ed their limbs, and they fell at full length on the snow to rise no more. The best means, says Q. Curtius, they knew to escape that mortal numbness, was not to stop, but force themselves to march, or else to light great fires at intervals; Margat relates that Tamerlane, advancing into Russia at the head of his numerous hordes of Tartars, was surprised by a cold impetuous wind; that snow and glazed ice spread over the plain, and caused a cold so rigorous, that men and animals found difficulty in moving. It is more than propable that Tamerlane must have lost many men before effecting his retreat into winter quarters on the plains of Kech. In the History of Russia by Levesque, there is an inquiry respecting the losses in men incurred from excessive cold, by the Russian princes and nobles who were continually engaged, before their union to the sovereign monarchy, in tearing each other to pieces. In 1632, on the 4th of October, the cold became so keen between Montpellier and Beziers, that sixteen body-guards of Louis XIII., eight Swiss, and thirteen camp-boys perished. Charles XII., a warrior alike rash and unreflecting, penetrated in 1709 into Russia, and persisted in his determination of marching to Moscow in despite of the wise advice given him to retire into Poland; the winter was so rude, and the cold so rigorous, that the Swedes and Russians could scarcely hold their arms. Cir-

cumstances made that sovereign change the direction of his march, bury himself in Little Russia, where he saw part of his army perish before his eyes, of cold, hunger, and misery, amid the desert and icy steppes of the Ukraine. If he had arrived at Moscow, it is probable that the Russians, then more accustomed still to depriving their enemies of all resources by fire and sword, would have set him at bay, and that his army, forced to retire, would have experienced the same fate as the French. How many soldiers have fallen victims to cold during the siege of Azoph, under Peter the First—the campaign of Moldavia, under Catharine the Second—and that of Persia, under Paul the First. In 1719, 7000 Swedes, on their way to besiege Drontheim, perished of cold amid the snows in the mountains that separate Sweden from Norway. In the retreat of Prague in 1742, the French army, commanded by Marshall Belle-Isle, and but little accustomed to winter campaigns, was forced to traverse impracticable defiles across mountains and ravines covered with snow. In ten days, 4000 men perished of cold and misery; no precaution had been taken; food and clothing were deficient; the soldiers, naked under the rigorous sky of Bohemia, died in anguish or despair; numbers of officers and soldiers had noses, feet, and hands frozen; in 1793 the French army also

bivouacking on the Alps, suffered much from the rigour of the atmosphere.

From those examples we may judge what was reserved for the French army, situated in 1812 in the heart of Russia, and surprised in its forced retreat by a most rigorous winter. How great must have been the sufferings of men utterly destitute, and borne down by a thousand debilitating causes? It would, however, be an error to believe, that cold has been the essential and only cause of the great mortality in the army in its retreat from Moscow and the banks of the Dwina, until the arrival of its fragments on the shores of the Vistula.

—quæq. ipse miserrima vidi, &c.

A rapid sketch of the campaign will explain the true causes that prepared the way for subsequent mortality from frost.

A numerous army, composed of men from the north and south of Europe, was led into a vast country, where resources are less scarce than difficult of access, by an improvident chief, devoured by thirst of conquest, and unfortunately, like Philip, accustomed never to look behind him. Troops called from Spain, Italy, France, and all parts of Germany, arrived on the banks of the Niemen, harrassed with fatigue after long marches.

Until then the soldiers had been well fed on his route, in the garrisons and cantonments he had just left. The difficulty of providing for so large a number of troops, assembled together on the same line, soon became sensible. Provisions became scarce, distributions irregular, and the rations often incomplete. In place of oats the horses got but rye, and for forage were reduced to rye stalks.

The army passed the river on the 23d 400,000 strong, like an impetuous torrent inundating a vast plain; accustomed to conquest, it proudly enters the interior of the country it invades. The first days of its march on this new territory, were signalized by atmospherical changes, as extraordinary in summer, as injurious to frames which have to support such sudden variation of temperature; to the excessive heat of the last fortnight of June, succeeded, in the first few days of July, stormy rains, accompanied for twenty-four hours by cold so sharp, as to make man and horse shiver; the barracks were inundated; fires were difficultly kept alive; to forget that frightful night would be impossible; the divisions left in the hospitals of Kowna and Wilna, a great quantity of sick attacked by catarrhal and gastric fevers, diarrhœas, dysenteries, pleurisies, or in a state of general weakness which put them out of condition to join their respective corps. There came on a terrible mortality amongst the horses; from the

Niemen to Wilna the roads and places of encampment were strewed with their carcasses ; the moist cold quickly destroyed those whom fatigue and bad nourishment had already too far exhausted.

Forced and counter marches were often rendered necessary, before and after the passage of the Niemen, by the plan of the leader, who was less careless of the health and life of man, than impatient to pounce with his masses on the Russian columns, and arrive triumphant under the walls of Moscow. The soldiers almost always covered with black clay dust, had, in July and August, besides great fatigues, to support an excessive heat, equal to what is felt at Naples or Madrid at the same season. They frequently found only muddy stagnant water to quench their thirst ; oppressed with fatigue, they sighed for the sweets of sleep, of which they had been for many days deprived. It was only after reaching Smolensko that some days of repose were allowed, but not enough to recruit the men from their fatigue, and the beasts from their exhaustion.

Notwithstanding those sufferings and privations, which were but preludes to those that awaited the army at the approach of the frosty season, it triumphed over all obstacles on the days of Smolensko, Valentino, and Mojaisk ; every thing yielded to the torrent of valour, and Moscow was taken, but in a state little favour-

able to an army besieged by want of every sort. Several thousand, sick or wounded, had, for their only wish, a place of repose and assistance. Orcha, Minsk, Krasnoe, Smolensko received a certain number of them, but between the last city and Moscow every thing was fired; the regiments were already considerably weakened, and I may say as much by disease as by hostile sword. Great numbers, scarcely able to drag themselves along, remained behind and covered the roads.

We may already enumerate as causes injurious to the health of the soldiers, the fatigues of the march; atmospherical variations; excessive heat by day and sharp coolness by night; the bad quality of the water that served them for drink, or for preparation of food, and which was often drawn from swamps and marshes, or in rivulets at the bottom of ravines, where were putrifying carcasses of men and horses; abuse in many cases of grain spirit; food alternately scarce and abundant, sometimes good and sometimes bad; an irregular way of life; deficient distribution of necessaries, which often forced the majority to live on what they could plunder. Many soldiers fell sick. One disease that did much mischief, by quick depression of strength, was diarrhœa, occasioned by the water that served for drink, and the rations of bread in which rye predominated. When bread was wanting, the soldiers fell upon the flour, which, for precaution, each of them carried

in a little leathern sack hung by his side. With this flour already warmed, mixed with broth or water, and seasoned with a little salt, they greedily satisfied their appetites ; they finished the repast with a glass of water, or of pungent empyreumatic grain spirit. This farinaceous food underwent an acid fermentation in the stomach and intestines, which rendered it indigestible ; it gave rise to windy colics, a mucous atony of the intestinal tube, and an abdominal colliquation, which wasted the body and rapidly diminished the strength. The herds of oxen, heifers, goats, and sheep that each regiment brought in its train, did not afford the advantage the measure seemed first to promise ; those animals, ill-conducted and attended to, and fatigued by the march, wasted ; the herds remained behind ; the drivers lost themselves in the vast pastures, or amid the woods ; and contagious disease, appearing at last, destroyed the rest.

Moscow it seemed should be the limit to, or at least give a moment's relaxation from, so many labours and fatigues. Buonaparte, like a navigator whose vessel is battered by a violent tempest, and who succeeds in landing in the nearest port, felicitated himself doubly on his entry into Moscow. He there expected, if he should not be already provided, to find all the means of revictualing. But how were his hopes blasted !!! then began to unroll before him a picture of horrors,

that could not but make him, as it did his whole army, anticipate his subsequent most embarrassing position. In a few hours, by a sacrifice as extraordinary as voluntary, and on which history alone can decide, superb edifices, like relics of the ancient capital of the Czars, presented nothing but heaps of cinders and ruins—the magazines of food abandoned by the Russian troops who were forced to retire, the depots of eatables left by the inhabitants, who fled voluntarily or were enjoined to desert the city, became, in a great measure, the prey of the flame. Pillage, authorised I may say by the progress of a fire impossible to arrest, notwithstanding every attempt, was more injurious than profitable to the soldier, who as usual, never thinks of to-morrow, wastes in 24 hours what might serve for several days, imagining thus to indemnify himself for the privations he has endured, stuffing himself with food which presented itself abundantly in Moscow, which was supplied with eatables of every description. Amid horrible disorder, shoutings, alarm and confusion, beer, foreign wine, brandy flowed in great tides; many soldiers were seen drunk. Those excesses after privations were debilitating; they multiplied disease, and caused a greater number of soldiers to be sent to the hospitals established in the edifices that had escaped the conflagration.

A similar catastrophe deprived the army,

in a very little time, of the resources, in food and clothing, which so large and rich a city as Moscow might have supplied. Nothing appears to have been provided for. At the rear, magazines were wanting; those formed at Kowno and Wilna were far removed from the army; the troops were not provided with clothing proper to enable them to endure the rudeness of a climate in which they might probably be obliged to winter; there was no certain distribution of victuals on the great road from Moscow to Smolensko. How many soldiers have I seen, wounded or sick, retreating without order, at random, sad, pale, and dejected, begging with tears in their eyes a morsel of bread from every one they met on the road! The burning of Moscow permitted with difficulty of the rescue of a small stock of provisions, which were put into a magazine, and were sufficient at the utmost for a month. Dry pulse, of which there was a tolerable quantity, was quickly consumed; provisions became scarce; forage almost exhausted; it was impossible to procure subsistence in the environs, which were abandoned by the inhabitants, ravaged by the troops, and where Cosack parties were constantly roaming.

In common years, in that part of Russia, winter is ushered in in September, and snow begins to fall in October; the return of that season proved, to the astonishment of the Russians, more tardy than usual. Towards mid-day the sun, al-

though less hot, was as radiant as in the south of France, but as soon as he left the horizon, it grew very cold ; a piercing air proclaimed the necessity of lighting good fires in the bivouacks, and the thick hoar frost, which covered the ground in the morning, was a signal precursory to the frosts, on which the Russians built the hope of our ruin, and their own deliverance. An orderly retreat at the end of September or beginning of October would have saved the lives of thousands.

The declared and predetermined design of the Russians not to make peace, their new hostile dispositions, the distance of our army from the centre of its resources, the great numbers of sick to be taken care of, the general indigence and want of every kind, the prospect of all that was to be feared from an enemy daily reinforced, and from a harsh climate preparing its horrors, at length forced upon us a retreat unexampled in military history. It is the historian's part to point out the improvidence and false calculation of a proud victor, as the origin of the disasters that overwhelmed the army. The friend of man sums up its causes ; he observes their effects moral and physical on the individuals whose health he is entrusted to watch ; but, exposed as he is himself to the influence of the same causes which he cannot escape, and deprived of means of assistance, he can but lament and weep over the deplorable

fate of so many unfortunates, victims to disease, and to the rigour of a climate, which the Russians with reason consider the most powerful and formidable bulwark they have to oppose to their enemies.*

To retreat and evacuate Moscow became imperative, to avoid being surrounded and exposed to perish there of hunger and thirst, and obliged ultimately to surrender, less from inability to defend ourselves, than from the horrors of famine. The troops who had been led to expect there to enjoy winter quarters, and obtain the repose they needed, were obliged to prepare to traverse 250 leagues of desert and devastated country, without victuals, magazines, or asylum; 12 to 15,000 sick were to be carried away; our situation was altogether such as to beget in every person lively anxiety respecting his future lot.

The order for retreat was given, and the first disposition commenced the 15th October, by the evacuation of sick and wounded, on the great road from Moscow to Smolensko. The carriages

* The Russians regard the winter of 1812 as one of the most rigorous of which they have any record; it was intensely felt through all Russia, even the most southern parts. The Tartars of the Crimea gave me as proof, that the great and little bustard, which at that season quit the plain and come annually for protection from the cold into the southern part of that peninsula, towards the coasts, remained benumbed on the snow, and that they caught a great quantity of them. This explanation removed my surprise, to see, in traversing the low hills in the spring of 1813, the ground covered in some places with the remains of those birds entire.

were far from sufficient to transport all whom the nature of their complaints or wounds incapacitated for setting out on foot. But where will a resolution fail that is quickly adopted from fear, danger, or despair! Many were seen then too confident in their strength and courage, destitute of necessaries, dragging themselves slowly out of the hospitals by aid of crutches and sticks, and taking with their comrades the road to Smolensko. Those to whom want of strength or severity of disease did not permit such effort, were deserted in grief and suffering, far from their country, their relations, and their friends—cruel necessity! But their lot was still not the most to be deplored. The divisions successively quitted that fatal capital, and took the road to Smolensko by Wiasma.

The autumn had continued fine; the fine weather seemed prolonged, and the season of frost retarded, only more completely to blind the leader. The cold became truly sensible from the 20th to the 25th of October, and the rigor of the winter began to press on the army at its exit from Moscow. At some days journey from that city, the privations became more sensible, from scarcity of food, from progressive consumption of the small quantity with which each had been able to provide himself, from diminution and desertion of carriages, whose horses died on the road of exhaustion. The unhappy soldiers, as ex-

hausted as those animals, underwent the same fate. The cold persecuted us more and more; the frost was so strong that, at night and towards morning, it rendered the march of the troops slow and distressing. The most pressing wants became daily more urgent; the divisions were constantly disquieted, hunted, harassed: it was no longer possible for individuals to leave the road without danger; victuals at length quite failed, which increased our sufferings. Thenceforth every one was observed, from a feeling that seems to justify such selfishness, to look to his single preservation, and to hide the little provisions that remained to him, which, however, were reduced so much as to be quickly consumed. From that time imperative necessity forced the soldiers to sustain themselves with horse-flesh. This necessity became general. Thus misfortune, and the most urgent wants, established a perfect equality of persons; the roads, fields, ravines, were seen strewed with carcasses of horses. Soldiers, officers, physicians, commissaries, and other functionaries fell upon them indiscriminately. I have seen persons, pressed by hunger, eating that raw flesh, but usually it was roasted at the bivouack fire, which rendered it only harder and drier. The soldier had no longer strengthening drinks; coffee supported the officers a little. Already we were obliged to break the ice of the streams, for water to dress horse flesh, refuse of

vegetables, in a word, any aliments, good or bad, that the strictest search and most cunning marauders could procure.

To extreme fatigues and want, which wasted us, were added other circumstances which made the position of the army still more critical and frightful. It had to traverse a country devastated by the passages of two armies, turned into a desert by the flight of the nobles and most of their vassals, from the terror diffused far and wide by the exterminating thunder of war, and by the horrible burning of cities, villages, and towns; the troops themselves destroyed what remained, and thus deprived of resource those in the rear, even the sick, who wanted asylum, and were forced to remain exposed to the injuries of the air, often without straw, on which they might taste, at least for some hours, the sweets of sleep. A convoy of sick was, from necessity, abandoned in the forest of Wiasma; those unfortunates all perished of cold or hunger. Those who were still more weakened by indisposition and disease, marching slowly and falling behind, fell into the hands of the enemy, or were the first victims of cold. Not a day passed without some affair—unhappy were the wounded who could not rise and move forward.

The army advanced towards Smolensko, where, as was said, it was to stop and establish winter quarters, but where, above all things, abundance

of provisions was to be had. All those flattering and illusory reports were spread with a view to sustain the spirit and courage of the soldiers ; but men of sense knew what to expect, and the state of ruin and devastation in which that city and its environs had been left, was not forgotten. Discipline was relaxed ; licentiousness was the sad effect of want of food ; a great number of soldiers strayed imprudently from the road, wandered in the plains, and then perished by cold or hunger, or the sword of the Cossack, or vengeance of the incensed peasant. The army was forced to encamp on the frozen soil, sometimes without fuel to light fires. There was nothing that the soldiers, whose clothes were worn, ript, torn or falling in pieces, did not contrive to defend themselves from cold. They were observed in garbs as pitiable as fantastic, muffled up in pelisses, female garments, fur bonnets, bad blankets, linen bags, rags, mats, skins of recently flayed animals. They had observed that, in order to get possession with facility of the clothing of those dead from cold, it was necessary not to wait until their limbs should be too stiffly congealed. Hence more that one unfortunate was plundered before breathing his last sigh. The superior officers, participating in that state of misery, had a common lot with the soldiers ; many, deprived of their horses and servants, and obliged to go on foot, supported with difficulty the fa-

tigues of the march. Dismounted troops were similarly circumstanced. There was still under arms a great number of suffering and sick soldiers, whom intrepid courage, and a feeling of honour retained in the ranks. It was not difficult to perceive, that privations of all kinds had sapped the strength of every individual; the skin was dry, discoloured, filthy, earthy, and as if contracted; the face was worn; add to that a long beard, that gave the expression something of wickedness, and total absence of bodily cleanliness. Many fell victims to a frightful bulimia. The army had in its train a great number of wounded, of stragglers, and of exhausted persons, so many unfortunates of which part was daily cut off by debilitating causes. Often unable to go farther, they fell and resigned themselves to death, in that frightful state of despair which is caused by total loss of moral and physical force, which was aggravated to the utmost by the sight of their comrades stretched lifeless on the snow. Where were the hospitals or even houses to receive those who stood in need of succour!! How would it be possible to procure beds, blankets, or even straw, to stretch them on, or broth or wine to revive their languishing powers? During a retreat so precipitate and fatal, in a country deprived of its resources, amid disorder and confusion, the sad physician was forced to remain an astonished spectator of evils he could not arrest, to which

he could apply no remedy. That state of matters remarkably affected the moral powers. The consternation was general. It appeared less strongly imprinted on their countenances, than profoundly engraven on all their hearts ; sensibility could not remain silent before a spectacle so distressful. Fear of not escaping the danger was very naturally allied with the desperate idea of seeing one's country no more. None could flatter themselves their courage and strength would suffice to enable them to support privations and sufferings above human nature. Italians, Portuguese, Spaniards, those from the temperate and southern parts of France, obliged to brave an austere climate unknown to them, directed their thoughts towards their country, and with good reason regretted the beauty of the heavens, and softness of the air of the regions of their birth. Unfortunate however was he who weakened himself further, by abandoning himself to sombre and too discouraging ideas and reflections ! He was sooner seized by the cold, and he prepared or hastened his death. I am convinced that nostalgia has been more common than was suspected among the young soldiers ; the circumstances could not but cause it ; besides, the Frenchman, who has every reason to boast of his happy country, whom a thousand recollections attach to his native soil, does not cease thinking and speaking of it when going to a distance ; 'tis even matter of observation that

the soldier loses his gaiety when led too far away, his physical education, the ease he enjoys in his family before embracing the profession of arms, unfit him a good deal for enduring with patience and resignation too severe and protracted privations ; he feels particularly prolonged bivouacks, and want of meat and of strong liquor.

The army was but three days march from Smolensko in the first days of November, when the heavens became dark, and snow began to fall in great flakes, in such quantity, that I have never seen the air so obscure. The cold then was felt with extreme severity ; the northern wind, which blew impetuously in our faces, incommoded many, who saw no more ; they strayed, fell in the snow, above all when night surprised them, and thus miserably perished. Disbanded regiments were reduced almost to nothing, by loss of men left every moment on the roads or in the bivouacks. In three days the army dissolved, and was in part destroyed owing to that cruel circumstance. It is painful to have to retrace the horrors of such a history ; but it is easily conceivable how a great number of individuals, overcome with fatigue, exhausted, and having no longer food, were unable to resist excessive cold. However, to get forward, they travelled without order day and night, often without well knowing where they were. Ultimately they were obliged to stop,

and complaining, shivering, to lie down in woods, on roads, in ditches, at the bottom of ravines, often without fire, because they had no wood at hand, nor strength enough to go to cut some at a little distance; if they succeeded in lighting one, they then warmed themselves as they could, and slept without delay. The first hours of sleep offered, then, alas! but deceptive delight, precursor of the grave that yawned for them. The fire was at length extinct for want of support, or owing to the great blast. Far from finding safety in the sweets of sleep, they were seized and benumbed by cold, and never saw daylight more. Some persons came to the burning houses to warm themselves. I have seen them sad, pale, despairing, without arms or caps, staggering, scarce able to sustain themselves, their heads hanging to the right or left, their extremities contracted, setting their feet on the coals, lying down on hot cinders, or falling into the fire, which they sought mechanically, or as if by instinct. Others, apparently less feeble, and resolved not to suffer themselves to be depressed by misfortune, rallied their powers to avoid sinking; but often they quitted one place only to perish in another. Along the road, in the neighbouring ditches and fields, were perceived human carcasses heaped up and lying at random in fives, tens, fifteens, and twenties, of such as had perished during the night, which was always

more murderous than the day. Such a sight, renewed at every step, was well fitted to freeze with terror, and excite serious reflections. It destroyed the whole eclat of a campaign that had seduced the imagination rather than the heart.

On the arrival of the army, the greatest disorder prevailed at Smolensko; the hospitals were crowded with Russian and French sick. Some distributions of rice, flour, and biscuits were made to the regiments; but scarcely any isolated persons, who formed at least one half, got a share. On the other hand, the distribution in detail was unequal, and pillage prevailed over order. In the streets nothing was to be met with but sick and wounded asking for the hospitals, soldiers of every sort, of every nation, going and coming; some seeking where provisions were sold or distributed, others still, taciturn, incapable of any effort, absorbed by grief, half dead with cold, awaiting their last hour. On all sides complaints and groans, dead and dying, formed a picture still further darkened by the ruinous aspect of the city. The famished soldiers disputed with force and violence for subsistence; some I have seen who pitilessly abused the law of force. What was not less maddening, was to learn that we could not stop at Smolensko. It was in fact quite impossible to maintain a military position, or procure provisions there. Those who were so imprudent as to wander too far from the

city fell into the hands of irregular and barbarous Cossacks; who, not content to batten on their spoils, in abuse of ill-acquired superiority, ill-treated them further by lance thrusts, or abandoned them, after stripping them of clothing, to all the rigour of the cold.

The troops quitted Smolensko from the 14th to the 16th of November. Many sick and wounded were left without resource, abandoned to the generosity of the enemy. By an order, which I call inhuman, the houses that, till then, escaped the conflagration, were at the moment of departure committed to pillage and the flames. The army followed the great road from Smolensko to Wilna. Although cold prevented many soldiers from using their arms, the defence at Krasnoë, where a Russian division intercepted the passage, was vigorous. Here again we were obliged to abandon the wounded to the mercy of the murderous elements, on that snow which they had just dyed with their blood. On the 18th of November we had the misfortune to see some of those unfortunates left on the field of battle after an evening affair, with the air of spectres rather than men, surviving their comrades, calling themselves Frenchmen, and beseeching with joined hands and plaintive dying voice to be carried forward. Those most affected by their condition, who stopped to lavish on them some consolations, had

but false hopes to give them ; means of transport were wanting ; the moving hospitals were dissolved ; the covered wagons abandoned. All the sick whom terror inspired by the Cossacks as well as by the horrors of the conflagration and famine, impelled at all hazards to remove from Smolensko and trust to providence, perished from cold along the road. New misfortunes were heard of daily ; the army was incessantly harassed by the enemy.

About the 19th, 20th, or 21st of November, the temperature grew a little milder. After having passed the Dnieper some bread and drink were procured from Polish Jews, a feeble resource for so great a number of famished individuals. At Orcha some distributions of provisions were made. Horse-flesh was always a resource ; it was not deficient, there was such mortality among those animals. They even grew nice as to the flavour, for the brain, tongue, and liver, were the parts first carried off, as most tender and delicate. The roads became miry and slippery ; the loss of men continued ; the sharp humid cold gave the last blow to the ruined health of numbers of officers and soldiers. The dry cold became again keenly sensible when they arrived on the banks of the Berezina.

Misfortune usually unites men ; the equality of a sad condition, the feeling the same punish-

ments and sufferings, leads them mutually to console each other, and even to assist each other in the smallest matters. But how strange were the effects in us of general discontent, of the continual sensation of cold, of physical wants not satisfied, of well-founded fears and anxieties of each one for his own fate, of the peculiar moral affections of each individual, and of the frightful idea of being exposed to perish of cold and famine! It seemed as if in our retreat misfortune had soured our minds and hardened our hearts. We were insensible, selfish, avaricious, and M. Labaume's remarks are very true.* On the philosophic historian, whose pen shall transmit to posterity the true and circumstantial history of this campaign, it devolves to describe the sad and silent progress of the fragments of our once flourishing armament; that crowd of soldiers of all nations, forced to march, though almost without foot-covering, in the snow or in the frozen sloughs, pressing in masses to cross the Berezina, amid cries, confusion, and tumult; also the great number of wounded, abandoned on those shores in the greatest depression, physical and moral, exposed day and night to the rigour of a cold so noxious to wounds, and for whom death pitilessly edged his scythe.

The same causes of misery and destruction

* *Relation Historique*, &c. Paris, p. 382.

oppressed the remains of the army in its march from the Berezina to Wilna. Though here and there some subsistence was found, the excess of cold and degree of weakness existing in most individuals, did not permit them to recover. The morbid affections with which they were afflicted, abandoned to themselves, irritated, and aggravated, exposed them to perish every moment. Feeling their strength fail, they suffered themselves often to sink into a repose that seemed to them agreeable. There were some who cared but little to die. Many individuals had their hands, feet, and ears frozen ; still too fortunate, if so happy as to escape the danger by sacrifice of some entire member. Some remained mortally seized by cold when obliged to stop to satisfy pressing necessities ; the arrival of that dreaded moment was in fact very embarrassing, as well on account of the danger of exposing oneself to the air, as of the numbness of the fingers, which took away the power of re-adjusting the clothes.

Wilna, exhausted already by the continual passing of troops, furnished but few resources to the army. The cold was then very rigorous, for in the beginning of December it ranged from -9° to -20° . It must needs have been a most affecting sight, to see, united in one city, the prey of disease and alarm, an immense number of feeble depressed creatures, and of dying sick and wounded, stretched on the streets and the squares

without fire or nourishment. Numbers of those unfortunates were victims to the barbarity of the Jews, a people nowhere so base as in Poland, who pillaged them and abandoned them in that state, and threw cold water on them under pretext of thawing them. The hospitals and private houses were filled with from 15 to 18,000 sick, to the most of whom the suitable and ready assistance of which they stood in need, could not be afforded. The asylums of humanity were, if we may say so, become its tombs. The accumulation increased the difficulties of military and medical arrangements, as well as the severity of the diseases. The sick arrived in crowds at the places destined for them; pierced with cold, chilled, frozen, and unable, circumstanced as they were, to undress, they stretched themselves on beds, without counterpanes, on straw, on the ground, rather dead than living, and in that state expired. M. Bertrand, physician to the army, who remained by order at Wilna to attend the sick, has observed the epidemic catarrhal typhus, which prevailed in Lithuania during the winter of 1812. He has remarked, that all the causes that acted unfavourably on the army, had equally predisposed to that malady the unhappy inhabitants of the town and country, who were forced to leave their dwellings; that from the month of November, the excessive cold had benumbed the vital energy of the skin, whilst that of the

mucous membranes received a considerable increase, and such as characterizes the phlogistic affections of that system. It is the same typhus with which the officers and soldiers continued afflicted, and which greatly increased the numbers of sick in the hospitals at Wilna, Koenigsberg, Warsaw, Thorn, Posen, Dresden, &c. It was recognizable amongst the troops immediately after their exit from Moscow, and only extended itself more and more in proportion to the multiplicity and intensity of its causes. It has also prevailed among the prisoners of war, French and Russian.

The remains of the army, attacked and harassed by the enemy, was obliged precipitately to quit Wilna. Numbers of soldiers devoid of power, incapable of keeping up the march, perished on every side. The army passed between rows of frozen corpses, or abandoned persons who expired when on the point of quitting a land so fatal, deprived in their last moments of the consoling succour of religion, and without means to entrust to depositaries their last will. At length, and in the most deplorable condition, they reached the Niemen. At Kowno they were no better off than at Wilna; the pillage of some magazines was injurious to such famished individuals as transgressed temperate limits; more than 800 soldiers perished with cold, owing en-

tirely to having been intoxicated by brandy, and having gone to sleep on the snow.

Towards the middle of December 25 to 30,000 men, fragments of a formidable army, re-passed the Niemen.

The prisoners of war fallen into the power of the enemy did not there find the end of their sufferings ; a great number perished with cold, misery and disease, in the hospitals, on the roads, and in lodgings before arriving at their destinations. Many had been deprived of the principal part of their clothes, by that infamous abuse of the rights of war, which should be confined to robbers ; they were thence obliged to travel badly clothed for several days in extremely rigorous weather.

It was difficult for the Russians, who made forced marches, and whose supplies of provisions were deficient, to insure adequate subsistence for the prisoners, who were very numerous. The ruin of the country and desertion of the plains rendered the thing impracticable. The officers and soldiers were obliged to march two, three, or four hundred leagues to reach their respective destinations. If the transmission of the soldiers had been, on some points, managed as upon others, by functionaries of a little more sagacity, foresight, and I shall even say humanity, much fewer would have perished of cold and weakness. I think I still see on the public place of Krasnoe,

and in the villages that I passed through as prisoner of war on the road to Kursk, those heaps of frozen corpses, which recalled to my mind those verses of Corneille, depicting the battle of Pharsalia.

Ces montagnes de morts privés d'honneurs funebres.

However, after the prisoners were out of the district of country which had been ravaged by the armies, they received regular subsistence of very good quality, and were lodged, by eight, ten, and twelve, with the peasants. In the provincial capitals, they received pelisses of sheep skin, fur-bonnets, gloves, and coarse woollen stockings, a sort of dress that appeared to them as grotesque as novel, but which was very precious as a defence against the cold during the winter. When arrived at the places in which they were to pass the time of their captivity, they found their lot ameliorated, and the reception we experienced, demands our grateful eulogy of the hospitality exercised by the Russians,* that virtue now so rare amongst other people, the orientals excepted. After this history of that campaign, I ask what army so considerable has been placed in a more critical posi-

* As for me, I owe an acknowledgement of profound gratitude, for the particular kindness heaped on me, and the eagerness to render my situation agreeable, evinced by the Duc de Richlieu, then governor general of the three great governments, and General Borsdin, governor of Crimea.

tion, and has seen showering down on it at once such a deluge of disasters and calamities? Who have had to encounter a greater number of united debilitating causes? Men obliged, in the midst of a vast desert, covered with snow, to endure the fatigues of war, the horrors of famine, the mortal strokes of cold, the completest want and misery, could not have shown more valour or courage. They still listened to the voice of honour, in despite of so many discouraging causes. A campaign of six months has destroyed the finest of armies. Had it not been for the improvidence of the chief, and so many causes that injured the health and enervated the powers of the soldier, provisions also and clothing being adapted to the season, the retreat might have been much less fatal. It would have been executed with order and security; the rigorous inclemency of the north (wind?) would not have given the last stroke to so many unfortunates, dead of cold, who have too well verified that sad truth regarding the destiny of man—that destiny that often sends him to die, far from a country he should never have quitted.

No person, enfeebled and wasted by the causes of which we have spoken, and who had not means to defend themselves from cold, could hope to escape the danger. Some, pale and depressed by inanition, swooned away and died, stretched on the snow. Others, though provided with some

food, at least in quantity sufficient to quiet the cravings of hunger, were seized by shivering, to which quickly succeeded languor and propensity to sleep. They were seen walking insensible and ignorant where they went: scarcely could you succeed in making them understand a few words; they had almost entirely lost the use of the senses. In a word, when no longer able to continue walking, having neither power nor will, they fell on their knees. The muscles of the trunk were the last to lose the power of contraction. Many of those unfortunates remained some time in that posture, contending against death. Once fallen, it was impossible for them, with their utmost efforts to rise again. The danger of stopping had been universally observed; but, alas! presence of mind and firm determination did not always suffice to ward off mortal attacks made from all directions, against one miserable life.* It happened to me

* I shall here record a circumstance, to which I probably owe my preservation. During the frightful night that we left Smolensko, I felt much harassed; towards five in the morning, a feeling of lassitude invited me to stop to rest. I sat down on a trunk of birch, beside eight frozen corpses, and soon experienced an inclination to sleep, to which I yielded the more willingly, as it then seemed delicious. I was fortunately dragged out of that incipient somnolency, which would infallibly have brought on torpor, by the cries and oaths of two soldiers opposite, who were striking violently a poor exhausted horse who had fallen down. I emerged from that state with a sort of shock. The sight of what was beside me, recalled strongly to my mind the danger to which I exposed myself; I took a little brandy, and set to running, to remove the numbness of my legs, whose coldness and insensibility were such as if they had been immersed in an iced bath.

three or four times, to help some of those unfortunates who had just fallen and begun to dose, to rise again, and set themselves in motion, after having given them a little sweetened brandy. 'Twas in vain; they could neither advance nor support themselves, and they fell again in the same place, where they were of necessity abandoned to their unhappy lot. Their pulse was small and imperceptible; Respiration, infrequent and scarcely sensible in some, was attended in others by complaints and groans. Sometimes the eye was open, fixed, dull, wild, and the brain was seized by quiet delirium; sometimes the eye was red, and announced transient excitement of the brain; there was then more marked delirium. Some stammered out incoherent words; others had a reserved and convulsive laugh. In some blood flowed from nose and ears; they agitated their limbs as if groping. It has been given out that some soldiers, from phrenitic delirium, had gnawed their hands and arms. I take the liberty of doubting it. The nervous symptoms that accompanied death by cold, when lingering, may have deceived those who say they have seen it. I have observed men overpowered by cold; I have seen them uncovering their breast, agitating their arms, as a sick man labouring under deaf delirium in an ataxic fever; In that state they certainly no longer felt desire of food; besides, the spastic pressure of the lower against the upper jaw was constant in most,

and only increased with the progressive effects of the cold which caused torpor and death.

Thus have thousands perished. Most of those that escaped the danger fell sick ultimately. In 1813, a number of soldiers more or less seriously injured by cold, filled the hospitals of Poland, Prussia, and Germany. From the shores of the Niemen, to the banks of the Rhine, were easily recognised, in their persons, the fragments of an army immolated by cold and misery the most appalling. Many, not yet arrived at the limit of their sufferings, distributed themselves in the hospitals on this side the Rhine, and even as far as the south of France, where they came to undergo various extirpations, incisions, and amputations, necessitated by the physical disorder so often inseparable from profound gangrene and from sphacelus.

Mutilations of hands and feet, loss of the nose, of an ear, weakness of sight, deafness, complete or incomplete, neuralgia, rheumatism, palsies, chronic diarrhœa, pectoral affections, recall still more strongly to those who bear such painful mementos, the horrors of this campaign.

CHAPTER V.

ON ASPHYXIA, GANGRENE, AND DEATH FROM COLD.

THE states we are about to consider are caused by abstraction of caloric and stupefaction of the vital powers, when the degree of cold is excessive or its application too prolonged, on a part or on the whole body. The insidious effects of that agent may extend from the slightest numbness, to the suspension and abolition of every motion and feeling. Individuals are generally more liable to it, in proportion as they are less capable of resistance, whether from defect of bodily vigour, or owing to the situation in which they stand. Soldiers, travellers, couriers, inhabitants of mountains, have most reason, in severe winters, to dread the pernicious effects of immoderate cold. The picture we have sketched of the retreat from Moscow presents a sad example of it, and might in some measure render others unnecessary, if they did not relate to some peculiar circumstances.

Soldiers, who are rarely provided with certain articles of dress suitable to winter, and whose caps do not entirely defend the lateral and superior parts of the head, and who often suffer from cold in bivouacks, are very liable to have ears and fingers seized on by asphyxia and mortification. Troopers, who remain several days

without taking off their boots, and whose usual posture on horseback contributes to benumb the extremities, often have their toes and feet frozen, without suspecting it. How many sentinels, victims of an icy night, have been found stiff and motionless when about to be relieved? Beyond the Rhine there have been no winter campaigns, in which some have not perished in this manner, or had at least some part sphacelated by cold.

Travellers relate many examples of the danger of exposure to cold. Mention is made in Cook's first voyage, of the risk run by the learned Solander, Banks, and Buchan, in a botanical excursion, on a mountain near Terra del Fuego, where they narrowly escaped death from cold, and where they found great difficulty in resisting the oppressive somnolency that oppressed them. Their negroes, who slept profoundly, perished. Entire families are sometimes lost from cold in the Alps, in travelling. The crosses we see planted in divers places in those mountains, attest the misfortunes that have befallen such as have been surprised by violent storms,* or overwhelmed by avalanches, or precipitated into deep abysses. But the astonished traveller may turn away from those memorials of misfortune, and contemplate

* In Siberia, travellers are sometimes surprised by hurricanes, which endanger their lives. They know then no better means of escape from danger than lying down; but in order that the accumulating snow may not suffocate them, they get up every quarter

with pleasure those truly pious asylums, opened by Christian charity, on the tops of mountains covered with eternal snow and ice, where are carefully gathered together those who have been seized by cold, and where every succour proper to recall their vitality is administered.

Notwithstanding the precautions taken against cold by the postillions and couriers of the north, they have sometimes the misfortune to perish. In Russia it is not rare to see, at the posthouses, persons wanting fingers, or a portion of the ear, or the point of the nose ; that accident even surprises very little those it befalls.

Repose or inaction is dangerous in the open air in cold weather. If a person that is exposed during sleep, whether natural or brought about by any unusual cause, be insufficiently covered, cold seizes him very soon, because the vital motions are slower than when awake, and because re-action, which might resist its noxious influence, is too feeble, and produces no effect.

Asphyxia and gangrene have been known to supervene, upon passing from a high temperature to a very low one, or by sudden variations, as Baron Larry has experienced. Lamotte re-

of an hour to shake it off.—*Voyage en Sibirie par Krachenikow*. I knew a Russian officer who made a long stay in that province ; he has assured me, that persons surprised by the fury of a hurricane, accompanied with snow, remained lying under that substance during the time the storm lasted, and were thus safer and less liable to perish from cold.

lates, that a servant, who in July had descended to the bottom of a pit to cleanse it, was there seized by a cold so sharp and a pain so violent, in the great toe of the left foot, that gangrene set in, and made rapid progress, rendering amputation necessary.

In proportion as a small quantity of stimulating drink is useful in winter, to the traveller who traverses a country covered with snow, and to the weary person who perseveres in motion, so is its employment noxious to him when abused, or if he stop and sleep, and thus remain exposed without defence to the freezing air, whose benumbing effect is sometimes doubled by the wind. We have said above, that all the soldiers that got drunk on the retreat from Moscow, fell asleep at length; the cold and narcotic effect of the alcohol overpowered them with lethargic sleep. At a fete given under Potemkin's administration, at Petersburg, by a farmer-general of distilled spirits, fifteen to eighteen hundred persons, who committed too great excess in spirituous drink, perished miserably from cold in the squares and streets of that capital.

Such are the usual situations, in which man is exposed to the deleterious action of cold.

Asphyxia from cold is divided into partial and general. I employ the word asphyxia to express partial congelation, only because modern writers have employed it; but they have

given it a comprehensiveness far removed from its true signification.

Local asphyxia is the effect of cold on one point of the surface of the body; what is vulgarly called frost-bite, or congelation of the limbs. The nose, cheeks, lips, chin, ears, feet, and hands, being parts far removed from the centre of the circulation, where, consequently, vitality is less active, are very subject to it; they are more rapidly seized according as the general powers are more feeble; the reverse happens if they are in favourable condition, and capable of directing powerful re-active efforts to the part seized by cold.

Partial asphyxia presents various phenomena in its progress, furnishing grounds for a distinction of three degrees.

First Degree.—The action which is felt through the whole body, is rendered more manifest on one of the parts habitually exposed, or not sufficiently defended. The alteration of the vital properties begins with distressing and very painful formication. The skin of the extremities of the fingers, nose, ears, &c. after having been for a long time red, hard, and affected with painful prickings, grows pale; its temperature and sensibility diminish; its vitality seems entirely extinct. Local numbness gradually takes the place of a disagreeable sensation, of which the per-

son is glad to be relieved, and the consequence is that he is unfortunately unaware of his state. *

Second Degree.—After entire cessation of pain, the part remains cold and insensible ; sometimes phlyctenæ arise ; sometimes the change of colour in the skin, which is livid and blackish, evinces, from the commencement, that there is mortification.

In both of those first degrees of local asphyxia, re-action, which supervenes infallibly, is announced by lively smart pain, as well as by redness of the skin. It is salutary when moderate ; but it is not without danger when too impetuous, or when concentrating its action too decidedly on one point. Whether the energetic return of sensibility and contractility be provoked by external heat, or caused by the force of the consti-

* The cessation of pain, or abolition of all vital re-action, augurs in some cases, as ill, as that, which in inflammation, denotes transition into gangrene ; but fortunately a very simple remedy, employed in time, prevents that fatal termination. I perceived one day on a journey, that two officers, prisoners of war, and my companions in misfortune, had the points of their noses of a horn white, the colour of old wax. I warned them, and frictions with snow were sufficient to remove this first stage of congelation, which they had not suspected ; but what appeared to them very singular was, that while I gave them advice, I myself needed the same ; my nose was in the same condition : *sibi non cavere et aliis consilium dare* ; from that moment we were on the alert ; we kept on our guard, and that we might not fall victims to a security alike fatal and involuntary, each begged his neighbour on terms of reciprocal service, to watch over his nose and ears.

tution, the effect is the same ; the blood and humours flow into the dilating tissues, and these occasion circumscribed distension ; in the whole part an insupportable formication and itching are experienced ; sometimes the pain becomes so sharp as to drag forth complaints and cries ; ardent inflammatory action is established, along with sharp and biting heat. When the skin, at the highest degree of re-action, preserves an equal redness, there is much less reason to fear its passing into gangrene, than when it assumes a livid or violet marble colour. In the second case, the epidermis rises here and there, and forms brown or blackish vesicles, which are filled with a serous, bloody, ichorous or yellowish fluid, whose presence increases the disagreeable and obtuse sensation felt in the part, and which causes even a state of uneasiness. I express what I have experienced in Russia ; in January, 1813, I had to support the rigour of the icy northwind, for six hours, on horseback. I braved the sharp and cutting pain which I felt at the ear of the side on which the wind blew ; it subsided at last, but the part remained cold and insensible. On my arrival at home, I was so benumbed that I could not use my hands, and descended from the horse all at once ; I did not feel even the ground on which I rested. The inexpressible uneasiness which deprived me of power, and the desire and impatience to be warmed again, made

me neglect the wise precaution of friction with snow. I entered an apartment moderately warm, the pleasant temperature of which would soon have re-animated me ; but I quickly experienced, in the lobe of the ear that had suffered most from cold, an obtuse disagreeable sensation, quickly changing into sharp expanding itching pain ; the ear swelled, and in less than fifteen minutes acquired double its natural volume ; the orifice and depressions were almost effaced ; the pain became lacerating, and the heat burning ; some large black phlyctenæ were formed, which, when perforated discharged serous fluid. I was pretty soon relieved, after having the suffering part anointed with fresh goose grease ; that remedy was recommended to me by a Swedish lady, as much used in her country, where that sort of accident is very common. I got off with a superficial ulceration.

The disorder is not confined to simple elevation and fall of the epidermis in layers or by desquamation ; it extends also into the interior, which constitutes properly the second degree of local asphyxia ; the cold attacks and kills the mass of the skin, the tendons, or the aponeuroses ; gangrenous eschars are formed of more or less extent, which are quickly surrounded by an inflammatory circle.

Third Degree.—This constitutes sphacelus. If to paleness and insensibility of the part seized

by cold, be added total cessation of organic action, and a feeling of weight which to the patient seems very great; if an easy separation of the epidermis disclose a livid marble colour of the chorion, and if to the softness and flaccidity of flesh which is insensible to stimuli, succeed exhalation of a putrid odour, we can no longer doubt respecting the complete sphacelus of the limb or part. It is the same dangerous affection which sometimes produces spontaneous separation of fingers, toes, feet, or even a whole member.

The stupifying action then of cold benumbs so far the vital properties, as to give to the part asphyxiated the appearance of death. But even when every symptom seems to confirm it, there is still time to re-establish its temperature, and recall its motion and feeling.

It would here be very dangerous to apply the axiom, *contraria contrariis medentur*. It is only in case of very slight numbness, that we can, without inconvenience, employ a gentle, moderate, graduated heat to dissipate it, or make gentle friction with woollen cloth. When, on the contrary, there exists profound stupor and suspension of all motion in the part, heat is unsuitable; its imprudent application would be sufficient to cause rapid gangrene, by making the part undergo a too sudden change of physical condition, which it is not in circumstances to

bear. On the other hand, caloric, by its repulsive property, rarefies the juices condensed and stagnant in the inert vessels ; the latter are distended, and owing to their incapability of reacting against the expanding fluids, are ruptured ; the juices are infiltrated ; the tissues are choaked up ; rupture of the skin and cellular tissue take place, and irreparable disorganization leads inevitably to gangrene and sphacelus. Hippocrates very well knew that heat was noxious to limbs asphyxiated by cold. He relates, (*de liquidorum usu*) that a man who had his feet frozen, lost them after having had warm water thrown upon them. I have been two or three times witness to the quick passing of partial asphyxia into gangrene, in soldiers who placed their limbs very near the fire, to warm them more quickly.

The true method consists in slowly exciting re-action, in gently recalling the vital properties, and preventing their too rapid restoration. It is proper to begin the application of means efficacious in such cases, on the confines of the asphyxiated part ; afterwards it is to be made general, so that frictions with snow or ice are to be employed, or with a sponge soaked in cold water, or the part itself must be immersed in the water ; the use of cold, to counteract its own benumbing effects, is a remedy well known, and I may say popular in the north.

I consider frictions with snow or pounded ice as preferable to all other means, because, besides the peculiar stimulus which those substances prove to the part after recovering a little its sensibility, they exercise likewise a mechanical irritation, which is not, I think, without efficacy in re-animating the contractility of the fibres. Those frictions must be continued until the appearance of the first symptoms of their good effects; we must not however adhere too long to the same degree of cold. From snow we pass to water successively less cold; after the part has become sensible, luke-warm water is used, and ultimately warm water, of which however we must make prudent use.

If the violet or black spots have disappeared; if the part is soft, supple, and red, we must confine ourselves to simple dry frictions with flannel. It has been further recommended to plunge the asphyxiated part in a dunghill in fermentation,* or envelop it with bags filled with cinders or hot sand; the employment of those latter means of heating should always be of short duration.

In such cases, as re-action proves feeble, slow, and unergetic, where the part presents insensibility, and an atony almost cedematous, and where sphacelus threatens, it is allowable to recur to

* Bernard Valentin mentions having seen a cat, who being frozen with cold and strampled on as dead, was buried in a dunghill; two days after it was perfectly re-established.

embrocations prepared from oak bark, cinchona, mustard, aromatic plants, &c. to which wine, alcohol, myrrh, and camphor may be added; the place affected is merely to be covered with woollen cloth. If, at the end of a few hours, the skin have not lost its livid or violet hue, it is to be scarified and dressed with the topical means just named. Turpentine has been also regarded as an advantageous remedy for dissipating numbness from cold; the limb is rubbed with it, and gradually exposed to heat, to melt the resin, that it may penetrate, and it is kept covered up until completely cured.

Excitants internally administered may sometimes prove useful—they are the same we shall point out when speaking of general asphyxia. Every pathological author has given a comparative view of what happens in an asphyxiated member, and in frozen animal and vegetable substances.

That comparison turns, 1st, upon the application of caloric to those substances; 2dly, on the employment of cold water to thaw them, and restore their primitive state. In one point of view the action of caloric seems in fact the same, for until the vital properties are fully re-established, it rests under the dominion of physical laws. If the caloric penetrate it suddenly, it acts upon it as upon frozen fruits, which, when brought near the fire, or plunged in hot water, are quickly changed in the texture of the paren-

chyma, which is distended and torn, quickly loses flavour, and rots without delay.

As to the second case, it is certain, from experience, that frozen fruit, plunged in iced water, and afterwards in water gradually less cold, thaws gradually, does not lose its flavour, and may be eaten or preserved at pleasure. So also of congealed eggs; meat also is thawed in that manner, fish, and the delicate game that is sent in winter from Archangel and other governments of the north and east of Russia.

The part asphyxiated, if subjected to a similar operation, resumes by degrees its natural condition; its analogy to frozen fruit extends no farther than the re-establishment of temperature, or the gradual introduction of caloric.

It is, therefore, beyond doubt, that the succession of cold applications used on the body of a person asphyxiated by cold, is intended to prevent external caloric from penetrating too quickly into the organic tissues, and the re-action from taking place too rapidly.

Independently of those effects, I am convinced that cold acts as a stimulant, less indeed on the benumbed than on the neighbouring healthy part, from which latter must spring the principal re-active efforts, which we excite in local asphyxia in the very temperature that caused it. When congelation is very extensive, re-action will, if we commence rubbing at the point far-

theft from the centre, be slow to supervene ; perhaps even impossible.

Re-action, gradually superinduced, re-establishes the vital properties in their integrity, without exposing the part to the risk of inordinate and gangrenous inflammation. If it rise to too great height, it is proper to moderate it by keeping the part for a sufficient time plunged in cold water, or by covering it with linen wetted, and often renewed ; the heat and redness diminish, the part lessens, and the pain subsides.

In the case of a merchant's clerk, whose hand had been asphyxiated and inflamed, I once used, with success, a sedative ointment, (prepared from one ounce and a half goose grease, two grains powdered camphor, ten grains extract of henbane) which he rubbed in every second hour. If the redness of the skin be very deep and dark ; if the part present livid brown and violet spots ; and, further, if there arise black phlyctenæ, which should be pierced without removing the skin, we must hasten to anticipate an imminent gangrene, and for that purpose employ fomentations of decoction of cinchona, with acid and camphor, at the ordinary temperature. A remark demanding attention is, that the part must not be loaded with compresses, or bed-clothes, and that every kind of compression is to be avoided, and the member to be conveniently supported.

Gangrene once established, whether primary

or consecutive, is to be treated locally and generally on the ordinary principles. According to the strength, and the quick or slow administration of assistance, nature marks out, sooner or later, a boundary between the dead and living parts.

General asphyxia extends at once over the whole machine, it presents the image of perfect death ; but persons found senseless and deeply benumbed have been recalled to life after twenty-four or forty-eight hours.

Man re-acts against a rigorous and immoderate cold as long as his strength and courage allow ; but re-action has a limit, and a moment arrives when the powers of the vital principle are exhausted, the faculties, physical and moral, remain as if enchained, and at length abandon the body to the progressive and always increasing energy of cold. Shiverings, puckerings, paleness, and coldness of the skin, livid spots, muscular flutterings are symptoms of the shock given to the vital forces ; the person feels syncope approaching, his stiff muscles contract irregularly ; his body bends and shrinks ; his limbs are half-bent ; sometimes lassitude and languor invite him to stop to repose ; sometimes a feeling of weight and general numbness retard his steps ; his knees bend, he squats down and falls ; he then feels an invincible propensity to sleep ; every thing grows strange to him ; his senses are

confused ; a thick veil darkens his view ; his mind grows dull, his ideas incoherent ; he stammers and raves : if he be free from suffering, he is often not so from agitation. Should you try to prevent him from stopping and sleeping, should you strongly represent to him the danger he exposes himself to, he looks at you coldly and stupidly ; if he has not lost all consciousness, he pronounces with difficulty a few words, entreating to be allowed to go to sleep ; his relations with all surrounding objects quickly cease ; he slumbers ; the parts farthest from the centre of the circulation become cool ; respiration, at first interrupted, becomes slow ; the contractions of the heart become feeble, quick, hard, irregular, and sometimes painful ; the pulse becomes smaller progressively ; the central heat is extinguished ; the brain is stupified ; the pupil dilated ; finally, a deep and mortal coma may be regarded as a certain sign of approaching inevitable death, unless the asphyxiated receive timely assistance.

The like holds of general as of local asphyxia ; we must not, in avoiding the danger from cold, transport the body into a heated place, or immediately apply to it warm substances ; too strong re-action might exhaust the remaining vitality ; the dilatation of the tissues and rapid expansion of the forces towards the surface, owing to sudden transition from cold and condensed, to warm and rarefied air, cause shooting pains, dyspnœa,

suffocation, and death itself. I once experienced vertigo and sudden swooning, after entering a very warm house, as are generally those of the Russian peasants in winter.

There are instances of travellers who, being chilled with cold, have perished from having exposed themselves immediately to a great fire. Amongst the Dutchmen who landed at Spitzbergen, those who remained shut up before the fire in little close places, perished, while those who took much exercise preserved their lives. The above is sufficient to determine the treatment proper in cases of simple numbness, or of general asphyxia.

What we have said of man is equally applicable to other animals. The child, for instance, leaps with joy at having made prisoner the bird that lay benumbed on the snow; a very natural judgment leads him to warm it quickly, by keeping it hidden in his bosom, or carrying it near the fire. Alas! his joy quickly changes into sadness; his tears flow. The poor bird gives no sign of life.

However complete may be asphyxia, to whatever degree we may suppose it to ascend, we must always try the administration of such aids as are most proper to arouse the remains of vitality. Dry coldness of the whole surface of the body, entire cessation of the heart's pulsation, absence of breathing, insensibility to prickings and inci-

sions cannot be considered as unequivocal signs of death, which indeed we cannot admit with reason, on account of the uncertainty respecting the interval elapsed since the accident, until after the appearance of signs of general putrefaction. In fact, congealed corpses are very long preserved.

Those who have the misfortune to be buried under snow, perish less quickly than those who, when surprised by cold, remain exposed to the open air. In Russia, I have been assured, there were many instances of persons taken alive from under the snow, after having remained there sometime, which shows that we should the longer cherish hope of re-animating them when quite benumbed.

In the *Bibliotheca Britannica* mention is made of a woman, who, having wandered amid the snows, was seized and benumbed with cold. Snow continued to fall. That unfortunate was inclosed by a layer of that substance, so thick, that she remained there eight days and nights, at the end of which time, the end of a coloured handkerchief appearing above the snow, led to her being discovered; she emerged from that gulf with the use of her senses, and took food with eagerness. What is most peculiar in that case is, that after the first numbness, she found herself very well beneath her snowy covering; that she felt neither cold nor hunger; that she felt thirst only, which she satisfied with morsels of snow. We read in

the old "Journal de Medicine," the history of the death from cold, of a man who, in crossing the Pyrenees, was surprised by a tremendous storm, and buried beneath the snow in a state of numbness. The fifth morning he came out of his torpor; a burning thirst informed him of his existence, and made him bite the snow that surrounded him. He was quite astonished on awaking to find his tomb lighted up; he broke the layer of snow that covered his head, but his efforts to disengage himself were vain, he then implored the aid of heaven, and recalled to his soul sentiments of religion and resignation; at length persons sent in search, found him; at sight of them, the unfortunate cried out, "wine, my friends, thirst consumes me." He was extricated; his breeches had slipt off and left his thighs naked; the epidermis was detached; two large wounds had exposed the kneepans; he appeared, however, insensible to pain. When transported into the nearest village, a surgeon, ignorant of the proper way of treating such cases, did just the opposite of what he ought to have done. The limbs became red, purple and black, the patient complained of burning heat. Pilhes, the writer of the history, being called too late, applied cold in vain; the feet came away; gangrene made rapid progress, and the victim expired.

In the north, they relate also instances of persons found asphyxiated, and dead apparently for

many days, who have been restored to life. How many resurrections might have been made on the retreat from Moscow!!! The vital principle "*ultimum moriens*" is slow to die completely, and even then, when supposed quite extinct, exists and constitutes a central nucleus, for the powers which are capable, by a happy excitement, of being called from the centre to the surface. The experiments undertaken by M. Prunelle, (*Annales du Museum d'Histoire Naturelle*, T. xviii. p. 28, 302,) and particularly on marmots, which were so stupified, that he had them sent from Savoy to Paris packed up like minerals, proves the possibility of removing the winter numbness by the action of different stimuli. In Russia it is curious to see fish, rendered stiff as sticks by cold, transported to great distances, and returning to life afterwards, on being plunged into cold water. Eels, motionless and frozen, but not therefore lifeless, are sometimes in that state brought to market. I shall refer for an admirable example of the success of excitation in such cases, to the instance of the sailor mentioned in the *Memoirs of the Academy of Stockholm*, who, being thrown in mid-winter on a rock in the Baltic, was taken up stiff and lifeless by the crew; aid prudently administered, restored him to the use of his senses.

Notwithstanding the greatest probability of ill-success, we must always afford the assistance de-

scribed, and try to re-establish the organic movements. We begin by placing the body asphyxiated in a place where there is no current of air, and whose temperature is a little above that of the atmosphere; it is quickly stripped of clothes, and laid on a mattress or horse-bed. Frictions with some exciting tincture are made on the precordial region and navel, and warm clothes are subsequently applied. Afterwards we proceed to the use of snow, iced water, and water successively less cold, in the same order and degree as in local asphyxia. This first operation should last almost a quarter of an hour; in the second place, water a little warmed, and afterwards lukewarm, and hot water.

When respiration and circulation are sensibly restored, and the muscles lose something of their stiffness, and a little heat is manifested, then the body is quickly wiped with dry linen; dry frictions are made with flannel, and the patient is placed in bed, wrapped up in a woollen blanket. In the mountains of the Asturias, the inhabitants are in the habit, when a herdsman has been surprised by cold, of covering him up with a cloth moistened with cold vinegar and water; some time after they moisten the cloth with the same liquid, but lukewarm; and, finally, they wet it with wine raised to a higher temperature, assisting those applications by exciting, and somewhat sudorific draughts.

Some particular exciting means may likewise have their uses ; such as irritation of the nostrils with a feather, ammoniacal vapours directed into the nasal fossæ, rude frictions on the palm of the hand or sole of the foot, with a brush dipped in very strong vinegar. The experiments of M. Professor Prunelle on the lethargic marmots, lead me to think, that, in such severe cases as may require trial of the whole catalogue of excitants, some success might perhaps be obtained from the employment of the voltaic pile.*

In case of profound asphyxia, external means would perhaps be impotent or slow to act, unless excitants internally administered, should, in aid of their good effects, be employed to rouse the organic action of the nerves, heart and brain. Hence, the instant the asphyxiated person can swallow, he is to be supplied with infusion of tea, or elder flowers, with the addition of some drops of ammonia, or a little brandy,—or cinnamon wine sweetened,—by spoonfuls. A draught at once exciting and restoring, might be prepared of an aqueous solution of yolk of egg, a small quantity of Cyprus or Malaga, sugar, and aromatic water of crisped peppermint, or of orange flower. Good broth and generous wine will not be less effica-

* Füschet says, in an observation mentioned in the Comment. Lipsiens.—That in a man of fifty, who had the feet and hands violently affected by cold, electricity at the end of three months, dissipated the numbness, and restored feeling.

cious if there be inanition. We may add to the above means, an enema composed of ten ounces of ordinary wine, a drachm of treacle, and two egg yolks. We must not suspend our exertions for two, three, or even four hours ; at the end of that period we sometimes effect the resurrection of vitality, like a spark that at length relights an almost extinguished fire.

As soon as vital heat is established uniformly on all points, and the chest dilates itself well, and the motions of the heart are strong and regular, the patient must forego exciting drinks, which might cause too lively re-action, and give rise to fever or some inflammation. We must confine ourselves to maintaining slight moisture of the surface. The first solid food should be light and restorative.

Cold produces the fatal effects we have just treated of, as well above as below 0°. Moderate cold continued, has the same consequences as severe cold of short duration. When very intense, as in the north, it sometimes acts on the frame so briskly, as to depress and destroy the powers with astonishing rapidity. In the Russian campaign soldiers have been seen expiring instantaneously, as if thunderstruck, from excessive cold. At Smolensko the temperature was so rigorous, that more than thirty grenadiers of the Italian guard fell frozen, as they attempted to set

themselves in line on a height beyond the Borys-thenes. A battalion of the regiment I belonged to, when encamped on that same height, lost in this way many men in a single day. There prevails, it is said, a wind in Chili, so impetuous and cold, that men and animals exposed to its action, are as it were petrified. Cold then may not only cause asphyxia, notwithstanding the physical power of the individuals, but even sudden death. It acts like opium, inflicting a mortal stroke on contractility and sensibility ; it benumbs directly the central system, and even the irritability of the heart. Prosper Alpinus had long since declared, in his excellent work, *De Presagienda Vitâ et Morte*, that stupefaction, caused by cold, presented results similar to the effects of narcotics.

As the action of cold is most frequently slow, and death arrives only after some hours' exposure, the contraction that diminishes the calibre of the vessels more and more deeply, repels the blood towards the cavities of the head, chest, and abdomen ; it causes, in the circulation of the lungs, and in that of the venous system of the head, an embarrassment that disturbs the functions of the brain, and concurs to produce somnolency. The probability of this explanation is strengthened by the flowing of blood from the nose and ears, spontaneous hæmoptysis, preternatural redness of the viscera,

engorgements of the cerebral vessels, and bloody effusions which have been found after death.* I think, therefore, that cold causes death, sometimes by rapid general stupefaction, and at other times by asphyxia and apoplexy gradually supervening, and always depending on the same cause.

It is certain, that in despite of all possible means of relief, many persons will sink under an extreme degree of stupefaction, or under sanguineous congestion or effusion within the cranium.

The manifest dangerousness of exposure to cold, justifies our using every precaution to guard against its murderous attacks. We cannot in this matter do better than choose the people of the north for our masters; they cover themselves with furs from head to foot. If seized by cold, they rub the benumbed parts with snow before entering their houses; they never travel without tea, coffee, some spirituous liquors, and even victuals, in order to avoid suffering from hunger, which they consider very dangerous. Constant

* It appears that, in some cases, cold causes cerebral excitation, which may even prove mortal. Battie says, in his Aphorisms, that he had occasion to see a man who became maniacal after exposure on a journey to very rigorous cold, with the head slightly covered. Bøerhaave gives a case (*Comment. Lipsiens. Vol. i. Part i. p. 232.*) of a coachman, dead of cold, whom he dissected; he found inflammation of the brain, particularly of the right hemisphere, which adhered to the dura mater by means of a false membrane easy to divide.

and forced motion is necessary for the foot soldier, to save him from surprise. The horseman will hesitate to remain long on horseback ; he will dread insensibility of the toes, and hasten to alight, and constrain himself to walk. Commanders of divisions should not order halts in winter ; they should take care that the men do not lag behind on the march ; above all are required gaiety, courage, and perseverance of mind ; those are the surest means of escaping the danger. He that has the misfortune to be alone, inevitably perishes. It is not enough to excite those whom cold has seized, and begun to stupify, by voice and gesture ; we must not even hesitate to use even menaces, and to recur to violent measures to prevent them from stopping and giving themselves up to a perfidious sleep. In winter travelling, prolonged repose, warm dishes, moderate use of wine and alcoholic drinks, animal food rendered heating by cookery, &c. qualify for enduring the rigor of the season. In winter campaigns, it is indispensibly necessary to provide soldiers with earflaps to their caps, gloves, woollen stockings, good gaiters, waistcoats of warm cloth, with sleeves, or lined with waxed or gummed cotton, which retains the heat ; above all, food must be properly secured : there lies the great talent of a general. In Siberia, the Russian soldiers, in order to preserve themselves from the action of cold, cover their noses and ears with

greased paper. Fatty matters seem to have the power of protecting from cold, or at least of greatly diminishing its action. I have ascertained, that a part of the body, which, after being rubbed, has been covered with oiled paper merely, retains heat better. The Laplander and the Samoiede anoints his skin with rancid fish oil, and thus exposes himself in the mountains to a temperature of -36° or -58° . Xenophon, in the retreat of the 10,000, ordered all his soldiers to grease those parts that were exposed to the air. A mixture of turpentine and tallow, one part to four, appears to me very suitable for this purpose. It would be proper to rub with it the nose, ears, chin, cheeks, hands, and feet, as well as all the articulations of the limbs. If this remedy could have been employed on the retreat from Moscow, it is probable it would have prevented more than one accident.

CHAPTER VI.

ON THE APPLICATION OF COLD TO THERAPEUTICAL PURPOSES.

THE discordance of opinions respecting the therapeutical properties of cold, is even more remark-

able than that in regard to its physiological agency. It would take too much time here to recount the arguments advanced on either side, to prove cold tonic or debilitating, and acting constantly as such on the animal economy. We shall content ourselves with recalling to mind our manner of considering its action on the healthy man. We have depicted it as exciting and tonic; and have, we conceive, established that this property depends on vital re-action, which continually develops and sustains the strength and vigour of the body; and further, that if this re-action be feeble or deficient, cold then acts as a debilitant. But shall we deny to cold an indirect tonic action, that which only Brown would acknowledge? I think we cannot but admit, that cold sometimes acts as a tonic in a secondary manner, that it restores energy without raising it beyond the ordinary degree, by abstracting an habitual or accidental stimulus, which enervates and rapidly exhausts vital force. Cool air, sea-bathing, cold aliments, act so on the cachetic, who is exhausted by the strong heat of the summer. Morton speaks of a scorbutic and asthmatic man of sixty, who, in summer, fell into marasmus from abundant sweats and febrile heat. On a summer day, the heat enfeebles, towards evening, him who, in the morning, was vigorous; a feeling of lassitude and weakness invites him to repose; inextinguishable thirst makes

him desire refreshment; he finds himself languid; his skin is burning and deluged with sweat; the whole vital energy seems engaged at the surface, owing to the excitement of an excessively warm atmosphere. Under such circumstances, cool air and the cold bath are indirectly tonic; they diminish the stimulus; they destroy its effects on the skin, and lead back the temperature to its natural degree; by directing the powers from the surface towards the centre, which was enfeebled, they re-establish a perfect equilibrium. In hot countries, one is certain of eating with better appetite, by taking a cold bath an hour before dinner.

In the languid state of the internal organs, which, as we have said, occurs when organic activity predominates at the surface, and is there constantly retained by the excitant caloric,—cold draughts are not tonic, as some suppose, they merely refresh for a moment, and absorb excessive caloric. I even assert that they weaken the stomach, and subsequently the whole body; for they cause nausea, and a feeling of weight at the epigastre, as if undigested; thirst is renewed; sweat flows abundantly, and one feels weaker. All those bad effects occur because the stomach is unable to re-act. Cold drinks do not produce such weakness, if a cold bath, or repose in a cool shady place, have previously restored energy in-

teriorly, and roused the powers of the digestive organs.

It is, therefore, established, that cold acts on man, 1st, by a tonic property direct, derived from vital re-action ; 2dly, by a tonic property indirect, resulting from abstraction of stimulus, or prevention of excessive diffusion and dissipation of organic activity. The former takes place in winter particularly ; the latter in summer.

Prophylactic medicine cannot fail to turn the properties of cold to good account, by bringing them into co-operation, with all her other means for the preservation of health, support of strength and prevention of disease. In regard to therapeutics, we shall briefly examine cold under the heads of Air, Bathing, Drinks, and Aliments.

1. Air. Its temperature exercises a marked influence on the physical character, from the earliest period of life. We perceive, as we go northwards, that there are fewer weakly children, and, indeed, to prove the salutary nature of cool and cold air, we need but refer to the health and physical force of the inhabitants of northern and of mountainous countries. Hence, as a consequence easily deducible, I infer that it is advantageous, from early life, viz. from the close of the third year, to harden the frame, to prevent delicacy, by rendering it less susceptible of injurious atmospherical impressions. To that

end we must accustom children to bear cold, and use themselves to all changes of temperature ; thus they are to be habituated to sleeping on straw, to early rising, winter and summer, without, however, deducting any thing from the repose that suits their age ; they must inhabit the most spacious and lofty rooms in the house, exposed to the north in summer, and very little warmed in winter, so that the temperature never surpass 60° ; the door and windows are to be opened very early ; the children are to be allowed to run and play at pleasure on the snow and ice, and are to be taught all the games and exercises of childhood, which, by keeping them always in motion, causes the vital powers to react, and develope caloric, and aid them in supporting, without complaint, a pretty low temperature ; their natural vivacity, the activity of their circulation, their fixed attention to their pastimes, render them in other respects very capable of enduring cold. It is proper to prevent their approaching the fire, otherwise they contract the habit of it and become chilly. It would be advantageous to use them to take their meals in the open air, unless in winter. They should be but slightly clothed in the house, go with head and neck naked, and never have the hair too abundant ; I should even advise, that from three to twelve years of age, the hair be kept cut pretty close ; that head and feet be daily washed

with cold water of the ordinary temperature, and that, in the house, children wear but a very slight foot-covering of tanned sheepskin. I even agree with Kruger, who recommends they should be left barefooted. In winter they must be kept sufficiently but not warmly covered. Thus the epidermis grows hard, and the fibre gradually acquires force and consistence ; the pores and extremities of the exhalents open but little ; children are less disposed to sweat during exercise ; are less liable to suppression of perspiration, catarrhal affections, fluxions, and chilblains. By fortifying their bodies, they fortify their minds also. An education harsh and austere suits not only the son of the artisan, labourer, and simple citizen, but also the sons of princes and kings, destined to govern peoples, to repress firmly the errors and passions of men, and to command proudly at the head of armies against the enemies of the state. The amiable Henry the Fourth was a good king ; his masculine and austere education did not, without doubt, a little contribute to confer on him superior vigour of body, an admirable temper of soul, and an imposing character of grandeur and magnanimity, which render his name dear to all Frenchmen.

The adult should, with similar care and attention, neglect nothing to preserve the strength of his constitution.

The aged, whose comparatively rigid, insensi-

ble, and feeble organs re-act much less, has little good to expect from the impression of cold, which can only further enfeeble, and from which he should rather try to protect himself; observing always the just mean, that does not expose him to the effects of too rapid transitions from one temperature to another. Hippocrates writes concerning old men : *Senibus paucus calor, frigidum corpus.*

2d. The bath. The opinion unfortunately too generally diffused and adopted, that the cold bath strengthens, causes, even in our day, abuse of this remedy in some countries. Philosophers without medical knowledge, and physicians without philosophy, have, in every way, endeavoured to establish the cold bath in use, with the view of fortifying the frames of infants, indiscriminately, as if, in man's physical education, every thing could be subjected to one general law. Their unsound counsel has fortunately not prevailed every where. In vain do they build on the example of the Gauls, who were in the habit of plunging their children into the cold bath from infancy; a great number suffered from it, and the weakliest inevitably perished. The ancient Germans very successfully determined, respecting the natural vigour of their infants, by the barbarous usage of plunging them in cold water the instant they were born. It has been urged also, that children have been stronger and robuster

after cold bathing ; but the proof is inconclusive, as to the general adoption of that remedy. In the use of every method, we are often misled by not taking unsuccessful cases into account. How many infants, feeble, delicate, and of great nervous susceptibility, have sunk under the process intended to strengthen them, and been brought to the grave victims of an erroneous doctrine ! In Russia, multitudes perish from abuse of this method, which is in fact less proper in a cold than warm climate. The Russian loves to see his children strong, robust, and insensible to external impressions, which he expresses by the words, " that child will be a good Russian."

But let us not confound the use with the abuse. In the physical education of children, the cold bath must be regarded in the same light as habituation to cold air. We cannot but consider it improper and hazardous to plunge all children indiscriminately in cold water, and to try to strengthen even those that do not require it. If they are weak and sickly, it is for the prudent physician to decide whether the bath be proper ; in that case, it is a therapeutical agent ; but it is not for the parents, incautiously, and without knowledge of the causes, to judge of the effects of the cold bath, which is indeed a more active remedy than is generally thought.

Cold is hostile to newly born infants. Right

reason declares, that an infant, who, for the first two years of life, is all nerve, and who has to pass through the terrible period of dentition, is incapable of bearing, without injury, an impression that alarms its extreme sensibility. Its soft and delicate fibre contracts violently, its skin hardens, and if it do not perish of apoplexy, it remains pitiable and pining. In the miscellanies entitled "*Curiosities of Nature*," we read, that the limbs of a newly born infant being plunged into the cold bath, jaundice followed the immersion, and afterwards death. The action of external cold, and of the inconsiderate use of the bath, cause, in new-born children, a hardening of the cellular tissue, of which they die, unless very well managed. What more is necessary to discredit the use of the cold bath, and of immersion during the tenderest years of life?

It is after suckling and dentition, between the second and third year, and after having habituated the child to partial washing, of different parts of the body, with water gradually used cooler, and at length with cold water, which, however, must never be lower than 70° or 77° , and then only, that we are to begin with general immersion. At first the temperature is to be a little raised, but afterwards gradually lowered: it must never sink below 66° .

Our intention in prescribing the cold bath requires a just medium; it does not require the child to remain long in. An immersion that

lasts but some seconds, and is not effected in a hasty manner, is sufficient to produce the desired effect. Repetition of those immersions has been recommended, but that causes a disagreeable sensation, which fatigues needlessly the delicate frame of infants. The stay in the water should not be longer than three minutes ; in summer, it may perhaps be longer, particularly if the water has been heated by the solar rays ; at length the infant accustoms himself to it, and finds pleasure in it. It is proper to let him move about, under a careful eye. On leaving the bath, he is to be quickly wiped with dry linens, somewhat rough, and not warmed. He is to be forthwith dressed, and allowed to exercise through the house ; by putting him to bed, we should but diminish, or altogether destroy the good effect of the bath. It is enough to bathe children twice a-week in winter, and every day or second day in summer. It is in the latter season that we must begin accustoming them to it.

We have said that the cold bath is a very active remedy ; that alone is a strong reason for using it circumspectly. Children to be bathed, should be free from the diseases and affections peculiar to their age. It is known that the cold bath is not useful to them, when they do not experience, on coming out of it, an agreeable sensation of heat at the skin ; if they appear oppressed ; if they want that rosy hue, that sprightly vivacity so well portrayed in their interesting

physiognomy; when they grow pale and sad, and lose appetite and sleep; if their skin grows dry, cracked, and hard; if there supervenes stiffness of a limb, colics, or diarrhœa. On the appearance of any one of those symptoms, we must not hesitate to suspend, or even altogether renounce the use of the bath.

The salutary influence of the cold bath is not limited to strengthening the frame by the habit of re-action; it contributes also to prevent the developement of various diseases frequent in early life, as œdema of the cellular tissue, obesity, atony of the belly, worms, obstructions, convulsions, scrofula, prolapsus of the rectum, hernia, rickets. English physicians affirm that much fewer rickety children are to be seen in their country, since bathing in salt water became customary. Floyer even declares, that that disease has become common in England solely from the abandonment of that custom. If infants were reared by the method we have just sketched, it is certain the mortality amongst them would be much less considerable, and we should see no longer such numbers feeble, effeminate, and valetudinary all their lives. This is the explanation of the beautiful allegory of Thetis plunging Achilles in the stygian waters, to make him invulnerable.

The young man and adult will alike derive, from the use of the cold bath, the inappreciable advantage of consolidating their energies, and rendering

their frames immoveable by external noxious agents. Depreciators have often attributed to cold baths disagreeable effects, which arose entirely from want, in the individual, of the conditions requisite to insure their success, or from the improper manner of using them. In health we should ever prefer habitual use of the moderately cold or cool bath to that of the warm or hot, which latter relaxes the frame, increases perspiration, disposes to catarrhal and rheumatic affections, as well as diseases of the nerves, whose tone it destroys, while it exalts its sensibility, to the diminution of the vigour of the constitution. The cold, on the contrary, proportioned in duration and temperature to the age, season, idiosyncrasy, &c. forearms against suppression of perspiration. By its means it is, that the English prevent the catarrhal affections to which their foggy climate exposes them. The cold increases appetite, energy, and facility of motion; it produces a feeling of well-being, and the radical vigour which it confers on the frame seems durable. Bacon, supposing it conducive to longevity, says, *Lavatio corporis in frigidâ, bona ad longitudinem vitæ*. The Romans, convinced of the good effects of the cold bath, substituted it for the warm, and to its use writers have attributed the strength of their soldiers and wrestlers. The Spartans, who were pre-eminently hostile to every thing that could soften the body, did not

fail, when the use of the cold bath was introduced into Greece, to complete, by its use, the harsh and austere educational system that distinguished them. Philip declared a captain who had used warm instead of cold water, unworthy to serve under his orders. It were to be wished that we, like the Romans, had habituated ourselves to passing from the hot to the cold bath, or that, for such seasons as do not allow of bathing in the sea or running waters, public baths like great reservoirs were to be had, where a temperature of from 70° to 77° should be maintained, and the youth might practise swimming, which would combine utility with amusement. That would be amongst the best modes of habituating them to brave with impunity all vicissitudes of temperature.

Cold bathing is very useful in southern climates, to remedy the debilitating effects of the excessive heat of the day, and render less formidable the coolness of the night. By its good effects on the solids and fluids, are prevented both bilious and adynamic fevers and dysenteries, and the intermittents that supervene at the close of summer and opening of autumn. It is calculated to fortify the frame against miasms during malignant and pestilential epidemic pyrexies. I shall not attempt to ascertain, whether it be by the constant re-active effort diminishing the power of absorption, or enfeebling and even de-

stroying the miasm received into its body, that cold protects from contagion, or succeeds in arresting it. Volney, in his Travels in Syria and Egypt, says the water-carriers, whose clothes are always cold and moist, never take the plague. The same has been confirmed at Constantinople. From this we may argue, that washing the whole body with cold water, snow frictions, often repeated immersions in the cold bath, particularly of salt water, might prove very advantageous, as preservative means in time of plague or other contagious disease. In such times it would be useful and prudent to send to the river or sea, such as are obliged to live together in large numbers, and amongst whom exists pretty frequently, from various causes, the principal focus of contagion; as soldiers, prisoners, hospital sick, hospital servants, workers in factories, persons detained in cloisters, asylums, poor-houses, &c.

3. Cold Drinks.—In the exact proportion that hot drinks are injurious to the digestive organs, by enervating them, cold drinks are, on the contrary, if taken in small quantities, advantageous to them: they manifestly increase their tonic force, and whet or provoke the appetite. Cold water is salutary; many make it their ordinary drink; it is the beverage likewise of all brutes. However its habitual use is not good for feeble inactive stomachs. The Neapolitan relishes his ices and *acqua nevata* the whole year round. In

Russia I have been surprised at the devouring appetite which the iced water, that formed my ordinary drink, and that of all the prisoners of war, contributed to give me. It is beyond doubt that the tonic property of iced drinks extends over the entire animal economy. The pleasurable sensation they afford is nothing : by quenching thirst, and moderating internal heat, they further prevent bilious, putrid, and worm diseases, so common in summer and in hot countries. Such is the opinion of Stoll, and of all good physicians. Plempius says that bilious affections became less frequent in Sicily, after the introduction of the use of iced drinks. M. Baumes has observed, that agues are rarer in some marshy places since iced drinks have become customary. Lancisi had already made the same remark. Iced drinks then, during great heat, combine advantage with agreeableness. He who is deprived of them, has great reason to exclaim with Boileau, " Point de glace, bon Dieu ! dans le fort de l'été."

4. Aliments. What we have just said of drinks is, in almost every point, applicable to alimentary preparations. The sensibility of the stomach must, we think, at length suffer from the repeated excitement of hot aliment. Is it not inconsistent too, in the midst of summer, to eat hot things and use iced drinks ? Hot meats relax the gums, render the breath fetid, and predispose to bilious

and putrid diseases. The custom of eating cold things, particularly in summer, I consider more suitable for preserving the digestive powers and maintaining the vigour of the constitution. In Russia iced soups are served up in summer; a refinement that has apparently escaped the Italians. I know full well we are generally ill disposed to forego sensual gratification. It matters little that the Apiciuses are the foremost to rebel against my decision; I consider it sufficiently established on the evidence of the tonic effects of cold on the frame. The custom of eating cold things has moreover the precious advantage of preserving the teeth.* The above

* It is not agreed what are the causes of change of colour, caries, and loss of the teeth. It is too certain that it is rare to meet with persons who have attained the age of twenty-five or thirty with a set of teeth quite sound. Who does not sometimes regret to perceive, between the vermilion lips of a young beauty, whose complexion glows with freshness and health, in place of bright enamel set off by the brightness of ivory, teeth stained, black, carious, or altogether wanting? Without denying that acid, salt or spiced meats may at length contribute to change them, I shall say there are two causes more common, yet not attended to; those are, the use of hot meats, and the subsequent passing into the cold. Heat greatly augments the sensibility of the teeth, and causes them to receive disagreeable and very painful impressions from contact with cold bodies. The repetition of those changes of temperature softens the bony substance at length, and disposes it to caries. Such is the effect of hot meats, of broth, tea, coffee, chocolate, hot gargles, of the bad habit of drinking while taking or immediately after soup, which is usually the hottest food. Peter Kalm, a Swedish physician, maintains that it is as hot drink that tea injures the teeth. Almost all the people of the north

announced principles, relating to the prophylactic uses of cold, appear to admit of no exception, unless in regard to the first and last years of life, and to sickly or too weakly individuals. The healthy and robust find from it advantage that cannot be disputed. Cæsar used to say, Give me a courageous man; with three days proper regimen I will make him a poltroon. And I say, give me one of these robust men of the north, to transport him to the south; with hot meats and baths, and by making him sleep on down, and inhabit well-heated apartments, not permitting him to go out in all seasons, I will make him to a certainty a feeble person in comparison with what he had been. We might easily, on the other hand, place in contrast with those, in every degree, from greatest to least, the effects of translation into the north upon a soft effeminate southern.

who use it, and love hot meat and drink, have their teeth very early spoiled, while those of the south, who take always cold drink, have generally very fine and sound teeth. Volney, in his "*Tableau du climat et du sol des Etats unis d'Amerique*," says that twenty years before, the savages, who used cold food, were never seen with spoiled teeth, but that, latterly, individuals and many women of each tribe, living within the States, having adopted the use of tea, have their teeth, like the whites, blemished with black spots and caries. People living on cool food, herbivorous or carnivorous animals, have fine and sound teeth. I have often remarked carious teeth in dogs and cats, domestic animals who deviate from their natural way of life, and who, with some, are fed in part on hot food.

CHAPTER VII.

OF THE THERAPEUTICAL PROPERTIES OF COLD.

COLD, as a therapeutical agent, has fixed the attention of physicians ancient and modern. Its employment bears date of the highest antiquity. Melampus, who, at his return from Egypt, introduced the use of the cold bath amongst the Greeks, employed it successfully to cure the madness of the Princess of Argos, who became his wife. Erasistratus recommended it in a case of convulsions. Musa effected by its means a creditable cure on the person of Augustus. Hippocrates, Avicenna, Galen, Celsus, all speak of the advantages they have derived from cold in their practice. Chardin, in his travels in Persia, mentions, that in certain epidemic diseases peculiar to that country, and which appear to be related to typhus, they stretch the sick on the floor, and rub the body with snow, or wet it with cold water, and with the greatest success. Modern physicians have multiplied the uses of cold in diseases external and internal, local and general; its employment has in our time been greatly extended, principally in England, Italy, and Germany. It is surprising that in France we are so

slow * to avail ourselves of opportunities of employing cold, and testing by experience the interesting observations offered us by foreign physicians. In France we have been generally boldest in the internal use of cold. Olaus Borrichius, who published *Observations in Natural History* made in his travels in France, says that the physicians of Arles iced all the syrups and decoctions they prescribed for the fever patients, a method they had borrowed from the Catalans. They assured him that, after they had adopted that practice, the number of their sick diminished much in summer.

Formerly the direct and sympathetic action of cold was not so completely analysed as now.

* M. Recamier, who has made many trials in various diseases, is free from this reproach, and the success he has obtained leads me to presume that he is occupied in multiplying and accumulating clinical facts, calculated to complete the medical history of cold. One of his pupils, M. Pavet, has made some cases, in which that Professor employed cold applications, the subject of a thesis presented at the Medical School of Paris in 1814. Professor Prunelle told me, that he made frequent and successful use of cold water among the sick of the House of Industry. I have had but one opportunity of seeing glacial frictions used in the clinical ward of Montpellier, on the abdomen and extremities, in a case of typhus, at the commencement of the third stage. The patient had comatose delirium, with extreme sinking. They were unsuccessful; and, as I believe, owing to neglect of subsequent measures necessary to secure their success. The application of cold in interesting cases requires the physician's presence, or that of an intelligent representative. Hospital servants in general execute what they are ordered badly enough, and too often commit absurd mistakes.

From defective acquaintance with this, they sometimes could not explain its various and opposite effects and consequences ; and sometimes confounded them together. Tissot, Pomme, With, who have recommended cold bathing in nervous diseases, have not, I think, adequately or clearly enough distinguished its effects on the economy.

The therapeutical powers of cold are best ascertained by examination of its effects on the functions, which effects we have already given in the third chapter, and to which we shall no farther recur than may be necessary in order to establish the properties that produce them, and which may be regarded in a manner as their constituent elements. Cold rarely acts by any single power : all its effects are more or less intimately connected and co-mingled. It is from observing the preponderance of any given effect that we are enabled to distinguish and characterize the property corresponding. The action of cold by one power rather than some other, is determined by external circumstances—or by organic predisposition. Thus, in that acute affection of the stomach, which is characterized by sharp pain, tension and tenderness of the epigastre, by a feeling of heat and burning thirst, the vital properties will not re-act, and cold draughts will prove refrigerant, sedative, and debilitating. Moreover,

we must keep in mind, that it is not always possible rigorously and absolutely to characterize the effects of cold.

I now approach the most important branch of my work, which is to determine the properties in question. An attentive and elaborate analysis has led me to distinguish seven; viz. 1. A refrigerating property; 2. An exciting; 3. A sedative; 4. An astringent; 5. A tonic; 6. A debilitating; and, 7. A perturbing property.

Each of those will be subject of particular examination.

1. Refrigerating Property. When from any cause the body is excited or heated, or has its vital properties exalted, there is then more caloric disengaged, which raises the temperature above its natural level, and carries it sometimes even to 113 degrees (?). That preternatural heat, which, during the irritative stage of fevers and inflammations, is recognizable by the touch and thermometer, causes a very strong and inconvenient sensation; it is always connected with morbid excitation of the organs, whose vital properties are still further exalted. In other cases, the caloric accumulated on the skin penetrates it quickly, irritates and inflames it; the excitation of its tissue is very soon followed by a greater afflux of vital caloric into the part, which becomes very sensible, red, and burning.

Excess of caloric in the system is an inconve-

nient and injurious symptom, which the physician must moderate ; it is an essential element which, whether cause or effect, requires to be directly combated by refrigerants. Van Swieten (*Instit. Boerhav.*) says, *Profutura videtur frigidorum applicatio tam interna quam externa, dum corpus nimis calore febrili æstuat.*

By restoring the natural temperature, cold allays the arterial orgasm ; it diminishes the rarefaction of the blood ; it enfeebles excitement, and prevents its being carried too far ; it prevents, in short, disorganization and danger during the disease.

Observe that unhappy fever patient, a prey to the excessive caloric diffused throughout, and accumulated in his frame : his skin is dry and rough, his countenance animated, his eyes sparkling, his lips parched, his breath hot and fetid, his pulse hard, frequent, and tense ; thirst torments him ; he asks entreatingly for cold drink, even ice, to cool him, and quench the fire that preys on him ; ever restless and agitated, he throws off his bed clothes ; every thing he touches burns, even the air he breathes ; in vain he seeks coolness ; he can find no ease ; constant sleeplessness increases his irritability, and delirium declares itself. We are by nature led to satisfy his ardent desire for every cold object ; to deny them to him would be to inflict on him the punishment of Tantalus. How admirable

the effects of cold ! Copious draughts, a current of air, agreeable ventilation, washing of the body, &c. moderate the extreme heat, remove thirst and agitation ; a delicious beneficent coolness supervenes and strews over his couch the anodyne flowers of Morpheus ; a few hours of tranquillity and sleep favour gentle perspiration, and sensibly improve his condition.

Refrigerants form then an essential part of the antiphlogistic treatment. Hippocrates recommends warm oxymel in winter, but cold for summer. According as the heat is internal or external, diffused or circumscribed, it is opposed by cold applications external or internal, local or general, which must be often renewed in the form of drink, bath, immersion, affusion, embrocation, lotion, &c. until the patient finds ease, and is no more tormented by devouring heat. Refrigeration produces always a delightful sensation, whose continuation the sick earnestly implores. But if too prolonged, the pleasure changes into pain ; we are then warned to suspend it, otherwise debility results.

2. *Exciting Property.* Cold has the property of exciting directly those tissues that experience its action, and sympathetically those organs to which that excitement is propagated. The excitation is energetic in proportion to the intensity of the cold, and to the liveliness and transitoriness of the impression. The nervous systems of

the organic and animal lives receive from it a shock that renders them more active, and even, in some cases, rouses them from insensibility and torpor. By means of this property, we succeed in awakening sensibility and contractility, when diminished or suspended, as, for example, in asphyxia or the hysteric paroxysm. To cut short syncope, it is sufficient to sprinkle a little cold water on the face. Hippocrates recommends plunging the feet in cold water, as a cure for the aphonia that succeeds an hysteric fit. Various authors speak of the usefulness of cold affusions on the head, of the application of ice to the eyes, the forehead, the temples, or back of the neck, in cases of amaurosis whether idiopathic or from local weakness, and of loss of memory owing to stupor and atony remaining after violent shocks of the head.

The stimulus brings the contractility of the fibre into play, and contraction consequently puts an end to its state of inertness. It is from the knowledge of this power of cold, that washing of the lower half with iced water, frictions with snow or ice, on the sacrum, or on the pubis and perineum, have been employed with success in palsy of the bladder, and in incontinence of urine from debility. Descamps (*Journal de Sedillot*, T. 23.) relates some cases in which he has observed good effects from injection of cold water into the paralyzed bladder. Washing the

abdomen with cold water removes inactivity of the intestines, and provokes stools. Marcard recommends them as a very safe remedy. Cullen mentions that, in certain cases, where purgatives had been employed in vain, cold water thrown on the lower extremities proved of itself sufficient to re-animate the bowels. In the sixth volume of the *Edin. Med. Ess. and Obs.* p. 556 and 568, we find, on this head, two very conclusive observations. Vaidy, in the article "Glace," in the *Dictionnaire des Sciences Médicales*, relates a case of obstinate costiveness, in which accumulated fœcal matters formed above the hypogastrium, a tumour of the size of an adult head. The patient was made to walk on wet flags, and flannels moistened with ice water were applied to his belly. Alvine evacuations took place without delay. *A frigore pedum alvus obstinator solvitur*—Klein. Those examples are, I think, of such a nature as to place beyond all doubt the exciting property of cold.

3. Sedative Property. It is undeniable that cold enjoys a composing or sedative property, very different from its debilitating property, in as much as the former operates by merely diminishing excessive sensibility, while the second is exercised on all the vital properties, which it destroys together. It must not be confounded with the perturbing property neither, which sometimes acts as antispasmodic, and allays cer-

tain painful and irregular actions of the nerves. The living solid, when irritated, whether directly or sympathetically, by cause known or latent, internal or external, passes into a state of *erethism*, whose principle is at once in the nervous and sanguineous systems. Exaltation of sensibility is almost always the symptom that precedes and provokes inflammation. When the affection is but local, the pain is sharp; the diseased part presents all the characteristics of *phlogosis*. When the affection is general, head-ach, redness of the conjunctiva, intolerance of light, a tongue sensible, parched, and as it were burnt, a feeling of heat through the whole body, urine red and unfrequent, tossing, sleeplessness, and delirium, characterize the state of general *erethism*, which is allayed by cold, as if by enchantment. It restores the exalted sensibility to its natural condition; it lulls the pain, and removes the delusive sensation of burning heat; it restrains the symptoms of the disease, whose course it renders regular and simple; it re-establishes, in short, the harmony of the functions.

We shall here merely cite a few very simple facts to prove the sedative property of cold. Every one knows the efficaciousness of cold water in allaying the exaltation of sensibility of the pharynx, *œsophagus*, and stomach, caused by pungent spiced food, by alcoholic liquors, by coffee, chocolate, &c. which, without producing

real rise of temperature, cause a very strong sensation of heat. Wounded persons are, just after undergoing operation, tormented by an unusually keen thirst, which is but the expression of a nervous irritation, which is appeased very readily by cold water. An enema of cold water lulls the feeling of pungent heat, and the painful gripings of hypercatharsis. In a lady who was subject to spasms, a very strong sinapism produced extreme sensibility, with sharp pain. An hour after its application, the surgeon besmeared the reddened part with fresh cream and white of egg beaten together, without affording the patient any relief. I recommended the application of iced water; it was immediately used by means of a sponge often moistened; success attended the experiment.

Violent passions and strong efforts of mind exalt cerebral sensibility. The erethysm they cause produces determination to the brain. At Venice I knew an individual passionately fond of play; he never quitted it without feeling a great headach, occupying the anterior half of his head; on reaching home at night he immediately washed himself with cold water; the pain ceased, and he passed the night tranquilly. He assured me, that without the use of such means it would be impossible for him to renew his play the day following. A physician of my acquaintance, of sanguine temperament, and very lively

imagination, told me he had experienced the good effects of cold water on himself, in lowering exalted cerebral sensibility, produced by the torments of a much opposed passion.

Thus, in diseases marked by increased sensibility, cold acts like the most potent narcotics. The bath and fomentation are, in such cases, the most useful forms for its application. As sedative refrigerants, we may likewise employ externally the distilled waters of lettuce, wild poppy, borage, cold,—or cold water, to which, if thought proper, mucilage, ether, watery tincture of opium or henbane may be added. The intensity and duration of the cold application must always be proportioned to the exaltation of sensibility and violence of erethism. Its use ought to be continued for some time, even after removal of the symptoms. I have been lately convinced of this. Having burnt with sealing wax the middle finger of my left hand, I plunged it at once into cold water at 66° ; the sharp pain ceased; after two seconds I withdrew my hand from the water, thinking myself cured; at the end of two minutes the pain began again, with pungent sharpness and strong sensation of heat, which occupied the whole finger. I plunged it again in the cold water, and was much surprised and highly content with the effect; every thing vanished on the instant; I retained it however

in the water five minutes more, and was permanently cured.

The physician finds no difficulty in employing cold with advantage, to lull pain and prevent too lively re-action ; as, *ex. gr.* after application of the actual cautery to a large surface, and principally around the joints. Dr. Rusch (?) after repeated trials on himself, represents the application of cold water on the lumbar region as a remedy efficacious against gravel pains. I shall never forget a soldier, whose leg was amputated at the military hospital of St. Ambrose at Milan. Some hours after the operation, he began to complain of a pain at the end of the stump, and which increased so much as to cause sleeplessness, and force him to utter piercing cries. Removal of the dressings threw no light on its nature. The employment of the principal narcotics, during thirty-six hours of suffering, gave no relief. At length it was determined that the dressings should be soaked in cold water, for it had been observed that hot liquids exasperated the pain. The effect I will venture to call miraculous.

4. Astringent Property. This property is sufficiently evinced by the power we have allowed to cold, of determining, in living tissues, an internal fibrous contraction, which makes them recoil upon themselves, and increases their cohesive force. That effect takes place in the sick

only where debility is not carried too far. Relaxed tissues, whose contractility has been much weakened, are but little sensible to the impression of cold; they do not experience the same contraction as those in an opposite state. It is for this reason, that cold is inadequate to check a passive hemorrhage in scurvy, and that stronger astringents become necessary.

Cold as astringent is proper : 1st, For renewing the contractile force of the tissues, and restoring to the parts the tone and elasticity they have lost. It is employed for removing the looseness of the skin which remains after disease, or is owing to abuse of hot baths ; for curing the relaxation of the sacrosciatic ligaments, and the atonic extensibility of the abdominal teguments consequent upon parturition. Emphysema, relaxation of the upper eyelid, œdemas or infiltrations from ligature, yield to the application of ice or cold water. Too great laxity of the scrotum or labia, softness and passive intumescence of the penis from masturbation or abuse of coition, are corrected by lotions and occasional immersions in iced water, or by frictions on the part with ice. By aid of local refrigerants Professor Broussonnet reduced to its natural size, a penis whose corpus cavernosum had swollen to an enormous bulk, in the case of a young man affected with venereal gonorrhœa. 2dly, Cold assists, and even forces displaced parts to resume

their natural situation and dimensions ; it prevents also recurrence of dislocation. Iced water acts thus on the prolapsed vagina, uterus, and rectum ; also sometimes in hernia. 3dly, It contracts and diminishes the pores, as well as the extremities of blood vessels and exhalents, when too much dilated ; it retards, suspends, and entirely arrests the flow of the fluids ; it checks their expansion, and prevents their extravasation or infiltration. Simple washing with cold water is sufficient to arrest hemorrhagies from the capillary system and small arteries. Good effects are obtained from cold promptly applied to bloody tumours from contusion, and to thrombus. Cold cuts short atonic sweats ; those profuse passive perspirations that depend on relaxation of the skin exhalents ; it succeeds in gleet, and other chronic and too protracted diseases of mucous membranes. Cœlius Aurelianus has cured a purely atonic diarrhœa by iced enemata.

5. Tonic Property. When we wish to strengthen, we try, by means of cold applications, to provoke re-action in the whole machine, or in the part merely that has lost its tone and natural vigour. The organic changes resulting, increase the energy of life, and evidently substitute strength for weakness. We have already explained ourselves respecting the *indirect tonic property*, of which abstraction of excess of heat, and astriction are the principal effects. As for

the *direct*, of which we now treat, it consists in greater activity of sensibility and contractility, determined and sustained by the successive or combined effects of the stimulus, of organic contraction and of re-action, which re-establish the play of the solids and fluids, and revive the vital forces.

True or real debility, viz. that which is marked by organic atony or inertness, by irregularity and tardiness of the animal and nutritive functions, contains the peculiar element that is to be combated by the tonic property of cold. But in this, as well as in every other point of medical doctrine, it is dangerous to generalise, because there is nothing absolute, for every thing is relative. Ignorance of this principle exposes one to a host of errors. It is not only of the greatest importance that the physician, who would avoid mistake in the use of cold as a tonic, keep constantly in view the state of the powers; but he must further take pains to distinguish true from apparent weakness, and to discover in what degree the constitution is deficient in re-active energy. It is further of some moment to specify the character of the debility, to ascertain whether primary or secondary, essential or sympathetic. The person subjected to the action of cold should, in order to be in physical circumstances favourable to vital re-action, possess a certain degree of vigour, in default of which, there

supervenes no increase of sensibility, contractility, or caloricity. New signs of weakness on the contrary appear; and the constitution of the sick declines more and more, particularly if the employment of the same remedy be obstinately persevered in. It is a bad sign, if after the bath, or after immersion or affusion, heat delays manifesting itself for more than fifteen or twenty minutes. Galen has remarked that cold, externally or internally, debilitates persons affected with extreme constitutional weakness. Sancto-rius writes, *Lavacra frigida corpora robusta calefaciunt, debilia refrigerant*. The second part of that proposition, however, is true only where debility passes the limit beyond which re-action becomes impossible.

The counter-indications to the use of cold as a tonic, vary with circumstances and the nature of the disease. In general, however, we may say, a constitution very delicate and nervous, coldness, pale complexion, leaden or greenish hue of skin, discoloration of lips and tongue, loss of vivacity of eye, flesh soft, flabby and bloated, viscous cold sweat, passive hemorrhagies of some standing, shiverings, weakness, with feeble pulse, languid air, &c. are signs of debility, which should deter from recurring to it, particularly in the shape of water. It is probably from not having ascertained the degrees of weakness, or investigated its cause, that cold has

proved injurious in diseases in which it was apparently indicated, and that in analogous diseases, ordinary baths or cold mineral waters have been of use to some and hurtful to others.

Partial being often connected with general debility, cold should act by its tonic power on the entire economy. It proves useful in many disorders depending on defect of tone ; it first renders the movements less slow and tardy, and afterwards manifestly invigorates. Cold remedies original weakness, and admirably strengthens the frame. Thus cold bathing has prevented recurrence of dropsy and abortion. It produces marked advantage in dyspepsy, general weakness, or exhaustion from onanism or venery. Tissot ordered it in such cases with success. It has been recommended in passive hemorrhagies and chronic catarrhs. Some physicians think it might be useful in amenorrhœa from atony. There is not, so far as I know, a single fact that authorises such a recommendation in the latter malady. I think, however, the use of cold might be advantageous, but that simple immersion would be preferable to the bath. All physicians are agreed in acknowledging its usefulness in rickets. Rosen mentions a girl, who being afflicted with that complaint, used cold bathing for three consecutive summers, and was completely cured. Barthez thinks it in such cases a potent exciter of the

constitutional powers, which are in a state of languor and debility.

Those who have denied to cold a tonic property, have stated that the excitement has no relation to the vital forces; that it is but local, and does not extend to the organs of animal life and of nutrition. But in our examination of the action of cold on the economy, we have adduced sufficient evidence of its effects by sympathy on all the interior systems.

Of tonic cold applications, the principal are the bath, immersion, affusion, and frictions with ice or snow. Repetition of the action of cold is better than prolongation, with a view to re-action, which is proportional in every case. It is of consequence to second that salutary effect, by remaining in a moderate temperature after the bath or immersion, or by motion on foot or horseback, or by taking the air in the sun if not too hot, or by rough dry frictions, and slight woollen clothing if in winter, together with generous diet, and stimulating drinks.

Local re-action is also turned to account in reddening the skin, inflaming it, and by this indirect way, bringing about resolution of certain indolent tumours and indurations of the cellular tissue. By means of general re-action sweats are obtained. If the patient, in lieu of dressing and exercising, goes to bed, and remains there sufficiently covered, the cutaneous spasm yields,

the concentrated heat revisits the surface, the skin becomes supple, the extreme vessels open, and general moisture ensues. Celsus has preserved the memory of the iced drinks used by the ancients, whose principal effect in the cure of fevers, was that of provoking profuse sweats.

6. Debilitating Property. Cold is one of the most potent debilitants known to therapeutics; and in this quarter we acknowledge Brown triumphant. We shall concede to the term representing that property, the whole value or extension given to it by the Scotch physician. Abstraction of caloric, universal constrictive spasm, diminution of sensibility and contractility to the last degree, are the destructive effects, to the production of certain degrees of which, cold as a debilitant may be advantageously employed in one class of diseases. The ends for which it is used are, 1st, To diminish excessive vital action, local and general, to lower the excitation of all the vital properties, and restore them to their usual healthy state. 2dly, To lower them to a suitable point, that the disorder may follow a safe and regular march. 3dly, To produce a degree of exhaustion of the constitutional powers, with a view to prevent their extraordinary development, or a recurrence of their exaltation, when there is reason to apprehend such.

It is in the irritative period of fevers, in the numerous phlegmasiæ, in recent wounds, that it

is most happily employed. The principal signs indicating the use of this potent debilitant are, pain, redness, heat, swelling, feeling of tension, burning sensation, thirst, sleeplessness, dreams, strong beating of the arteries, prominence of the veins, pulse full, frequent, hard and vibrating; in short, combined symptoms of phlogosis, plethora, and erethysm of the vascular and nervous systems.

Cold applications act externally and internally, by first debilitating the part; the effect extends itself afterwards, by continuity and sympathy, over the whole frame. Almost every form of refrigerant is employed in the debilitating method. The action of cold should be prolonged until the symptoms are diminished or quite dissipated; otherwise supervening re-action may re-establish, with energy, a set of very acute inflammatory symptoms. It is thus that the inconsiderate application of cold has in some cases caused a transition of inflammation into gangrene. I have often treated paraphymosis by bathing the penis in very cold water, and have always succeeded in dissipating, in a great degree, the œdematous inflammatory swelling, and repassing the prepuce over the glans. In a case where the thing was impracticable, the principal assistant surgeon, who treated the patient, deferred another attempt until the evening visit; meanwhile such re-action supervened, that the penis acquired

double its natural size, and the strangled gland assumed a red and deep purple colour. I did not hesitate to make immediate incision, to prevent mortification of the glans, and possibly of the whole penis. Hence we learn how closely re-action must be watched.

7. Perturbing Property. This property may be regarded as depending on sensation and brisk spasm. The strong and unusual impression of cold causes general surprise, produces over the whole sensitive system a sudden shock, which modifies its present condition. Hence it is capable of breaking through the continuity or periodicity of certain nervous movements. It is in this point of view that it is to be considered as antispasmodic, whether acting immediately or by sympathy. In the latter case the perturbation is a revulsive excitement, which destroys the movements existing elsewhere; it acts constantly by the law of the strongest. We shall adduce some proof of this property. If you apply cold water to a muscle affected with spasms, says Grimaud, the sudden impression arrests the movement that agitated it. Cramps frequently yield to the application of a cold body, by changing the place of a limb in bed, or by plunging it in cold water. It is well known that a glass of cold water removes hiccup; that convulsions have ceased after the administration of iced water enemas; that ices have, as if by prodigy, delivered

hysterical women from palpitations and symptoms of imminent suffocation. Marcard mentions having obtained good effects from affusion of cold water on the head, in certain cases of vertigo, and in this he has confirmed the observations of Aretæus. I cured a woman, who two years before, had been asphyxiated by carbonic acid, and had, since that accident, complained of very acute pain in the sinciput, which she compared to that from a nail driven into the head with a hammer. I recommended the cold water *douche* on the crown of the head; after the second application she came in great spirits to thank me, saying she was cured. Olaus Borrichius relates an instance of cure of cruel and obstinate headaches, by the use of cold water alone. Intermitting mania has been successfully treated with immersions by surprise.

In the *Journal de Médecine*, we find some cases that evince the surprising and admirable efficacy of the perturbing property of cold. I select one, anno 1781, p. 54. A woman in labour was attacked with epilepsy. During the fit, which lasted usually half or three quarters of an hour, the patient uttered frightful cries, her mouth was distorted and foamed; her frame, universally agitated by horrible convulsions, was sometimes stiff, as if affected with tetanus; the child's head was presented with an expulsive effort, but the mouth of the womb, which was spasmodically

contracted, prevented the termination of the labour. A *douche* of iced water was used; the convulsions ceased forthwith, as by magic; the os tinæ began to dilate; the pumping was continued, and the labour was next day very happily completed.

Another observation, with analogous and equally satisfactory results, presents itself to me in the same Journal. Baigneres, the author of it, mentions having used iced water in a laborious labour with convulsions, on a woman who, towards the third month of pregnancy, had received violent strokes on the body, particularly on the belly. After venesection at the seventh month, the inferior extremities became œdematous, and afterwards the superior. Thereafter the woman ceased entirely to feel the motions of the child. In the eighth month after a laxative, she felt sharp pains in the belly, and fell into convulsions immediately. Her eyes sparkled; her countenance changed: after the fit the patient remained exhausted; respiration was scarcely sensible; a cold sweat gushed from her whole surface; her eyes grew dull, and her decease was every moment expected; the womb was spasmodically contracted. Pumping with iced well water was employed. The success was as complete as in the succeeding case. The perturbation caused by cold is not only direct, but also extended by sympathy to the whole system. It

interrupts, breaks up or cuts short suddenly fluxions towards organs; it even prevents their formation and re-appearance. To this perturbation we must attribute the quick separation of connected dogs, when cold water is hastily thrown on them. Diemerbroeck relates that a man, who, before coitus, had rubbed his penis with musk, remained attached, and that it became necessary to employ the cold affusion, in order to separate them. The suppression of certain discharges, as of the menses, lochia, milk, &c. which succeeds the sudden impression of cold, has suggested the artificial use of that physical agency, and its employment in therapeutics. In Italy, I have witnessed the operation by which the peasants sometimes suppress lactation in their wives, by hastily and repeatedly throwing a glass of very cold water between their shoulders. It is known, that the milk readily disappears in animals made to walk in water. I have repeatedly, and without the least inconvenience, prescribed the application to the breasts, of a cold aqueous infusion of elder flowers and red roses, with addition of a small quantity of sal ammoniac, with a view to prevent lactation, in women whose constitutions would not admit of suckling: during that local perturbing action, called also repercussion, I neglected no means calculated to divert and extinguish the natural determination to the part.

When a determination is not quite established,

and is but commencing, local perturbation may be very useful ; but if the reverse happens, then cold is to be applied to a distant part. Hippocrates well knew this : see what he says, Aph. 23, § 5. It is thus that cold applications are so useful in active hemorrhagies, which depend essentially on the nervous system. Hildanus mentions a man, who had, without success, employed a great many remedies for an epistaxis that afflicted him ; it occurred to him to dip his lips in a vessel of cold water, and the blood ceased flowing. The fact related by Pasta, proves evidently the power of perturbation by sympathy. He says, a physician cured a lady of uterine hemorrhage by making her walk with naked feet, and supported by two persons, in a chamber having its pavement covered with a layer of ice. In such cases we should ever choose for our applications the most sensible regions of the body, those that have the most relations of sympathy with the part to which we wish to direct the perturbing action of cold, which latter must be very intense, and must be applied hastily and at intervals, as often as occasion shall require.

CHAPTER VIII.

OF REFRIGERANTS.

WE shall denominate refrigerant or frigorific, every substance solid or fluid, simple or mixed, which, when applied to any surface, whether internal or external, produces all the effects of cold. We shall include under that general name :

1. Cold air. Cool air is generally more advantageous than positively cold air, in diseases with inflammatory symptoms. Natural philosophy has not yet attained the invention of an instrument suited to lower rapidly the temperature of apartments, and produce in them real cold, with the same ease as she can gradually raise their temperature. In well-chosen apartments, however, and with the assistance of various means pointed out in works on the hygeia, we can diffuse a very sensible and agreeable coolness. At Montpellier, in 1705, there happened such an excessive heat, that scarcely an inhabitant enjoyed health out of his cellar. The inhabiting of subterraneous places convenient and sufficiently lightsome, would probably be useful in tonic summer diseases, marked

by treacherous exaltation of force, which always causes apprehension and presages danger. It is certain that the sick suffer much less from heat, in summer in the subterraneous hospitals of fortified places.

2. Common water. This is the easiest way of applying cold, as it is always at hand, and as we can readily graduate its temperature. Between 65° and 80° water is cool : it is called icy when extremely low and little removed from the freezing point, as it usually is in winter, and can at any time be made by adding a sufficient quantity of ice.

3. Sea water, which is colder in proportion than fresh.

4. Cold mineral waters, natural or artificial, chalybeate, saline, sulphureous, or acidulous.

5. Snow or ice. Those substances are exhibited by means of apposition, by friction, or as epithems, until completely liquefied. For this last form, the ice should be pounded and inclosed like snow in a linen bag or bladder three-fourths full. The degree of cold is, if thought necessary, increased by adding three parts of kitchen salt or sal ammoniac to eight of ice. Ice is in some cases introduced into the cavities ; patients are also made swallow small pieces of it.

6. Mixture of neutral salts. Desiccated muriate of soda, muriate of ammonia, nitrate of potass, the sulphate, phosphate and carbonate

of soda, and desiccated muriate of lime, are convenient for producing cold. A bag of fine linen is to be filled with two of those salts quickly mixed and moistened with water. The mixture also of nitric or sulphuric acid with snow produces an intense cold.

7. Mercury. This metal, although of the temperature of the atmosphere, produces on our organs a very lively feeling of cold, owing to the rapidity with which, like many other bodies, it abstracts caloric. Of this property we may in proper circumstances avail ourselves.

8. Ether. Its rapid evaporation adapts it for carrying quickly away the principle of heat. It is used in embrocation, freely exposing to the air the part to be refrigerated. Its activity is even increased by ventilation or exposure to a current of air. When there exists too great exaltation of sensibility it is not proper; as in burns, for the slightest degree of which some physicians recommend it; it does not always give ease: the lively pain it causes warrants its rejection.

9. Herbs. These are refrigerant and sedative, owing to their containing much of a naturally cold juice; such are common groundsel, purslain, nymphaea root, house-leek, endive, lettuce, mercury, pellitory, &c. Two or three of those plants are taken fresh, and pounded in a marble mortar; a little kitchen salt or sal ammoniac

is added, and this pulp is applied as a cataplasm to be often renewed.

As sea water and natural mineral waters receive increase of efficacy from the substances they hold dissolved, we may imitate them, by adding to common water, such waters as may contribute to answer certain particular indications to be fulfilled, in diseases which we have decided on subjecting to cold ; such as nitre, sal ammoniac, common salt, acetate of lead, sulphuric acid, alcohol, soap, ammonia, &c.

Cold is applied, internally and externally, in different forms, which demand some observations from us. The following are the principal, viz.

1. *Aliments.* In some diseases it is of some moment that the diet should agree with the treatment: we know for example that the cold regimen is better for hysterical and hypochondriacal persons than the warm. During hæmoptysis, physicians prescribe iced jellies as food for patients. In the two first stages of putrid and bilious fevers, we cannot but disapprove of giving broths, soups, or any other light hot food. I think I have observed, that children afflicted with worms prefer cold to hot food.

2. *Cold Drinks.* They may consist of water pure or containing various substances diffused through it, such as acetic, citric or tartaric acids, oxymel, acid syrups, sugar, oil, resin, &c. Cold drinks are heavy on the stomach, and should be

taken in small quantities at a time, they otherwise prove injurious. Their employment is discontinued when they cause diarrhœa or brisk cough. The heat, thirst, dryness of the lips, mouth, and throat, the wishes of the sick, the nature and period of the disease, will determine the degree of cold proper for the drinks, and the quantity of drink to be taken.

3. Ices. By means of this preparation also, we can apply cold directly to the stomach. Ices are very heavy, and ought therefore to be administered in moderate quantities. They may be rendered more exciting and tonic, by incorporating with them some liquor or other appropriate substance. I have seen them prescribed by Italian physicians, during convalescence, to restore the tone of the stomach. In some cases lemon, coffee, or vanilla ices may be ordered with advantage. A physician mentions having cured chronic pulmonary catarrh by repeated use of chocolate ices. Might we not avail ourselves of this form, to administer cold other exciting and tonic substances, as mace, canella, nutmeg, anise, chalybeates, extracts of cinchona, juniper, &c.?

4. Cold Bath. In addition to the constant necessity of adapting its temperature to the sensibility and degree of force, the therapeutical intention further fixes its duration, which, in general, should be short in proportion as the

bath is cold. We must always avoid the super-vention of a second shivering. Marcard recommends washing the head with cold water before plunging. After leaving the bath the patient should be quickly wiped with clean dry linen. In some cases it might be useful to rub him with flannel, and even to cover him up in a woollen cloth. In running water the patient should remain a shorter time, as the abstraction is more rapid. The temperature of the cold and cool bath is to be the same I have pointed out when treating of common water.

5. Immersion. This is the act of plunging suddenly the whole body or a part only, into cold water, and withdrawing it immediately. It must not be confounded with the bath. The momentary cold impression has not the effect of permanent cold. Hippocrates preferred this fugitive or transient impression, which is usually sufficient to produce the effects desired, whether by the shock or the re-action it causes. Physicians recommend immersion repeated two or three times following, but I am, with Buchan, of a contrary opinion. In taking some cold baths, to confirm the opinion of that physician, I have in my own person ascertained, that repetition of immersion fatigues the machine, and even that the re-action is never so energetic, so complete or agreeable, after three or four, as after

a single immersion, or after remaining two or three minutes in the water.

6. Pumping or *Douche*. Water is used from 32° to 54°, and the application continued a longer or shorter time according to the effect desired. It is proper, on account of the uniformly disagreeable sensation produced by the fall of the liquid, to change place, or diminish the impression by interposing a linen cloth.

7. Affusion. This external application consists in pouring cold water on the body, either in a sheet or pretty considerable mass; a bucket or vessel is poured on at once. We might take advantage of a cascade or water-fall near a mill. It might likewise be effected with a large head of a watering pot. Wetting by a shower is, both in duration and effect, more rapid than by washing. Affusion produces a lively deep impression, exceeding that of immersion: it is stronger or weaker according as the water pours more quickly or slowly.

8. Aspersio. This form consists in hastily sprinkling on a part, a few drops or threadlike streams of cold water.

9. Fomentation. This local and permanent application should be often renewed: it is done with linen or flannel or a large flat sponge soaked in cold water. In some cases Schmucker's cold fomentation merits preference. It is com-

posed of: cold water, lb. xl., acid. acetos. lb. iv., nitrat. potass. lb. i., muriat. ammoniæ, ℥ viij.

10. Embrocation. A local application of little duration, which favours refrigeration by means of evaporation. For this purpose we particularly employ ether, oxycrat prepared with distilled water, and the following: common distilled water, lb. ij., distilled acetic acid, ℥vj., sulphur. ether, ℥ ij., aromatic rose water, ℥iv.

11. Lotion or Washing. The patient is stretched on a mat on the floor, or still better on a horse bed, and his entire body washed with a sponge dipped in cold water, after which he is slightly dried and replaced in bed. Cold water is further employed to fulfil several particular indications, in the form of gargle, injection, and clyster.

CHAPTER IX.

ON THE APPLICATION OF COLD TO DISEASE.

COLD is a more active agent in disease than in health. For this single reason the greatest consideration, sagacity, and prudence are required in its use. Cold water, apparently a simple

and innocent remedy, is, like many others, capable of doing much good and much evil. It is necessary to weigh the grounds of the indication, to examine the counter-indications, to consider the action of cold in connection with the state of the strength, with the cause, character, and symptoms of the disease; in short, to observe well the effects consequent on its application. In important cases, we must ascertain thermometrically the temperature of the liquid. Regard must be had to the season, climate, age, sex, temperament, symptoms and stages of the disease, as also to the nervous susceptibility of the sick. In some cases it is preferable to increase gradually the cold, varying its degree in each application, always paying due regard to the symptoms of the disease, and to the nature and sensibility of the parts. We must not forget that cold acts more briskly on infants and young persons, than on the adult and aged; on those of delicate and supple, than those of hard, dry, and tense fibre. We defer noticing counter-indications peculiar to some cases, until we come to speak of disease; and will content ourselves here with the general position, that the application of cold to the entire surface is not proper: 1. When there is sweat; 2. When the sick are pale and feeble, with impoverished blood and cachectic constitution; 3. When there are threatenings of fluxion or congestion in any of the cavities;

4. In cases of acute or chronic engorgement of the viscera, or even simple inflammatory disposition.

The employment of cold is not always sufficient completely to fulfil a curative indication ; sometimes even it is but a remedy of symptom. In such cases, in order to realize our wishes, we must bring into co-operation with it various other therapeutic means of established efficacy.

The temperature of the sick chamber, of the bed, bed clothes, beverage, food, &c. modify in many ways the effects of cold applications, whose success often depends on their co-operation. The physician should therefore, with one view embrace all the detail of the refrigerating method.

Since, in the series of diseases that have cold among their remedies, many cases resemble each other, and as we find in some several indications to be fulfilled by the same means, and since cold is applicable in several different forms in the same disease, I have thought proper, as well to avoid confusion and repetition, as for the sake of pointing out analogies and useful and necessary distinctions, to treat of the principal affections, in which the different properties of cold are available, in their nosological order.

And first of essential or continued fevers.

The efficacy of cold, in the treatment of acute or continued fever, has long been recognised. The difficulty of specifying the particular cases,

circumstances, and stages of diseases, in which it is proper internally and externally, are the reasons why this remedy has been so timidly employed. The refrigerant method, the offspring of hot climates, originated in Spain. Cirillo brought it into vogue in Italy ; but he abused it, pushing it so far as to gorge patients in nervous fevers with iced drinks. It is according to the dictates of experience, and to the symptoms that indicate the true genius of fevers, that the physician must regulate the administration of cold.

In this class of diseases, cold is improper when, 1. there is shivering or feeling of cold at the skin ; 2. or abundant sweat, whether symptomatic or critical ; 3. or severe diarrhoea ; 4. or irritation in the chest ; 5. or inflammation of an organ ; 6. or extreme exhaustion from debilitating causes. It is not less important, to keep in view the various complications of fevers with each other, or with acute or chronic inflammations.

A. Inflammatory Fever. In this species of fever, cool air and moderately cold drinks are sufficient to check excitement. We must not follow the advice of Galen, by throwing cold water on the patient till he tremble, and his whole body be chilled, in order to obtain a crisis by sweat. Such a plan might prove more injurious than useful, in a disease, whose termination is almost always quickly and happily enough brought

about by hemorrhage, sweating, or diuresis. Besides, it might possibly not produce the crisis desired; the spasm might change the character of the malady, or might disturb the curative plan, which nature slowly prepares, from the outset of this disease, which, at all events, is generally of moderate duration.

Two species of inflammatory fever, however, we must distinguish; that with true, from that with false plethora. In the former, there is excess of blood and radical energy. Cold may increase the first of those elements, by causing shrinking of the vessels, and recoil of the blood to the interior: it may also increase the second. In inflammatory fever from false plethora, there is rather erethysm than increase of real force; rather turgescence than sanguineous plethora: this is produced by exciting causes, often enough by insolation. In this case, the application of cold is very proper, and should be preferred to bleeding. Willis speaks of a robust female, attacked by acute fever, with furious delirium, who obtained no relief from two ample bleedings, with enemata, but recovered her senses after being bathed in a river for fifteen minutes. To this latter species of inflammatory fever, the following observation, furnished by Planchon, should, I think, be referred. (*Journ. de Médecine, par Roux. T. xxvii.*) A Flemish youth of eighteen, of sanguineous temperament, had a simple fever,

owing to having heated himself too much. Notwithstanding some ample venesections, gentle laxatives, enemata, and cooling drinks with nitre, he fell into furious delirium; the fever was violent. On the sixth or seventh day, at a moment when he was not watched, he rose, seized a knife, and pursued his master into the garden. The master alarmed, and fearing the furious youth might kill him, fled, and the patient continued the pursuit. The master, however, recovered his self-possession, and surprised at his flight, retraced his steps, and menaced the furious Fleming, who, becoming in his turn afraid, wheeled about and fled. Seeing a pit that was in the garden, he cleared it, and threw himself into it, to escape the blows he was threatened with. The cold dip recalled him to his senses; he called out for help; was immediately taken out of the water and carried to bed, where he perspired copiously. After that he remained tranquil, and that really salutary sleep, lasting all night, cut short the fever.

B. Bilious Fever. Experience has convinced physicians of the impropriety of hot drinks in that fever; they cause nausea; do not assuage thirst; favour bilious derangement in a direct and peculiar manner; increase weakness, and dispose to putridity, particularly in the burning fever characterised by morbid excitement of the nervous and vascular systems, superadded to bili-

ous disorder, most frequently without increase of real force, and even with atony. The repugnance of patients for such drinks, and their desire for every thing cold and iced, have led physicians to make frequent use of cold application in such fevers. In the epidemic of Tecklemburg, observed by Finke, the sick desired ardently to drink cold water.

Cold iced drinks, as pure water, lemonade, barley water with oxymel, whey, cream of tartar water, &c., are proper for the irritative stage and increase of the disease. In ardent fevers, Galen repeated draughts of cold water until the patient grew pale ; but it is, I think, wiser to proportion the beverage, in coldness and quantity, to the particular conditions of the disease and patient, and to lessen them, when, to irritation, succeed depression of force and general sinking. In the stage of coction they are much less proper ; they may break the chain of symptoms and interrupt the crisis. Most physicians affirm, that they are favourable to evacuation by stool and urine. If there be a tendency to perspiration, they are given agreeably cool.

We are not of the same mind with the ancients, who will not allow of cold until symptoms of coction shall have been manifested. On the contrary, we adopt the opinion of Rhazes, who states, that he has seen more of those cured, who took cold water from the beginning of the

complaint, than of those who deferred its use until the appearance of signs of coction. In periodical bilious fever, Hippocrates advises the patient to drink it during the intermission. General heat, burning thirst, external redness, dryness, tossing, anxiety, frequent respiration, pulse full, strong, hard and quick, headach rising to delirium, &c. indicate the refrigerating method in bilious fever.* With that view I have often, in Italy, had the bodies of fever patients washed with cold water, to which a little acetic acid had been added. This practice is very proper in bilious fever, when complicated with a really inflammatory element, and still more when it presents that false excitement, which furnishes good reason, particularly in very warm weather, to fear a transition into the adynamic state after the first week.

Washing the body should be practised three times daily at least, principally in moments of exacerbation, and on the face, belly, and extremities. The patient is to be wiped and replaced

* The physician who is taking measures for fulfilling an indication, should always have an accurate conception of the characteristic marks of the element he has to contend with. In this respect great service has been done to science of late, by presenting, in analytical order, the series of constituent elements of diseases, which are and always must be fruitful subject of study and meditation to the physiological physician. On this head I refer the reader to the article *Element* in the *Dict. des Scien. Médicales*, by Dr. Berard.

in bed. He acknowledges with gratitude the pleasure and comfort thus afforded him. Cold is therefore more proper for bilious fevers, in that the heat peculiar to them is associated with a smarting, that aggravates every symptom.

Drinks, lotions, enemata, epithems, to the epigastre and right hypochondre, allay the irritation of the gastric and biliary systems ; moderate the heat and dryness ; check the rarefaction of the blood and humours ; weaken the exacerbations, and prevent or curb the delirium so often loquacious. Cirillo says, that in an epidemic ardent fever prevailing at Naples, powdered ice was, in some cases, applied to the chest. Raymond, in a dissertation on bathing, speaks of the success of cold immersion, in a girl affected with ardent bilious fever, who, escaping the vigilance of her guards, went and threw herself into the water. The salutary effect of cold is not confined to diminishing preternatural excitement ; it also suspends every septic tendency of the humours, to which very high atmospherical and animal temperatures are favourable, particularly in burning climates, where bilious fever has a march and character much more rapid and energetic than in cold and temperate countries. For a case of bilious fever, very conclusive in favour of cold water, at least in its details, I refer to the *Ancien. Journ. de Médecine* ; I shall here give but a short extract from it. A person was attacked by putrid bili-

ous fever. Every thing tried proved inefficient; the skin was covered with a miliary eruption; convulsions were general; there was delirium and inextinguishable thirst; the belly was inflated, the face of a leaden colour. Potions and vesicatories had proved very mischievous, and, as the author says, increased the conflagration. Fusée Aublet, being called into consultation, proposed iced water, which the patient drank with delight; the belly was fomented, and convalescence followed.

Finke has derived the greatest advantage from cold air in bilious fevers, when accompanied with prostration of strength, and threatening consequently to assume the adynamic form. Cool air and agreeable ventilation are always very advantageous. The patient finds benefit in being covered with a sheet merely, which should be often shaken. Ætius, speaking of ardent fever, says, *Decubitus sit in locis frigidis patentibus, et aëre puro perflatis, stratum molle et sæpe renovatum*. Beds of fresh straw are as salutary for the sick to repose on, as those of feathers or wool are injurious. Might we not refresh them, by imitating the voluptuary, who, in summer, had a pan of ice passed through his bed? According to Bruce the traveller, it is by retaining the body some time in a bed soaked in cold water, that the inhabitants of the Isle of Massuah cure the most violent bilious fevers.

C. Mucous Fever. The impression of cold externally or internally, is improper in this sort of fever, which is most frequently caused by moist cold. In it re-action is so feeble, and excitement so little marked, that we are very rarely obliged to have recourse to cold drinks, and still less to ice; they would be more mischievous than otherwise. If physicians have, as they assert, cured this fever with cold water, there must undoubtedly have been a stage of well-marked irritation. It will however be more prudent not to follow their example.

D. Putrid or Adynamic Fever. This fever, whose principal features are great prostration of strength, and manifest diminution of the vitality of the blood, requires great attention on the part of the physician. It might be supposed that the debility, by rendering re-action difficult, should prohibit the use of cold in its treatment; but it has on the contrary been found very useful, particularly in the first stage, which simulates an inflammatory state, and even in the second, when the symptoms, greatly aggravated, give reason to dread rapid and complete sinking, and putrescence of the humours, and prognosticate great danger.

In this sort of fever the exacerbations exhaust more rapidly the vital energy than in any other, by repetition of re-action or morbid commotion. Cold, by moderating them, not only sustains the

organic power, but also, while checking vicious re-action, increases the already undermined energy of the constitution; the disease passes through its course with fewer unfavourable chances, and fatal terminations are prevented. Good effects therefore will be derived from cold drinks and washing of the whole body. Avicenna gave cold water in drink, and he even prescribed cold bathing. From the moment the symptoms of irritation decline, the radical debility advances. Then the temperature of the cold drinks must be lowered; their nature rendered more exciting and tonic; spiced lemon, gooseberry, strawberry, &c. ices, are, in such cases, alike agreeable and useful. I cannot enough extol the efficacy of cold or iced lemonade, containing wine or brandy, in the second stage of the disease. Besides being very grateful to the sick, there is no beverage so well suited for fulfilling three indications at once, viz. to cool, to support the strength, and to prevent putrescence.

After the setting in of critical sweats, cold is mischievous; otherwise, when moderately and judiciously employed, up to the very moment of crisis, it gives tone to the fibre, gently stimulates the organism, and diminishes weakness. Hence the utility of cold dry air; the advantage of great coolness in the sick room; of whipping the bed in summer; of washing the body with liquids slightly cold and tonic, at longer or

shorter intervals ; and of appropriate cold drinks even after total removal of irritation. I shall close this article with the abridged case of a deserter, sent from prison to the military hospital of Treviso, affected with adynamic fever of eight days standing, and having a large gangrenous ulcer on the back of his neck. This unfortunate, being condemned to die by sentence of Court Martial, entreated of me to suffer him to perish. I tried to console by persuading him to hope his punishment would be commuted, which in fact happened. The pestilential odour that exhaled from his body, determined me to have him washed twice a day, from head to foot, with a decoction of aromatic plants, cold and sharpened with two ounces of alcohol and two drachms of oxymuriatic acid to each quart of liquid. I also prescribed for him a pound and half of strong decoction of cinchona, with as much red wine ; this was his beverage, and some slices of iced lemon were thrown into it. This man's condition improved daily, and his recovery was perfect.

E. Ataxic or Nervous Fever. The irregularity of the symptoms of this fever, which proceeds from an anomalous vitiation of the vital properties, and from manifest disorder of the nervous system, precludes the use of cold, or seems at least to forbid our expecting from it such substantial advantages as in bilious or

adynamic fever. Since, however, there is a tendency to weakness, and the heat of the exacerbation provokes too abundant sweats, which increase the debility, the free access and momentary impression of dry cold air cannot but be salutary, by sustaining a degree of energy in the system. In an advanced stage of the disorder, Smith proposes washing the body with cold water, in order to excite strong re-action, and invite nervous and vascular activity to the surface. Pinel appears with reason to consider that measure as too bold, and capable of effects quite contrary to those desired. It is doubtful whether the established debility, and still more the irregular and disorderly erethism of the nerves are conditions favourable to re-action. It is, on the contrary, to be feared, that one disturbance superadded to another, might prove injurious to the patient. We must wait until we gather facts from experience, authorising the use of cold lotions in this sort of fever; while we doubt, caution, or a judicious reserve is safest.

F. Typhus. This sort of fever, distinct from those preceding, appears in a form benign, malignant, or contagious; it presents symptoms, and a severity of character, which connect it with adynamic and ataxic fevers. The irritative or false inflammatory stage is the only one in which, according to some physicians, cold washing of the body succeeds. Giannini, however,

asserts he has successfully employed it in the second stage. Currie mentions having seen good effects from affusion as late as the 11th, 12th, and 13th days of the disease.

The irritative stage is very well marked in typhus, by intense fatiguing heat, thirst, desire of cold sour drinks, animated countenance, red eyes, pulse full, brisk, rigid, expansive, tense hypochondria, &c. At the commencement of that stage, at the moment of exaltation of the symptoms of re-action, and at the acme of the paroxysm, which happens after noon, or in the evening, and during which there is great dryness, redness, and thirst, cold applications agree, and have wondrous efficacy. They afford the patient pleasure, and an agreeable feeling of coolness; the skin becomes supple and free; heat and dryness diminish; the delirium declines and vanishes; the pulse becomes slower and less rigid; thirst, tossing, and anguish cease; the patient feels himself much more comfortable, and tastes tranquil and refreshing sleep: his whole body is covered with a gentle perspiration, which quite removes the preternatural heat, and weakens the cause of the disease. The too impetuous movements of the organism are moderated, and directed to an easy, quick, and happy termination. Here we must state a case of typhus, selected from those published by Currie, which

presents results similar to those observed by Wright in his own person.

An hospital servant, who had many fever patients to attend, caught the contagion. His complaint began with violent shiverings, accompanied by vague pains, followed by heat, thirst, and headach. Sixteen hours after, the heat in the axilla was 103° ; his pulse was strong, 112 strokes per minute; thirst great, tongue loaded, skin dry; five pails of salt-water at 44° were thrown over his naked body, and after being well wiped, he was put to bed. Tossing and hiccup ceased, his pulse gave 96° , and after an half hour 80° ; the heat fell to 98 ; headach vanished, and thirst almost entirely ceased. Six hours after he had no more fever; he complained of weakness only. A few small doses of columbo root, and nourishing diet were prescribed for him. The affusion was repeated for several days, and the fever appeared no more.

In fevers of this kind, there is almost always weakness along with erethysm. In this respect cold is by all means indicated. No other agent combines, like it, a double action, and offers consequently so great advantages. Tonics renew force but increase erethysm. Diluent and tranquillizing medicines have an opposite fault. Many facts prove that those remedies produce no good effect, and some proclaim the triumph

of cold water. I shall here relate the history of a fever, given by Odier in his notes to his translation of Smith on jail fever. A young girl, of eighteen, was ten or twelve days ill of a fever, which first foreboded little danger; but at the end of some days the tongue grew black and dry, the teeth foul, the belly affected with meteorismus, the pulse small, frequent, concentrated, and the skin dry with pungent heat; besides, the patient was delirious and much oppressed. That able physician had at first recourse to cinchona, elixir of vitriol, and other tonics. Those remedies producing no improvement in the patient, he abandoned them and contented himself with having her whole body washed with cold water, every second hour. This measure succeeded admirably; the delirium abated, the fever diminished, the heat became nearly natural, the belly soft and less tense. Every time the washing was repeated, the good effects were immediately obtained. The patient slept tranquilly, and during sleep she had gentle perspiration. The paroxysms became slighter and slighter, and at the end of some days the cure was complete.

The plague, pestilential typhus, yellow fever, typhus icterodes, have this irritative stage, in which, according to Valentin, Jackson and Bally, baths, immersions, and cold lotions are very successful. An Englishman, being attacked by the plague in Morocco, and finding the reme-

dies prescribed of no use, urged by violent thirst, had cold water brought, of which he drank a great quantity : he rescued himself by this measure. Linnæus reports a striking example of the utility of cold drinks. He mentions, that the plague carried off all the inhabitants of a village in the north, except a lover and his mistress. The lover being seized by the complaint, his courageous mistress washed his whole body carefully in cold water, and thus snatched him from death. Being herself afterwards attacked, her lover paid her like attention ; this service, by preserving the lives of both, only rendered their mutual attachment more impassioned.

The success of the ice frictions employed by Samoilowitz, (*Lettre sur les experiences des Frictions Glaciales, &c. Paris.*) in the plague of Moscow, deserves great attention from physicians. The disease presented peculiar features, manifestly indicating present danger. The skin, instead of being dry and burning, was in an extremely relaxed state ; its colour was yellowish and cadaverous : there was diarrhœa, and involuntary flow of urine, and menstrual flux. In this state Samoilowitz exhibited ice frictions. After a single rubbing, the skin lost its yellow hue ; it reddened, and with pleasure it was observed, that the repetition of the frictions re-established the strength. Those frictions consisted of rubbing the whole body over with a piece of solid

ice. It was done however very gently on the chest and belly. The instant the patient began to tremble, that physician had him put to bed, and a little wine given him to drink. As soon as signs of debility began to re-appear, he recurred to ice frictions, which he had repeated three or four times a day. For ordinary drink he prescribed cold water acidulated with sulphuric acid.

In the first stage therefore of typhus, cold and iced drinks only are to be given. The pretty large number of sick that have recovered of typhus, by drinking cold water only, is proof of its good effects. Washings and immersions, repeated occasionally, are preferable to baths and affusions. As external applications, we may employ natural or artificial salt water, or acidulated water. If the typhus be contagious, it would be, I think, advisable to add to the cold water for washing, some nitric or oxymuriatic acid. Gregory recommends washing the body with a sponge dipped in vinegar. Those washings are usually practised twice a day, at the exacerbation, and in the evening between eight and nine o'clock; they are even repeated during the night, if symptoms require. In 1793, Rush had recourse to cold water in yellow fever; he had it applied to the head in towels, or else gave it in enemata. In those diseases it gave the same relief, as opium in others from different causes. Sometimes he

had the face, the hands, and often the feet bathed; it was, he adds, the most potent remedy. Hildebrand says, that the catarrhal state of typhus by no means counter-indicates the refrigerant method.

In the morning remission cold applications are not proper, and in the third stage of the disease, when great debility and exhaustion appear, they would be quite unsuitable, actively employed. However, if the sweat be colliquative, we may arrest it by cold, and remarkably by frictions with snow and ice, which cause contraction of the skin and dispose to salutary re-action; the sweating then moderates, or becomes critical. This was observed by Samoilowitz in the plague of Moscow and by De Haen in the malignant epidemic fever that prevailed at Breslaw in 1737.

In this sort of fever, cool air co-operates powerfully to the same end with lotions. The sick should be placed in spacious rooms, whose atmosphere is often renewed. The temperature should be kept at 55°. James Sims, in his excellent observations on epidemics, says, speaking of malignant fevers, one of the remedies whose effects were most rapid and salutary, in the most dangerous stage of the disease, was exposure to cold air. I prescribed indeed a cooling regimen in the first stages; the curtains were always open; I had the quantity of bed clothes lessened, the drinks taken cold, the linen changed, however

little the patient might sweat, and as they were often in stifling small rooms, I ordered that the door should be always left open, that no fire should be made, and that at no time should several persons be in the chamber together; but in the last and most perilous stage, all those precautions were inadequate to the intensity of the disease. Recourse to more potent and unusual means became necessary. I had the patient taken out of bed, enveloped in a pretty thin covering, and exposed to the cold air for a considerable time, often until shiverings of his whole body and chattering of his teeth announced, that the cold air had done its work. He was then carried back to bed, and if, as sometimes happened, there was a strong disposition to sweat, every thing was tried for its prevention. Chance suggested to me the idea of a practice in appearance so bold. Some patients, who in this, as in other fevers, by force or art eluded the vigilance of their attendants, escaped into the fields naked; this imprudence changed their state for the better, from being amongst the most dangerous. Others had even plunged into cold water with like success.

Lancisi has said, *Nullum optimum ad curandos ab epidemicis febribus inventum esse remedium ipso nivis usu.* (?)

Thus, in contagious typhus, which we may select I believe, as the most complete example

of success from cold applications, the effects of cool air, drinks, washing, and frictions and affusions, are :

1. To check the first symptoms of the contagion and of the invading fever, and to cause the disease to abort. Currie mentions having seen the cold bath succeed instantaneously the 1st, 2d, and 3d day of the disease, but rarely the 4th. He states, that the affusion of cold water on the bodies of 117 men labouring under the first symptoms of typhus, viz. pale face, dejected countenance, dull red eyes, &c. checked and extinguished the disease in fifteen of them, who, save weakness, immediately recovered their health.

2. To weaken and moderate morbid excitement.

3. To cause contraction of the tissues, preventing great weakness of the solids and expansion of the fluids.

4. To favour sweating by re-action, aided by the moist heat of the bed, and effect solution of the nervous spasm that imprisons the caloric and the humour to be excreted by the skin.

5. To neutralize the contagious miasm, to check its production, and thence oppose the march of contagion. Hildebrand has greatly commended cold, as one of the best prophylactic means to oppose typhous contagion. *

* In fevers of bad character, and decidedly contagious, in gangrenous and putrid diseases, cold should be taken into consideration as

G. Intermittent. Chance, which has led to the greatest discoveries in the physical and mathematical sciences, has, in medicine also, brought to light many remedies which would never have been thought on but for some happy accident that detected them, or made known the use that might be made of them. But owing unfortunately to the imperfection of the human mind, we are not, until late, permitted to attain to the knowledge of what might be useful and advantageous. The facts lying scattered through and

an excellent prophylactic, antiseptic, and disinfecting means. The atmosphere is the great reservoir of deleterious and contagious miasms; it affords them every where. Hospital wards, sick chambers, furniture, beds, clothes, are charged with them. It is known that cold air and water, when at the lowest possible temperature, after some time disinfect the objects contaminated, and also resist the communication of the miasms. Is it not to cold we must recur as the cause why putrid fevers and gangrene are so rare in winter; why epidemic dysentery and variola vanish at the beginning of that season; why the plague itself more rarely rages at the approach of winter, and seems even to be extinguished? In an excellent memoir on the complication of wounds with ulcers, known under the name of hospital gangrene, M. Delpech says, that in the epidemic of the Hospital of St. Eloi at Montpellier, the casements of the wards were left open at night, notwithstanding the season being winter, and that it was near those openings, where the air was oftenest changed, that the disease showed itself stationary, or less active in propagating itself in the vicinity. Thus in all fevers and other putrid and contagious diseases, free access of external air, currents of air, washing of the rooms very early in the morning with cold water containing vinegar or common salt, frequent changes of bed and body linen, exposure of the furniture of the sick to cold air day and night, &c. are prophylactic measures which it is of great importance not to neglect.

lost as it were in practical authors, should, I am persuaded, long since have suggested the idea of applying cold in ague, and it is to their perusal probably, that English physicians owe their being the first to have applied it in that sort of fever. In the *Anc. Journ. de Med.* T. xxxv. p. 145, I find the following case, which presents results analogous to those recently observed. A man had a quartan for a long time. Tired of his condition, perceiving himself nothing improved by use of a great number of febrifuges, it occurred to him to plunge into cold water during the heat of a fit, after having passed the cold stage in the sun; he remained in until he felt no more heat of the fever, which never returned.

In the use of cold immersions in the treatment of ague, it has not been the intention of Dr. Currie and Giannini so to employ it in all species of that family, nor directly to attack the disease, but to simplify it and secure the success of tonics. The latter combines cold immersion with cinchona, which is exhibited in the intermission. (*Della natura delle febri*, v. 2.) According to our nomenclature, the Italian physician employed cold bathing of short duration rather than immersion. He left his patients immersed for one, eight, twelve, or thirteen minutes, sometimes even till chilliness supervened. The facts that support this doctrine are very seductive; they have an air of authenticity that will not admit of

the smallest doubt respecting the success alleged. It is in the hot stage that the cold immersion was employed, to diminish febrile excitement, which the Author calls *neurosthenia*.

The patients, having agues of various types, who were the subjects of his experiments, presented, almost all, in the second stage, the following collection of symptoms: pulse frequent, full, vibrating; skin and lips dry, countenance animated, eyes inflamed and brilliant, thirst, head-ach, vertigo, anxiety, somnolency, delirium, subsultus tendinum, confusion of thought, laborious respiration, preternatural burning heat, prostration of strength.

The nature and intensity of some of those phenomena denote, that the fever had in several cases a formidable and pernicious aspect, or threatened to assume such. However, under the influence of cold immersion, the symptoms disappeared, and intermission took place. Those immersions were repeated in every paroxysm. The patient was then slightly wiped and put to bed; he then took cinchona with opium. I cannot avoid relating here the following case entire, from among the fifteen whose histories Giannini has given in the above-cited work.

A young man of robust make, twenty-six years old, was received into hospital the 16th of September, having for three days laboured under symptoms of continued fever, without mani-

fest distinction of paroxysm and intermission. He had great headach ; his eyes were inflamed and brilliant, his lips dry, his respiration at intervals laborious, with a burning heat and arid skin ; his pulse 130°, vibrating, yielding to compression ; occasional, not frequent, subsultus tendinum ; much confusion of thought by day, and delirium by night. The disease was considered a dangerous ague. The patient was consequently subjected to cold immersion, which procured ease as usual. Pulse 102 : cinchona and opium.

17th. Respiration natural ; headach removed, but great heat of skin ; cold immersion repeated produced complete apyrexia : cinchona and opium as before. In the evening cold stage comes on ; cold immersion repeated in the hot stage.

18th. The patient almost apyretic ; completely so after immersion.

20th. Convalescence.

This method of treatment offers the following advantages :

1. It weakens or arrests the paroxysm, and quickly produces intermission.
2. It facilitates the immediate use of cinchona, particularly in remittent fevers of bad character.
3. It prevents the debilitating effects which gain more and more upon the organism, from the repetition of the morbid excitement of the exacerbation.

We must take care to avoid the use of cold in the cold stage ; it would be fatal, as well nigh happened in a patient mentioned by Currie, whom the hospital servants inconsiderately plunged in the cold bath, during the first stage of fever. It would be likewise a mistake, to try to make the cold bath concur as a tonic in the cure of ague. Greater weakness, and relapses would inevitably happen. Many examples prove beyond dispute, that lively sudden impressions have permanently cured ague. I have read, I know not where, of a boatman affected with tertian ague, who was cured by falling into the water on the very day he was to have the paroxysm. In certain simple agues, *i. e.* exempt from all complication, and which have been unsuccessfully treated by excitants and tonics, it would not be useless to employ cold immersion half an hour or an hour before the return of the fit, as a perturbing remedy, to break up the nervous habit of periodicity. But this remedy cannot be employed if the patient be too weakly or enervated. The patient should go to bed and wait until the hour of access be passed. An exciting tonic draught might be given. Physicians worthy of credit affirm that agues, which had lasted some time without yielding to any sort of medicine, have been suppressed by immersion in cold water. Currie mentions having succeeded in altogether preventing the paroxysm, by employ-

ment of the cold bath, for some days successively, before the hour it was expected.

Several clinical observers relate cases of agues, the paroxysms of which were removed by the influence of a humid cold atmosphere alone. In this case, immersions will have the additional decided advantage, of fortifying the cutaneous system against the mischievous influence of that constitution. Huxham mentions his having observed, that there is nothing better for preventing relapse, after agues prolonged by this cause, than the use of the cold bath and roast meat, a treatment whose success would be farther secured by addition of good wine.

H. Slow Fever. The cold bath or simple immersion by no means suits equally all cases of slow fever. The variety of its causes, by making so many species or varieties of it, makes a peculiar treatment necessary in almost every case. Respecting the use of cold in this fever we find little precise remark. Galen was acquainted with no remedy for hectic fever but the warm bath; and he closed the treatment with cold bathing: "*In hecticis vero febris, id quod remedium offert, calidæ solum non est, sed frigida.*" We have elsewhere quoted that observation of Morton, of the old man whom the cold atmosphere of winter cured of the hectic fever that consumed him in summer. Dr. Saunders (Saunders?) mentions having derived great advantage from

cold bathing, in a sort of irregular slight fever which attacks healthy persons. Huxham recommends the cold bath as a remedy for that slight quickness of pulse or febricula that remains after acute diseases, and often denotes the commencement of a slow fever. The state of the patient is marked by paleness, loss of appetite, and atonic sweats that exhaust him, particularly at night. Every thing favours the opinion, that in such cases cold immersion might be very useful, and prove tonic.

Fevers in their progress present important symptoms, which may, with much success, be combated with cold applications. It will be proper to give a particular account of them.

1. Headach. The erethism that characterizes fever, particularly of the bilious kind, requires refrigerant *topicals* to check it. An embrocation of ether is applied to the forehead or temples; linen clothes soaked in oxycrat are applied to the same parts; bags of snow or pounded ice are applied to the head, or perhaps a cap soaked in cold water.

2. Delirium. When in bilious fever there is bright redness of the face and eyes, strong pulsation of the carotids and temporals, constant watchfulness, great heat, tossing, full and vibrating pulse; and in inflammatory fever, when we want to prevent the supervention of delirium, after critical symptoms, we must use the same

refrigerating means as against headach. In the Comment. Lipsiens. V. 2. Pars 2. p. 663, we find the case of a man addicted to wine, in whom a fever declared itself with great headach, burning heat, ardent thirst, hard pulse, subsultus tendinum, and hiccup. After four bleedings there happened a remission of the febrile symptoms, but then appeared delirium and convulsions. He was bled in the jugular, got enemata of cold water, and had a bladder filled with it applied to his shaven scalp; and, finally, the patient was plunged for an hour and a half in a cold bath; he was put to bed, slept, sweated, and ten days after recovered his health entirely. In the epidemic at Naples, Sarcone allayed the phrenetic delirium by ventilation and snow water. Even when febrile delirium was accompanied by stupor and prostration of strength, Cirillo had snow and ice introduced forcibly into the mouths of the sick. Marcellus Donatus relates, that a man attacked with fever fancied, in his delirium, he saw a lake in the middle of his chamber, and entreated to be permitted to bathe in it; after some refusals the physician suffered himself to be prevailed on; the patient rose, and the sensible improvement suddenly effected in him, leaves no room to doubt, that the impression of the cold floor was the cause of an advantageous change so striking and rapid. Does not this instance warrant the application

of cold to the feet in delirium? This revulsive and perturber of the cerebral excitement, offers no real inconsistency with the advice given by most practitioners, to apply heat to the feet during the action of cold on the head. It will be particularly useful, in a species of delirium that depends on a viciously increased sensibility. Sarcone procured a calm, in such cases, from immersion, or from the cold bath continued for some minutes.

When, in fevers, there arises a violent nervous erethism in a strong and vigorous subject, characterized by convulsive motions of the limbs, spasmus cynicus, violent headach, forcing cries from the sufferer, redness of the eyes, delirium, &c. warm semicupia and napkins dipped in cold water, applied to the head, are the true means of removing that state. Pains must be taken to maintain the tepid temperature of the bath, and to retain the patient there for three, four, and even six successive hours. Feuilleres (*Comment. Lipsiens. V. xix. Pars 2, pag. 6.*) states, that he visited a sick man who raved, whose body was stiff, and who had convulsive motions of the upper extremities, and spasmus cynicus, with a natural pulse. The attending physician despaired of him, and as a last remedy, had prescribed coffee. Feuilleres ordered the head to be shaved, and clothes soaked in cold water to be forthwith

applied. After three applications the convulsions ceased, and the patient was restored.

3. Plethoric Congestion of the Head. This may proceed directly from exaltation of the vital properties of the brain, which attracts blood in greater quantities, or else from an impetuous movement towards the head, or even from a state of atony and stupor, that permits this fluid to stagnate, to distend the vessels, and compress the brain : this state is combated by similar cold applications. We must however attentively watch the automatic movements of nature, and use great caution in the employment of cold.

4. Stupor. This pretty common symptom of fever may extend from somnolency to coma, or carus the most profound, in which there is general torpor and loss of motion and feeling. This symptomatic affection has probably its seat in the head, the brain being seriously affected ; but we are far from always knowing the true cause that plunges that organ into such a state of stupor. Profound and durable torpor always denotes danger. The alarming symptoms offered by the circulation, respiration, and locomotive powers, are but secondary to the soporose affection. The patient must be quickly extricated from a state which aggravates his disease. The practitioner, who will, with reason, suspect every appearance of somnolency, will institute an active practice, in stupor carried to a very high degree. To

combat this symptom, which occurs particularly in the second and third stages of fever, and which appears also in many other complaints, cold applications, employed as excitants and perturbors, are preferable to local and general bleedings, which, in more than one case, must be opposed to the end truly indicated, and which always increase the debility. It will be proper, after shaving the head, to practise very cold pumping and affusion on the part, and to employ ice or snow frictions, which are to be repeated occasionally. Some practical observations have enabled me to estimate the great efficacy of that plan, and taught me to regard sharp cold as very suitable, by the activity of its operation, to extricate the brain and its dependencies from the stupor that enchains them. In the 18th volume of Sedillot's Journal, p. 64, we find the history of a soporose affection, with loss of feeling and motion, in an infant of six, who had variola. The exanthematic disease began with very violent headach; towards the sixth day the stupor, at first slight, degenerated into torpor: the young patient was then in a state of absolute insensibility; the eyes were open and fixed; the pupils dilated and insensible to the strongest light; the jaws closed, limbs flaccid and hanging, neck flexible, complexion highly coloured, respiration free, pulse quick and confined, skin burning. It is perhaps of importance to observe, that, before

the attack, the child had had a fall, in which the forehead principally suffered, and every exciting remedy used to remove the coma was without effect. On the 22d day they shaved the scalp, and let fall on the parts several small streams of cold water, with the addition of a dram of mur. ammoniæ to each pound of liquid. On the same day there were motions of the eyes, and slight contractions of the pupils. The same *douche* was repeated daily, increasing the height of the fall. The patient returned gradually to itself, and perfectly recovered.

M. Recamier has employed the cool bath, for some minutes in a case of cerebral fever. The infant who was the subject (Thesis of Dr. Pavet above cited,) fell, at the moment of the fit, into profound coma; there was extreme dilatation of the pupils; the pulse was small and moderately quick; the skin hot; the patient occasionally shrieked, and was violently agitated: affusion, the bath for five minutes, and enemata of cold water, produced salutary effects. The effects were, immediate diminution of temperature in the skin and colour in the face, and cessation of stertorous respiration. The repetition of the bath and of the affusion, gradually cooled, at the outset of the paroxysms, weakened more and more the tendency to stupor. Convalescent.

The same physician has employed ice, affusion and bathing, in a violent bilious fever, on a

young person of twelve or thirteen, in whom the delirium lasted till the 11th day, from the use of exciting medicines. Stupor then came on, and the following day M. R. was called in. The symptoms presented by the patient are thus enumerated: supine posture, profound sleepiness and stupor, extreme dilatation of the pupils, great sensibility of the retina, deep circumscribed redness of the cheeks, deafness, hurried respiration, crude limpid urine, fæces without consistence or cohesion, skin dry and burning, pulse extremely rapid and 180 in a minute, upper extremities relaxed and insensible to tickling and pinching. The bath of cool well water was employed for several minutes; thenceforth diminished frequency of pulse; no more strabismus or dilatation of the pupils; recurrence of symptoms obliged them to have recourse several times to cold applications. They ceased entirely at length; a sort of crisis took place, and the patient became convalescent.

Thus in idiopathic somnolency, with or without fever, and unaccompanied by burning heat of skin, very active momentary cold applications to the head are the only proper remedies. The cool bath is proper when there are symptoms of general excitement. The cold bath would be too active, and might, in cases difficult to specify, be injurious, by increasing the cerebral affection.

The application of cold should, I think, be of great use in the variety of ataxic fever, denominated soporose ague, whose distinctive character is a profound carus-like stupor, which increases, diminishes, and re-appears with the paroxysm, and which renders patients in a high degree insensible to the strongest stimuli. I think the affusion of iced water, or iced aromatic camphorated wine, on the head, might be very useful during the intermission, and prove an admirable adjuvant to cinchona, in preventing the return of the paroxysm, which is often mortal.

5. Meteorismus. Almost all the varieties of this symptom require cold applications; they will prove particularly efficacious in the following:—

A. In Meteorism depending on Irritation.—It occurs in the first stage of the disease; it sometimes also arises from subsequent irritation. It is announced by sharp pains, intense internal heat, and great sensibility of the abdomen: this is one of the most formidable symptoms, if it do not yield quickly; purgatives are improper; they are even quite inefficacious, as are enemata also; it is combated with demulavemens of cold water with mucilage, and cold fomentations, frequently repeated, over the entire extent of the belly and loins. Hippocrates says, De Inter. Affect. cap. xlii. *cum ardor tenuerit lintea fri-*

gida intenta quâ præcipue parte ardere dixerit, admoveo.

B. In Meteorism from Irritation and Collection of Bilious Putrid Matter. Those matters ferment, owing to the heat, which exceeds that of health; they maintain the distension and inflammation of the bowels, and may even cause them to pass into gangrene. As the atony or exhaustion of those viscera depends on erethism, it is necessary to restore their peristaltic motion; for this purpose ice frictions are made on the belly; fomentations of acidulated iced water are applied; iced lemonade, or iced wine and water is given. If obliged to purge, we prescribe iced lemonade with antimony, or Epsom salts with nitre dissolved in cold water.

Stools appear sometimes spontaneously, with emission of fetid gasses, by the single agency of cold fomentation. Tissot mentions, that in a patient attacked with bilious fever, there arose such a meteorism in one day, that respiration became extremely laborious; the pulse was small, the head clear. He had linens soaked in cold water applied to the belly, and renewed every quarter of an hour. He at the same time ordered ℥ iij of cold water to be drunk at each repetition of the fomentation. At the end of two hours the meteorism ceased; a slight colic and borborygmi occurred, abundant bilious sweats followed, and the patient rapidly recovered.

Meteorism, even at its highest degree, should not make the patient be despaired of; cold may, even in this case, be regarded as the anchor of safety. A case inserted in vol. ii. *Annales de la Soc. de Med. de Montpellier*, p. 158, shows how far cold water deserves our confidence. The patient was in the twenty-first day of a bilious adynamic fever. The symptoms were; belly enormously swollen; face void of expression and of a yellow leaden colour; pulse slow and sunk; respiration deep; sharp pungent heat; extreme anguish; pressure on the hypogastrium or epigastrium, caused audible movements in the intestines, from one of those regions towards the other. The whole belly was enveloped in linens soaked in cold water, and fetid bilious stools were excited some time after. The patient recovered.

C. In Meteorism from Atony—we recommend ice friction, good wine mixed with iced water, cold tonic remedies in small quantities. *

* One of my colleagues, a military surgeon, told me, that in a case of atonic meteorism from worms, in a child whose belly was puffed up extraordinarily, and who seemed in danger of suffocation, he obtained the greatest success from applying to the belly a large cataplasm of pounded ice, rue, acetic acid, and muriate of soda. External cold applications, with iced water for drink, would not, probably, be useless in some cases of worms in the bowels. Goetze says, the copious drinking of cold water has helped to expel tænia. To expel that tenacious worm, Rosen advises drinking a great deal of cold water immediately after the action of a purgative.

I shall here add some remarks on meteorism, and tympanites which is related to it, and which offers new proofs of the efficacy of cold, which acts, in both cases, not only by condensing the tissues, and preventing their excessive dilatation, but also by a physical effect very rapid and sensible, consisting in the condensation of the hot rarefied air which distends the intestines and the abdominal parietes. This air is found to be reduced to a much less volume by abstraction of caloric; it then permits the parts to double upon themselves. The effect is the same, as we shall see, in the case of the inflated gut in hernia. In flatulent colic, this condensation of air is likewise manifest, where the patient is relieved by an iced drink and cold applications to the belly. Richerand says, that grapes eaten to excess, ferment and give birth to so much carbonic acid gas, that the elastic fluid overcomes the resistance of the intestines, and causes a sort of meteorism, which is dissipated by drinking cold water, which, besides absorbing and condensing the gas, prevents its further disengagement by arresting fermentation. Zacutus Lusitanus made tympanitic patients drink a great quantity of iced water, and recommended them at the same time a cold regimen. Combalusier, in his history of windy complaints, relates the case of a tympanitic girl, who regained her health by bathing in cold sea water. He adds, that a friend of his, by name Rast, cured a woman of tympanites,

by internal and external use of iced water. According to Pomme, cold applications are very efficacious remedies for hiccup, constipation, and vomiting depending on that state of the belly. He cites a case of tympanitis complicated with quartan, in which he had cold fomentations applied, and gave iced chicken broth. If constipation has existed for several days, as happens in nervous affections, it would be advantageous at first to facilitate the evacuations by oily demulavemens.

6. Petechiæ. Those spots are formidable symptoms in typhus, whether contagious or non-contagious. Cold washing of the body has been successfully employed; also envelopment of the patient in a linen cloth, soaked in cold water and vinegar half and half, or even pure vinegar, as Samoilowitz was in the habit of doing in the plague of Moscow, a measure which he persevered in until the petechiæ disappeared. Dr. Dewar cured a young man, attacked by spotted or petechial fever with violent epistaxis, by having him placed in a cold water bath. Allion covered with ice from head to foot, a man who, in malignant fever, had purple eruption with very bad symptoms. Respiration became free, the pulse rose, delirium, anguish, and cold sweating ceased. A critical sweat terminated the disease.

7. Sweating. In speaking of fever, we have

already touched on this subject. When sweating is too abundant, this arises from considerable relaxation of the skin, and a state of great weakness. We succeed in diminishing them without danger, by cold air often renewed, and by frequent changes of cold bed and body linen. Tonic drinks must be exhibited, Bourdeaux or Oporto wine mixed with iced water. In excessive sweats that exhausted the patient in adynamic fever, Avicenna had cold water or snow applied to the lower extremities. Crescenzo says, that cold unctuous sweating, along with coldness of the extremities, indicates the use of cold water, not however in such abundance as he advises: it checks the sweating, warms the body, and raises the pulse.

II. PHLEGMASIAE.

This class of diseases is remarkable for an exaltation of the vital properties, and an augmentation of organic activity more or less considerable. Cold, as a refrigerant, sedative and debilitant, allays their symptoms, and arrests their progress. The father of medicine frequently employed cold water, in nascent inflammations accompanied by excessive heat: "*Partes quæ inflammatione patiuntur refrigerandæ.*" Physicians of every sect and country have tried cold

water in inflammatory complaints. Sydenham ordered, as a superior remedy, that patients should get out of bed often, and even dress lightly, and so rest themselves for some time. However we cannot with prudence generalize hastily: proper distinctions must be made. Cold is more proper for false or erysipelatous, than true or phlegmonous inflammations. In the latter it is only theoretically proper. The inflammation, once established or rooted, is too far gone to retrace its steps; the disease must then end by coction. Cold would but aggravate the symptoms, or cause termination by induration or gangrene.

a. Exanthemata. In acute exanthemata cold has long been in use. Bartholinus ordered very cold water in variola. Theden used cold washing of the body. Sydenham most loudly condemns stimulants, and treats at great length of cooling drinks and exposure to cool air, in that disease, in order to diminish the inflammatory heat, and prevent the weakness, convulsions, and coma. Zimmerman mentions having been called, in winter, to prescribe for an infant of a distinguished family. He found the little patient labouring under confluent small pox, and delirious. After a stiff encounter with the solicitude of a weeping mother, he immediately had the fire extinguished, the curtains opened, as also the doors and windows; he then placed the in-

fant on the snow at the casement. The delirium declined forthwith, the fever moderated, and the parents recovered hope of preserving a darling child. Ingenhouz did as much at Vienna: he found a variolous infant patient in convulsions, which ceased a few moments after it was exposed to cool air.

It appears that cold is useful, in proportion as the pock is confluent, and threatens to become malignant. When cold air and cooling drinks have failed to diminish the violence of the inflammatory systems, the disease is liable to assume a bad character. If the eruption be very abundant and difficult; if the pustules be small and pale; if the pulse be frequent and concentrated, or if there are threatening convulsive symptoms, then, says Odier, (*Man. de Med. Prat.*) the most successful plan is that of stretching the patient naked on the floor, and pouring over his whole body cold water from a watering pot; after which he is to be wrapped up in a woollen cloth, and put to bed: at the same time we must employ every thing calculated to revive vital action. According to Cullen, we cannot determine how far cold drinks, continued throughout the disease, may be useful; he further observed, that when the pustules were numerous, and angina and salivation supervened, acidulated cold drinks caused death; but tepid drinks, on the contrary, were very useful.

Currie has employed lemonade and cold affusion in the eruptive fever: great refreshment, according to him, results from them. He advances facts, proving that the fever was quite subdued, for the incipient delirium ceased, and quiet sleep supervened. In his first case he remarks, that the affusion was repeated three or four times in twenty-four hours. The eruption was favourable; there was but little secondary fever, and the patient quickly recovered. From that he infers the utility of cold affusion, particularly when the eruption is confluent. Cold drinks offer the same advantages. Edward Ives, an English surgeon, who remained a long time in Bengal, relates, that from the moment a person is inoculated, he is bathed three times per day in cold water, that a very cooling regimen is prescribed for him, and no other drink than cold water is allowed him. According to Werlhof and Cotugno, cold tonic washing, and the action of cool air, are very useful in the third stage of variola, and particularly in the secondary fever, to remove the relaxation and flaccidity, and to subdue the adynamic element which hurries on the disease with a march extremely rapid.

Kæmpfer speaks of the advantages of cold water in the measles. It appears that moderately cold applications may be useful, when the cutaneous excitement is not vehement.

Cold water affusions appear to have been use-

ful in scarlatina, particularly where intense symptoms denoted a severe disease, and seemed to give it a malignant character. Dr. Gerard has used it in the first stage, and mentions having seen very good effects from it. Those affusions offer no advantage, I think, in the second stage, or after efflorescence is once manifested, unless the inflammatory symptoms persist. In a Thesis defended by M. Bruere before the Medical Faculty at Montpellier, respecting an epidemic rubeola and scarlatina which prevailed at Brest, the Author says, that in one case of scarlatina, there was such lively excitement of the whole system, and such insupportable heat of skin, that the patient felt himself broiled. The symptoms were checked with advantage, by plunging the patient several times for five minutes into a cold bath. In the work of Giannini there is a very interesting observation to be met with, of the effects of cold water, which he had tried himself in a case of very bad scarlatina. (Op. Cit. T. 2, P. 319.) In some cases, an exanthema that had *gone in*, has been recalled by cold washing; a bold practice, which however seems rational.

b. Cutaneous Phlegmasiæ. Those demand great judgment in the use of cold, as it may prove as quickly mischievous as it is capable of being useful. Should we, like the English, apply ice to phlegmon and erysipelas without distinction? Avicenna and Paré had, it is true,

before them, made use of cold applications in such cases ; but instances of bad success quoted by authors, evince that that method, employed with a view to moderate local inflammation, is not always proper. Hagendorn states, that a woman affected with erysipelas in the face, having applied linen soaked in cold water to the part inflamed, derived transient relief from it, which however was followed by frightful delirium, and finally death. Hoffman mentions a similar case, in which the same measure caused inflammation in the throat, which put the patient in the greatest danger. It appears then improper, to apply cold remedies to symptomatic erysipelas from internal cause, because they act as repercutients or perturbants. Desault advised, that no topical means should be used, but that the part should be simply exposed to the air. The heat is however sometimes so sharp, burning, and insupportable, as to make the patient wish for ease. There would be no inconvenience, I think, in moistening the whole erysipelatous surface with cool distilled water, or in ventilating it.

Cold applications, often renewed and long continued, may, as debilitants, be useful in eruptions from external causes, in idiopathic erysipelas, as that from insolation, from the action of acrid irritating things on the skin, from the strong heat of a focus or furnace, &c. M. Bertrand, the physician, told me, that on the first

day's march of the French army in Egypt, almost all the soldiers experienced an eruption of little pustules on the forehead, which caused intolerable itching. A part of the troops marched along the sea, but afterwards followed the Nile. Frequent washing first eased, and at length removed entirely this eruption. I have seen an erysipelas in the leg, occasioned by the acid vapor exhaling from an ant's nest, near which a young botanical student had reclined: cold water alone cured him. The same remedy is recommended for the phlegmonous erysipelas, caused by the highly irritating hydrogenous gas, which exhales from the *toxicodendron* or poisonous sumach. It may be employed likewise for the stinging of nettles.

The rubbing of the nates causes, after a walk either long or rapid, an erysipelatous inflammation of the circumference of the anus, with sharp itching pain, excoriation, and tumefaction of the external hemorrhoidal veins; this affection, though trifling, incommodes greatly in walking. I have known hemorrhoidal tumours, in soldiers, pass into the inflammatory, and after into the suppurative state. Nothing is more efficacious, as a curative and preservative remedy, than washing with cold water, and applying between the nates a sponge or linen soaked and often renewed.

At the military hospital of Tarentum, a cannoneer, of the second regiment of foot artillery, presented himself with very considerable erysipelas of the scrotum and teguments of the penis, which was in a state of almost perfect erection; he confessed that it was caused by a sort of animal that floats in the sea, with which one of his comrades had advised him to rub his genitals, to see the singular effect of it. He felt a burning itching and great uneasiness; the permanent application of cold water allayed the inflammation. The animal in question is a sort of mollusca, almost gelatinous, of a dull white colour, having on its free or floating edge, an amethyst blue or bright purplish zone; it travels in shoals in our seas, following the current; the waves frequently throw it up, and leave it dry on the shore; it is called sea-hat, or sea-nettle. In the Crimea, I had a second opportunity of convincing myself of the irritating quality of this mollusca. A young Russian officer, in whose company I was on a pleasure party, put one weighing nearly fifteen pounds, into his handkerchief, to show it to some ladies; a servant was ordered to wash the handkerchief; as soon as dry she returned it to the officer, who used it, and was not a little surprised in the evening at sneezing every instant. In the night, an erysipelas attacked his nose and the whole lining membrane of the

nasal fossæ. Recourse to cold water, to which I advised, had the same success as before.

I shall further relate a fact observed on my own person, in favour of the agency of cold. Travelling in 1799 on the coast of Genoa, in the midst of summer, I was obliged to pass the night in a room without windows; overcome with fatigue, and tormented with heat, I slept stretched on a bed without clothes or shirt; on awaking, I found myself cruelly bitten from head to foot by gnats; the pruritus I felt was very painful, and I had a general sensation of burning heat, which harassed me and gave me not a moment's repose. I ran immediately to throw myself into the sea; I took the bath for an hour and a half; the relief was instantaneous; in the evening I took another, and all the little erysipelatous phlegmons that embossed my body, vanished.

Thus cold water and ice are the best local sedatives for the bites of all insects. It is proper to keep the part immersed for one or two hours, or longer if necessary, until the cold shall have overcome the pain and erethism.

A burn is, of all cutaneous inflammations, that which most promptly and imperiously demands the use of refrigerants. Cold acts less against the cause than effect; it prevents afflux of humours, and opposes the inflammatory process, which it even cuts short; this method is appli-

cable to the first and second degrees of burns. I have much regretted, that in a case of burn of the trunk and upper extremities, in an hospital servant, who in descending the stair, received on the body a bucket full of broth coming from the boiler, the head surgeon of the hospital where I then was, did not persevere long enough in the use of cold applications, to allay the pain and prevent inflammatory re-action. The whole extent of the scalded part was denuded of its epidermis, reddened, and rendered extremely sensible. This unfortunate man sunk the ninth day, under the cruellest pains, which I regard as the true cause of his death. *

* When re-action has begun, we may still hope for success from cold applications ; but if it be at its acme, if by its action, or by that of the body that scalds or burns, the epidermis has been detached, or the substance of the skin affected, and large eschars have denuded the aponeuroses muscles, or their tendons, the pain accompanying that state, is excessive ; it feeds the inflammation and suppuration, and rapidly wears out life by its duration, and by its increase during dressing, particularly when the burn is general, or very extensive. It is useful to lull it, as far as possible, by means of the tepid bath, prepared with decoction of mallow, night-shade, and black henbane, in which the patient is to be put for a short half hour before each dressing. It was thus I saved two sailors, who, in a fete, given on the water, to Prince Eugene, by the town of Ancona, had their whole bodies horribly burnt from the explosion of a barrel of powder. A third sailor, victim to the same accident, but treated by another surgeon, who did not use the tepid sedative bath, miserably perished.

In idiopathic phlegmon, topical cold suits only the commencement. Pain is the food of inflammation. The essential point is to allay the one in order to remove the other : *Principiis Obsta.* We can extinguish whitlow, by keeping the part, from the moment the pain becomes sensible, for some hours immersed in iced water. It is easy to cut short the venereal fluxion to the testicle, if, on the appearance of the first sign of disease of that organ, instead of emmollient poultices, and other hot and relaxing applications which favour it, we use cold affusion, or apply wet linen, or cataplasm of cold herbs. The sedative and perturbing effect on the fluxionary movement, prevents with certainty the local engorgement. Might we not, by aid of an ice poultice, prevent the formation of symptomatic cynanche parotideæ, the increase and suppuration of which is with reason dreaded ?

c. Muscular and Articular Phlegmasiæ. The pretended powers of the Sicilian Capuchin, (B. M. di Castrogianna,) at Malta, in the use of ice for rheumatism ; the advice of Celsus to apply cold water in gout, when the part affected is red and swollen ; the counsels of Homberg, Floyer, Pietsch, &c. to use the cold bath in that complaint ; the example of Stoll, who prescribed cold water internally and externally, &c. &c. have not yet carried conviction to every mind, nor determined practitioners to employ that me-

thod, either for the cure of the essential constitutional disease, or to moderate its symptoms. Dr. Giannini has, of late years, confirmed the success of cinchona, in weakening and cutting short the gouty fit: he has, in fact, advanced new proof, that gout and rheumatism are not essentially phlegmasiæ, but atonic constitutional diseases. But should we believe him when he attempts to prove, that cold immersion is one of the best adjuvants in cutting short the fit, and procuring intermission, by subtracting caloric, and at the same time removing distension, the cause of the pain, and other symptoms? He even says, that in febrile paroxysms, of degenerate gout with inflammatory symptoms, such that the disease seemed at certain intervals to assume an acute character, he has derived great advantage from cold immersion. I may, I think, with great justice ask, if it is not acting against the principles of a rational and prudent practice, to employ for the cure of a disease, an agent, which is its most frequent efficient or aggravating cause? Daily observation shows, that gouty and rheumatic persons suffer from cold impressions, during the attacks of their distressing diseases, and congratulate themselves, on the contrary, on the good effects of moderate warmth. Although the symptoms of those acute inflammations, of which the muscles and fibrous tissues of the joints seem the seats, apparently indicate local refrigerants,

and though the aphorism of Hippocrates (25. § v.), leaves no doubt as to their efficacy in allaying pain and lessening tumefaction, we still must not allow ourselves to be misled by their sedative effect, but reflect, that the quick suppression of a gouty fit is apt to aggravate the complaint, to the great detriment of the patient; that the perturbation caused by cold, may disturb the order of fluxionary movement, and by metastasis displace the humour or material product of the disease, and thus obstruct a salutary crisis. In such a case, the sedative effect of cold will never be more than an apparent and delusive change. The observations of Giannini show us, that he has well profited by the counsel of Hippocrates; but in combining cold immersion with cinchona, in the treatment of benign gout, this physician has not given a sufficiently just idea of his method; he has not brought forward any cases of cure without return of constitutional disease, nor of bad success which must have attended cold immersions, as well as every other remedy. Besides, in opposing the course of the malady, or suppressing one, may not cold occasion another? Weikard mentions a German Baron, who became subject to frequent asthmatic paroxysms, from having, by advice of an Englishman, put his feet in cold water to rid himself of a gouty fit. It is then wiser to abstain from the refrigerant method, as well in gout as in rheumatism.

d. Inflammation of Serous Membranes. In this class of inflammations cold applications are of no use, but on the contrary very hurtful. Cold, acting only sympathetically, would increase the fluxion. A woman lately delivered, and labouring under symptoms of peritonitis, was immersed in the cold bath, instead of the warm as advised by M. Recamier. The patient fell immediately into delirium, with slight coma, which lasted thirty-six hours; she recovered her senses, but the pains persisting, she died. (Mercier: *Sur les Bains*, Paris, 1815.)

e. Inflammations of mucous Membranes. Mucous membranes are susceptible of two sorts of inflammation. Cold, it is well known, does not suit those of catarrhal nature; it exasperates the morbid state, or it causes another disease. I have often known engorgements of the testes occur, in soldiers who had inconsiderately bathed the penis in cold water. At Odessa I was called to see an old Genoese merchant, many years affected with catarrh of the whole mucous membrane of the throat and lungs. Tormented with thirst, he rose, in winter, and drank copiously of cold water. Thence suppression of the habitual catarrhal spitting: in the morning, on getting up, spontaneous weakness, vertigo, paleness of face, loss of consciousness, heartburn, suffocation, *râle*, small pulse, cold extremities. Hot exciting applications, and a large blister between the

shoulders, removed the danger of his condition ; expectoration was re-established.

It has thrice occurred to me, to observe catarrhal inflammations protracted, when declining, by too prolonged use of warm gargles. I observed it first in myself. I was annoyed to find, on the tenth day, a cold in the throat not cured. A constant spitting fatigued me, and I felt at the narrow part of the gullet, an unpleasant sensation of swelling and sharp heat. The use of warm gargles I then abandoned, substituting cold water. Twelve hours after I was well. The same occurred to an Arnaut captain, who was in the fifteenth day of the disease. The tongue was clean and whitish ; there was a little fever, and the cure was protracted. The back of the mouth was of a lively red ; the velum, pillars of the palate, and tonsils, presented œdematous swelling. I advised the patient forthwith to abandon hot gargles, and throw off some fur he had kept about his neck from the beginning of the complaint. A gargle of cold water, to which I had *mur.ammoniaë* added, (3 ss. to lb iij.) was sufficient to change the state of the throat, and effect a quick cure. Observation discredits the happy effects, that physicians say they have obtained from cold water, in drink and lotion, in incipient cattarrhal inflammations. If it has been useful in dysentery, we must suppose the disease to have deviated from its catarrhal nature,

and to have assumed a very intense bilious character, or that it approached to enteritis. Helbigius, who wrote on the curiosities of India, mentions that the people of those countries recommend washing in cold water, in almost all diseases, particularly in fevers and dysenteries, and that the practice is very useful to the sick. He states that he was greatly harassed with an effervescence of bile and fever : headach, sleeplessness, looseness, and gripes, had exhausted him. He adopted the plan of washing in cold water. After the first washing he was better ; some more restored his health.

At Palma Nuova I treated a grenadier of the ex-106th Regiment, for an exquisitely inflammatory dysentery. The patient with pain effected some small bloody evacuations ; the belly was swollen, tender, and burning ; the pulse quick and hard ; thirst very great. I prescribed a light mucilaginous emulsion very cold ; I had a fomentation of cool water with nitre applied to the belly. The patient got great ease, and was quickly cured. Heurteloup, in one of his Notes to Giannini's Work, Tom. 1, p. 96, says, that in virulent gonorrhœas, when the inflammation is at its acme, and there is spasmodic contraction and extreme sensibility of the urethra, the best remedy to ease those symptoms, is the repeated use of injections of cold water, and lotions of the

same ; he affirms he has always derived advantage from them.

Acrid irritating substances introduced into the mouth, or masticated, cause inflammation, which sometimes extends to the pharynx and larynx : cold water subdues it admirably. Some years since, on a botanical excursion to Monte Baldo in Italy, with an intimate friend, I carried in my mouth and thoughtlessly chewed a morsel of fresh bark of *Daphne Mezereon* : half an hour after I felt, through the whole mouth and posterior fauces, a sharp heat, that became burning, with thirst and painful feeling of constriction in the throat. My voice became hoarse ; for two-thirds of the night I could not close an eye. I gargled constantly with cold hydrogala, and frequently changed a handkerchief that I soaked in cold water and applied to the front of my neck. The irritation was lulled, and I prevented, without doubt, an exquisite sore throat, that would have inevitably followed.

Experience proves, that powdered ice applied round about the jaws, and cold acid gargle, moderate ptyalism, and allay the inflammation of the mucous membrane of the cheeks caused by mercury.

Cold epithems have been praised in ophthalmia. Bartholinus states that a physician, his colleague, cured himself of ophthalmia by the application of a snow ball. Cold *topicals* are, I think, improper

in specific ophthalmies, or those depending on an internal cause, as well as in those of a catarrhal nature. Every thing, on the contrary, confirms their utility in acute idiopathic ophthalmia, provided they are employed at the commencement of the disease, and during the very action of the cause that may have given rise to it. A child looking on at hodmen working, received a morsel of mortar in the eye : it was bled, purged, emollient *topicals* were applied, bathing was employed ; all without success. I was consulted, and discovered that the child had totally lost the use of the eye. Here however is an accident that might easily have been prevented by the ready and prolonged application of cold water. Thus, in case of introduction of any irritant into the eye, even after its extraction or expulsion, we must immediately have recourse to cold water ; it is the true way of dissipating pain and redness, and of preventing an inflammation, the course of which is not always exempt from danger. Cold applications are, for the same reason, proper after the operations for fungous tumours of the conjunctiva or caruncle, for pterygium, and for albugo, &c. after cauterisation of the cornea with lunar caustic. It appears to me there would be great benefit derived, with a view to prevent the inflammation that so often frustrates the operation from cataract, from applying and carefully changing a fine linen cloth soaked in cold decoc-

tion of henbane or night-shade, for the first twelve or twenty-four hours, over the whole orbitary region.

Cool water is the sole topical remedy with which the eyes should be washed in variola. Ophthalmy becomes sometimes atonic, and the sick, who know no more of the cause than the unskilful physician, are surprised to find so simple a complaint linger so long. The abuse of hot *topicals* and of clothes kept so long applied as to become heated, and the warm air of the apartments themselves feed the atony of the vessels and cellular tissue of the conjunctiva and eyelids. The momentary action of cold water and air are then advantageous.

f. Phlegmasiæ of Parenchymatous Organs. Cold suits but very few parenchymatous inflammations. The ancients proved long since that it was mischievous in true hepatitis.

Sarcone (Mali. Osserv. in Napoli, T. 1, p. 228.) condemns keeping the chambers of patients shut in peripneumony, and preventing free access of external air. He says cool air should be admitted, but without blowing directly on the sick. He praises cold drinks, and even in some cases snow. They are most proper, no doubt, at the height of the inflammation, when there is great internal heat and extreme thirst.

Cold is of acknowledged use in inflammation of the brain and its membranes. The whole head

is covered with a large cataplasm of pounded ice, and constant free access of air is allowed. Cold *topicals* have been advised in the first stage of hydrocephalus likewise, when there is excitement and turgescence in the cerebral vessels.

What authors call cerebral fever, seems rather an acute affection of the brain, with symptomatic fever, terminating sooner or later in apoplexy. This view is confirmed by our finding after death, the meninges red, the vessels injected, and serum effused under the cranium or in the ventricles. Before cerebral insensibility appears, there are sometimes symptoms of local excitement of short duration. The headach is sharp ; there is thirst ; the eyes are red and watery ; the face is animated and the patient raves. In such cases, cold applications to the head will be as useful as in cephalitis. If there be general excitement, a bath agreeably cool will be very useful.

III. HEMORRHAGIES.

Those constitute the class of diseases, in which the astringent and perturbing properties of cold can be turned to best account. However, before trying to moderate and arrest the flow of blood, we must take pains to ascertain the character of the hemorrhage. We must not hastily arrest that which is salutary in health, and still

less that which is critical in fever or inflammation: that would be to refuse the relief offered by nature, and might cause incalculable mischief. It would therefore be dangerous to have inhalation, by the nostrils, of cold water, or any application of analogous agency, employed in epistaxis from inflammations, fever, or any other case, where the head offers manifest signs of fluxion or active sanguineous congestion. The employment of cold would, in like manner, only aggravate the symptoms in any hemorrhage with general fluxion. Persons affected with hæmorrhoidal flux, have lost that health of which that discharge had been the safeguard, by imprudently washing themselves with cold water in order to get quit of the inconvenience.

It is sufficient for me to have noticed the circumstances required in suppressing hemorrhagies; I now pass to the particular cases where cold applications are proper.

A. Epistaxis is sometimes very troublesome, and may be mortal. It is arrested by injecting into the nasal passages, iced water, to which, if necessary, alum is added, to render it more astringent. Ice, snow, or iced water, are applied to the crown of the head, forehead, or back of the neck. As cold applications succeed better in arresting the flow, when made in a distant place, sudden affusion is to be used between the shoulders, or on the genitals. Van Swieten was

in one case content with ordering linen, folded several times, and soaked in cold oxycrat, to be applied to the scrotum; the effect was rapid. Another measure not to be neglected, is keeping the hands and feet immersed in the coldest water.

B. Hæmoptysis in an hemorrhagy in which the application of cold offers, at once, probability of success and hazard of mischief. The irritation which causes and sometimes sustains it, may be exasperated and bring on pneumonia. However, when hæmoptysis is considerable, and menaces the life of the patient, we must without delay recur to means of arresting it. Of all, cold is the quickest and most effectual; it merely requires prudence in its application. The cases inserted by Renard in the *Journ. de Med.* 1771, show that he has repeatedly cured hæmoptysis, by having pieces of ice held in the mouth, and afterwards swallowed, and even by applying pounded ice on the chest and neck. Gervasius, in his *Treatise on the use of Water*, recommends the application of sponges dipped in iced water, to the chest. M. Gallereux, physician at Tonnerre, has inserted, in *Sedillot's Journal*, a very interesting case of hæmoptysis cured by cold drinks, in a weakly valetudinary of sixty. Besides the symptoms peculiar to hemorrhage, which was abundant and alarming, there were lypothymia, pulse irregular and intermittent, subsultus

tendinum. Prescription: pounded ice with sugar internally; bags of ice on the chest; ice in the hands; iced water on the arms; very low temperature of chamber; doors and windows open: the symptoms ceased and recurred three times; the recovery was complete. M. Sedillot subjoins to that case a fact from his own practice, showing the success he has obtained from cold in an analogous case. He had the patient constantly ventilated, and ordered compresses steeped in iced vinegar, or a bladder of pounded ice to the chest.

Pediluvia by immersion simply, or affusion on the lumbar region, may also be employed. Iced drinks are given, rendered slightly acid or mucilaginous, or in an emulsion, and sweetened to the taste of the sick. When De Haen failed of arresting hæmoptysis by the means pointed out, he prescribed cold water internally. He states, that in one case he premised bleeding, and the patient recovered.

C. Iced drinks have been advised in hæmatemesis. There are many instances of cure extant. In a melæna of which I had the treatment, in the daughter of the Receiver of Contributions at Ancona, a child of seven, I obtained full success from iced drinks, and the occasional application to the epigastrium and umbilicus, of a towel in several folds and soaked in water.

D. In hæmaturia we should give not only iced drinks, but use also cold affusion on the scrotum ; ice is to be applied to the sacrum, hypogastrium, and perineum. The same means will be very useful in immoderate hæmorrhoidal flux. In this last case, good effects will be obtained from ice applied on the margin of the anus, or introduced into the rectum.

E. Uterine Hæmorrhage, at first active, becomes quickly passive, owing to collapse, or defective action of the womb, after abortion or delivery. The organ has lost its contractile force, and cannot immediately return on itself, or returns but slowly ; its flaccidity and inertness maintains the hæmorrhage, and prevents it, although its mouth is open, from evacuating the detached placenta, or a mass of coagula, whose presence causes constant pains.

This sort of hæmorrhage demands immediate medical aid, when too abundant or prolonged, particularly if the patient has been already weakened by any other cause. It is dangerous, say the accoucheurs, in proportion to the blood lost in a given time ; there is then urgent necessity for removing the inertness of the womb, and rousing its contractility by the influence of cold, that its cavity may diminish, and the vascular extremities contract and terminate the hæmorr-

hagy.* To this end, a towel soaked in iced water is to be applied to the abdomen and vulva. Injections of cold water into the vagina and *démilavement* of the same will be equally useful.

If the discharge occur, during pregnancy, to an alarming extent, we must, instead of cold, have recourse to delivery forthwith, by evacuating the waters of the amnios.

The application of cold is reserved particularly for hæmorrhagies after delivery. It often happens that the patient finds herself very weak; iced drinks are not proper then, but there is no counter-indication to cold external applications.

I went lately to see a mason's wife, who about the end of the third month of pregnancy, had two days before aborted, in consequence of a violent effort to carry a considerable weight; she lost by the vulva a pretty considerable quantity of blood; paleness and sunken features announced diminished strength; she had some fever, dry heat of skin and sharp abdominal pains. I first removed that state, which I attributed to obstinate costiveness of which the patient complained, by an enema of decoction of pellitory

* It is so much the more advantageous to remedy that state of inertness of the uterus, in that by preventing an atonic congestion, we lessen the risk of acute or chronic metritis, puerperal fever, and many other affections, that destroy the health of the woman, and for ever deprive her of the pleasure and happiness of becoming again a mother.

with olive oil; I ordered the feet to be kept immersed for some seconds in cold water, to which I recommended the addition of a little ice, and wet towels to be put on the thighs; the flow was arrested. Twenty-four hours after I saw this woman on foot attending to her affairs.

In 1813, I was called to see a French lady settled in the Crimea, who had considerable discharge from the fifth hour after delivery. I found the patient unconscious and very weak; extreme paleness and cold sweat covered her face, her pulse was small and convulsive. I did not hesitate about applying towels, soaked in very cold water acidulated with vinegar, to the belly and inner parts of the thighs, and introducing wet clothes into the vagina. I gave at the same time a draught of aromatic waters of mint and balm, tincture of cannella, and alcohol with sulphuric acid; the hæmorrhage stopped. An hour after that consciousness was fully restored and the pulse rose.

In the *Journ. de Med.* 1776. p. 531, we read the following case, which shows how far we may hope for success from cold applications. Gauthier, surgeon at Versailles, was called to the assistance of the wife of a sutler, who was dying of excessive uterine hæmorrhage, accompanied by spasms and convulsive motions. Recourse had been had to cordials already, and stronger were about to be tried, but he arrived soon

enough to substitute more efficacious means ; he consequently had the dying woman wrapped up in a cloth dipped in cold water ; this remedy operated with such success, that the hæmorrhage and convulsions ceased immediately.

A cold bath of short duration, has been recommended for women who menstruate immoderately. The semicupium, in which immersion as far as the pelvis might be effected, seems to me preferable, for restraining that periodical discharge within proper limits, or suppressing a constant stillicidium.

F. Traumatic hæmorrhagies arise from capillaries, little arteries or great vessels ; those that come in a sheet from small vessels, are easily arrested by cold water, and even by the action of cool air alone. Hæmorrhage from the little arteries, may also cease in the same manner. I know from experience, however, that we should distrust, particularly after amputation of the limbs, the delusive effect of the cold water with which the stump is moistened, to arrest an hæmorrhage apparently trifling, but which reappears with energy after the spasm is over. It is better then after amputations, as indeed after all operations, to wait until the spasm yield and the blood flow, in order to tie the very smallest vessels ; besides, the muscular contraction caused by the impression of cold on the stump, is unfavourable to union by the first intention.

There are some particular cases where ligature cannot be applied, as in hæmorrhage, sometimes following the operation for anal fistula; for this a cataplasm of pounded ice to the margin of the anus, iced injections into the rectum, or introduction of a sheep's bladder to be distended with iced water, are advised.

Cold gargles may be very useful in removing the hæmorrhagies from the mouth or posterior fauces.

Cold arrests hæmorrhage, not only by astriction of the vessels and perturbation of the flow, but also in some cases by the quick formation and consolidation of a clot. In 1800, we received in the military hospital of Pavia, a cannoneer of horse-artillery, who had the left arm taken clean away three fingers breadth above the insertion of the deltoid, in a skirmish, owing to sudden explosion of the piece, which shot away the sponge; the stump was conical; it was denuded of tegument, particularly on the side of the anterior edge of the axilla, which had been greatly bruised. The hæmorrhage was inconsiderable; the axillary artery was so much retracted that the end was not perceived, which, added to a great clot which closed its mouth, sufficed to suspend the flow. The surgeon of the regiment fearing formidable hæmorrhage, consulted Professor Scarpa, and Dr. Seveillé, who then was surgeon to the forces in Italy, and had one of the

hospitals of Pavia in charge. It was resolved merely to apply to the clot, from time to time, pledgets soaked in very cold water mixed with a portion of alcohol. No hæmorrhage supervened, and the wound healed like an amputation made according to the rules of art. Complete cure was retarded merely, by exfoliation of the necrosed extremity of the humerus to the extent of two half inches.

The like we may always do, when it is difficult or impossible to tie a vessel, and when a well-formed clot stops its mouth. Many instances have proved, that the wounded remaining after an affair, stretched on the snow, before they could be taken away, have owed their lives to the cold's having suspended the effusion of their blood. Cold water and alcohol, as they quickly coagulate the fibrine of this fluid, are very proper to consolidate the clot.

IV. NEUROSES.

Nervous affections, which, from the unqualified recommendation of cold bathing as a tonic, might be regarded as for the most part pre-eminently asthenic, present a vast field in which physicians have warred for and against its use. Many of them, *ex. gr.* Tissot, Floyer, Whytt, are reproachable with having neglected to spe-

cify sufficiently the cases where cold is useful. Pomme has offered practical facts highly interesting, but which do not furnish a body of information sufficient to regulate our conduct in the employment of cold. This is in truth one of the most delicate points in therapeutics, and I feel I have not a sufficient number of observations to enable me to throw any light on it. I believe, however, I may say, that they have often generalised too much, in assigning weakness as the general essential element of nervous diseases, vaguely called also vapors in both sexes, and have long erred in declaring the cold bath the best remedy for removing it, or as is said for *fortifying the nerves*. Many examples evince, that success has not always crowned the attempt. It is necessary then to know the ætiology and symptomatology of nervous affections. All such as remain under the empire of moral causes, and are owing to more or less profound commotion in the epigastric region, are aggravated by cold bathing. It is not uncommon to hear certain females complain of the bad effect of cold bathing, while others, on the contrary, gratulate themselves on the benefit they have received from it. This difference probably arises where cold has produced bad effects, from the body having been subjected to too low a temperature, or from the duration or the temperature of the bath not having been adapted to the nervous sus-

ceptibility, to the state of the strength, or perhaps even to the nature of the disease.

We shall classify nervous maladies, or aberrations of the sensitive system, in which cold is recommended, as follows :—

A. *Neuroses, with nervous erethism and increase in the organic activity of the sanguineous system.* Those neuroses sometimes assume an inflammatory character. Arterial re-action follows close upon nervous erethism. Cold applications then operate as refrigerant, sedative and debilitant. We cannot, therefore, overlook in their action, a perturbing effect.

a. Cold pumping, at the atmospherical temperature, is practised on the head, in madness, where there is usually fluxion towards the brain, with redness and heat of the face. The application of snow and ice to the same part, is preferable to the *douche*. In madness with furious delirium, cold drinks are at the same time prescribed to assuage the thirst, which is very great. If there are bowel pains, cold fomentations are used on the abdomen.

In the *Journal Encyclopedique*, we find the case of a girl mad and deaf, who escaped into a wood quite naked, and without food. For two days she remained exposed to continual rain, which cured her. Several such facts are extant. I will extract from Corvisart's Med. Journ. V. 27, the history of a mental alienation, which lasted

something more than two months, and which fully establishes the utility of refrigerants in mania. A young man of twenty-eight, of sanguineous temperament and robust frame, labouring at mending roads, experienced for some days a slight incoherence of ideas, and had afterwards a violent attack of mania. Furious delirium, red sparkling eyes, very animated countenance, savage aspect, and slight acceleration of pulse, were the symptoms observed when Mr. Ralston first saw him. He immediately bled him in the arm to sixteen or eighteen ounces: twelve hours after an equal bleeding was effected. The patient was made take purgatives in strong and repeated doses, and a draught was exhibited. After the use of these remedies the head was shaved, and compresses steeped in oxycrat were constantly applied; pediluvia, vesicatories to the inside of the thighs, and sinapisms to the soles of the feet were also employed; at length camphor was given internally. Those different means procured considerable relief; but the disease continued. Then recourse was had to cold affusion on the head: the liquid was let fall in abundance, and from some height. Immediately after each *douche* the patient became calm, recovered his reason, and slept. Delirium and incoherence of ideas re-appeared after some time, and were dissipated by fresh affusion. The

paroxysms became gradually more distant, and health was perfectly re-established.

Sharp brisk cold, acting at once physically and morally, proves an energetic tranquillizing means in madness, owing to the unexpected sensation and surprise it causes.

b. The surprise bath, *i. e.* immersion or affusion by surprise, has been recommended in intermittent mania. Pinel proscribes it. I shall take the liberty of differing a little on that point from that celebrated Professor. Sudden immersion is plainly useful from the perturbation and shock of the system. It is necessary, however, there should be no symptom of excitement or congestion in the brain, for it would increase the cerebral plethora, as would likewise the ordinary cold bath. Lorry relates the case of a young girl become mad from the suppression of the menses, who was plunged in cold water. (*De Melancholia*, T. II. p. 266.) After the first bath she was cold all day, and her skin cold to the touch; she slept at night. Next day they again eagerly plunged her into the cold bath. She grew very weak in it; was taken out; her face was black and livid. Lorry arrived, and found but a corpse. *

* Portal cites, under the head of apoplexy from cold, an instance not less striking, of the fatal effect of the cold bath inconsiderately taken by an hysterical girl, in whom the bath calmed the pains and other symptoms referable to increased sensibility and irrita-

Cold applications succeed best in mania, when seconded by warm pediluvia, particularly by placing the patient in a tepid bath, and, while he is there, directing a cold stream on his head.

c. Asthenic melancholy must be distinguished from that which is announced by symptoms of lively irritation seated in some viscus, and denominated maniacal melancholy, with disposition to suicide or homicide. The famous surgeon, Theden, was in his youth very hypochondriacal, and had a disposition to suicide. Copious use of cold water restored him to health.

Where nervous erethism has caused sanguineous congestion in the head, the refrigerating

bility. She habituated herself to baths of long duration. She was advised to place a bladder containing ice on her head, and even to throw some into the bath. This advice was too exactly followed; and the quantity of ice was even augmented on the head and in the bath. The patient complained of no pain; she was seized with most profound sleep; her respiration became stertorous; she was taken out of the bath senseless and motionless. She was dead. Dissection discovered a sanguineous effusion between the membranes on the ventricles of the brain.

Those instances show how mischievous and dangerous the general action of cold may prove, in all cases where afflux of blood to the head, chest, or abdomen, is impending or present. It is capable of aggravating an internal inflammation, of quickly exciting an apoplectic attack, of renewing headach, hemoptysis, &c. It is surely injudiciously that some physicians have advised cold bathing for asthmatics, persons pthisical or subject to palpitations, or having internal aneurism or organic disease of the heart. The lively impression of cold may likewise cause local uterine plethora in pregnant women, and excite a movement noxious at once to mother and child.

method of Avenbrugger seems to promise success. It consists in forcing the patient to drink a pound of pure cold water every second hour, frequently moistening the temples, forehead, and eyes, with cold water, and applying to the head linen soaked in the same. Those means are continued until the patient appears less furious, more collected, and more cheerful and communicative.

d. Hydrophobia. In hydrophobia confirmed, medicine confesses herself impotent. Much, however, has been said of immersion by surprise in the sea, and I have heard cases cited, to which, however, I have lent no more faith than may be fairly due to the accounts of extra-professional persons. It is with difficulty, I confess, I can comprehend the effect of those immersions, when the rabious virus has produced its fatal effects on the economy. If cold water offers any advantages in hydrophobia, it is, I suppose, in tranquillizing, by means of its cooling and sedative properties, the extreme sensibility of the nervous system, particularly the organs of sense, to which is to be added also the vascular system of the head. The characteristics of this state of exaltation are delirium, florid countenance, eyes red and inflamed, wild look, pulse strong, frequent, and hard, &c.

We might therefore, I think, without danger, try on a hydrophobic patient a bath between 66°

and 77°, continued for several hours, and which might easily be cooled by degrees. Cold *douches* and fomentations on the head, as well as cold waters by drink and lavement, would form parts of the treatment. In a disease that invariably leads to the grave, *melius anceps remedium quam nullum*. I have but few authorities to allege in favour of this practice. Hecker mentions having arrested the contagion produced by the bite of a mad dog, by plunging individuals in cold water. James proposes the cold bath in rabies canina. Boerhaave recommends plunging hydrophobics in very cold water, or pouring it over their bodies till all horror of liquids cease. It is stated in the Phil. Trans. that a person bit by a mad dog, and beginning to show signs of rabies, was cured by frequent bleedings (by which 120 ounces were drawn in one week,) and cold baths, prescribed for him by Drs. Hartley and Sandis. Van Helmont attests the cure of a hydrophobic old man by forced immersion in cold water. Mention is made likewise in the Hist de l'Acad. des Scien. (1699, p. 49,) of a girl of twenty, who was bitten in the hand by a rabid little boy, who, sixteen hours after the bite, had all the symptoms of rabies. She was repeatedly plunged quite naked into a bath of river water, in which a bushel of salt had been dissolved. She was thus tormented with repeated immersions and left at length seated in the bath, quite benumbed.

She was herself astonished to see herself without emotion.

e. Restlessness. To remove this the ancients applied linen soaked with cold liquids on the bregma, and took care to renew them when dry. These remedies they called oxyrhodines, because composed of roses and vinegar. When sleeplessness depended on cerebral irritation, Weikard states his having found slightly laxative cooling drinks and cold applications to the head, very satisfactory. When depending on general irritation, the cold bath has been used and recommended by Pomme. M. Brun, physician in Pignan, in Provence, has published the case of an hysterical maniac, who passed three months without sleeping, eating and drinking very little, and who recovered sleep and appetite by constant application to the head, of linen dipped in cold water, and often renewed, and by use of enemata and fomentations on the belly, of the same fluid. Smith says, that a woman who had not slept for three days, recovered sleep by applying to the head a folded towel dipped in cold water, and dipped again as often as it became warm.

f. Erotomania. This state may have for its exciting cause too lively excitement of the brain by an extravagant passion, or may arise from irritation of the genitals, as often happens in priapism, satyriasis, and nymphomania. This state is tranquillized by cold nitrated emulsive

draughts, by cold epithems to the head, lotions and cold fomentations on the loins and genitals, and by enemata of iced water. Riviere mentions having prescribed the cold bath with success in furor uterinus. Maret, in his Treatise on Baths, mentions a maiden of forty to fifty, tormented by furor uterinus to such a pitch as to transgress all bounds of decency, and whom he cured by making her take a score of cold baths. Repeated bleedings and antispasmodics had produced no benefit.

In Vol. 4. *Annales de la Soc. de Medicine de Montpellier*, there is a case of a sort of erotomania, described as libidinous hysteria, which occurred in a maiden of thirty-six, of robust and vigorous constitution and great appetite, whose menses were suppressed, and who had the pernicious habit of polluting herself twelve or fifteen times a day. Her face was rose coloured, her pulse agitated; she supported naked the most intense cold; she felt an agreeable heat in the precordial region, and numbness in the loins; she was sad and pensive; she tore her clothes, had constant wakefulness, headaches, and even lipothymia. She felt so great a pruritus of the clitoris, and so strong a heat in the hypogastric region and genitals, that she could not ease, or for a moment allay either, unless by her unhappy indulgence. They were obliged to tie her to her bed, and apply pounded ice to the lower belly

and genitals. Twenty-four hours after, the patient felt herself better; the menses re-appeared, the pulse became calm again, and from that moment she renounced for ever her pernicious habit.

Priapism may depend on a cause that exalts local sensibility, but is not always accompanied by desire of coition, as are satyriasis and nymphomania. M. Professor Fages has related in his interesting "*Lecons de Pathologie Chirurgicale*," the case of an aide-de-camp of General Dumourier, who in consequence of a fall from horseback, experienced paralysis of the lower extremities, with constant priapism. He had vessels of cold water thrown on the parts of generation, and seized the moment, when relaxation took place, to introduce the sound into the bladder, to enable the patient to satisfy the desire he had to make urine. The waters of Balaruc, whither that officer repaired, partly removed the paralysis, and with it the priapism.

M. Pinel speaks of a priapism caused by use of cantharides, which yielded to cold epithems to the genital organ.

At the Military Hospital of Tarentum I attended a soldier who had received a kick of a horse on the inguinal region of the right side. The spermatic cord was contused, and the lively irritation developed through the whole generative apparatus, caused a priapism, which inter-

mitted, the penis relaxing sometimes ; but when at intervals the pain became more acute, the virile member entered into a painful erection, encreased by the slightest touch. The patient was tormented by the desire to make water, and it was impossible to introduce the catheter into the bladder. The use of the catheter was impracticable before the end of five hours, during which time I had applied to the genitals, a cold fomentation of decoction of poppy heads, and had a *demilavement* of the same administered.

B. *Neuroses with nervous erethism ; exaltation and aberration of sensibility ; irregular symptoms ; alternate contractions of muscles and internal parts ; type continued or intermittent ; paroxysm sometimes regular, sometimes not.*

a. There are not sufficient practical facts extant, to enable us precisely to specify all the convulsive affections in which cold applications may be proper. Currie vaunts their good effects when prescribed at the moment of convulsion, and when the attack was not sympathetic. From the nature of very many of the physical causes that occasion that sort of nervous affection, cold may, I think, often remove, or at least moderate the concomitant local and general disorder. A case by Brun, (*Comment. Lipsiens. V. xv. p. 2.*) informs us, that a woman of twenty-seven had, after delivery, a convulsive and epileptic attack, which was increased by sup-

pression of the lochiæ; he had her stripped naked, and cold water thrown over her body; the convulsions ceased and she recovered sensibility. M. Recamier has had like success (*Thes. de M. Pavet, sup. cit.*) from the application of pounded ice to the head, from affusions and repeated cold immersions, in the case of a woman given to drink. The nervous affection appeared as it were on a sudden. The symptoms presented by the patient when seen by the Clinical Professor, and when he decided on the use of cold, were as follows:—Burning skin, hemiplegia of the right side, coma alternating with convulsions, strabismus, dilated pupils, retinæ very sensible, intellectual faculties entire, trismus, grinding of the teeth.

b. Chorea and Tetanus. In both these diseases the cold bath has been advised, but this recommendation is not supported by satisfactory observations. Hippocrates, I think, contradicts himself in respect to the use of cold in tetanus. He says, *Aph. 18. sect. v.*, that cold is hostile to the nerves, and in the one preceding that it causes convulsions and tetanus; and after in *Aph. 21. same section*, he recommends cold affusion in that complaint as means suited to recall the heat; and the heat, according to him, is to cure the symptoms. Experience unfortunately does not sanction that aphorism. The assertions of Barrere, lately physician at Cayenne,

who has ordered *douches* and cold bathing in the tetanus of new-born infants, along with those of Heurteloup, are not better calculated to determine the opinion of practitioners respecting that point in therapeutics. Let us beware says Mr. Percy in the article Eau, (Dic. des Scien. Medicales) of throwing buckets of iced water on the head of wounded persons labouring under tetanus or trismus; he makes mention of those unfortunate French soldiers, who being mercilessly thrown into, and retained in a tub of well water, and at the same time constantly pumped on the naked head, with a great stream, perished in frightful torment, having in many instances the abdominal muscles, and particularly the sternopubic, detached and torn. De Haen states, that a tetanic patient, who seemed eased by the cold bath, died a few minutes after leaving it. What shall we then think of the observations of Wright, who has published a memoir on the use of cold water, the success of which he vaunts, citing six cases of cure of tetanus, in which he employed it, conjointly with opium. The first affusion, he says, increased the heat and considerably diminished the symptoms; the method of using it, was to throw on the bodies of the sick, two or three buckets of water every third or fourth hour. Such contradictions are calculated to keep the practitioner's judgment in suspense, and make him wish for more facts, to convince

him of the success of cold water in a disease of such difficult cure.

c. Affusion and immersion by surprise have been, by some physicians, advised, as parts of the treatment of certain epilepsies ; but here again facts are wanting to dissipate all uncertainties. It is, however, probable that cold water would succeed in some cases. Brown says, that an epileptic who threw himself into a well, was cured of his complaint without ever feeling the slightest return. Comte, surgeon at Aoste in Dauphiné, has given the case of the wife of a water-guard of the royal farms, who was exhausted by eight months lactation, and suddenly attacked with epileptic symptoms. The cold bath, in which the patient remained several hours a day, and the application of cold water to the head, cured her radically. (*Journ. de Med.* t. xxv. p. 140.) I have seen the surprise-bath but once employed on a child ; the epileptic attacks became less violent and frequent. Renard mentions having at once cut short an epileptic attack, by introducing, with much trouble, pieces of ice into the mouth. The application of an ice poultice on the part that is the seat of the disease that causes the sympathetic epilepsy, may prevent the attack or even suddenly arrest it.

d. Cold appears however to have efficacy in some sorts of neuroses of that class, as in con-

vulsive cough, spasmodic vomiting and nervous palpitations. In England, Smith has seen a woman tormented by violent cough, cured by lotions of cold water, applied about the ears, temples, and crown of the head, after having tried all other remedies in vain.

Count Beuvrens, a German, had been for some years affected with palpitations of the heart, with convulsive motions, and a feeling of cold in the chest, which rendered the hottest air, even in the dog-days, insupportable to him. He was constantly wrapped up in furs. Gastrogiane, his physician, made him strip off his coverings, prescribed for him free air and iced water; in five weeks the Count was cured.

e. Cardialgia has often yielded to ices and iced water, as well in drink as epithem, to the epigastrium. Patients have received ease from the ingestion of small morsels of ice as pills; the same method of applying cold suits, purely nervous colics, accompanied with constipation and great heat. Frederic Hoffman speaks of a woman afflicted with intolerable colic from suppressed menses, who owed her cure entirely to cold water in drink and epithem.

f. M. Recamier has, in a case of spasmodic susceptibility at the menstrual period, brought into co-operation, cold drinks, aliments, baths, *lavemens* and affusions. The water was but cool, from 77° to 83°; the nervous symptoms were

allayed; the hæmorrhagic efforts ceased, and the menses were restored to their regularity.

g. Hazon, Doctor Regent of the faculty of Paris, says, that he was called to a woman of thirty, of the lower order, of sanguineous plethoric temperament, strong, vigorous, and moderately fat; she was attacked with most severe iliac passion, complicated with pregnancy of five months standing. The disease was of some days standing; the symptoms consisted of enormous pains of the belly, particularly in the course of the small intestines; the patient vomited every thing she got to drink a short while after taking it; she vomited bile, sometimes accompanied with stercoraceous matters, moulded and shaped as when passed by the usual intestinal channels; nothing passed downwards; enemata came out as they entered; the pains were so acute as to be accompanied by convulsions. I examined whether there was any hernia, says that physician; I found every thing in the natural condition. After using, without success, every vaunted remedy for such cases, I changed my plan, and advised the domestic cold bath; the two first baths produced no effect; the fourth was successful; the woman was delivered of a dead child; the fæces resumed their course, but the vomiting did not cease; the same remedy was continued and succeeded admirably, for the vo-

miting ceased, and the pains at length gave way. Journ. de Med. t. iv. p. 110.

h. Cholera Morbus must be regarded as a convulsive state of the stomach and intestines, accompanied with brisk erethism, which sometimes occasions a transition into phlogosis and gangrene. Excessive pain, thirst, burning heat, are the symptoms that make the patient desire cold drink. Some observers have raised doubts respecting the efficacy of cold drinks in such cases, fearing they might cause mortal inflammations. Mathey (Annal. Cliniques de Montpellier, t. xxiv. p. 251.) has furnished the history of a case in which abstinence from all drink suspended the cramp, anguish and dejections, and that a glass of cold water granted to the patient by those about him, renewed all the symptoms.

But this instance is not sufficient warrant for the condemnation of cold or iced drinks. In small doses, often repeated, they will, I believe, be easily borne by the stomach, and do much good. When the cholera has an intensity of symptoms giving reason to fear a gastritis; when there is ardent thirst and internal burning heat; when the tongue has a dry brown colour, and there is immoderate desire of cool drinks, then the indication is doubtless to allay the irritation. Cold water slightly acidulated with citric acid, and sweetened with syrup of althæa, iced de-

coction of veal, chicken, dogs-grass, or liquorice, are generally agreeable to patients. Hippocrates advises drink of cold water, and Hoffman relates the history of a cholera, the cure of which was effected by that beverage taken in great quantities. As light aliments, we prescribe cold gruel or rice-water.

M. Chrestien has published, in *Annales Clin. de Montpellier*, t. 1., cases which prove the efficacy of ices in that disease, when spontaneous, or when caused by excess in fruit. A wise remark of that physician seems to me to account for the bad success of ice and cold drinks in cholera. He remarks that they do not suit every stage of the disease; that if employed too early they suspend the necessary evacuations; and in the last stage, when there is coldness of the extremities, faintings and cold sweats, they hasten death.

Cold epithems to the epigastrium and right hypochondrium, will also have their effect in allaying the irritation of the stomach and biliary system. M. Py, physician at Narbonne, mentions having seen cholera cured merely by the application of ice on the epigastrium, repeated every three or four minutes. (*Journ. de Sedillot*. T. xii.)

C. Neuroses with radical debility and exaltation of sensibility.

In this class of diseases the sensibility is deranged, and seems augmented in proportion to

the debility, whence results greater excitability of fibre : this state therefore is characterized by defect of equilibrium of action and energy in all the systems, by frequent irregular spasms, by great mobility, which renders the body impressible by the slightest causes. Spasm allies itself with atony, but one generally prevails over the other. A feeling of cold in various parts of the body, irregular pains, stirring in the bowels, flatulence, indigestions, vomiting, constipation, colics, diarrhœas, paleness of the face, redness of the eyes, yawning, dropping of tears, whistling in the ears, frights, panic terrors, constant feeling of lassitude and numbness, restlessness, general languor, loss of appetite, hiccup, palpitation, throbbing in the cœliac region, want of sleep, &c. composes the cohort of symptoms, that by their number and succession form the revolving picture of an universal derangement.

We know that the debility that constitutes the essential element of those neuroses is increased by the summer season, by an atmosphere too electrical, by too great heat of apartments, by the heated air little if at all renewed, of theatres and churches, by hot baths, wool or down beds, sad or debilitating passions, strong odours, and, above all, by abuse of antispasmodics and stimulants internally and externally, *ex. gr.* amber, opium, castor, ether, Hoffman's liquor, &c. medicines which delude by masking

their noxious effects under the momentary ease they afford. It is not here my business to explain all the prophylactic observances that may be employed against commencing or established nervous weakness. I shall merely observe that moderate temperature of apartments in winter, inhabiting mountainous and northern countries in winter (summer?), morning walks in summer, mid-day walks in winter, cold aliments, cool beds,* baths of fresh or salt water of short duration, and moderately cold temperature, diminish and ultimately cure it.

Cold is of essential use in the neuroses as a tonic ; but there are some in which mistakes and errors more frequently occur respecting the degree of heat to use ; the bath should deviate less from *tepid* in proportion as the fibre is more irritable. In using it, it is best to pass by transitions of a degree at a time, from the higher temperature downwards. The immersion is to begin in water warmed slightly, or agreeably cool. The temperature is to be insensibly lowered from 88° to 65° above zero. English hypochondriacs merely immerse themselves in cold water for a few minutes. If the nervous weakness be accompanied by much irritation, then the duration of

* Nothing is more wholesome and agreeable in general, for man in health or sickness, than a straw bed, equal parts of moss, chaff of maize and short oat or millet straw mixed, are best for filling the bed sacks.

the bath is to be somewhat prolonged. The cold and tepid baths act in the same manner in respect to their tranquillizing and antispasmodic property; but the cold is preferable, in that it fortifies, while the tepid relaxes. The one cures the disease, the other favours its recurrence or prolongation.

Cold then in this class of neuroses fulfils three indications: 1. As sedative, it allays excessive nervous sensibility and irritability. 2. As perturbing, it moderates and suspends the irregular motions, prevents agitations and shocks not natural to the economy, and re-establishes the equilibrium of the sensitive power. 3. As tonic, it concentrates the forces, and by re-action it excites an increase of vital energy, which insensibly effaces the debility and nervous mobility.

Cold has the further advantage of repressing sweat from atony, which increases weakness and languor. Whitt and Tissot say, that in those cases there is no better tonic for the nervous system than cold bathing. Nothing weakens more than hot bathing.* Cold immersions, therefore, I consider very advantageous in the atony with trembling, which succeeds poisoning or asphyxia

* A case inserted in the *Ancien. Journ. de Medicine* p. 62, vol. xliv., furnishes an instance of the bad effect of hot, and of the success on the contrary of cold bathing, of cold enemata, and towels soaked in cold water, and applied to the belly, in a case of convulsive hysteria.

from non-respirable gasses ; in hypochondriasis, hysteria, and melancholia. Marcard quotes, in his Work on Baths, a case of profound melancholy cured at Pyrmont by Zimmerman, by aid of cold bathing alone : the cure was begun with tepid baths. The observations of Pomme on hysteria and hypochondriasis may be consulted. In the former, which is a true Proteus, Lorry mentions having seen excellent effects from cold bathing. The anomalousness of its symptoms, and the variety of states in which it places females, furnish frequent opportunities for a happy application of it. In the treatment of hysteria and hypochondriasis, Dr. Petetin of Lyons has had great success in the employment of cold and iced water. With respect to hysteria, it is necessary to distinguish the treatment of the intermission from that of the paroxysm. In the intermission, cold immersions are intended to fortify. During the paroxysm, all frigorific means act as excitants, sedatives, or perturbers. It is for this reason that cold water is a proper application to the head during the presence of the globus hystericus. Sharp lancinating pains with tumefaction in the breasts, which might deceive and lead to the suspicion of schirrus, have been successfully treated by external use of cold water. Pomme says, that by means of cold to the head, cold drinks and cold water enemata, which were in many cases iced, he has allayed hysteric colic,

as well as spasm, cerebral congestion, painful tension of the belly, and burning heat of the bowels, attending on suppressed menses. For those last symptoms he has obtained excellent effects from cold water fomentations on the abdomen. He brings forward several curious facts. I shall examine but one.

A girl of the lower rank had for long suffered in consequence of suppressed menses, for which no remedy was employed, because she was not in circumstances to have advice. She grew worse. The patient had been twice bled, and anti-hysteric draughts had been given without advantage. Pomme was called in. He had the cold fomentations applied to the belly, which operated wonderfully. The belly fell; the colics gradually gave way; they disappeared next day; and the menstrual discharge was so abundant as to carry off the paroxysm.

D. *Neuroses with diminution or complete suspension of motion and feeling, general stupor, lesion more or less obvious of the respiratory and circulatory functions.*

In comatose neuroses it is important to remove quickly the state of the sensitive system. Cold employed to that end operates particularly by its exciting effect.

a. Cold applications to the head appear to be successful in idiopathic sanguineous apoplexy, the only species they agree with; but it is as

much against the cerebral plethora that the cold is in that case directed, as against the apoplexy itself, which depends upon congestion of blood in the cerebral vessels, or its effusion under the cranium ; hence also the advantage of the debilitant or exciting and perturbing action of cold on the head to prevent the disease in full habits of sanguineous temperament, with face red and bloated, eyes animated and restless, lively passions, short neck, and hasty temper, and who experience vertigo or troublesome somnolency, which becomes habitual, particularly after meals. I have known a Russian major who combined all those predispositions to apoplexy, and who warded it off by the custom of rubbing his head and neck, morning and evening, with a large piece of ice, until it liquified completely. Marcand mentions having been consulted by three individuals of about fifty each, who had equal tendency to apoplexy ; they had violent pulsations in the head, and frightful vertigo ; he recommended them the cold water affusion ; the symptoms diminished, and they lived to above seventy.

b. In the asphyxia of new-born infants, aspersion, and hasty affusion of cold water act as excitants ; so also in that caused by odoriferous flowers, nonrespirable gases, as nitrous gas, sulphurated hydrogen, carbonic acid which arises from grottoes, vats, combustion of charcoal, &c. It

is equally necessary in every case of asphyxia from such causes, immediately to expose the patient to the free air, and in the shade in a cool place, and to pour hastily over the face, head, neck, and chest, the coldest water with vinegar. He is to be put to bed again, where he is to remain warm for some minutes, after which the aspersion is to be resumed, which has thus more effect. Some morsels of ice are introduced into his mouth, or he is made to swallow some cold water acidulated with vinegar or lemon juice. It will not be inefficacious to give likewise *lavemens* of iced oxycrat, or cold water, in which a good deal of mur. sodæ has been dissolved.

In the experiment at the Grotto del Cane, near Naples, the poor animal destined to satisfy the curiosity of strangers, falls and loses motion and feeling almost the instant he is enveloped in the deleterious gas. He is then taken out of the grotto, and he slowly emerges from his asphyxia. It is generally thought that his life is more rapidly consumed by repetition of that experiment, which surprised me less when I visited that grotto, than the description of it which I had read in some works on physics and chemistry. Perceiving the dog struggle convulsively, I asked permission of his master to throw it into the lake Agnano, on whose banks the grotto stands; the immersion made the convulsions stop instantly; the animal opened its eyes, rose

without delay, and came out of the water. This is, in fact, what is done usually, as I have heard, when the dog is slow in recovering.

c. In catalepsy, when the attacks are frequent, the pulse small, the respiration easy, and the countenance natural, Tissot recommends the cold bath; the indication he mentions seems to imply that he means simple immersion.

d. The hysterical paroxysm is sometimes carried to such a height, that there is loss of motion and feeling, almost absolute suspension of respiration and circulation, and apparent death. It is probable that fatal mistakes, against which one cannot be too watchful, when the question respects the quick decease of persons affected with nervous maladies, have caused the too hasty burial of women, supposed dead, in whom however total absence of life was simulated by one of those violent attacks of hysterical catalepsy and asphyxia, which we know may last two or three days, or by one of those syncopes accompanied with extreme weakness which enchains the vital energies. Tissot relates the case of an officer who had travelled post for several days; on alighting from his horse he fell into a faint that resisted all ordinary remedies; he was saved by plunging him into a bath of iced water.

The police regulations should give sanction to that advice of Klein: "*Pro mortuis habitæ ante diem tertium terræ non mandandæ.*" (?)

I shall on this point cite with pleasure the history of a case, in which the illustrious Barthez obtained such brilliant success from the use of cold, and tasted the inappreciable delight of rescuing from the tomb a woman about to be inhumed alive. (Eloge de Barthez, etc. par Baumes, Montpellier, 1816.) A lady of the Queen's palace, eminently endowed with that constitution called nervous, fell sick, at a time that Barthez her physician, being himself sick, could not attend. Pain threw her into delirium, her sufferings reached their acme; an overpowering agony plunged her into deathlike swoon. Tears had been flowing; her coffin was preparing. Barthez heard it, jumped from the bed where sickness detained him, flew, suspended the terrible burial preparations, called for ice, and covered with it the cold inanimate body. How was his happy audacity rewarded! The heart, whose movements had been suspended, began to beat; heat diffused itself through the limbs; with that life was developed, and that corpse, that was about to be consigned to the last asylum of mortality, resumed motion and speech. At this recital I see the detractors of medicine rest dumb and confounded.

Leichenhäuser has inserted, in a dissertation on the unequivocal signs of death, the history of a case equally singular and interesting (Mem. de l'Academ. de Berlin, 1797.) There happen-

ed to a woman after delivery, a violent uterine hæmorrhage, that reduced her to a state of apparent death. While one of the friends of the patient was sending for that physician to give assistance, they thought she expired. He arrived, and found her covered with a single sheet, and lying on straw, in a chamber without fire, in January, during very rigorous frost. Surprised and disgusted by such a barbarous proceeding, which is, however, unfortunately in accordance with popular prejudice, he had the supposed corpse replaced in bed, and having applied an embrocation of cold oxycrat to the belly, he had at the end of an hour, one of those pure and rare enjoyments that support the physician in his thorny path. This woman revived, and an hour after her resuscitation, new contractions of the womb expelled the placenta, which had not been entirely detached, and which brought away a large clot of blood. The re-establishment was perfect after six weeks of convalescence.

This case is not less conclusive than the preceding, and warrants every expectation from the use of cold in some desperate cases. Stupor of the nervous system, with extreme but not radical weakness, may prove quickly mortal, if cold, by virtue of its peculiar exciting property, which often succeeds when all other excitants fail, be not employed to recall the departing breath of life.

V. POISONING.

Poisonous substances, whether animal, vegetable, or mineral,—whether simple or compound,—and introduced into the stomach, whether intentionally or otherwise, act ; 1. By stupefying the sensibility of that viscus ; 2. By causing, by local irritation, a state of nervous and vascular erethism, announced by grave symptoms ; 3. By attacking in a destructive manner, by their mechanical or chemical properties, the tissue of the organs.

It is less the stupefying, acrid, or corrosive quality in general of poisons, than their particular effects on the individual, that should, I think, be considered, when we wish to avail ourselves of the advantages which cold applications offer in the treatment of cases of poisoning ; the symptoms, therefore, that follow their ingestion deserve to be well considered.

We shall first lay down a general rule, *that before the expulsion of the poison, or during vomiting, whether spontaneous or artificial, cold and iced drinks are improper*, because it is one of their properties to prevent vomiting, and even suddenly to arrest it.

A. In poisoning by narcotics, immediately after the total or partial expulsion of the poison, iced drinks, and lemon and vinegar ices are proper from time to time, to excite re-action in the

stomach, in order to prevent the ulterior effects of a remnant of poison, or to rouse that viscus from the stupor into which it has been sinking. It is doubtless with this view that Plenck advises drink of cold and iced water, in poisoning by mushrooms or belladonna. M. Porta, an Italian physician, has announced in one of the cahiers of the Journ. de Med. Par Leroux, that by means of cold water in drink, lavement and fomentation on the belly, he has succeeded in curing a lady poisoned by mistake, by a decoction of 3 iij. of opium. M. Orfila, from an experiment made on a dog, concludes, that water at zero, administered in drink and lavement, produces no considerable advantage, in as much as the animal died after the second administration, five hours after the application of the poison. This experiment does not seem to me conclusive, to the rejection of cold drinks. M. Orfila, besides, seems generally too apprehensive, that drink may dissolve the active part of certain poisons, and facilitate its absorption, although it is certain that the more a poison is diffused or diluted through or with water, the less active and quickly injurious it will be.

I think, then, that in every case of poisoning by narcotics, cold and iced drinks may be advantageously prescribed, and that *lavemens* of iced water, and frictions on the belly with ice, may even be successfully combined. If there

has been constipation, and the patient has not had a stool for twelve hours before, it will be proper previously to empty the great intestines by an enema of oil and mucilage.

The desire to sleep, at first slight, but afterwards insurmountable,—weight of head, dullness and stupor, apoplectic coma, characterise the diminution of sensibility and stasis of the blood that engorges the veins of the brain. Vertigo, a sort of drunkenness, gay or furious delirium, indicate transitory excitement of the brain, to which at length succeed convulsions and narcotism. In either case, I consider the application of pounded ice on the head as highly useful. The cerebral congestion should besides be treated locally, as idiopathic apoplexy from sanguineous stasis or effusion. Cold applications to the head will be equally indicated, when the engorgement of the cerebral vessels is purely passive, and depending on suspended pulmonary action. In each case cold tends to diminish and remove the stupor of the brain; it has the advantage of exciting, without irritating, the circulating system, and should, by carrying off caloric, and lessening the bulk of the humours, ease the cerebral compression.

Cullen holds throwing cold water on different parts of the bodies, to be one of the most effectual means of rousing from stupor those who are attacked by apoplexy from poison.

B. Acrid and irritating poisons produce effects varying with their doses, and are analogous to those of corrosive poisons, which are certainly more rapidly injurious, but whose results we shall not separately consider. They manifest their deleterious action, and exercise their fatal ravages, immediately or very shortly after coming into contact with the stomach. It is fortunate when we arrive in time to hasten their expulsion, or when the vital forces, alarmed by their presence, do not await the physician's aid, but cause salutary vomiting. The practitioner most frequently finds the patient with vomiting, which continues after the expulsion of the poison, or else when he has arrived, the poisonous substance has been but partially rejected, or has wholly or partially passed into the small intestines, where it acts prejudicially. The patient, after some hours, presents inflammatory and nervous symptoms, or the phenomena of reaction, such as sensation of burning and intolerable heat, great dryness in the mouth and gullet, with feeling of constriction, ardent thirst, redness and swelling of the face, eyes lively and fiery, continual cutting pains in the bowels, pulse full, frequent, hard,—headach, and phrenetic delirium. The nature of those symptoms denotes plainly erethism and pain in the pharynx, œsophagus, stomach and bowels, which may be regarded as already inflamed, or on the point of

becoming so. Besides, nervous irritation, direct or sympathetic, gives rise to various other peculiar symptoms, as vertigo, hiccup, trismus, spasm, convulsions, &c.

Cold applications ought certainly to hold a place in the antiphlogistic treatment employed in such cases. If an emetic become necessary or expedient, its effect should be seconded with water scarcely warmed, or agreeably cool. Tepid and hot drinks would invigorate the inflammation, and be altogether unfit to allay the burning heat, which is the first symptom caused by an acrid or corrosive poison. Afterwards cold water is to be used in emulsion, or with mucilage, sugar, honey, &c. in drink, gargle, and lavement. Fomentations of plain cold water are to be used on the belly, and, if there be cerebral excitement, on the head also. Remaining in a cool or moderately cold bath would, I suspect, be successful in quickly tranquillizing general erythema, and checking the disorderly and destructive nervous movements, in the midst of which the patient is liable to perish.

In the *Ephemerides Curios.* is to be found an observation, by Wepfer, of poisoning by *cicuta aquatica*. The subject of it being in torment from the first effects of the poison, immediately drank cold water, and having introduced his fingers into his mouth, succeeded in making himself vomit, and rejected great part of the

poisonous substance. But the symptoms that manifested themselves, viz. dryness of the throat, which was black as pitch, heat of stomach, nervous motions, &c. reduced him to a very critical condition. All the symptoms however yielded to the use of well water alone, of which he took twelve pounds in the twenty-four hours that the dangerous stage of the disease lasted.

In such cases, as in every other, real advantage is to be expected from cold applications, only so far as attention is paid to continue them according to the duration and intensity of the symptoms, and to the agreeableness of their effects; and to repeat them when, after a moment of calm, the symptoms are perceived to increase or re-appear.

C. There is, in poisoning by narcotics, acrids, or corrosives, a third period, in which the vital powers are deeply affected, and life is threatened with extinction. This state is marked by stupor, atony, &c. or by convulsive motions, by risus sardonicus, a pulse small and confined, loss of characteristic expression, loss of sight, syncope, faintings, livid purple spots, meteorismus, and swelling of the whole body. In this alarming condition the physician is often as destitute of hope of saving the sick, as of therapeutical means to combat such terrible symptoms. In such a case again, I discover a probability of success

in the heroic power of cold. Iced water for drink, to which may be added, as may be thought proper, according to the nature of the complaint, camphor, ether, ammonia, aromatic distilled water, and alcoholic tinctures; pounded ice on the belly, and icy frictions over the whole body are the best to employ. I subjoin here two cases, which show that even in the most advanced stage of poisoning, we should not always despair of the patient.

Hippocrates mentions (*Lib. de Morb. Mul.*) that a woman, who was in good health and plump, had taken a purgative bolus to prepare herself for conception. This medicine was apparently very active, for she was seized with colics, with violent gripes, swelling of the belly, and other symptoms; she fell as many as five times into a faint, and seemed dead. She had thirty pitchers of cold water poured on her body; a considerable evacuation took place downwards, and she escaped from that state.

In the *Annal. Cliniq. de la Soc. de Med. de Montpellier*, T. xxiii. p. 337, is to be found a case of voluntary poisoning from amorous spite, in which iced water had the greatest success. M. Cazals, the author, visited a young girl who presented the symptoms following: constant nausea, face extremely pale, disturbed vision, vertigo, hiccup, respiration short and embarrassed, pulse almost gone: he favoured vomit.

ing, and prescribed cooling and tranquillizing drinks. After considerable vomiting, that young woman had much animation of countenance; the pulse became hurried, and fever was established: she complained of pricking and ardent heat of the gullet; strong convulsions came on, which often recurred, and left her sometimes insensible. At a moment when she had recovered her senses, the physician enquired of her what she had taken. "I loved a man," she replied, "who seemed to return my affection. I was used to see him every evening; I know not by what mischance I had been deprived of his visit for three days: I could not console myself. I was flattering myself it was not his fault, when I saw him pass under my window with a female. I looked forward to a complete rupture; I abandoned myself to that idea; and that I might not survive it, instantly resolved to poison myself." She confessed to having procured at several laboratories the substances necessary to the execution of her design, and to having taken in one dose gr. xxx of ipecacuan, nearly as much red oxyd of mercury by nitric acid, and gr. vi. of corrosive sublimate; the whole mixed with a small quantity of water. The bleeding demanded by the state of the pulse, with tranquillizing drinks, small doses of castor oil, leeches to the ankles, were of little use. Respiration was still short and embarrassed, with ardent thirst, into-

lerable pain of stomach, and excessive burning pain of throat : there was anxiety and extreme sensibility of the epigastrium. Calming drinks moderated without removing the symptoms.

9th Day. Occasional coldness is observed. To vomiting succeeds extreme weakness of stomach. *Chicken broth, in which is infused a little cinchona.*

From the 10th to the 11th. Sudden cessation of pain, without any symptom of solution : pulse small and concentrated, loss of force, altered features, foetid eructations, stertorous breathing, cold limbs, copious urine. Iced water was prescribed internally ; and, according to the advice of Van Swieten in such cases, affusions of very cold water were practised on the feet, afterwards on the legs, at length on the thighs and belly. They agreed well with the patient, who recovered her health.

VI. TRAUMATIC INJURIES.

A. Wounds. Those lesions made with pricking or contusing instruments, interest less or more the aponeuroses, muscles, tendons, vessels, nerves, fibro-ligamentous and capsular organs, and even the viscera inclosed in the cavities. The erethism and pain that come on at the very outset, give rise to convulsion, tetanus, inflam-

mation, &c. No applications can excel cold in moderating the earlier symptoms, and anticipating very grave affections. To that end cool or moderately cold water is the best remedy. In the army we most frequently used cold water only in our first dressings of gunshot wounds, contusions, and lesions, by crushing, tearing, or laceration: we have always found it in the earlier stage of those affections mitigate remarkably the symptoms, preventing particularly the engorgement that follows stupor, and simplifying the disease.

Baron Percy, from his own experience, asserts the good effects of cold water in all recent physical injuries. It is matter of fact, that this *topical* alone prevents excessive afflux of humours, and too great exaltation of vital properties, bridles nervous erethism, and prevents too great dilatation of the capillary system. The nervous element is the object that most urgently demands the physician's attention, in incised and punctured wounds; in those, above all, that affect the tendinous, aponeurotic and ligamentous parts. In Italy I have often seen tetanus supervene on penetrating wounds of joints. A soldier tried with a smart kick to break a potsherd of delf. A sharp angle of the resisting body pierced the shoe, and penetrated the sole of the foot. Tetanus declared itself in the morning, and the patient died two days after. I ask,—in such a

case as in many others similar, of which observers have recorded the unhappy terminations, is it not possible to prevent the terrible change that causes death? The application of emollients is for the most part insufficient. However slight the physical lesion, every topical irritant is to be avoided. Cold then here again seems to me the sovereign remedy. The blood must be let flow; after which the wounded part is plunged in cool or cold water, whose temperature is gradually lowered with ice, or else it is to be covered with pounded ice, or with snow. For some time after it is kept wrapped up in linens soaked in cold water. If, notwithstanding, sensibility increase after some time, and be associated with a feeling of great heat, the same *topicals* are to be repeated. The addition of gtt. xxx of solution of *acetæ plumbi*, and ʒ ss. of tincture of henbane to each pound of liquid, renders the cold water still more sedative. The effects I have oftentimes obtained from this *topical*, I cannot sufficiently praise, particularly in the cases of two young persons, of whom one had a puncture in his right hand thumb, and the other suffered intolerable pain from a rather long and very sharp splinter, which was thrust under the nail of the left hand middle finger, which I was obliged to open in its whole length to effect the extraction. The symptoms ceased immediately after the administration of the cold sedative application.

In the Civil Hospital of Poitiers, I saw a woman die of rapid gangrene of the whole upper right extremity, from having pricked her thumb with a needle, and instead of following the advice given her to hold her finger plunged in cold water, preferred that of a gossip of the neighbourhood, and applied hot wine to it, which of course hastened the developement and progress of a violent inflammation, which terminated thus unfortunately.

Cold applications, then, will be beneficial as sedatives, in incipient traumatic lesions. The cold pediluvium will prevent the tetanus that might follow the pain caused by eradicating a tendinous ganglion, or a corn. I should suppose *demilavemens* of cold water and fomentations on the belly, useful in preventing inflammation of the bladder and abdomen, after long and painful operations for the stone. I have two different times opened the left knee joint at the upper and internal part, in a man of fifty-five, to give issue to an enormous quantity of grumous blood which had accumulated, owing to a violent contusion from a fall. I showed this patient to one of my colleagues, Mr. Abadie, staff-surgeon to the army in Italy, who wished to see him, and who was apprehensive of the consequences of opening the articulation, which I kept wrapped for forty-eight hours with compresses soaked in iced water. No symptom of inflammation showed

itself, not even the slightest pain. The lips of the incisions united as in any other simple wound, and the patient perfectly recovered.

I regard in the same light contagious virus, animal poisons, and vegetable poisonous juices, which, when introduced into the mass of the blood, through external injuries, or by way of absorption, cause deep rooted changes in the solids and fluids, grave functional disorders, and sooner or later death. I have considered that in certain wounds by animals, as stings of bees or wasps, there must be something more than a simple puncture of a sharp body; for not only is there tumefaction of the spot where the animal plunges its dart, but, in some cases, we see further, the swelling spread far, and the head or some other member increase considerably in volume. Would cold or iced water give ease in such cases merely by its sedative property? Would it not farther weaken the quality of the poison introduced? I am induced to believe that both occur. It is also probable that suspension of the absorptive power, resulting from the permanent action of cold, would obstruct the ulterior progress of the venom.

It is not by gratuitous suppositions that I am led to augur good effects from cold and icy external applications, continued or renewed during twenty-four, thirty-six, or forty-eight hours, in all so called envenomed or poisoned wounds,

and to consider their use calculated to render the greatest service, to simplify the treatment of those lesions, and perhaps even to render unnecessary painful incisions and cauterizations which do not always secure the patient from danger. I have not personally observed any thing which I can allege in favour of this opinion ; but intense cold, we know, weakens the activity of poison, virus, and contagious miasms ; that amongst us the venom of the viper loses energy after the first cold of winter ; that it is also from the influence of cold that the poison possesses less activity in the north, where poisonous animals are very rare, and where plants of acknowledged injurious quality have little effect. It has often been observed, says Van Swieten in his Commentaries, that persons bitten by a mad dog, at the beginning of winter, have shown no signs of hydrophobia during that season, but only in the spring. To neglect nothing that may strengthen the proposition, in which I seek to establish not only the appearance, but also the reality of the happy effects of cold in rabies, it will be proper here to refer to some facts already cited in the article on hydrophobia, p. 276-7?. It is mentioned also in certain authors, that recent local venereal inflammations have been checked and cured at their outset by cold applications.

If facts are to be trusted, the consequences plainly deducible from them should lead us to make trial of a method that promises advantage, and to reject it only after having collected a number of proofs of its inutility. I shall not then consider as vain, the hope of succeeding in extinguishing the rabious contagion, by aid of the local or general cold bath, and of annulling the action of the venereal poison by injection of iced water, immediately after coition, into the urethra, and by bathing the penis and scrotum for some time in such water. This last remedy will prove, perhaps of all proposed to this day, the surest and most efficacious in preventing syphilitic infection. Anatomists, who sometimes undertake dissections of bodies beginning to putrefy, or of corpses of persons dead of contagious diseases; accoucheurs, who are liable to syphilitic infection, fevers of bad character, and gangrene from lesions of the fingers, may, by application of cold water, snow and ice, cut short the diseases caused by inoculation with irritating and deleterious humours. Theden relates, that he had punctured the point of his finger with his bistoury, in opening a fistulous abscess at the arm. The pain, slight at first, became insupportable; the disease was propagated along the fore-arm; the elbows swelled considerably, and became very painful; fever declared itself; at last the progress of the disease was such, that

this famous surgeon determined to have his arm cut off; but recollecting the good effects of cold water, he made use of it and recovered.

We must, by use of cold applications, not only take precautions against the grave and alarming accidents that accompany wounds by rabid and poisonous animals, but also against such as result from punctures and bites by animals, which are neither, or are believed to be neither. Do the painful consequences in the latter case depend on the physical or on the moral constitution of the bitten or punctured person, or on some quality peculiar to the saliva of irritated or famished animals? Such unhappy cases, are, in fact very numerous. The bite of a healthy man has caused hydrophobia*. At the military hospital of Bologne, I have seen a young soldier perish of rapid mortification of the upper left extremity, with nervous symptoms, from having the end of his little finger bit by a mouse, while his arm hung out of bed during his sleep. In all such cases, I shall certainly trust most confidently in the stupefying power of cold and ice, applied immediately with a view to checking symptoms and preventing danger.

* An individual in anger bit his comrade who became hydrophobic. In the London Philosophical Transactions mention is made of a man, who, coming from play, desperate at having lost all, bit his thumb and died rabid (?) This I have tried in vain to verify. Trans.

B. Ulcers. Although authors affirm that cold water calms the pain of cancerous ulcer, and that atonic ulcers have been cured by immersion in cold water, I am not favourable to its employment, and believe, that in external affections and all suppurating wounds, *topicals* below the temperature of the apartment in summer, or less than tepid in winter, can only do harm; on this head I refer to the aphorism of Hippocrates: *Ulceribus frigidum mordax.*

C. Hernia. In strangulated hernia cold applications are very useful; they should always be preceded by bleedings and enemata. Wolstein merely plunges the feet in cold water. Alone the pediluvium can produce but little effect; but it may advantageously be used conjointly with cold topicals. It is of the greatest importance to distinguish strangulation by infarction, from that by inflammation. In the first, the application of cold ought to be sudden, transient, and repeated at short intervals. The gases that distend the hernia condense; the retractile spasmodic movement is communicated from the scrotum to the hernial sack and to the intestine, whose calibre diminishes, and which sometimes immediately re-enters. Lombard, operating on a strangulated abdominal hernia, could not replace the liberated but inflated bowels. The patient's asking for a glass of cold water to allay the hiccup that harassed him, suggested to

that excellent surgeon, the idea of applying to the intestinal mass compresses soaked in cold water; a few moments after borboryzmi were heard, precursory signs of a disposition in the parts to resume their natural situation. The reduction was, in fact, affected with the greatest ease. It sometimes happens, that the belly spontaneously unloads itself after the return of the bowel.

In the second case, on the contrary, when there are symptoms of inflammatory strangulation, the hernia does not so quickly enter either spontaneously or by the taxis. We must then not be content with momentary application of cold or iced water; the re-action would increase the inflammation and hurry on gangrene. Cold should be used as a debilitant, and be continued for eight or twelve hours, regard being had to the strength of the patient. It is not in all cases, because the hernia has been inflammatory, that ice has sometimes caused gangrene, but rather because its apposition has been of too long or of too short duration.

D. Concussion. In cases of concussion of the head, we see the same phenomena as occur in other parts when contused and shaken; the place affected becomes, owing to the collapse, the seat of an engorgement; the blood and humours flow thither, and the solids are unable to re-act against them. After falls or blows on the head, it is

very difficult to ascertain whether the loss of consciousness and the stupor are direct effects of the commotion, or else of primary sanguineous effusion which may immediately, or so to say, contemporaneously happen. Howsoever it be, the stupor from which we are advised quickly to extricate the patient, is not the most alarming symptom. The application to the head of pounded ice, or of snow, or Schmucker's cold fomentation, employed as soon as possible, should precede the blister recommended by Désault: these are the only means to resist passive congestion of the brain, the source of the subsequent symptoms, which also cold topicals are capable of preventing, and of weakening when already commenced. The effects of cold will be well seconded by revulsives and derivatives, by bleeding in the foot if the patient be plethoric, by an emetic in a large quantity of fluid, by irritating *lavemens*, &c. Warner advises the patient's feet to be put in hot water. I have had two opportunities of experiencing the good effects of ice applied to the head; in one case particularly, where to symptoms of concussion succeeded phrenetic delirium.

Ice is not useful in contusions and concussions of the head, only immediately after the accident: I consider it useful when that part is free; when the patient has recovered consciousness; has his ideas clear; and even when the

supervened paralysis has entirely, or in great part, ceased. How many simple concussions and wounds of the head, considered slight from their causes and the condition of the external soft parts, have been followed by slow obscure inflammation, by abscess in the substance of the brain, and purulent effusion between the meninges, and at length by a rapid death, the more surprising, in that, for days and months, the patient had manifested no sign of hidden encephalic disease. There is perhaps no practitioner who cannot cite some facts in support of that pathological truth. I, for my part, can count up seven or eight. Prudence then requires, that we should not expose a patient to the danger of a false security, and that to various prophylactic measures, we must join that of applying ice or snow to the head twice a day for a fortnight. The same end will be gained by frequent washing of the part with cold ammoniated water or sea water.

Analogy leads me to think that cold applications might be beneficial in violent contusions and concussions of the chest and belly, immediately after the accident.

E. Fractures. Whether the relations of the parts allow of the limbs being kept in a convenient situation without bandage for the first four or five days,—or the state of the fracture require immediate reduction,—or procrastination, on ac-

count of severe contusion or laceration of soft parts,—we must, in every case, use cold water alone as a *topical* for eight or ten days. The member and containing bandages must be moistened with it during the treatment. It lulls pain, prevents and diminishes engorgement caused by numbness or irritation, and allays the itchings that so much annoy the sick confined to bed. *I affirm, that I have never employed, in hospitals, any other topicals for dressing fractures, than cold water; and its advantages will not permit me ever to abandon it.*

F. Sprains and Luxations. Recent sprain requires immediate use of cold. The suffering part is to be quickly plunged into a bath of iced water; but as ice is not always immediately accessible, the coldest water is to be used that can be had; to which may be added, vinegar, sugar of lead, or muriate of soda or ammonia. The immersion should last several hours. After this local bath the part is to be subjected to constant cold fomentation, as long as there may be reason to fear engorgement and inflammation. Although those should have been present some hours, there is no reason to suppose it too late to recur to cold. Having a short time since sprained my right foot, and not having been able to plunge it forthwith in cold water, I acquired, from personal experience, the conviction that

excellent effects may be had from the cold pediluvium several hours after the accident.

After reduction of luxations, it is useful to affuse iced water on the joints, and to moisten with it its containing bandages. M. Percy mentions, in the above cited article "*Eau*," that spontaneous luxations have been prevented and cured by *douches* and fomentations of cold water.

G. Aneurism. An internal debilitating treatment, with cold and astringent applications externally, have been proposed, and with full success employed against aneurism. The first part of the treatment, used more particularly in aneurisms that are internal and inaccessible to the operator, is due to Albertini and Valsalva. It consists in condemning the patient to the most absolute repose of body and mind, and gradually debilitating him by repeated small bleedings, by regimen, and by the use of cold acidulous drink. As for the second, it is altogether topical. In incipient external aneurism, M. Guerin, of Bourdeaux, applies pounded ice on the naked tumour, or compresses soaked in oxycrat iced, containing 1-16th of vinegar. He refers to several facts drawn from his own practice, evincing the success he has obtained. Professor Pelletan gives an equally flattering account of this plan. Others demand whether the cures were not spontaneously obtained, and not really attributable to it? It is positive that cold retards the circu-

lation; that it acts by its astringent property on the parietes of the aneurismal artery, not only by resisting too great dilatation of its tunics, but also by forcing them to shrink, so that in a short time the volume of the tumour may be 1-3d diminished. A concomitant effect which contributes to the cure, is coagulation of the blood extravasated and contained in the aneurismal sack, which at length forms a hard and solid body, which closes and compresses the vessel. Though, according to the author who has proposed the method in question, cold applications may alone suffice to effect a spontaneous cure, the debilitating method of Valsalva is a powerful auxiliary in the treatment which in every case must be conducted with much prudence and art. In a Dissertation on Aneurism, presented to the Faculty of Medicine of Montpellier in 1814, the Author, M. Boë, gives the history of an aneurismal tumour from dilatation of the humeral, which he cured by compression, the debilitating method, and epithems of pounded ice, in co-operation.

H. Venous Dilatations. The action of cold subdues, withers, and sometimes makes them disappear. Its repeated application might then be useful in accidental hemorrhoidal tumours, in varices of the lower extremities, in recent varicocele. If we do not radically cure, we certainly at least diminish the disease, and procure ease.

M. Chrestien mentions, in T. 1. Annal. Cliniq. de Montpellier, that in a case of retention of urine, it was quite impossible to introduce a catheter of any size whatsoever; that suspecting that the difficulty of the introduction was owing to a varicose state of the vessels of the urethra, * he determined on applying compresses soaked in iced water on the perineum and neighbouring parts, and ice on the hypogastrium; that those applications persevered in for two hours rendered practicable the use of the catheter.

Here ends the task I have undertaken. I omit drawing general conclusions; such would be but an abridged repetition of the particular conclusions established in the course and at the end of each Chapter, as the subject may have given occasion. Besides, the reader may himself conclude according to the principles announced

* I have met a like case in an Italian comedian, who called me in on account of a retention of urine, of twenty-two hours duration. I found him with the hypogastre very tense, and in great suffering. I introduced the catheter; but it met an obstacle that I perceived to be a flabby body. Sure of my way, and guiding the beak of the sound with the *index* in the anus, I pushed to force a passage. Blood flowed; I withdrew the instrument when just about to enter the bladder; the varices of its neck emptied themselves; nearly an ounce of black blood escaped. The catheter was then introduced with the greatest ease.

respecting the effects of cold. I have not the vanity to suppose that nothing remains to say on the subject. I shall consider myself very fortunate if I have succeeded in throwing a little more light on the agent in question, by rendering more convergent the rays of some truths calculated to illustrate it. The physician will probably not consider it uninteresting to find embodied in this monograph, most of what, in regard to hygeia and therapeutics, it concerns him to know, in order to render cold useful in practice. It is for observation and experience hereafter to accumulate facts, to render its history more rich and complete.

APPENDIX.

Pages 2, 4, 5, 6, &c.

LIFE, VITAL PRINCIPLE, &c. are names of which our author makes very frequent use, even when discussing interesting pathological questions; they are indeed in very general use in medical writings. When the ear is familiar with a name, it is very natural to conclude, that the mind is in possession of some precise corresponding conception. The conclusion is, however, often incorrect, and the present is, I think, an instance; of this various late disquisitions furnish abundant proof.

If *life, vital principle, &c.* be synonymous with *cause of organic life*,—we may, in one sense, say that the heart is the *principal condition, cause, or principle*, of vitality. Animation is dependent more immediately on the function of the heart than on either that of the lungs or stomach,—the only organs that could compete with it for the title in question.

If *vital principle, &c.* be tantamount to *material cause* in the peripatetic sense, oxygen, nitrogen, water, various salts, &c. are vital principles. Harvey does not scruple to call the blood *vital principle*. None of those above mentioned excludes the others, and the names

vital principle, &c. may be extended to them all without impropriety, and to as many other elements and organs as seem necessary to the continuance of animation.

There is another sense of the names, *life*, *vital principle*, &c. in which is expressed some sort of *efficient cause* of vitality, amounting more or less nearly to the excitability, vital force, plastic nature, *impetum faciens*, sensorial, or nervous power, or influence, or energy, or fluid,—animal spirits, vegetable and animal souls, *callidum innatum*, archæus, &c. &c. of different physiologists. Of this vital cause there is no experimental evidence; it mocks sense. Physicians have, therefore, endeavoured to render it tangible to their minds by comparing it with various more familiar agents. Some ancients figured it to their minds as some sort of fire; some moderns have apparently regarded it as a sort of liquid, acting according to hydrodynamic laws. Others have preferred considering it as a kind of irritating fluid, not unlike ardent spirits; upon which others again refining, have compared it, and in some instances identified it with the hypothetical fluid of Galvani. Others have preferred the supposition of an inferior intelligence, so far different from the mind in constitution, as to be unconscious of its own operations. The theory of Stahl is well known. Others have spiritualized matter, and explained the phenomena of organized bodies by *sensibilities* of various degrees and descriptions. All those hypotheses, to which impatient physiologists have had recourse to meet questions to which their knowledge of nature did not furnish answers, serve but to conceal difficulties, and in the words of Hecker, “attest mere-

ly our ignorance, and the effort we make to hide it behind words." There is, I apprehend, no evidence that the phenomena of organized bodies are, in any other than a theological sense, referrible to any one cause. There is, I am sure, abundant evidence that a thousand causes conspire to produce them. It is apparently a mere illusion that leads us to regard the various powers or properties that give functional activity to our organs, as, like our thoughts, different modifications of one essence, different modes of acting of one fundamental energy. In this sense of the names *life*, &c. there is probably nothing in existence that corresponds to them. They signify merely *entes rationes*.

There is another sense of the phrase, in which it expresses an abstraction likewise, but in this case consisting of real elements. Such are, I believe, the *animal* and *organic lives* of Bichat, the *organic spirit* of Pring, &c. *Life* means in this sense the aggregate of the properties or simple phenomena to which the complex processes of animal bodies, or any class of their functions, can by analysis be reduced. The names *Life*, &c. are here but abbreviated expressions of a great multiplicity of elementary conceptions. It is always in this sense that our author is to be understood. I have remarked but one or two passages that cannot be deprived of any obscurity that the use of those words and phrases may throw over them, by the substitution of the phrase *vital action*, or some equivalent, (which is tantamount to *life*, &c. in the sense last explained) for that of *vital principle*, &c. Such a substitution has been, in nearly similar circumstances, recommended by the acute and learned translator of Magendie's Elements of Physiology, in his Notes to his edi-

tion of that work. Vide Milligan's Magendie, Notes, p. 411-12.

Page 18, lines 20, 21.

It appears to me there can be no doubt that our author gives the true account of this fact, the causation of which the ingenious Laurain seems entirely to have misapprehended. (Du Froid, chap. 10.) In an habitual or ordinary state of the cutaneous function, a sudden change of 20° or 30° in the temperature of the atmosphere, is acutely sensible; of this every one has had personal experience. Belgrado speaks of some Frenchmen, "who having had a quick passage, arrived from South America when the summer was yet at its acmé at Paris; they found their native air as cold as did their countrymen in mid-winter." (Delle Sensazioni dell' Calor and dell' Freddo.) Parry mentions, that after living several days in a temperature of -15° , 20° , it felt quite mild when the glass rose to zero, but cold when it fell again. (Voyage.) When, however, the cutaneous function is vigorous or highly excited, it is much less readily deranged by the morbid qualities of cold. Scoresby and Franklin both assure us, that they never observed any bad effects from the greatest transitions, in healthy persons, when no sensible perspiration prevailed; that is, when the morbid agency of cold was not favoured by *fatigue*, (more or less of which would be almost always produced by any exercise, taken by a sailor on duty, to an extent sufficient to produce sweating, in arctic regions), or by *increased evaporation* from the skin. "During the whole day," says Blagden, "we passed out of the heated room (the temperature seems to have been 240° , and

sometimes 260°) after every experiment, immediately into the cold air, without any precaution; after exposing our naked bodies to the heat, and sweating most violently, we instantly went into a cold room, and staid there even some minutes before we began to dress, yet no one received the least injury. In similar experiments, (says Southey, from whom, not having the originals beside me, I quote,) repeated by Dr. Dobson at Liverpool, the gentleman engaged in them passed from the heated room into the cold air with equal impunity." After being half an hour in a steam bath of about 115°, I have had water at 60° thrown over my head and shoulders, without any inconvenience. In short, there is abundant evidence that sudden transitions from *hot* to *cold* are abstractedly from morbid predisposition, much less formidable than Dr. Laurain supposes.

Page 22, line 12, et seq.

This explanation is satisfactory, so far as defect of nervous function, if any existed, is concerned. In this female, fibrous contraction, secretion, exhalation, absorption, deposition, circulation,—functions of the blood and vessels, which have not been proved to depend on the nervous system,—which exist alike where the latter is entire, defective and altogether wanting, (vide notes to Chapters III. and VII.) must have been pretty effectually exercised. There must, therefore, be supposed further some change in the solids and fluids, enabling them to a considerable extent to discharge their functions, with the assistance of a portion of external heat much short of what they usually require. This conclusion seems to me unavoidable.

Page 38, line 3, et seq.

THE following are the general results of some experiments I made on the cold bath.

The first organs of the modification of which we become sensible are the nerves. The change they undergo does not appear to be suspension to a greater or less degree of their functions, as happens in the case of the capillaries. On the contrary, they make their existence much more sensible, and help to attract much more of the attention of the subject to the phenomena of which they are the physical conditions; the liveliness of the sensation, must, of course, in great part, be attributed to the novelty of the impressions. The body may be for a long time exposed to cold, and if exercise or stimulants be not employed, the activity of the circulating system may be very greatly reduced before the *consociative* or *conductive* powers of the nerves disappear, or be even materially diminished in torpefaction. After an hour's exposure to cold,—the first fifteen minutes to an atmosphere of 60° *en chemise*,—the next fifteen minutes to the same atmosphere, being wrapped up in a wet cloth,—the remaining thirty minutes being immersed in a bath at 57° ,—I found tactual sensibility little affected; the cerebral functions entire; the susceptibility in the skin, of pain from friction, augmented; the so called motive power only of the nerves somewhat diminished, as I infer from the shiverings, &c. concerning which some observations will perhaps be offered hereafter.

The functions of the circulating system come next in order. Of those the contractile is the only one I know of that undergoes sensible change. The natural

effect of the application of refrigerants seems to be immediate diminution of vascular activity. But when cold is used in the form of affusion or immersion, the pulse is often accelerated considerably. Sudden change of temperature is common to both,—besides which, the former has mechanical impulse, and the latter mechanical pressure,—both in a high degree capable of disturbing the respiration. I have found in many trials, that the respiratory muscles do not learn to accommodate themselves, and increase their efforts to meet the additional object, unless after some training. In every instance I found the abdominal parietes yield to the water, so that much less than usual of the room necessary for the air inspired was obtained by pushing down the intestines, and consequently much unusual labour devolved on the elevators of the ribs. The expiration was usually more completely and rapidly performed. In some instances, the removal of this preternatural state of respiration by leaving the bath, was immediately, on sitting tranquilly for a little, followed by a fall of many strokes in the minute. In ten minutes after the bath, it fell on one occasion from 57 (to which the cold had reduced it, from 64) to 45. The muscular efforts that occur involuntarily, unless in those who are rendered less averse or impressible by habit, must also be taken into account, and the effect of the sudden impression in plunging into water, or receiving the affusion, cannot but in many instances greatly, though momentarily, affect the heart and derange the circulation. To those antagonists to the sedative power of cold must, if Dr. Edwards' experiments be admitted, be added suspension of cutaneous respiration. This, more particularly in the case of

immersion, would probably throw additional labour on the lungs, render more urgent the want of oxygen, and cause the animal instinctively to hurry on the action of the inspiratory muscles.

On the supervention of shivering, I always found the pulse rise in frequency, and become at the same time irregular, and often difficult to count.

In pure water or atmospherical air of sufficient coldness, the effect of exposure on animal heat is very regular in general. Occasionally, after a fall of the thermometer in the first instance as usual, will occur an unexpected rise. But steady application of cold will readily suppress that effort, and the temperature will afterwards pretty regularly decline.

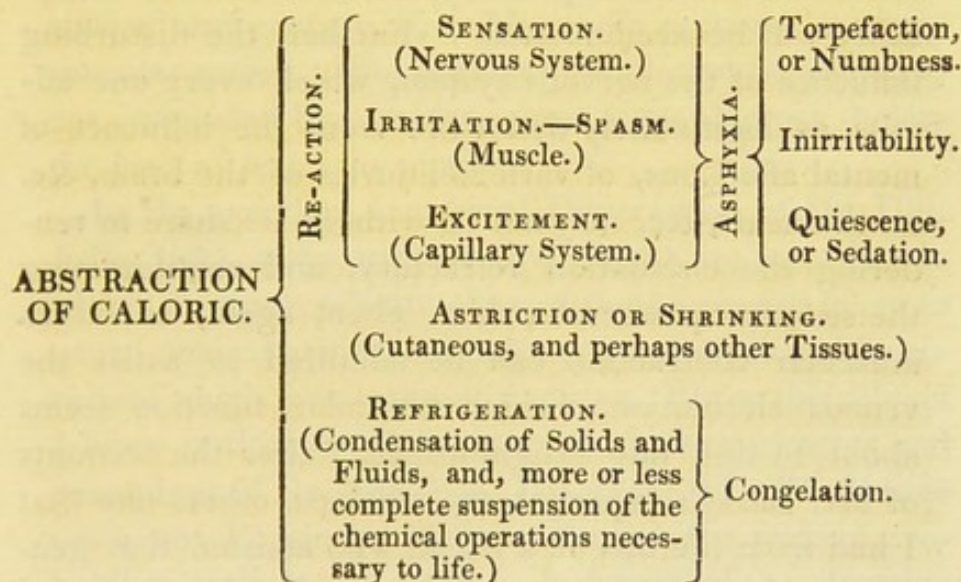
In some trials with warm drinks and wine, I found the sensation of cold little less lively, and the access of shivering little retarded. The pulse, however, and heat under the tongue, were much less reduced by the cold than in other trials made without such preparation.

In almost no instance did I find the muscular power diminished. On the contrary, I thought myself sometimes more vigorous after an half hour's stay in the cold bath, by which my pulse was reduced nearly twenty strokes, and my temperature from three to five degrees,—than before immersion. (Three to five under the tongue: over the tongue and in the axilla on the one hand, the instrument gave a difference of from five to seven degrees; while on the other hand, the urine never fell below 98°.)

Page 40, line 1, et seq.

It is plain that practical utility, not logical exact-

ness, is here held in view by our author. Re-action, for example, which is a very complex state, cannot hold a place in a strictly analytical division. Neither is it physically accurate to say that sensation is the first effect. Exclusive of impulse, which indeed it would be very hard altogether to exclude in any experiment calculated to show the effects of cold in a striking light,—it is from abstraction of caloric that Marcard deduces all the physiological and therapeutical effects of cold bathing. Humboldt reduced the action of cold to two principal heads: 1. Contraction or astringent. 2. Diminished activity in the various chemical operations of life. This is a physical rather than medical division; but, considering the difference between the objects the writers had in view, it agrees pretty well with our authors. The effects of cold may perhaps be represented as follows:—



There is in the form, and in the substance of the above table, debateable matter. The irritation may be disputed.

But it seems to me to be admissible as following from the cold application *mediately*, from the sensation *immediately*. At all events, I know from experience that moderate refrigeration rather increases contractility. Whytt I think mentions having seen muscular contraction excited by a cold blast. I have myself excited contraction in a heart by aspersion of cold water. I do not, however, pretend to determine how much may be due in those experiments, to impulse.—Excitement is perhaps more open to objection. It cannot easily be admitted as a direct effect of refrigeration. However, without contending for the *propter hoc*, we may admit the *post hoc* as of very common occurrence. After all, perhaps, something can be said in the way of explanation. Brown will help us here. The refrigeration will of course render the pulse more susceptible of acceleration and augmentation, by external heat; which fact Brown would express by the words, “the excitability will be accumulated.” Further, the disturbing influence of the nervous system, which every one admits as legitimately deducible from the influence of mental affections, of various injuries of the brain, &c. on the heart, &c. may not be without its share in rendering the circulation refractory, and counteracting the sedative power of cold. Then, again, so far as muscular contraction can be admitted to assist the venous circulation, (which muscular function seems about to sink into insignificance, unless the accounts of Mr. Barry’s experiments, amongst others one that I had from the lips of a friend who assisted that gentleman, be greatly exaggerated.)—So far increased energy of contraction may be supposed to favour the vascular state in question.

The plan of the table will, it is hoped, require no detailed explanation.

Page 56, bottom.

Zwierlein, in his remarks, "*Über die neuesten Badeanstalten*," gives several cases to prove that many of the bad effects of cold bathing are to be attributed to absorption of water in large quantity. In no instance, however, does he appear to have weighed his patients, or taken any precautionary measures to avoid fallacies. Absorption of the skin when unbroken, is denied by most. I see, however, no reason why the *imbibition* of Fodera and Magendie should not happen in the cold bath. Imbibition must be independent of temperature, unless in so far as astriction or relaxation of a tissue may affect its porosity. The second part of the process of absorption, viz. transportation into the mass of the blood, is no doubt more under the influence of temperature, if, as Magendie supposes, it imply vascular action. But capillary circulation is, we know, not suspended by a temperature some degrees below the heat of water in summer.

In the excellent Inaugural Dissertation of Dr. Dill, Edin. 1825, some original experiments are recorded, in which, however, adequate precautions were not taken to guard against error from pulmonary absorption, the results of which favour the old doctrine. But on this subject I know nothing so satisfactory as the experiments and reasonings of Dr. Edwards. His work, "*De l'Influence des agents Physiques sur la vie*," turns the scale of probability entirely, as I think, in favour of the doctrine of cutaneous inhalation.

P. 63, line 14.

I do not know the observations from which our author has come to this conclusion. He does not say that he has himself made any experiments on the subject. Possibly he may have become acquainted with those of Dr. Davy or Dr. Edwards, more probably the latter, before they were given to the public. Dr. Davy's are, so far as I know, but lately and in part published in the Quarterly Journal of Science. Dr. M. Beaupré published in 1817. Dr. B.'s estimate is, however, greater than those researches warrant.

Page 82.

The wife of the principal clergyman of Lulea, on whose accuracy I have the greatest possible dependence, assured me that she had, at the Post-house of Biorsio, in the parish of Torp, in Swedelpad, seen large quantities of the yellow aconite (*aconitum lycotonum*,) collected and boiled for the use of the table, like cabbage. This astonished her very much, as she knew it to be used in Zemtland to poison flies. When she expressed her apprehensions about eating of this herb, the maid-servant laughed at her, telling her it was too good to be slighted. (Linnæus, *Lachesis Lapponica*, V. ii. p. 123.) A cold climate may, by invigorating the frame, invest it with comparative insusceptibility of injury from some poisons, as in the case of alcohol and opium. But the impunity with which wounds from certain animals, and certain sorts of food, may in some countries be borne, which in other regions would prove fatal, seems to me principally owing to the influence of diet, temperature, &c. on the animals and plants reputed poisonous. With respect to plants,

the instances mentioned by our author, and that from Linnæus, are sufficient illustrations of this remark. With respect to animals, a species of pheasant is said to be in some months poisonous in North America. Some fish are poisonous only at certain seasons and places; and even the yellow-billed sprat is sometimes wholesome food. Many illustrations of this nature might be added.

Page 86.

This article on sensibility is perhaps one of the least satisfactory in the volume. Our author here, and indeed through the whole work, confounds several distinct conceptions under the common title of *sensibility*.

When the nerve of an amputated limb, for example, is irritated with a needle, &c. the muscle which it supplies is spasmodically affected. Here there is no sensation.

2. A similar injury of a healthy limb would be followed by pain as well as muscular contraction. Here the exercise of mental faculty is implied.

3. *Moral Sensibility*. This requires no explanation.

4. That popular conception that might be equally well expressed by the words irritability, impressibility, affectibility, susceptibility, &c. &c.

The second, which we may call *physical* or *sensorial*, is a compound of the first and third. It requires alike, and to an extent yet undetermined, integrity of the nervous and intellectual functions.

The third, or *moral* sensibility, is apparently the only principle to which the term sensibility is properly applicable. Sensation, feeling, &c. are states exclusively mental. Organised matter is, so far at least as we

have knowledge of its affections, as completely insensible as an earth or a metal. To attribute sensation or sensitiveness or sensibility to matter, is much in the spirit of the philosophy of the olden time, when man, ignorant of the history of the subject of the only phenomena with the relations of which he was at all acquainted, mistook its sphere of action, referred to external things the effects of the operations of his own mental faculties, and in fact spiritualized all nature. The ancient inquirer explained external phenomena by mental laws, the modern materialist explains internal phenomena by principles borrowed from the external world. Thus both agree in attributing to an unknown subject two classes of qualities or affections, which differ so strikingly, as to render the inference of identity of subject altogether ridiculous.

No. 4. Sensibility, in other words, susceptibility of change, is an abstract conception, in some cases of like nature with *predisposition*; as when we say sensibility to cold, which is equivalent to predisposition to unpleasant sensations and to morbid affections perhaps, from impression of cold. This sensibility being no physical or physiological element or principle, can be but a metaphorical expression of some fact. The fact is this: of several persons exposed to similar causes, some are more intensely or readily affected than others; in other words, the combined causes that determine the relations of the organs previously to exposure, admit of a modifying or suspending agency on the part of the causes newly applied, in the former more readily than in the latter. The real value of this sensibility, so far as it is equivalent to susceptibility in the nervous organs, of the physical conditions of

lively sensation, may probably be thus shortly stated: In different persons, and in the same person at different times, the other solids and the fluids are in different degrees susceptible of those states that produce *sensible* modifications of the nervous system: The nervous organs also are themselves, in different instances, variously susceptible of *sensible* modification, whether by or through the other parts, solid or fluid, or *directly*, as by light, &c.

Our author's observations on the effects of cold climates and bathing, fall principally under the fourth head. There is no reason known to the translator, warranting the belief that either of the *consociative*, or (as Cuvier has called them,) *conductive agencies* of the nervous system, is materially less in the north than between the tropics. Seeing and hearing are nearly or altogether alike in both. The Russians are noted for imitative mechanical ingenuity, which argues considerable delicacy of touch. Lovers of cold bathing never complain of defect of tactual sensibility. Voluntary power is rather increased than diminished by a cold climate and by cold baths. In a word, there is no defect of any known nervous property, action, or function.

The diminution of sensibility in the fourth sense, (in other words, of susceptibility of derangement, of impressibility by ordinary or slight causes,) enjoyed by the natives of cold climates, extends of course to every system and organ, more or less, and to the nervous system amongst the rest.

In accordance with these remarks are the author's observations in the first four paragraphs of the 11th Section, *On the Constitution in general*.

Page 90.

Our author's remarks respecting the influence of climate over the generative flame must not be admitted without restrictions. The Samoiede girls are said to marry often at nine or ten years of age. The Kamschatkadales are said to marry very young, and cease bearing at thirty; precisely as in India. Lessep has seen a pair, man and wife, who were fourteen and eleven respectively. Cook says they marry commonly at thirteen and fourteen; other exceptions are not wanting. *Vide Finke, Allgem. Medicin. Geographie, B. 2. B. 657, &c.*

Page 97, line 2.

The most curious example of the effects of cold extant, is probably that of Bartholin. (*De Nivis Usu, cap. xii.*) It is to be remarked, he says, that the corpses of persons killed in winter remain stiff in the same attitude and situation as before death. This was exemplified outside our city (Copenhagen) when, on the 11th of February, 1659, the assailing enemy was repulsed and overthrown with great slaughter. For some, stiffened as they were, showed the angry countenance; others the eye upraised; others the teeth exposed and threatening; some with outstretched arms menaced with the sword; others lay prostrate in various situations; and even out of the sea, when thawed in the beginning of spring, a horseman was taken entire, sitting on his horse, and holding something in his hand.

Page 129, 130.

Gangrene is the result of a vital process. It is by

virtue of the re-active power of the organism, that cold is capable of occasioning increased action. If the circumstances of the part refrigerated be very favourable to re-action, and the cold be not so intense or long applied as to kill the part, violent excitement may follow, such as, in some rare cases, to produce sudden sphacelus. This seems to the translator the most probable view of such facts. If this view be admitted, it follows that a cold more intense, or more perseveringly applied, is the antidote.

P. 149.

Professor Richter, of Göttingen, gives minute directions for the treatment of general asphyxia, differing but little from those of Dr. M. Beaupré. Dr. Callisen also, whose opportunities of observation must have been very great, describes, although with less detail than Richter or Beaupré, the treatment proper in such cases.

Page 159, line 8.

WITH respect to *gestation*, of which our author nowhere takes notice, it is to be regretted that it has not been introduced into civil practice. The efficacy of the remedy seems great and well established. The invigorating power of riding or walking into the country in health is known to every one. This popular observation is confirmed by the latest inquiries of Dr. Edwards respecting the functions of the skin. Physicians know that no measure so rapidly revives and restores a convalescent, as a jaunt in cold dry weather. The great cures that Sydenham, Fuller, and others, to speak only of moderns, have effected in desperate com-

plaints, by mere air and exercise, are familiar to English physicians. Dr. Rush recommends gestation from personal experience. (Med. Obs. and Enquir.) Dr. J. C. Smith tried it on himself with great advantage, (On Jail Fever;) as did likewise Dr. Currie. The effects of long voyages are well known. Dr. Jackson's experience of gestation is extensive and uniformly favourable. Dr. Hennen speaks very favourably of it, (Military Surgery.) Dr. Tanchon has seen the very best effects from it in typhus, diarrhœa, &c. even in cold weather. (Du Froid.) Hildenbrand strongly recommends making typhus patients walk about their chambers, supported, if necessary, while fresh air is freely admitted; and this is to be done several times daily, (On Typhus.) Reil regrets that fear of the vulgar prevented him from giving trial to gestation, in a very bad low fever that resisted almost every remedy, (Mem. Clin.) Dr. Wake published a very favourable account of it in his inaugural Essay. Dr. Jones also spoke highly of it. Dr. Luscombe, from considerable experience, recommends the remedy in high terms. It appears from Celsus to have been a remedy of Asclepiades.

The operation of *gestation* is complex. 1. There is general excitement from various and frequently changing sensible impressions; whence stupor, listlessness, &c. when not excessive, removed,—melancholy and despondence dissipated. 2. Constant application to the surfaces, of a cooling fluid in a stream; hence universal refreshment and excitation of the skin and lungs, and subsequently of the whole frame. 3. Contact of the purest air constantly renewed, with the whole respiratory apparatus; and hence, in addition to

refreshment, excitement, and corroboration of the whole cutaneous and pectoral economies, purification as complete as possible of the mass of the blood. 4. Voluntary muscular effort in supporting the body, and mental exercise in observation of external phenomena. The last circumstances are particularly insisted on by Dr. Parr.—Dictionary.

Gestation appears to have in *all* cases, those only excepted, which require rapid and powerful refrigeration, all the good effects of cold in the aqueous form, and to demand less preparation and caution in its administration.

Page 160, 161.

THOSE, says Tschirnhausen, who take too much pains to defend themselves against cold impressions, are for that very reason taken ill immediately on deviating from their custom. Does not that very morbid susceptibility, on which our author lays so much, furnish an indication for cool bathing? If children have so much to fear from cold, is it not therefore the more desirable and necessary to fortify them by habituation against its impressions? It is scarcely practicable to allow a child sufficient air and exercise, particularly if old enough to walk, without affording it abundant opportunity of putting the native re-active vigor of its constitution to the test; and often under disadvantageous circumstances, as when heated by motion on a windy day. It is, therefore, incumbent on us to diminish his danger, and as far as possible provide against exposure to cold, by strengthening the natural conservative energy of his frame by the additional antagonist influence of habit.

Weighty authorities maintain the safety and efficacy of cold bathing (at 60°, lower is unnecessary, higher often sufficient.) The first rule laid down by the cautious and even timid Hufeland in his "*Physische Erziehung des Kinder*" is, "Let the infant be washed every morning from head to foot with cold water." This he recommends from the third or fourth week forward, before which lukewarm water is to be employed.

Frictions, warm drinks, &c. are sometimes not convenient in the case of very young children; when it is desirable to use precautionary measures to ensure reaction, as in very young or delicate infants, the use of a bath consisting of a solution of kitchen salt (a pound or more to the gallon) would be probably suitable. The greatest inconvenience that too much salt can occasion, if the child's skin be nowhere broken or inflamed, is slight eruption of pimples, &c. of no consequence, and in future easily avoided by using the solution weaker.

Page 164, line 3—6.

In order to secure the good effects of cold bathing, Galen ordered for those about to begin,—frictions with soft cloths,—afterwards frictions with coarse cloths,—then frictions with oil,—then violent, or at least active exercise,—then the cold bath, not slowly, but quickly, or at a plunge,—then, after coming out of the cold bath, inunction again, which was to be practised by several persons at once, so as to heat the skin.—*De San. Tuend.* L. 3, C. 4. Callizen says, that the cold bath suits all ages and sexes, not excepting infants of tender age; but it agrees particularly well

when friction is employed after the bath. He recommends very susceptible and timid persons to begin with the cool bath, which he places between 65° and 85° Fahrenheit, and to defend their bodies from the action of the waters, if considered excessive, by woolen covering.

The processes advised by those two great therapists, to secure persons from bad effects, and ensure to them the salutary agency of cold bathing, rest upon the great principle of *artificial completion of the organic conditions necessary to the success of a remedy, where such conditions are not present in due degree.*

The result in question is restoration in due time, and degree, of cutaneous heat and vascularity; or rather the establishment of certain, in great part unknown, conditions of the solids and fluids, of the presence of which conditions, restored cutaneous heat, vascularity and softness, are the most satisfactory signs. The production of those signs can be facilitated and accelerated by various means, of which those recommended by Callisen and Galen are amongst the easiest and most efficacious. The auxiliary measures are of two kinds. 1. Those that diminish morbid susceptibility, or rouse depressed energy; which are either stimulating drinks, as warm milk, tea, &c. and vinous liquors, or frictions with cloths, the flesh-brush, &c. inunction, &c. 2. Those that impede or counteract the morbid activity of the cold, as bathing clothes, and saline or other irritating matters dissolved in or diffused through the water of the bath. Of those auxiliary measures, I have tried wine, hot drinks, and kitchen salt. For reasons that need not be specified here, I could not at that time push my trials of stimulant drinks far enough to

enable me to come to a decided opinion. The salt I tried often enough, and with such results as to convince my own mind that the report given by Sims of the effects of the brine bath is not materially exaggerated.

Page 166.

Baynard has a similar remark about the watermen, boatmen, &c. about London bridge, during the last plague. As for the manner of operation of cold, the author must mean by "enfeebling or destroying the miasm," merely diminishing or preventing its effect. Cold is not a decomposing agent. Miasms, in other words the unknown causes of certain diseases, cannot, with all respect to great names be it said, without absurdity be maintained to be animals. In respect to the miasms of hospital gangrene, it has, it is said, been lately analytically ascertained in Holland, that they are chemical elements. The same is to be presumed of the others. Our author, therefore, is to be understood *poeticè*, as speaking figuratively.

Page 177.

I SUPPOSE the word *stimulus* to signify something that, in common with other things of different natures, possesses a power of determining the production of more intense functional manifestations, in an organism that is in other respects in circumstances favourable to the change. In this sense of the word most authors of credit attest its exciting power. Richter, Callisen, Athill, Marcard, Reil, Hahn, Sarcone, Jackson, Johnson, Hunter, consider it an excitant. Richter, Callisen, Hahn, Jackson, &c. expressly affirm it. Hunter,

Athill, &c. infer it from experiment. My illustrious preceptor, Dr. Thomson, observed the same modification of the circulatory organs in the web of the frog's foot, from the application of ice as from that of ammonia, or from pricking it with a needle; in each case the artery observed contracted, and entirely or nearly disappeared. (Lect. on Inflam. p. 83, 4, 5, and 632.) Hastings has a pretty similar observation (on Bronchitis, p. 89.) "We find that removing animals into a colder medium," says Reeve, "instead of increasing, rouses them from their torpidity." On Torpidity, p. 51 and 53. In the Med. and Phys. Journal, vol. vi. is a very interesting case of Ischuria renalis, in a Russian nobleman, cured by Dr. Rogers, by immersion of the patient for some minutes, as far as the knees, in ice-cold water. Before morning the patient made a large quantity of urine. Bleeding, purging, &c. had been employed to apparent advantage. I have had frequent occasion to observe the exciting power of cold water, taken to the amount of a pound, or more, immediately after getting out of bed, in accelerating the peristaltic motion, and quickly producing evacuations. Parat and Martin mention that those of the French soldiers who were seized on by the cold, and stupefied, were scarcely at all to be roused while in any calm place, and that they were always obliged to have the stupefied person removed to an open exposed situation. Was it not from the want of the stimulus of the cold blast in the calm place that this necessity of removal arose? The contraction of the lips, throat, &c. mentioned by the same writers, and by Fletcher (apud Boyle on cold) and by Scoresby, (Arctic Regions,) bear further testimony to the irritating power of cold. The

considerations that establish the exciting and corroborating qualities of cold, are candidly stated and pretty fully summed up by Baur of Cassel (in his Essay in answer to the question proposed by the Faculty of Medicine of Göttingen for the prize of 1802) chap. 3.

Dr. Stock, in his work on Cold, maintains that it is a pure sedative; and there is much truth and ingenuity in that gentleman's observations. The sedative and debilitant powers cannot be called in question. It appears, however, that even those qualities of cold, whose efficacy is undoubtedly much less dependent on predisposition, and other concurring causes, than its exciting and perturbing properties, do not produce their proper effect unconditionally: they must be exercised for a certain time, and with a certain degree of steadiness, in order to be successful. It seems, in short, inaccurate to assert that *sedation* and *debilitation* are the only effects that can be elicited in the use of cold. The facts above and elsewhere in this book referred to and quoted, and the opinions of persons extensively versed in practical medicine, and not misled by Brunonian fictions, seem incompatible with Dr. Stock's opinion. Dr. S. seems to have fallen into the common error of confounding medical with physical causes, and consequently of extending to the former that invariability of efficacy which is peculiar to the latter.

Page 178, line 6. et seq.

The doctrine implied in this passage, traces of which occur in various parts of the work, closely resembles that eclectic system lately compounded of Brunonian biological abstractions, of the *doctrine of the*

tissues of Smith and Bichat, of that of *determination of blood* of Stahl and Parry, and of some old neurological notions, by Dr. Broussais, and christened *Doctrine Physiologique*.

The doctrine of *determination* is undoubtedly very valuable, practically considered. It must, however, be admitted, that in a speculative point of view, and as a doctrine, the system of Stahl and Parry is not unobjectionable. In fact, to inquisitive minds it has by no means given satisfaction. It seems undeniable, that the affections and conditions of the vessels and fluids must be considerably changed from the healthy state, before such anomalies as fluxions can take place.

With regard to those primary morbid alterations yet undetermined, it may be asserted with some confidence, that the hypothesis of *erethism* or *irritation* by no means fills the blank their absence causes in our knowledge.

What is the value of the word *irritation*? It seems to be conceived that *irritation* may exist in the vascular or in the nervous system independently, and that ordinary inflammation is the result of the co-existence and co-operation of those two irritations. What then is *vascular irritation*? It is an acute morbid state precursory to, and causative of inflammation. What is the nature of the elementary morbid changes that make up *vascular irritation*? If it be said that the changes consist of diminished contraction of vascular fibre; of increased vascular diameter, &c.; then *irritation* and *inflammation* are the same thing, and the causes of the inflammation remain as before, in obscurity. If it be said it is not diminished contraction, &c. but diminished contractility, tonicity, &c.; the objection is obvious.

The question then always recurs: What modifications of what functions is it that constitute *vascular irritation*? In what do the affections of the blood, and the condition of the functions of secretion, absorption, nutrition, fibrous contraction, &c. in a part in a state of vascular irritation, differ from the healthy condition?

Then, with respect to *nervous irritation*, what mean such phrases as *exalted sensibility*, *nervous erethism*, &c.? *Exaltation of sensibility*, means apparently some change not in quality or kind, but in quantity or degree,—of which the nervous system is the subject. This increased activity of the supposed nervous functions or action, causes vascular derangement, and, in short, inflammation. What are these other functions of the nerves?

From the experiments of Haller and others, it appears that the contractility of the heart is a *vis insita*; in other words, a property not dependent upon any property of any other organs, unless in the general way, that all organs depend on the blood, heart, stomach, lungs, &c. The independence of the vessels on the nerves is proved by the experiments of Haller and many others. It is further proved from the history of monsters. From botany. By comparative anatomy. By pathological observations. The nervous theory of secretion has been, I think, successfully encountered by Professor Alison, who has (to my mind) satisfactorily proved, that its advocates have erred, from having deduced from *partial identity—analogy*—of effects, *entire identity* of cause. Dr. A. has pledged himself to the public to discuss, in like manner, the nervous theory of animal heat. I do not at present know whether he has re-

deemed his promise. However, that theory is incompatible with numberless facts. From the physiology of plants,—from that of brutes,—from the history of monstrosity,—from a great variety of pathological observations,—from the manifest inconclusiveness of the arguments advanced in favour of the theory in question, we infer, with formidable *vis consequentiæ*, that caloricity is equally independent of brain, &c. with secretion, circulation, stimulability, &c. The erroneousness of those theories has been *indicated* in the profound logical treatise of Dr. Pring.

The nervous theories of secretion and caloricity cancelled, it follows that the fluids, which have no immediate connexion with the nervous system, are still less liable to direct modification through the nerves, than the vessels. I presume, therefore, that such speculations as that of the learned Trevianus, respecting the causes of motion of the blood, cannot be listened to. For, in addition to the gratuitous mystical supposition of an all-animating *nescio quid* emanating from the nervous organs, it further assumes a self-locomotive power in the globules of the blood. For the latter and more novel hypothesis, there is no evidence, unless the change of form that the globules have by different experiments been observed to undergo,—and which, supposing the globules soft and flaccid, as they appear in fact to be, may be readily otherwise explained,—be evidence.

In health, there is then no regular dependence, to use Pring's phraseology, of the vascular system or the blood, on the nervous system, for power to discharge their respective functions. Since then, disease is but a variety of vital action, a modification of the ordinary,

so called healthy state; since secretion, circulation, contractility, &c. &c. exist in every complaint, it necessarily follows that inflammation cannot be the result of simply increased activity of any function *regularly* discharged by the nervous system. Our author's *nervous irritation* or *exalted sensibility* is therefore fictitious.

Perhaps, however, the phrase *exalted sensibility* may be so interpreted, as to make the doctrine as above announced, less inconsistent with sound physiology. The phrase may be understood to mean *altered condition* of the nerves in respect to the blood and vessels; in other words, *assumption on the part of the former of new relations to the latter*,—relations different, not merely *in quantity or degree*, but *in quality or kind*, from those that obtained during health. In favour of this view many analogies may be urged, and some facts may be stated to prove that such alteration really takes place. Section of the eighth pair is often and indeed in general followed by increased secretion from the mucous membrane of the lungs. Great congestion of blood is likewise remarked in those organs. In some instances vascularity of the mucous membrane of the stomach is observed. Again, section of the fifth pair is often followed by iritis, sloughing of the cornea, inflammation of the conjunctiva, &c. In those cases, some influence must, in consequence of the division of the nerves, have been withdrawn; or, some influence not before in existence must have come into operation. In favour of the latter, much may, I think, be said. First, as to the word influence.

We observe in the world of sense, modifications of one object produced by another which has no sensible connexion or channel of communication with the for-

mer. Magnetism, gravitation, furnish examples of this. In the moral world, we perceive effects every moment that evince the erroneousness of the maxim—nothing can act where it is not; in other words, no being can modify another that is not within its immediate sphere of existence. The exertion of influence, therefore, implies no such connexion between the *agent* and *patient*, as exists in some modes of agency, and seems, in such cases, an essential condition of the causal efficiency. The capacity, therefore, of one organ to affect another, by no means necessarily involves any such communication as occurs in mechanical causation, nor yet any such, as is at present by most supposed to take place in electrical action. There is not necessarily, in short, any contact, nor any transmission of material elements. The words “influence exerted, communicated,” or any similar, are merely metaphorical expressions of some fact. In the case of the nervous system, for example, it is found, that, in order that volition shall be capable of affecting the muscles, certain nervous chords must be undivided, &c. This fact is all that is meant when it is said, “section of the nerve arrests nervous influence,” &c.

Health is the aggregate of the phenomena occasioned in the organism by the influences to which it is ordinarily exposed. This is, perhaps, nearly as precise an account, as can, in a few words, be easily given, of a conception which, being popular, cannot be defined. The relations that obtain between our organs, the modifications they undergo from mutual action, and from external influences, in the state of health, are the objects of physiological research.

All organised bodies are susceptible of disease, or, in other words, are composed of parts capable of entering into relations with each other, and with external agents, different from those they exist in during the state of health. In disease, therefore, it is to be expected, that new agencies will arise, and that organs will become susceptible of modifications by other organs, in some points unlike any that physiology acknowledges, and not explicable by any law of the healthy state. In other instances, phenomena, of which, perhaps, the healthy condition offers some traces or example, will, in the endless diversity of disease, be presented in more numerous and various forms and combinations. Nor need we look far for examples in point. Of the former, the agency by which the brain, when compressed, inflamed, irritated, &c. produces vomiting, liver disease, &c.; that by which stricture of the urethra produces symptoms of calculus, of intermittent or remittent fever, of stomach complaints, &c.; that by which a hard body pressing on a nerve in the leg produces epilepsy; those by which disease of the heart, of the alimentary tube, produce a thousand morbid affections of the body and mind; are instances. Of the latter, various modifications of the vascular and muscular functions by mental affections, (which, however, it might be contended, are always immediately dependent on certain conditions of the nervous system); various symptoms, of what are called nervous diseases, &c. are sufficient examples.

From the preceding observations, it seems to follow, that the nerves, though not causes of healthy secretion, circulation, nutrition, &c. may nevertheless, when morbidly affected, exert a *disturbing, morbid* influence

over the vessels and blood, and be exciting causes of those vascular and sanguineous vitiations that are the principal constituents of inflammation. An interesting fact lately reported by the illustrious Magendie, favours this view. He divided the fifth nerve on one side, and then exposed both eyes to the irritating fumes of ammonia; inflammation soon supervened in the eye of that side on which the fifth was entire, whereas the other eye suffered no change whatever.

Since the nervous system is unquestionably the most delicately constituted, and most easily derangeable of the systems, it may be urged that acute diseases have their origin in morbid conditions of the nerves, which exert, in consequence, preternatural and morbid influences, the effects of which, in the extreme vessels, are inflammation, &c.

If this were our author's doctrine, I should be obliged to admit, that though the basis is too narrow for a general theory of acute disease, yet, that it is, in my opinion, likely that the origin of acute diseases, as they occur in practice, is, in a large proportion of cases, such as this speculation indicates. That inflammation always arises in this way, however, cannot be maintained, without falling into the old mistake, of supposing that all vital power, all capability of being affected by vital agents, external and internal, is, in the blood and vessels, dependent on some nervous emanation.

To conclude, since then the theory, according to which only the phrase *exalted sensibility*, as used by our author, is intelligible, is without foundation in experience, we may say that Dr. M. Beaupre's view, *practically considered*, differs little if at all, from Dr. Parry's. In a *speculative* point of view, however, they

are perhaps a step in advance of Parryism, since they refuse to pronounce the heart a Pandora's box, and acknowledge that there is another source of disease beside fluxion.

Page 201.

The following cases are too interesting on several accounts to be omitted. Our author's arrangement is arbitrary, and to me unsatisfactory, so that I am at a loss to determine where they should be introduced. The same difficulty, indeed, often recurs in the remaining portion of the work. I shall, at all hazards append them entire to this article, "Douche," for want of some more appropriate place. They are to be found in Dr. Rust's Magazine, volume 17th.

An indolent disorderly young man of twenty, took ill in June 1823. His principal complaint was an "enormous" headach. This lasted many weeks. He had, when he came under Dr. Hausbrand's care, a sleepy and very stupid expression. He lay motionless in bed; asked for no food or drink; passed his stools involuntarily, and sometimes, from his weak and irregular pulse, seemed on the point of death. When roused and led about a little, his head inclined to the rear, so that he threatened to fall backwards, but never to either side; this last symptom lasted many weeks. He had a constant vomiting, although with tongue clean, and belly natural. For weeks he ejected every thing he ate and drank, but without effort; and usually from half an hour to an hour after ingestion. Dr. Hausbrand had at length recourse to cold affusion. Two pails of cold water were thrown over him. This operated well; but after some hours, the typhomania

returned again. Next day, two pails more were used, which made him lively and rational for twenty-four hours; but the vomiting remained as before. The third time a syringe was used, from which a stream of cold water was from some distance directed against the præcordia. The vomiting immediately gave way, and health was rapidly re-established.

A drunken gardener had, after a week of continued drunkenness, a severe attack, for the second time, of mania. Four men could scarcely hold him; a powerful bleeding did not affect him, neither did a vomit. Three pails of cold water thrown over him caused quiet and some hours sleep. After this calm, the delirium returned so furious, that he burst his chains. Cold affusions were used, which only diminished this violence. Dr. Hausbrand therefore directed a stream of cold water against the præcordia, until the skin was as red as if a sinapism had been applied. The patient complained extremely of the sensation it caused. He became collected, slept six hours, and awoke in the morning quite rational and fit for work. The like means had the like success in this person on a subsequent attack.

Page 201, line 14, et seq.

Dr. Baynard has actually taken advantage of such, in a case of mania, with the best effect, (Psychrolusia.) Celsus recommends a similar proceeding to those who have pains in the head. *Cui Caput infirmum*, L. 3. c. 4.

Page 202.

Fomentations, as defined by our author, should, whenever it is practicable, be applied in a half filled

bladder. This method has the advantages of economy and cleanliness, and more important still, of safety. With respect to the important point of safety, it is sufficient to refer to the cases by Dr. Ritter, in vol. ii. of Hufeland's Journal. In two cases, wetness of bed-clothes, caused by the trickling down of the fomentation, produced superaddition of catarrh to the previously existing complaints, and in both cases, aggravation of the latter, with great peril to life. In another, the lodging of a portion of strong solution of vinegar and sal ammoniac, used in the common way, as a fomentation, in the bed in contact with the skin, caused very disagreeable erysipelatous inflammation.

Page 208, 209.

D. Kleefeld of Danzig has a very striking case in Hufeland and Himly's Journal, B. 38, that speaks "trumpet-tongued" in favour of cold in some desperate cases. In the winter of 1799, he visited a patient at night, who had *facies Hippocratica*, whose pulse was almost gone, who was ice cold, dripping with sweat, insensible. He had been three days in this state, in the last stage of an acute fever, at first rheumatic, but owing to a fit of anger, become bilious. Every thing had failed; he had convulsive hiccup.

His arms were put into water containing mustard and salt. To his dose of ether. and laudanum, (ether sulph. g^{tt} xx. Tinct. opii crocat. g^{tt} x. which he had taken every second hour for the two previous days, but in vain,) were added two heaped up spoonfuls of pounded ice. The instant the ice was swallowed the hiccup stopped, and respiration, and it seemed, life also, stopped with it; but the pulse was found to be

stronger and fuller, and shortly after the patient began to respire again. The cold sweat gave place to a warm perspiration, the pale face became red, &c. Frequent repetition of the same dose soon brought him round, and he shortly perfectly recovered.

Sect. D. Page 214.

Löffler has a very remarkable case (*Archiv. der Prakt. Arzeneykunst Leipzig*, 1786, B. 2,) well worth insertion here. A young man was taken with putrid fever, with very bad symptoms. One morning Löffler found him senseless; his body was covered with sweat, his respiration short, his abdomen swollen and hard, and his evacuations passed unconsciously; the pulse was quick and small, &c. Cold applications were resorted to. Cloths steeped in vinegar covered the belly, and were changed as often as they became warm. After four hours use of cold the patient became sensible, and asked for cold water to drink. The belly diminished, the breathing became freer, and the pulse fuller and slower. The epithems were continued; he was allowed as much cold drink as he would have. A diarrhœa with much flatus followed and relieved him. Next day the fever was gone.

Sect. E. Page 214, 215.

Whether the following most interesting case should fall here, or under the following or some other head, I do not know. Our author's, or rather Pinel's nosographical distinctions, I do not, in respect to fever, sufficiently well understand. In Professor Pinel's classification, however philosophically he may have intended to analyse, I think I find, as in those of other nosologists, much that is arbitrary,—distinctions and identifications, in short,

without corresponding differences and agreements. However, a girl of twenty-two grew melancholy from disappointment in love, and afterwards fell into an acute nervous fever. The disease quickly attained a frightful degree of intensity; the tongue and lips were black, the former so stiff and hard that she could not move it. She had constant delirium. Her evacuations were involuntary, her face was frightfully distorted. *Decubitus gangrenosus* appeared in several places; and camphor, castor, arnica, blisters, &c. had no effect whatever. Under these circumstances, the cold affusion generally, and cold *douche* to the head (in the intervals?) did more good than all the other remedies. Under this treatment, she ultimately, owing, Dr. H. thinks, to the use of cold, recovered.

Page 222, bottom.

In this and some other instances, of which it is sufficient here once for all to take notice, quotations occur in which considerable inaccuracy will be observed. I have looked in this instance unsuccessfully, for the original passage in Lancisi. As mere verbal or grammatical inaccuracies, not obscuring the sense to the merest tyro, they are apparently of little consequence.

Page 231, 232.

These observations seem to run counter to one of the oldest maxims in medicine. Baur mentions an acquaintance of his, who, when drunk, has a great inclination for putting his feet into cold water; when he does so, he increases the intoxication so much that he acts quite irrationally; on becoming sober, he has no recollection of any thing that happens during the fit. Bartholinus mentions a drunkard who, on having his feet

immersed in ice-cold water, lost his memory and judgment, which he did not recover for a year. Examples in fact in favour of the maxim abound.

There are no doubt others of an opposite tendency. Athill mentions two cases of cephalalgia, somnolency, and other bad symptoms, cured by cold bathing, without wetting the head. Floyer I think, reports a case of a person, that was made stupid drunk with stramonium, but quickly came to himself on having his foot-soles moistened with cold water. I have often found slight tinnitus aurium and headach disappear after immersion in the cold bath. A glass or two of strong wine taken at one draught, are generally sufficient at any time to give me slight headach, tinnitus aurium, &c. I once took two glasses immediately on leaving my bed, and instantly got into the bath at 60°; I remained in it for half an hour. The headach that would otherwise have come on in a minute or two, did not supervene for an hour or more after the bath, until my heat and circulation approached the natural state. I did not wet my head.—I am, notwithstanding, convinced that the experiment in the text is one that requires caution and judgment.

Page 235.

In the 14th vol. of the Ed. Med. and Surg. Journal, Dr. Abercrombie has two very interesting cases, strikingly illustrative of the power of cold in judicious hands. The first would naturally fall under another head, but may, being short, be here noticed. A strong man, delirious, and defeating every attempt of four or five men to restrain him, was, by pumping on his head for a few minutes, completely subdued, and even thrown into a

state resembling asphyxia. The other case falling more properly here, is that of a child that lay insensible to ordinary impressions and stimuli, but was roused in a very short time by the cold *douche*, and perfectly restored.

Page 245, line 7, et seq.

From Wagner's observations in the first volume of the *Dissertations of Austrian Physicians*, it appears, that from old time the tepid bath has been a popular remedy in Hungary for small-pox. It was practised twice daily. Fischer, (from whom Wagner, Marcard, Dr. Haen, &c. cite the particulars they communicate on this subject) mentions, that bad symptoms rarely occurred under this treatment, which he tried himself in an epidemic variola in 1727-8, without losing a single child. Little or no medicine was given. When symptoms are of such a kind as to indicate exciting means, cold, in the form of washing, affusion, gestation, after preparation when such is necessary, would no doubt be an excellent remedy. But when cooling and softening the skin in febrile diseases, are the principal objects, this Hungarian practice of tepid bathing would, it is probable, prove quite adequate. This is indeed almost put beyond doubt by Nicholl's experiments, (*Med. Rep.* v. 9); by Marcard's experiments and observations, (*Sur les Bains*, chap. 5, 6, and 7); by Horn's experience recorded in different parts of his *Journal*; by Ritter's observations, (*Abhandlung*, v. der Ansteck. Krankheiten, B. 71,) &c. &c.

In the vast majority of the fevers of England the stimulus of cold is altogether unnecessary, cold air and drink excepted. Waving the chance of cutting short

the disease during the first few days by cold, (a virtue by no means exclusively belonging to that agent), I can find no advantage peculiar to Dr. Currie's treatment. I do not find that patients are less weakened by British fevers when subdued by the cold affusion, &c. than when cured by any other treatment conducted with judgment; nor is the mortality from fever diminished on the whole by the troublesome practice in question.

Before closing this note, I would remark, that it seems to me clear, that in the discussion between Drs. Jackson and Currie, the former has been always misapprehended by the latter. Dr. C. always understands by "susceptibility of impression," as used by Dr. J., "susceptibility of *morbid* change." His reasoning plainly rests upon that misconception. Is it not manifest, however, that Dr. J. means "susceptibility of *salutary* change?" does he not mention his employing certain agencies to effect certain changes; and bring about a state which he calls "susceptibility of impression," in which state he never employed cold affusion without the most salutary effects? Is it not, in short, evident, that Dr. Jackson's *susceptibility of impression* is always associated with a *due capability of re-action*—*natural*, or *artificially brought about* as the case may be? In a word, is not the great therapeutical question really at issue between those illustrious physicians, whether the removal of an *unfavourable*, and the production of a *favourable* state of impressibility by cold, may not, by such means as bleeding, warm bathing, gestation, purging, frictions, wine, &c. be effected?

Towards the solution of this great problem, Dr. Currie furnishes us with no data, and does not indeed seem to have ever proposed it to his own mind; and

here we are forced to yield the palm of boldness and profundity to the sagacious veteran Jackson.

How has it happened that Dr. Currie, who seems to have added nothing to the information transmitted to us by the ancients, has been the object of such extravagant praise? How has it happened that Dr. Currie's popular practical rule, which can be admitted only as a guide for sick-room servants in the administration of cold affusion, has been lauded as a therapeutical discovery, and elevated into a therapeutical principle to determine the decisions and govern the practice of physicians?

Page 245.

The salutary effects of affusion, as employed by Mr. Magrath, during and even after the eruptive fever of measles, are well known from Dr. Bateman's communication in the *Ed. Med. and Surg. Journal*. In Hahn's work is a case (No. 6.) of measles, with sore throat, treated throughout with cold affusion, and quite successfully. Dr. Giannini has a case treated with the same remedy, in which cough was present. Others are not wanting.

Page 253, line 18, et seq.

THE unsoundness of this passage is sufficiently plain. A practical refutation is therefore sufficient. Expressing ourselves after the loose inaccurate manner of our author, we may say that cold is the efficient or aggravating cause of chilblain. What says Richter respecting the treatment of chilblain? "One of the most efficacious remedies for chilblains in the first and second stages, is cold water or snow." He makes

mention of no exceptions, unless of those who are subject to cough or colic, or those who are so irritable that the cold epithem increases the inflammation, by its stimulus. *Anfangsgründe, &c. B. 1. K. 6.* What says Callisen? after enumerating many applications, acid, aromatic, spirituous, terebinthinate, camphorated, &c. for chilblain, he adds, "from all which the palm is borne away by cold, &c. &c. provided there be, he adds, no counter-indication." *Syst. Chir. Hod. vol. i. sect. 644.*

Page 255, et seq.

Our author's decision respecting the use of cold in inflammations of serous and mucous membrane, is, in its unqualified state, quite unwarrantable. Hosts of facts attest this. Our space will not admit of comments. With the following facts before him, the reader will be able to judge for himself.

Respecting the serous membranes of the cranium, authors are agreed as to the value of cold. I will confine myself to the other serous membranes.

Sarcone mentions having seen pectoral complaints that "*parevano sovente alla natura e all' arte superiori*" cured by the use of water cooled with snow, or by snow in substance. (*Mali osservat. in Napoli.*) The utility of cold in hernia is universally acknowledged. Dr. Sutton employed successfully a lotion (℥ xii. mixt. camphor. ℥ iij. aquæ acet. ammoniæ. ℥ j. proof spirits) in peritonitis, with much success. Three of his cases were complicated with pectoral symptoms. His eighteenth case is one of carditis, treated like the others preceding, bleeding being conjoined with cold fomentation, and with like success. Dr. Abercrombie

has used cold applications to the abdomen in enteritis in many cases, and with excellent effect. (Ed. M. S. Journal, v. xvi.) Injections of cold water to the extent of several pounds have been employed in enteritis with the best effects. Mr. Smith of Kingussie has given details of four cases of abdominal inflammation in Dr. Duncan's Journal, three of which were undoubtedly enteritis, in which cold applied to the abdomen produced excellent effects. Dr. Stock mentions a case of enteritis, in which he observed good effects from the external use of cold applications. In the twelfth chapter of Giannini's work, there is a case by Dr. Cozzi of Bruzzano, of peritonitis puerperalis cured by cold applied generally by immersion. Giannini mentions a case of pneumonic fever, and another of measles, with cough, &c., treated successfully with cold affusion. (Chapter xi.) The case of the grenadier to be noticed in a page or two after this, under the head of catarrhus inflammation, falls as properly under this head. In the Med. and Phys. Journ. v. xxxii. p. 90, is a case of enteritis, in which cold acted "like a charm, and produced a perfect remission of the pain, which the most copious detraction of blood had been scarcely able to mitigate for an hour." In the same Journal, v. xxxviii. is a case of peritonitis, in which "there was every prospect of gangrene" cured by cold applications. Dr. Good (Study of Medicine, v. ii,) recommends cold epithems in puerperal peritonitis after failure of hot applications, on the authority of Löffler and others. M. Gasc recommends cold, and even ice epithems, when external and animal heat and fever and thirst are considerable. Dict. des Scien. Medicales, v. xl. In Johnson's Journal, v. i. p. 594, it is said that two London physicians,

of whom Dr. Temple is one, have for years used cold epithems in all peritoneal inflammation, with the greatest success. Doctor Tanchon, in his late brochure on the use of cold, has highly commended cold epithems in peritonitis. P. 72, et seq. contain a very interesting example of his treatment. To those facts others could be added. But those are sufficient under the head of inflammation of serous membranes.

With respect to mucous membranes. In Hufeland's Journal for 1825, (5^{tes}, Stück,) Dr. Sachse mentions out of a letter from Dr. Hellerung of Wismar, the following case,—A child ill of croup, got worse after a remission, and was given over; ice-cold epithems were tried as a last resource, and renewed every five minutes; in two days, difficult respiration, choking, and fever, almost vanished: the child had used calomel largely: it completely recovered. Dr. Sachse makes mention of a Dr. Muhrbeck, who was in the habit of curing cynanche tonsillaris with ice applications. He says he has often imitated him in that with advantage. In the Salzburg Medical Gazette for 1822, B. ii. it is mentioned that Dr. Harder of Petersburg, cured a child of his own, of croup, by cold affusion. The disease was in the fourth day, with pulse and strength depressed; eyes sunk; expression of countenance changed: the father expected death every moment. The child was relieved ten times after as many exacerbations, and every time the cold *douche* on the head and back was repeated successfully. Three other successful cases are given by Dr. Harder, (Abhandlungen einer Gesellschaft Prak. Aerzte zu Petersburg, 1821.) Two of them were encountered during the first or inflammatory stage. The

third (by Dr. Müller of Petersburg,) in circumstances like those of Dr. Harder's child. In Rust's Magazine, B. xiv. mention is made of cold pumping or *douche* having been successfully employed in croup, by two physicians resident in Merseburg. In the Salzburgh Zeitung, 1822, B. ii. Dr. Aberle of Salzburg gives a case of croup, treated with happy results by cold affusion. The pulse intermitted every third or fourth stroke. The temperature of the skin was lower than natural; the face was pale and bloated; the eyes closed, &c. Four effusions cured this child. In the Salzburg Zeitung for 1813; in Hufeland's Journal, v. 59, and elsewhere, other cases will be found. In the Med. and Phys. Journal, v. vi, I think Dr. Rogers mentions ice frictions on the throat as a popular remedy in Russia, for inflamed throat. Dr. Gibney recommends cold cataplasms renewed often, and used with perseverance, on the external fauces, in cases of cynanche parotidea and tonsillaris, on Baths. Dr. Sutton mentions a Scotch gentleman, Dr. Andrew Stewart, who had great success in the treatment of phthisis. One of this gentleman's favourite measures was washing the chest with cold water. (On Delirium tremens, &c.) Dr. Hamilton of Ipswich, (Beddoes Hygeia, v. ii.) relates the case of a boy cured of severe catarrh, by passing the night in the open air. On the following morning at seven o'clock, the thermometer gave 10° below 32°. Dr. Rush mentions having often found a walk of three or four miles on a cold clear day, diminish hectic febrile irritation in phthisical patients, as much as venesection to six or eight ounces. Dr. Rush found enemata of cold water give as much relief, in bilious fever, to the pains in the bowels, as opium to

similar pains from other causes. He found external use of cold water relieve the tormina, &c. (Med. Obs. and Enq. vol. iii.)—"Where pain, irritation, and tenesmus constitute the leading features of the dysenteric form of fever, the application of cold water to the lower part of the abdomen by wet cloths, or by immersion in a tub, or even the injection of cold water into the cavity of the intestines, rarely fails to give relief;"—But when congestions or inflammations of the coats of the intestines are established, Jackson considers cold improper. (On Feb. Diseases, p. 215-16.)—Lind mentions having known dysentery cured by cold bathing. (Diseases of Seamen.)—Floyer gives examples of dysentery and diarrhœa cured in the same way. (Psychrolusia.)—Cyrillo of Naples gave cold water successfully as sole medicine in dysentery and diarrhœa. (Phil. Trans. Shaw's Abridgement, vol. vii.)—Our author gives a case in point, (p. 257.)—Hahn refers to Seitz as treating bloody flux with cold bathing, and with success; and gives similar instances himself, (p. 88, note.)—More might be added, but it can scarcely be necessary.

It seems then, quite certain, that, in a great variety of inflammatory affections of the serous and mucous membranes, cold epithems have been employed with striking benefit. Can we then prudently or rationally subscribe to the almost unqualified condemnatory verdict of various able and distinguished writers in the *Diction. des Sciences Medicales*? Shall we, in the teeth of such facts, coincide with Drs. Thomson, Beauré and others, in declaring cold epithems, in such diseases, uniformly or necessarily injurious? I imagine we cannot. With such facts as some above cited before our eyes, we cannot doubt that the sanative powers

of cold greatly exceed what it is usually admitted to possess; and what, perhaps, with our present knowledge in therapeutics, it can, in many cases to which it is applicable, be with certainty made to exercise.

Page 273, Sect. A.

The following most interesting case should fall apparently under this head, (sect. A.) Its nature is considerably different from most of the diseases arranged by our author under this definition. However, no more appropriate place presents itself in the book, and the case is too interesting to be omitted.

A woman of twenty-eight was reduced, from vigorous robust health, by disappointed love, after recovery from a fever, to the following state, in which Caspar of Berlin found her, April 1820. Voluntary motion almost intolerable; face bloated; complexion pale and sallow; lips, gums, and *carunculæ lacrymales*, of a bluish red; eye expressive of languor and suffering; constant pungent pain in the region of the heart, increased by the slightest muscular effort, particularly of the left arm: This pungent pain was felt sometimes along the left arm, over the left side of the neck and head, and along the course of the arteries: The left ear was affected with deafness. When the paroxysms came on, "the respiration was so hurried, that the chest flew or shivered, if we may be allowed the expression, so quick, that its motions could not be counted:" Those fits lasted five or ten minutes. The arteries also became so excitable as not to bear the slightest touch; unless at particular moments, the most cautious and gentle examination of the pulse, either at the heart, or in an artery, immediately brought on the paroxysms

of suffocation and pain. The functions of the alimentary tube throughout, and the menstrual flux, natural. Her nights usually bad. Her frame greatly wasted.

Curative remedies of great variety had failed, and palliative treatment only was now thought of. Dr. Caspar prescribed Haller's acid elixir. In the course of 1820, some blood was drawn, principally by a few leeches. Some other topics were used, as cloths wet with cold water, aromatic poultices, but they could not be borne. An issue was put in the arm towards 1821: alum whey was used for ten weeks. From any of the foregoing means but slight and transient relief. After this, cold affusion was determined on. A garden watering pot was employed. The first affusion brought on a paroxysm, but the pain was less than usual. After each shower-bath she was put to bed; at length she came to bear six successive pails of ice-cold water without inconvenience. In August 1821, symptoms considerably relieved.—Prussic acid prescribed at her own request. Soon after an opiate ointment was applied to the chest by means of a hair pencil; and iron was prescribed in September. After fifty-seven shower-baths she was so far recovered as to be able to dispense with them. In October 1821, she returned from Berlin, home to the country in good health. A recurrence of the former symptoms in 1822 was combated successfully by the cold affusion and prussic acid.*

Page 284. Subsect. c.

In Johnson's Journal, vol. iv. is a striking instance of the perturbing power of cold affusion. In the American Medical Register, vol. iii. are two interesting cases

* I have no note of the source from which I have taken this. I think it is in Rust's Magazine.

of convulsions cured by cold affusion, by Dr. Prioleau. The following is perhaps one of the most interesting on record.

In the tenth and twelfth volumes of the Med. and Phys. Journal, Dr. Thackeray has recorded a case, of which clonic and cataleptic spasms and delirium, alternating with each other, were the leading features. "One evening she was deprived of speech; her head, stomach, and limbs were violently convulsed; then animation seemed wholly suspended, &c.—She bore every appearance of impending dissolution." Ice was put in her drink, and applied to her head and stomach, and by herself, as if by instinct, rubbed over her face, neck, and arms, with apparent pleasure. Pieces of ice were put repeatedly into her mouth. Those means were productive of much advantage. To the last principally she seemed to owe the recovery of her speech. On another occasion she had ceased to speak, and was universally stiff,—was afterwards violently convulsed, and for half an hour, in apparently the greatest torture. The bath restored her instantly to ease and recollection. On another occasion, "the skin was cool and clammy," yet the shower bath produced the best effects.

The particulars of a case of a very interesting nature lie before me at this moment; but it resembles so much that published by Dr. Stock in the appendix to his work on cold, and the notes have swollen to such a size already, that I cannot insert it. The observation is by my highly esteemed friend Dr. Haycraft of Birmingham.

Page 286. Subsect. g.

The application of cold to the abdomen in colic is

an old practice. Hoffman, De Haen, Hahn, Van Swieten, and others, notice it with more or less approbation. Dr. Abercrombie commends it in Ileus. In the *Acta Hafniensia Medica*, vol. v. Brandis records nine cases of colic and Ileus treated successfully by this method. He has employed it, he says, "alike in delicate women and robust men with sure and quick relief in every instance, and never with bad consequences." One example may be given. "A woman got wet in the feet during menstruation; she vomited not only every thing she swallowed, but also the very enemata of assafoetida that had been administered; her extremities were cold; she had obstinate hiccup; her pulse was small, quick, and hard." Under the use of icy epithems this woman completely recovered.

Page 288. Sect. C.

The following case may perhaps be appended to this article. I see no more appropriate place for it.

An unmarried lady, of spare and nervous habit, complains, that while in bed, she starts up suddenly out of sleep at intervals, with heat, fulness, and pain in the head, and with distressing palpitations. She gets up in the morning with headach, lowness of spirits, &c. which remit towards evening. Slight fits of palpitation occur occasionally during the day.—From early life she has been subject to asthmatic paroxysms, and very delicate. An affection of a carcinomatous nature had supervened, some two or three years before this time, in one mamma, after which the asthma was no longer troublesome. The mamma was removed, and she enjoyed good health for some time. A year after the remaining mamma became diseased. Since that, the symp-

toms first described have made their appearance. Various nervous medicines were ordered for her, by an eminent physician, with advantage. The efficacy of each, as is usual, was, after some time, lessened from habit. The impossibility of communicating with her medical adviser, without great delay, made her listen to the promises of a neighbouring quack. He recommended her to have cold water poured on her head twice or thrice daily, and to take a hot foot-bath at night. After a week's trial, the symptoms complained of were gone ; and after a month the cold affusion became unnecessary. At pretty long intervals she has had relapses, but has been always well again after a few days use of her old remedies.

Page 315. Sect. B.

Note. This paragraph must not be admitted without some restrictions. In J. Smith's "Curiosities of common water," mention is made of a very red and angry ulcer, (from a burn by melted brass, which got into the shoe,) which a surgeon could not heal in nine weeks, but which healed in a fortnight or less, after being exposed to cold water, by the patient's standing in a river fishing for two hours.—"From much observation it appears, that the operation of cold (as in spring water) is well suited to counteract the state of inflammation which accompanies scrofulous sores ;—but such simple application, adds Mr. Russell, is more properly applicable to the mild and pure forms of scrofulous sores. (Russell on Scrofula, pages 105, 106.)—In similar cases, the application found most serviceable by Cullen, and very universally admissible, is that of linen cloths, wetted with cold water, and frequently changed. (First

Lines, vol. iv.)—"Moderate pressure, by means of adhesive plaster, conjoined with the application of cold water, is one of the best remedies for the mild scrofulous ulcer: but, for abating heat and pain, Mr. White prefers compresses wet in cold saturnine lotion. (On Struma.)—Callisen recommends cool sea bathing long persevered in, with frictions, and for local remedy, sea water in lotion, for the scrofulous sore. (Systema.)—Dr. Hennen treats inflamed stumps, which I suppose may be regarded as ulcers, by leeching and cold compresses. (Mil. Surgery.)—Dr. Thomson recommends cold poultices in the first and more active stage of inflammation in inflamed ulcers. (Lectures.)—The utility also of cold water in inflamed ulcers, treated on Mr. Baynton's plan, is universally known. See further, vol. vi. of the Med. and Phys. Journal.—Ed. Med. Surg. Journal, No. xxxv.—Rust's Magazine, B. 9, B. 517.—&c. Rust conjoins hunger and cold applications, and attaches considerable efficacy to the former.

FINIS.

